STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

Propedeutics of the internal medicine
For Second Year Students of International Medical Faculty (Dentistry)

Module 1. Main methods of examination of patients with diseases of internal organs. Symptoms and Syndromes of Internal Diseases

Donetsk 2011
Guidelines for practice activities on propedeutics of internal medicine for 2 years students of International Medical Faculty (Dentistry). The main methods of examination of patient on internal disease course and symptoms and syndromes of internal disease. - Donetsk: the Donetsk national Gorky’s medical university, 2011 – 256 p.

In the guideline to practical training of propedeutics of internal medicine for the second year students of international faculty (Dentistry) the ones are represented according to a method and dedicate to research and diagnostic of organs and systems with factors of anatomico-physiological data. The method is prepared with the modern requirements of high school and directed on increase of studies efficiency for students of higher medical institutes.

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Module 1
Main methods of examination of patients with diseases of internal organs
Symptoms and Syndromes of Internal Diseases

Key objectives of the module:
1. To show one’s ability to possess and follow moral deontological principles of a medical specialist and the principles of a specialist subordination in a hospital.
2. To show one’s skills in carrying out the procedures of questioning a patient, physical and instrumental examinations of patients and analysis of their results in the course of internal diseases.
3. To master practical skills and analyse the data of main laboratory and instrumental methods of examination.
4. To master practical skills and determine main syndromes and syndromes of pathology.

Subject 1: Entering into a clinic. Medical ethics and deontology.
Subject 2: Inspection of patient.
Subject 3: Examination of the respiratory system. Percussion and auscultation of the lungs. The main syndromes of pathology.
Subject 4: The methods of the cardiovascular system examination. Clinical topography. Percussion of the heart. The main syndromes of pathology.
Subject 5: Auscultation of the heart. Origin of the heart sounds and heart murmurs. The main syndromes of pathology.
Subject 6: Digestive system examination. The main syndromes of pathology.
Subject 7: Investigation of urinary tract. The main syndromes in nephrology.
Subject 8: ECG: Laboratory and instrumental investigation in the cardiology. The main syndromes of pathology.
Subject 9: Examination of the blood system. The main syndromes of pathology.
Subject 10: Examination of the endocrine system. The main syndromes in the endocrinology.
Subject 11: Examination methods and semiotics of allergy manifestations. The main syndromes in allergology. Joint syndromes (arthritic, osteoarthritic).

Specific goals:
- learn the main principles of examining a patient in accordance with the traditions of the domestic therapeutic school
- To master methods and techniques of a proper questioning and examining patients with diseases of internal organs. To interpret correlation between a patient’s complaints and give a preliminary estimation of the system damaged
- To summarize the results of questioning a patient and identify the main syndromes and symptoms on their basis.
- To learn how to enquire and examine patients with pathologies blood system, musculoskeletal system, endocrine system.
- To identify the main syndromes of pathology of the blood system, musculoskeletal system, endocrine system.
- To interpret the received data of laboratory investigation for recognition of pathology of blood system and endocrine system.
- To choose appropriate methods of investigation for certain blood, endocrine, musculoskeletal diseases.
STUDENT'S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

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Donetsk 2011
**Importance of the Subject:** getting information from the clinic of internal illnesses, skills, ethics and deontology allow to formulate a general purpose from practical medicine and to define ways of study of subsequent themes from propedeutic of internal medicine. An inquiring has the large value in the estimation of the general state of patient and allow to find out tactic of care for patient. 

An inquiring is a mean of arrangement of psychological contact between doctor and patient, information of anamnesis is fundamental principle for the construction of diagnostic suppositions and in fact an oral cavity is closely related to the different organs and systems. At some diseases of internal organs the first symptoms very often appear exactly on the mucus membranes of oral cavity which make a patient to consult with the dentists.

**Key Objective:** to find out a concept about the clinic of internal diseases, basic moral and ethics aspects, to master the rules of labour and accident prevention protection. Able to distinguish components of anamnesis and know order of proper sequence each of them.

**Specific Goals:**
1. To have an idea about the clinic of internal diseases. Development of domestic therapeutic school.
2. To define the basic methods of examination of patients: physical, instrumental, laboratory.
3. To gather passport information of patient and write them in a case record.
4. To know the parts of case records and algorithm of inquiring patients with destabilisation of complaints.
5. To master the method of inquiring according to the functional condition of organs and systems, history of present disease, anamnesis of life, and also written down in a case record of the important information.
6. To analyse received data and to done diagnostic suppositions.
7. Psychotherapeutic influences of enquiry on the patient and preventive iatrogeny.

**Level of Knowledge and Skills before the Practice:**
1. To estimate basic human physiology. «Physiology».
2. Moral and ethics interrelations in society. «Philosophy».

**Questions for Self-Assessment of the Pre-Practice Knowledge (correct answers gone after last task).**

**Q1.** Under the direction of the nurse the student of the 2nd rate draw a passport part in admission office of the case record of patient D. 54 years, which hospitalize in connection with essential hypertension. At this time has hardly come the man of 65 years old in the office. He was pale, with complaints to
dizziness, sharp weakness. Suddenly including patient has lost consciousness, has fallen, cramps have begun.

What medical and deontological tactics?
A. Nurse should begin immediately external cardiac massage and artificial breath (on the floor). The student should transfer patient D. in other room and urgently call a doctor.
B. Firstly he must finish registration of the case record.
C. Student should begin immediately external cardiac massage and artificial breath (on the floor). The nurse should transfer patient D. in other room and urgently call a doctor.
D. The nurse should call the doctor immediately and wait his orders.
E. All above variants are allowable

Q2. Determine physical factors which cause diseases.
A. High pressure action
B. Low temperature action (-35°C)
C. Electric current action
D. Exposure of electromagnetic field
E. All above-listed

Q3. Determine chemical factors which cause diseases.
A. Contract with water
B. Contract with the concentrated sulfuric acid
C. Contract with physiological solution
D. Contract with a solution of baking soda

Q4. Determine psychogenic factors which cause diseases.
A. Stress
B. Book reading
C. Adequate psychological and emotional loading
D. Joy
E. Physiological sleep

Q5. Determine biological factors which cause diseases.
A. Virus
B. Microbe
S. Protozoa
D. Rickettsia
E. All above-listed

Q6. Determine genetic (hereditary) factors which do not cause diseases.
A. Trysomia on 21-st chromosome
B. Genotype XO
C. Genotype XXY
D. Patau's syndrome
E. All above-listed

**Q7.** Determine the characteristic of the safety measures at work of medical staff with electrocardiograph.

A. Use of the equipment with past scheduled checking engineering - metrological control
B. Use of the equipment with obligatory presence of grounding and insulating conditions
C. Use of the equipment with corresponding ratings to characteristics of an power grid of an alternating current and a class of power supplies
D. Use of the equipment by persons allowed to work with corresponding equipment.
E. All above-listed

**Key answers:** A, B, A, E, C, E

The following printed materials can be of help to improve your pre-practice knowledge and skills:
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

**Contents of Practice**

**Topics of Theory:**
1. General biographic information: Surname, name, patronymic, age, sex, home address, place of work, occupation.
2. Complaints: main, their detailed elaborations, minor (general).
3. The general anamnesis: (Enquiry about a functional condition of all the organs and systems): the general condition, cardiovascular system, respiratory system, digestive system, urinary and hematopoietic, nervous system, the locomotor system.
4. The history of the present disease: the beginning of the disease, the possible reasons of the disease, the course of the disease, results of inspection, treatment, current in to clinic etc.
5. Patient anamnesis: conditions of life in the childhood, mature age, labour activity, family status, previous illness, harmful habits, allergy, health of the nearest relatives etc.

**Practical skills:**
Students should be able to demonstrate mastery of the following practical skills
2. Revelation of complaints of the patient, their detailed elaboration and
gradual statements in the case record.
3. Enquiry about a functional condition of all the organs and systems, history of the present disease, patient anamnesis and also a statement of the corresponding data in the case record.
4. The analysis of the revealed data and formations of diagnostic guess.

**Suggested Reading List**

**Required Reading**

1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination. Edited by Jonh Macleod, Jonh Munro, Churchill Livingstone, 1986
3. A system of case recording and clinical examination of patients on propaedeutic of internal diseases.
4. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
5. Methodical guideline for students
6. Website of department: [www.cardiology.dsmu.edu.ua](http://www.cardiology.dsmu.edu.ua)
7. Flow charts for Practice

**Additional Reading**

2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

**Sequence of Actions in the enquiry of the patient**

1. First gather general biographic information of the patient and their statement in the case record (better do it in a column).

2. Ask the patient: «What do you complain of?» or «What troubles you?». Give him possible to speak on it and at opportunity moment detail complaints. At a statement first of all describe the main complaints (pain,
vomiting, cough, expectoration of blood, dyspnoea, etc.), in consistent form, understandable, clear formulations.

3 step. General anamnesis: conduct enquiry about a functional condition of all the organs and systems consistently and according to the scheme. State in the name of the patient, in 3 person of a singular (complains, troubles, marks, specifies, feels etc.) without repetition and medical terms. Don’t describe only the revealed symptoms with their details, but also symptoms on which the patient answers negatively – with the didactic purpose (faster to adopt pathology’s displays of different system).

4 step. History of the present disease: enquiry and a statement record especially carefully, consistently, according to the scheme - initial sing, the possible reasons, external occasions, the further dynamics of disease, occurrence of the new symptoms, the lead treatment, its efficiency etc.

5 step. Patient anamnesis: enquiry and a statement conduct as the medical biography of the patient. Keep to the circuit of the case record - condition of life in the childhood, at mature age, labour activity, the marital status, previous illness, harmful habits, a heredity etc.
The brake down chart of the subject "Enquiry of the patient"

The anamnesis

Complain

The general anamnesis (enquiry on a functional condition of bodies and systems)

History of present disease

Patient anamnesis

Components range

The maintenance (contents)

1. The main complaints, their detailed elaboration
2. Secondary (common) complaints

1. The general condition
2. Nervous system
3. Locomotor system
4. Respiratory system
5. Cardiovascular system
6. Digestive system
7. Liver
8. Urinary organs
9. Sexual function
10. Hematosis system

1. The beginning of disease, the possible reasons
2. The subsequent course
3. Results of inspections
4. Efficiency of the previous treatment
5. Course of disease in clinic
6. Treatment in clinic, its efficiency

1. Conditions of life in the childhood, study
2. Conditions of life at adult age, labour activity
3. Sexual life, family life
4. Previous illnesses
5. Harmful habits
6. Intolerance of food, medical preparations
7. Health of the members of family of relatives, heredity diseases.
General Biographical Information included surname, name, patronymic, age, sex, place of work, occupation, home address, date of admission to hospital

Complaints (Present illness)
The data revealed at enquiry are necessary for systematizing in the certain sequence. First name the principal (main) complaints of the patient which are testifying about the most expressed changes in an organism (pain, dyspnoea, cough, expectoration of blood (haemoptisis), vomiting, diarrhea, high temperature, oedema, swelling, loss of weight etc.). Then detail each of them. Don’t pass to subsequent complaints, not having finished detailed elaboration previous.
Then describe group of the general, secondary complaints which are indicating functional, neurotic disorder ("feel unwell", "aches a bit", "undue fatiguability", "irritability" etc).

The General Anamnesis (Anamnesis communis)
Enquiry about a functional condition of all the organs and systems.
To state according to a specially outlined scheme (on behalf of the patient - the third person singular), instead of a terse answers to the submitted list of symptoms. To avoid recurrence of the same words and expressions. To use the synonyms most suitable on sense in each concrete case (complains, marks, specifies, feels, notices, pays attention, observes etc.). Thus, if the patient characterizes the painful figurative (and it is very successful!) it is necessary to put down them so-called.
If pathological deviations during enquiry on the investigation system are not present, it is necessary to describe physiological condition under the same circuit (with the educational purpose).

Next is present list of main complaints which allocated between chapters.

The general condition
Weakness: its expressiveness, for a how long, progressing.
Loss of weight: how many kg has loss of weight, for a how long.
Decrease of efficiency, fast fatigue.
High temperature (pyrexia): up to what figures, during what time of day, for a how long time rice of body temperature. Character of fever: constant, separate increases, waviness.
Rigors: duration; perspiration. Tolerance of a fever: rather well, hardly.

Nervous system
Headaches, Vertigo (dizziness, giddiness), Blackouts (loss of consciousness, faints, syncope), Memory, Sleep, Mood.

Locomotor system: pain in joints, muscles, bones, volume of joint movement.
Respiratory system
Breathing through nose, Voice, Chest Pain, Cough, Expectoration of blood (haemoptysis), Breathlessness (shortness of breath, dyspnœa), Attacks of asthma (onset of breathlessness)

Cardiovascular (blood-circulation) system
Pains, Breathlessness (shortness of breath, dyspnoea), Palpitations, Intermissions (escaped beats), Filling of a pulsation, Pains in gastrocnemius muscles, Oedema (swelling)

Alimentary Gastro-intestinal system (DIGESTIVE SYSTEM)
Appetite, Saturability, Taste in a mouth, Thirst, Chewing (mastication), Salivation (sialism), Swallowing, Abdominal pain, Heartburn (pyrosis), Nausea, Vomiting, Abdominal swelling, Burning, itch, Stool (evacuation), Constipation, Diarrhoea, Feces:
Liver

Urinary organs
Pains in lumbar region, Urination, Dysuria, Urine color

Sexual function
Sexual desire (libido), Menstruation

**History of the present disease (Anamnesis Morbi)** should include next questions and information about course of the disease:
What time of the onset of the disease?
How began disease? (it is necessary to collect characters of the first symptoms)
What the reason of this disease in patient’s opinion?
The course of the disease
Course of the disease in clinic
Dynamics of disease development clinical presentations

**Patient anamnesis (Anamnesis Vitae)** – at this part must be reflected all next information:
Childhood, Past children's diseases (rickets, dyspepsia, infections), Adolescence, Maturity
Social history at this time.
Harmful habits
Previous illnesses
Family history
Residence or travel abroad.
Allergological anamnesis (especially drug allergy).
Immunoprophylaxis

Immunoprophylaxis against viral illnesses includes the use of vaccines or antibody-containing preparations to provide a susceptible individual with immunologic protection against a specific disease. Immunization against viral illnesses can be either active or passive. With active immunity, protection is achieved by stimulating the body's immune system to produce its own antibodies by immunization with a virus preparation. Passive immunity is conferred by administering antibodies formed in another host. For example, an antibody-containing gamma globulin preparation may protect a susceptible individual exposed to a viral illness.

The viral vaccines currently approved for use are of three types:

Attenuated live viral vaccines

Most live vaccines contain viruses that have been attenuated by laboratory manipulation. These attenuated viruses can infect and replicate in the recipient and produce a protective immune response without causing disease. Live attenuated viral vaccines can often confer lifelong immunity after one immunization series. However, because live viruses can multiply in the body, there is always the possibility that they may revert to a more pathogenic form. Adequate laboratory and animal testing and extensive clinical studies must be performed to assess this possibility. In addition, new recombinant technologies facilitate direct alteration of viral genetic structure, thus permitting scientists to produce attenuated viruses in which the genetic regions likely to lead to pathogenic reversion are modified or deleted.

Killed (inactivated) viral vaccines

Killed viral vaccines contain either whole virus particles, inactivated by chemical or physical means, or some component(s) of the virus. Completely inactivated viral vaccines cannot cause infection. However, they do not generally produce lifelong immunity following one immunization series; additional doses are usually required. In addition, because killed virus does not multiply in the host, the inoculum itself must provide a sufficiently large concentration of viral antigens to induce the desired immune response.

Recombinant-produced antigens

Application of a recombinant DNA strategy to develop new vaccines is performed by identifying the specific component(s) that can elicit the production of protective antibodies, and then cloning and expressing the gene encoding that protein and assembly of a complex in some cases. This approach has made possible a safe and effective recombinant vaccine against hepatitis B virus, which has replaced the vaccine derived from the plasma of hepatitis B virus-infected individuals.
Revision Questions

Q1. Under the direction of the nurse second year student drew a passport part in admission office of the case record of patient D. 54 years, which hospitalize in connection with essential hypertension. At this time has hardly come the man of 65 years old in the office. He was pale, with complaints of dizziness, sharp weakness. Suddenly this patient has lost consciousness, has fallen, cramps have begun. What is medical and deontological tactics in this case?
A. Nurse should begin immediately external cardiac massage and artificial breath (on the floor). The student should transfer patient D. in other room and urgently call a doctor.
B. Firstly he must finish registration of the case record.
C. Student should begin immediately external cardiac massage and artificial breath (on the floor). The nurse should transfer patient D. in other room and urgently call a doctor.
D. The nurse should call the doctor immediately and wait his orders.
E. All above variants are allowable

Q2. In the resulted list of questions specify those from them which concern to complaints of the patient:
A. An occupation of the patient now
B. Complaints in the beginning of disease
C. Harmful habits (smoking, the use of alcoholic drinks)
D. Complaints of the patient during admission to hospital
E. The transferred operative interventions concerning the present disease and their results

Q3. Patient anamnesis:
A. Labour activity in the past
B. Home address
C. Features of the beginning of disease
D. Results of resort treatment
E. Results early the carried out treatment

Q4. General biographic information:
A. Intolerance (unusual reactions) medicine (es)
B. Other transferred operations
C. Features of development at children's and youthful age
D. Results early the carried out researches
E. Transferred diseases during life

Q5. The history of the present disease:
A. The birthplace
B. Dynamics of current disease
C. The family status
D. Domestic conditions
Q6. There should not be elements of answers ("help") in the questions, set to the patient i.e. suggestion as it is easy to run into a mistake – to assume disease which is not present at the patient actually. In the list of questions resulted below specify. Correct formulation of question:
A. Do you complain of a pain somewhere or do you haven’t got any pains?
B. What troubles you?
C. Do you have dyspnoea at walking even on plane surface place?
D. Do you test compressing pains in the precordial area at walking because of what?
E. Do you have prickle pain in the right hypochondrium?

Q7. Suggestion formulation of question:
A. What do you complain of?
B. Does the compressing pain trouble you at walking at the precordial area because of what you have to stop?
C. What's brought you along today?
D. What troubles you?
E. Do you have complaints now?

Q8. Patient H., 28 years, the teacher, during last 5 months complains of a aching, constricting sometimes pressing pain at the precordial area, with radiation in the left hand, with duration (from hours to whole day), amplify at excitement; irritation, insomnia; feels better, without dyspnoea at movement or physical exertion. Pulse – 84 per 1 minutes, regular, the arterial blood pressure – 120/80 millimeters of mercury column, borders of cardiac dullness normal, heart sounds are clear, an electrocardiogram – without changes. The diagnosis: neuroculatory dystonic, cardiac type, "cardioneurosis" In what connection disease is recognized first of all?
A. Detailed enquiry and absence of objective symptoms
B. Only due to absence of objective symptoms
C. Due to character of complaints
D. Due to subjective symptoms
E. Only due to combination of complaints

Q9. In the list of complaints specify those of them which concern to a category of the main, prove expressed organic changes in an organism.
A. Compressing pains in precordial area at walking
B. Weakness
C. Fast fatigue
D. Irritation
E. Depressed mood
Q10. In the list of complaints specify those of them which concern not to a category of the main, don’t prove expressed organic changes in an organism.
A. Dyspnoea at walking
B. Attacks of asthma
C. Expectoration of blood
D. Pains in epigastrium area right after meal
E. Palpitation at excitement

Key answers: 1-A, 2-D, 3-A, 4-A, 5-B, 6-B, 7-B, 8-A, 9-A, 10-E

SUMMARY OF PROCEDURES

The practice lesson conducts in the study room. After the brief repeating (the structure of the anamnesis, the contents of main parts, technique of enquiry) checking of the homework and guidelines for students on drawing up of the case report are distributed to students. Then in an educational room the patient is invited. One of students is offered to find out general biographic information of the patient which then writes down in a writing-book (see sequence of actions about injury of patient). Other student under the offer of the teacher asks complaints, detail, which it is specified and supplemented with questions of students of all group. The teacher, leading over work of students, explains necessity of statement of this or that question, its formulation, corrects admitted mistakes, briefly stops on diagnostic value of the found out complaints. Then one is offered to students to formulate complaints, the final variant note down in a writing-book with the teacher help.

In the same way students conduct enquiry of other sections of the history of the present disease and patient anamnesis. By the end of lesion the sample of a fragment case records (anamnesis) for the subsequent independent work is created at students.

Final tests

Q1. General biographic information:
A. Intolerance (unusual reactions) medicine (es)
B. Other transferred operations
C. Features of development at children's and youthful age
D. Results early the carried out researches
E. Transferred diseases during life

Q2. There should not be elements of answers ("help") in the questions, set to the patient i.e. suggestion as it is easy to run into a mistake – to assume disease which is not present at the patient actually. In the list of questions resulted below specify incorrect (suggestion) formulation of question:
A. What do you complain of?
B. Does the dyspnoea trouble you laying position?
C. What's brought you along today?
D. What troubles you?

Q3. Among the following complaints, choose the main complaints:
   A. Weakness
   B. Decrease in appetite
   C. Nausea
   D. Inspiratory dyspnoea
   E. Eructation

Q4. The diseases caused by negative interrelation of medical staff and patients are called:
   A. Social
   B. Iatrogenic
   C. Somatogenic
   D. Professional
   E. Psychogenic

Q5. Suggestion formulation of question:
   A. What do you complain of?
   B. Does stomach pain increase after taking a meal?
   C. What's brought you along today?
   D. What troubles you?
   E. Do you have complaints now?

Q6. Choose correct sequence of parts in case report:
   A. General biographic information, anamnesis of life, complaints, history of present disease, objective examination, inquiring about all organ and system
   B. General biographic information, history of present disease, objective examination, anamnesis of life, inquiring about all organ and system, complaints
   C. General biographic information, history of present disease, objective examination, complaints, anamnesis of life, inquiring about all organ and system
   D. General biographic information, anamnesis of life, history of present disease, inquiring about all organ and system, objective examination, complaints
   E. General biographic information, complaints, inquiring about all organ and system, history of present disease, anamnesis of life, objective examination,

Q7. In the list of complaints specify those of them which concern to a category of the main, prove expressed organic changes in an organism.
   A. Compressing pains in precordial area at walking
   B. Weakness
   C. Fast fatigue
   D. Irritation
   E. Depressed mood
Q8. In the list of complaints specify those of them which concern not to a category of the main, don’t prove expressed organic changes in an organism.
A. Dyspnoea at walking
B. Attacks of an asthma
C. Expectoration of blood
D. Pains in epigastrium area right after meal
E. Palpitation at excitement

Q9. In the list of complaints specify those of them which concern not to a category of the main, don’t prove expressed organic changes in an organism.
A. Diarrheas up to 8 times day
B. Bad sleep
C. Sudden occurrence of bloody urine without of pain
D. Fast lost weight (10 kg for 2 months)
E. Paroxysmal pains in the right hypohondrium, accompanying with a rising of the temperature up to 37.8 and darkening of urine color (color of beer).

Q10. The diseases caused by negative interrelation of medical staff and patients are called:
A. Social
B. Iatrogenic
C. Somatogenic
D. Professional
E. Psychogenic
The Health Ministry of Ukraine  
Donetsk National Medical University

Approved
at the meeting of
Propedeutic and Internal Medicine
Department

Head of department
Associate Member of NAMSc of
Ukraine,
Professor G. A. Ignatenko
«_______ »________________ 2011 p.

STUDENT’S SELF-STUDY GUIDELINES FOR  
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<td>the general condition. Work of admission</td>
</tr>
<tr>
<td></td>
<td>office and general therapy department.</td>
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<tr>
<td></td>
<td>Personal hygiene of patient.</td>
</tr>
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<td></td>
<td>Prophylaxis of bedsores.</td>
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<tr>
<td></td>
<td>Anthropometry. Thermometry. Types of</td>
</tr>
<tr>
<td></td>
<td>fever. Particularities of care for</td>
</tr>
<tr>
<td></td>
<td>patients with a fever.</td>
</tr>
<tr>
<td>Course</td>
<td>2</td>
</tr>
<tr>
<td>Faculty</td>
<td>Dentistry</td>
</tr>
</tbody>
</table>

Donetsk 2011
**Importance of the Subject:** the General assessment of the patient has essential diagnostic value for the internship doctor of any speciality, as allows to assess the general condition, and in some cases – to distinguish disease "at first sight", is especial at a pathology endocrine glands (acromegalia, Addison's disease etc.), nervous system (paresis, paralyses, etc.) to reveal the main syndrome (heart failure, jaundice, cyanosis, etc.) or other separate symptom which leading diagnostic search in a true direction. Master by students-medics of ways and methods of medical care for unhealthy people is an important element of professional training of doctors.

**Key Objective:** To be able to lead consistently the general assessment of the patient with the purpose of revealing of pathological signs and to make conception about organism generally. To master practical skills in the different aspects of medical care for patients.

**Specific Goals:**
1. To master methodology of conduction of general inspection.
2. Determination of the general state of patient (varieties of the general states of patient and their criteria).
3. To determine posture of the patient in a bed (active, forced, passive, their kinds), standing, walking (varieties of standing and walking at different pathology),
4. To determine consciousness (stupor, sopor, coma, delirium).
5. To know habitus (type of constitution), to pay attention on height and body weight (obesity, emaciation, cachexia). Basic criteria of normal constitutional types.
6. To determine oedema (general, local), to assess diagnostic value of available changes.
7. To examine mucous membranes (cyanotic colour of lips), skin (color, elasticity, humidity, temperature, elements of rash, nevus, scars), pathological changes (pale, acrocyanosis, pigmentation, scars, jaundice, elasticity, sweating, skin eruptions, etc.), estimation of the condition of hair and nails, subcutaneous tissue (fattened, distributing, types of obesity).
8. To examine muscles (the level of development, tonus, atrophy), joints (configuration, deformation, tenderness, active and passive movements, fluctuation), to assess diagnostic value of available changes
10. To explain diagnostic value of symptoms receiving during the general inspection of patient.
11. To know types of medical institution.
12. To master basic principles of organization and work of admitting office and general therapeutic department.
13. To master personal hygiene of sick: care of skin, oral cavity, eyes, ears, nose and hairs.
14. To know concept about the therapeutic regimen.
15. To know about prophylaxis of bedsores.
16. To change of linen.
17. Serve of urinal.
18. To done anthropometry.
19. To know principles and methods of thermometry.
20. To know types of fever.
21. To know peculiarity of care for patients with a fever.

**Level of Knowledge and Skills before the Practice:**
1. Clear knows physiology of visceral systems of an organism. («Normal physiology»).
2. The anatomic characteristic of visually determined sings at injury. («Faculty of Anatomy»).

**Questions for Self-Assessment of the Pre-Practice Knowledge (correct answers gone after last task).**

**Q1.** Determine the characteristic of clear consciousness at the healthy person from the physiological point of view.
A. Correct display of the reality in a brain of the person, adequate reaction on external irritant and signals.
B. Twilling state.
C. Correct display of the reality in a brain of the person, the slowed answer on external irritant and signals.
D. Absence of reaction
E. Any listed variants

**Q2.** Determine the characteristic of stupor.
A. Correct display of the reality in a brain of the person, adequate reaction on external irritant and signals.
B. Twilling state.
C. Correct display of the reality in a brain of the person, the slowed answer on external irritant and signals.
D. Absence of reaction

**Q3.** Determine characteristic of normosthenic habitus from the physiological point of view.
A. Significant prevalence of the longitudinal sizes of a body above transversal
B. Significant prevalence ratio of extremities to a trunk
C. Increase anteroposterior sizes of a thorax
D. Right epigastric angle
E. Significant prevalence ratio of a thorax to abdomen
Q4. Determine characteristic of asthenic habitus from the physiological point of view.
A. Prevalence of the transversal sizes of a thorax
B. Right epigastric angle
C. Significant prevalence of the transversal sizes of a body above longitudinal
D. Significant prevalence ratio of extremities to trunk
E. Significant prevalence ratio of abdomen to thorax

Q5. Determine characteristic of hypersthenic habitus from the physiological point of view.
A. Increase anteroposterior sizes of a thorax
B. Right epigastric angle
C. Significant prevalence ratio of a thorax to abdomen
D. Significant prevalence ratio of extremities to trunk
E. Significant prevalence of the longitudinal sizes of a body above transversal

Q6. What is bedsore?
A. Affection of tissue, which developed under the pressure
B. Affection of tissue, which developed under the beating
C. Infection of the skin
D. Ulcer after the sunburn
E. Ulcer after the acid affection

Q7. Patient A. 66 years with cardiovascular pathology has specific changes of fingers and nails - clubbing of the fingers (bulbous swelling of the tip of the fingers) and nail in form of watch glass. What is pathogenesis of these changes?
A. Chronic hypoxia
B. Reduction in output of adrenocortical hormones
C. Anaemia
D. Increased concentration of bilirubin
E. Myxoedema

Q8. Patient F. 38 years has specific changes of fingers and nails - clubbing of the fingers (bulbous swelling of the tip of the fingers) and nail in form of watch glass. What is typical reason of these changes?
A. Endocrine disease
B. Chronic liver disease
C. Chronic cardiac disease
D. Chronic intestinal pathology
E. Haemolytic jaundice

Q9. Patient V. 22 years has specific changes of nails - altered forms as curved inside. How is called these changes?
A. Watch glass nails
B. Koilonychia
C. Symptome of “thimble”
D. Striae
E. Hirsutism

**Q10.** Patient M. 44 years female was admitted to the hospital. During physical examination decreased turgor of skin was revealed. Which condition may cause this change?
A. Dehydration
B. Thyrotoxicosis
C. Hyperhydration
D. Myxoedema
E. Acromegaly

**Q11.** Alpinist climb of mountains on height about 3 km became feel worse, developed weakness, loss of consciousness, tachycardia. What is reason of this state?
A. Hypoxemia.
B. Alkalosis.
C. Acidosis.
D. Hypercapnia.
E. Hyperglycemia.

**Q12.** Child with patent ductus arteriosus has low physical grows, frequent pneumonias. Connection of which vessels is cause violation of hemodynamics?
A. By a pulmonary artery and pulmonary veins.
B. By aorta and pulmonary artery.
C. Vein cava superior and aorta.
D. Vein cava superior and pulmonary artery.
E. Aorta and pulmonary veins.

*Key answers: 1-A, 2-C, 3-D, 4-D, 5-A, 6-A, 7-A, 8-C, 9-B, 10-A, 11-A, 12-B.*

The following printed materials can be of help to improve your pre-practice knowledge and skills:
B. Saunders company Pennsylvania 2001
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

**Contents of Practice**

**Topics of Theory:**
1. Conduction of general inspection.
2. General state of patient.
3. Posture of the patient in a bed (active, forced, passive, their kinds),
standing, walking (varieties of standing and walking at different pathology)

5. Habitus (type of constitution), height and body weight (obesity, emaciation, cachexia). Basic criteria of normal constitutional types.
6. Oedema (general, local), to assess diagnostic value of available changes.
7. Mucous membranes (cyanotic colour of lips), skin (color, elasticity, humidity, temperature, elements of rash, nevus, scars), pathological changes (pale, acrocyanosis, pigmentation, scars, jaundice, elasticity, sweating, skin eruptions, etc.), estimation of the condition of hair and nails, subcutaneous tissue (fattened, distributing, types of obesity).
8. Muscles (the level of development, tonus, atrophy), joints (configuration, deformation, tenderness, active and passive movements, fluctuation).
10. Types of medical institution.
11. Basic principles of organization and work of admitting office and general therapeutic department.
12. Personal hygiene of sick: care of skin, oral cavity, eyes, ears, nose and hairs.
13. Concept about the therapeutic regimen.
15. Changing of linen.
17. Anthropometry.
19. Types of fever.
20. Peculiarity of care for patients with a fever.

**Practical skills:**

Students should be able to demonstrate mastery of the following practical skills

1. To show methodology of conduction of general inspection.
2. To determine of the general state of patient.
3. To determine posture of the patient in a bed.
4. To determine consciousness.
5. To determine constitution.
6. To determine presence of oedema.
7. To examine mucous membranes and skin.
8. Estimate of the condition of hair and nails, subcutaneous tissue.
9. To examine muscles and joints.
10. To palpate lymphatic nods.
11. To explain diagnostic value of symptoms receiving during the general inspection of patient.
12. To tell all types of medical institution.
13. To perform personal hygiene of sick: care of skin, oral cavity, eyes, ears, nose and hairs.
14. To perform prophylaxis of bedsores.
15. To change of linen.
17. To done anthropometry.
18. To take body temperature.
19. To care for patients with a fever.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>acromegaly</td>
<td>a chronic disease characterized by enlargement of the bones of the head, hands, and feet, and swelling and enlargement of soft tissue, esp the tongue. It is caused by excessive secretion of growth hormone by the pituitary gland</td>
</tr>
<tr>
<td>cachexia</td>
<td>a generally weakened condition of body or mind resulting from any debilitating chronic disease</td>
</tr>
<tr>
<td>cholecystitis</td>
<td>inflammation of the gall bladder, due to bacterial infection or the presence of gallstones</td>
</tr>
<tr>
<td>convergence</td>
<td>the turning of the eyes inwards in order to fixate an object nearer than that previously being fixated</td>
</tr>
<tr>
<td>exophthalmos</td>
<td>abnormal protrusion of the eyeball, as caused by hyperthyroidism</td>
</tr>
<tr>
<td>gigantism</td>
<td>excessive growth of the entire body, caused by over-production of growth hormone by the pituitary gland during childhood or adolescence</td>
</tr>
<tr>
<td>habitus</td>
<td>general physical state, esp with regard to susceptibility to disease</td>
</tr>
<tr>
<td>leprosy</td>
<td>a chronic infectious disease occurring mainly in tropical and subtropical regions, characterized by the formation of painful inflamed nodules beneath the skin and disfigurement and wasting of affected parts, caused by the bacillus Mycobacterium leprae</td>
</tr>
<tr>
<td>pericarditis</td>
<td>inflammation of the pericardium</td>
</tr>
<tr>
<td>ptosis</td>
<td>prolapse or drooping of a part, esp the eyelid</td>
</tr>
<tr>
<td>sweat</td>
<td>the secretion from the sweat glands, esp when profuse and visible, as during strenuous activity, from excessive heat, etc.; commonly also called perspiration</td>
</tr>
<tr>
<td>tremor</td>
<td>an involuntary shudder or vibration, as from illness, fear, shock, etc</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>uraemia</td>
<td>the accumulation of waste products, normally excreted in the urine, in the blood</td>
</tr>
<tr>
<td>chloasma</td>
<td>the appearance on a person's skin, esp of the face, of patches of darker colour: associated with hormonal changes caused by liver disease or the use of oral contraceptives</td>
</tr>
<tr>
<td>chlorosis</td>
<td>a disorder, formerly common in adolescent girls, characterized by pale greenish-yellow skin, weakness, and palpitation and caused by insufficient iron in the body</td>
</tr>
<tr>
<td>endocarditis</td>
<td>inflammation of the endocardium</td>
</tr>
<tr>
<td>jaundice</td>
<td>yellowing of the skin and whites of the eyes due to the abnormal presence of bile pigments in the blood, as in hepatitis</td>
</tr>
<tr>
<td>naevus</td>
<td>any congenital growth or pigmented blemish on the skin; birthmark or mole</td>
</tr>
<tr>
<td>thrombosis</td>
<td>the formation or presence of a thrombus</td>
</tr>
<tr>
<td>vitiligo or leucoderma</td>
<td>any area of skin that is white from congenital albinism (see albino) or acquired absence or loss of melanin pigmentation</td>
</tr>
<tr>
<td>thermometry</td>
<td>the branch of physics concerned with the measurement of temperature and the design and use of thermometers and pyrometers</td>
</tr>
</tbody>
</table>
Step 1

Disinfection of thermometer

Step 2

Zeroing of thermometer (by shaking method)

Step 3

Checking of body temperature

Step 4

Adding data to the temperature sheet
<table>
<thead>
<tr>
<th>Skin</th>
<th>Color of the skin</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Pale</strong></td>
<td><strong>Physiological</strong></td>
<td><strong>Transient</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Vasomotor reaction</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong></td>
<td><strong>Thick skin</strong></td>
</tr>
<tr>
<td><strong>Pathological</strong></td>
<td><strong>Absolute</strong></td>
<td><strong>External or internal hemorrhage</strong></td>
</tr>
<tr>
<td>(amount and quality of blood)</td>
<td><strong>Relative</strong></td>
<td><strong>Vascular spasm</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Accumulation of blood in dilated vessels</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Aortal valvular disease</strong></td>
</tr>
<tr>
<td><strong>Tint</strong></td>
<td><strong>Yellowish</strong></td>
<td><strong>Addison-Biermer anemia, hemolytic anemia</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Greenish</strong></td>
<td><strong>Iron deficiency anemia, chlorosis</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Earth-like</strong></td>
<td><strong>Malignant tumor</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Brown or ahs-color</strong></td>
<td><strong>Malaria</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Café an lait (coffee with milk)</strong></td>
<td><strong>Infectious endocarditis</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Yellow and cyanotic</strong></td>
<td><strong>Congestive heart failure</strong></td>
</tr>
<tr>
<td><strong>Red</strong></td>
<td><strong>Physiological</strong></td>
<td><strong>High temperature, sunshine, excitement</strong></td>
</tr>
<tr>
<td><strong>Pathological</strong></td>
<td><strong>Local</strong></td>
<td><strong>Pneumonia (side of affection)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>One checks</strong></td>
<td><strong>Mitral butterfly (mitral stenosis)</strong></td>
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<tr>
<td></td>
<td><strong>Two-sides</strong></td>
<td><strong>Lupus butterfly</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Diffuse</strong></td>
<td><strong>Polycythemia</strong></td>
</tr>
<tr>
<td>Central or diffuse</td>
<td>Chronic lung disease</td>
<td>Hypereemic</td>
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<tr>
<td>-------------------</td>
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</tr>
<tr>
<td>Cyanosis</td>
<td>Congestive heart failure</td>
<td>Macula</td>
</tr>
<tr>
<td></td>
<td>Poisoning</td>
<td>Inflammatory - Disappears when pressed</td>
</tr>
<tr>
<td></td>
<td>Local cyanosis</td>
<td>Non-inflamatory - Don’t disappears when pressed</td>
</tr>
<tr>
<td></td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pathological</td>
<td></td>
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<tr>
<td></td>
<td>Jaundice</td>
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<tr>
<td></td>
<td>Paracynematous or hepatic jaundice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Obstructive or suprarepatic jaundice</td>
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</tr>
<tr>
<td></td>
<td>Liver disease</td>
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<td></td>
<td>Exogenous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physiological</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silver drug</td>
<td></td>
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<tr>
<td></td>
<td>Leucoderma</td>
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<tr>
<td></td>
<td>Albinism</td>
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<tr>
<td></td>
<td>Vitiligo</td>
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</tr>
<tr>
<td></td>
<td>Eruptions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vascular</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Newborn 3-7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lemon-yellow tint; unconjugated or indirecting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orange-yellow tint; unconjugated and conjugated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Greenish-yellow tint; conjugated</td>
<td></td>
</tr>
<tr>
<td>Artificial spot</td>
<td>Inflammatory</td>
<td>Typhoid fever, para-typhus, louse-borne typhus, syphilis</td>
</tr>
<tr>
<td>-------------------------------</td>
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<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Roeola</td>
<td>&lt;1 sm or less than nail size</td>
<td></td>
</tr>
<tr>
<td>Erythema</td>
<td>&gt;1 cm or more than nail size</td>
<td>Allergy, erysipelas, syphilis, systemic lupus erythematosus, brucellosis</td>
</tr>
<tr>
<td></td>
<td>Slightly elevated</td>
<td></td>
</tr>
<tr>
<td>Haemorrhage lesions</td>
<td>Petechia</td>
<td>Small point</td>
</tr>
<tr>
<td></td>
<td>drops</td>
<td></td>
</tr>
<tr>
<td>Purpura</td>
<td>less than nail size</td>
<td>Red, elevated</td>
</tr>
<tr>
<td>Ecchymoses</td>
<td>more than nail size</td>
<td>Large, not elevated</td>
</tr>
<tr>
<td>Vibices</td>
<td>lines</td>
<td></td>
</tr>
<tr>
<td>Sugillatio or Hematoma</td>
<td>Sweeling from the gross bleeding</td>
<td></td>
</tr>
<tr>
<td>Pigment spot</td>
<td>Depigmentation</td>
<td>Congenital</td>
</tr>
<tr>
<td></td>
<td>Leucoderma</td>
<td></td>
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<td></td>
<td>Albinism</td>
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<tr>
<td></td>
<td>Congenital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vitiligo</td>
<td>Acquired</td>
</tr>
<tr>
<td></td>
<td>Acquired</td>
<td></td>
</tr>
<tr>
<td>Hyperpigmentation</td>
<td>Freckles</td>
<td>Acquired</td>
</tr>
<tr>
<td></td>
<td>Chloasma</td>
<td>patches of darker colour: associated with hormonal changes caused by liver disease or the use of oral contraceptives</td>
</tr>
<tr>
<td></td>
<td>Nevus</td>
<td>Congenital</td>
</tr>
<tr>
<td>Wheals (urticaria)</td>
<td>After sting (mosquito)</td>
<td>Elevated, without cavity</td>
</tr>
<tr>
<td></td>
<td>Allergy</td>
<td></td>
</tr>
<tr>
<td>Vesicles</td>
<td>Cavity &lt;0,5 sm</td>
<td>Herpes</td>
</tr>
<tr>
<td>Blister, bulla</td>
<td>Cavity &gt; 0,5 sm</td>
<td>Burn</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
<td>Disease</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>Papula</td>
<td>Without cavity</td>
<td>Psoriasis</td>
</tr>
<tr>
<td>Pustule</td>
<td>Pus in skin</td>
<td></td>
</tr>
<tr>
<td>Abscess</td>
<td>Pus in skin</td>
<td></td>
</tr>
<tr>
<td>Node</td>
<td>Without cavity</td>
<td>Tuberculosis, leprosy</td>
</tr>
<tr>
<td>Ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petechia</td>
<td>Drops</td>
<td>Hemorrhagic</td>
</tr>
<tr>
<td>Ecchymoses</td>
<td>Spot</td>
<td>Hemorrhagic</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Normosthenic</td>
<td>Asthenic</td>
</tr>
<tr>
<td>------------------------------------</td>
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<td>----------</td>
</tr>
<tr>
<td>Anteroposterior/Transversal</td>
<td>0.65-0.75</td>
<td>&lt;0.65</td>
</tr>
<tr>
<td>Limbs</td>
<td>Limbs &gt; Trunk</td>
<td>Limbs &gt;&gt; Trunk</td>
</tr>
<tr>
<td>Thorax &gt; Abdomen</td>
<td></td>
<td>Thorax &gt;&gt; Abdomen</td>
</tr>
<tr>
<td>90 Right Angle</td>
<td></td>
<td>&lt;90 Acute Angle</td>
</tr>
<tr>
<td>Prominent</td>
<td></td>
<td>Moderate or Absent</td>
</tr>
<tr>
<td>Moderate Oblique</td>
<td></td>
<td>More Vertical</td>
</tr>
<tr>
<td>With Contour</td>
<td></td>
<td>Wide</td>
</tr>
<tr>
<td>Expressed</td>
<td></td>
<td>Sharply Pronounced</td>
</tr>
<tr>
<td>Horizontal</td>
<td></td>
<td>Sloping</td>
</tr>
<tr>
<td>Closely Fit to the Chest</td>
<td></td>
<td>Separated from the Chest</td>
</tr>
<tr>
<td>10-th Rib may be free (Costa Decimal fluctuants)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td>Thin</td>
</tr>
<tr>
<td>Oval</td>
<td></td>
<td>Elongate</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>Deficiency</td>
</tr>
<tr>
<td>Forced positions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Standing upright – have to stop</td>
<td>Angina pectoris, peripheral vascular disease</td>
<td></td>
</tr>
<tr>
<td>Orthopnoea</td>
<td>Legs hanging down</td>
<td></td>
</tr>
<tr>
<td>Sitting</td>
<td>Fixing the shoulder gird</td>
<td></td>
</tr>
<tr>
<td>Sitting</td>
<td>Inclines forward</td>
<td></td>
</tr>
<tr>
<td>Supine</td>
<td>Abdomen pain – appendicitis, cholecistitis, perforated ulcer</td>
<td></td>
</tr>
<tr>
<td>Head thrown back and legs on the abdomen</td>
<td>Cerebrospinal meningitis</td>
<td></td>
</tr>
<tr>
<td>Opistatonus</td>
<td>touching with head, heel and may be pelvis – meningitis, epilepsy</td>
<td></td>
</tr>
<tr>
<td>Prone (face down)</td>
<td>Tumor of pancreas (pressing on solar plexis), gastric ulcer of back wall, trauma or TB of spine, sore of back</td>
<td></td>
</tr>
<tr>
<td>Side</td>
<td>On affected side</td>
<td></td>
</tr>
<tr>
<td>Side</td>
<td>Dry pleurisy</td>
<td></td>
</tr>
<tr>
<td>Side</td>
<td>pneumonia, tumor, effusive pleurisy</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>paraneprhitis</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>cavities</td>
<td></td>
</tr>
<tr>
<td>Knee-elbow</td>
<td>Effusive pericarditis</td>
<td></td>
</tr>
<tr>
<td>Knee-elbow</td>
<td>Fractured ribs, intercostals neuralgia, herpes zoster</td>
<td></td>
</tr>
</tbody>
</table>
Gait

hemiplegic
Doll's/puppet
peroneal
ataxic
duck

Abidance leg draw aside
Parkinsonism: tremor, muscular rigidity, hypokinesis
High climb of leg
High climb of leg, long searching of floor - neurosyphilis
Dislocation of femur

Face

Facies pneumonica
Facies tuberculosa
Facies Corvisara
Facies acromegalia
Facies myxoedematosa
Facies basedovica

One-side blush, herpes on lips
Exhausted, pale with blush on cheeks, “burning eyes”
Heart failure – edematous, pale, yellowish, cyanotic hue
Pallor and puffy face
Grefe – sunset
Mobius – disorder of convergence
Stelvag – rare blinking
Sparkling eyes
Elinek – hyper pigmentation of palpebrarum
Koher – opposite to Grefe

Facies nefrica
Facies amimica
Facies leontina
Hirsutism
Risus sardonicus
Vax doll
TB
facies lunata

Parkinson
leprosy
Tetanus – laugh on grief face – skin fold on forehead
Addison-Biermer anemia. Edematous, very pale with yellow tint.
Pale skin with noticeable eyes
Red, O-shaped, with mustache and beard at woman
<table>
<thead>
<tr>
<th>Condition</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miosis</td>
<td>Uremia, tumor of brain, cerebral hemorrhage, morphine + enophtalm + ptosis – syndrome Bernar-Horner’s (one side) – affection of cervical sympathetic plexus or ramus</td>
</tr>
<tr>
<td>Mydriasis</td>
<td>All comas except uremia, brain hemorrhage</td>
</tr>
<tr>
<td>enophthalmos</td>
<td>peritonitis</td>
</tr>
</tbody>
</table>

### General patient's conditions

<table>
<thead>
<tr>
<th></th>
<th>Consciousness</th>
<th>Posture</th>
<th>Countenance (facial expression)</th>
<th>Mental reaction</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory</td>
<td>clear</td>
<td>active or with restriction</td>
<td>sensible</td>
<td>adequate</td>
<td></td>
</tr>
<tr>
<td>Comparative satisfactory</td>
<td>clear</td>
<td>active or with restriction</td>
<td>sensible</td>
<td>adequate</td>
<td>many complaints</td>
</tr>
<tr>
<td>Moderate middle grave</td>
<td>deranged</td>
<td>forced</td>
<td>alterative</td>
<td>partial deranged</td>
<td>some of them</td>
</tr>
<tr>
<td>Grave</td>
<td>deranged</td>
<td>forced</td>
<td>change</td>
<td>inadequate</td>
<td>almost all loss of weight, oedema</td>
</tr>
<tr>
<td>Extremely grave</td>
<td>unconsciousness</td>
<td>passive</td>
<td>indifferent</td>
<td>without reaction</td>
<td>coma, shock, agony</td>
</tr>
</tbody>
</table>
The brake down chart of the subject «Examination of the patient »

Survey of the patient

The general survey

Satisfactory
moderate middle
grave

Clear. Stuper.
Spoo. Conz.
Delirium,
Hallucinations.

Normosthenic
Hyperschismic
Ashence

Normal
Obesity
Emaciation
Cachexia

Active
Forced
Passive

Color, pigmentation,
Sweating, turgor,
erupitions,
hemorrhage lesions,
scars, vascular
network

Expressiveness of
oedema: the general,
local. Cavity, outer

Survey of difference parts of a body

The general
condition

Consciousness

Habitus

Body weight
(kg)

Posture of the patient

Skin

Subcutaneous fat

Head

The form of a head

Esophthhalmus Eyelids:
ptosis, oedema. Pupils:
size, reaction to light,
anisocoria.

Eyes

Mucous membranes,
gums, teeth, tongue,
tonsils

Mouth

Neck

Thyroid gland,
pulsation of veins,
arteries, oedema

Muscles

Degree of
development,
atrophy, tenderness

Joints

Configuration,
volume of
movement.

Lymph nodes

Sizes, consistence
surface, mobility,
painfulness adherence
together and with
surrounding tissues
Eruptions on the skin

**Herpetic lesions** – small vesicles 0.5-1 cm in size, filled with transparent fluid then after collapse of vesicles crusts are formed (herpes labialis, herpes nasalis)

**Pustula** – visible accumulation of pus in the skin

**Roseola** – rash-like eruption 2-5 mm which disappears when pressed by finger (typhoid fever, para-typh, dysentery, syphilis)

**Erythema** – develops in hypersensitive to strawberries, eggs, crabs, erythema nodosum at rheumatic fever, after some drugs

**Weals (urticaria)** – red round itching lesions elevated under skin, which appear as allergic reaction

**Purpura** – haemorrhage into skin

**Petechia** – small pointed haemorrhages, do not disappear during pressing by finger

**Ecchymoses** – large black and blue spots, extravasation (Werlhoff’s disease, haemophilia, deficiency vitamin C and K, leukaemia)

**Teleangioectasia** – visible dilatation of small subcutaneous blood vessels

Rectal temperature is 0.5-1° higher than in the armpit.

As a rule, temperature is taken twice a day (at 7 or 8 a.m. and 5 or 7 P.m.).

Normal temperature of the body (as measured in the armpit) is 36.4-36.8°C. The temperature undergoes circadian variations. The **lowest** temperature is between 3 and 6 a.m. and the **maximum** between 5 and 9 p.m. The **difference** between the morning and evening temperature does not exceed 0.6 °C in normal persons. The temperature of the body slightly **rises** after meals and physical strain, and also at high ambient temperatures.

- **Subfebrile** – from 37° to 38 °C
- **Moderately high** – from 38° to 39 °C
- **High** – from 39° to 40 °C
- **Very high** – over 40 °C
- **Hyperpyretic** – over 41° and 42 °C

**Type of fever**

1. **Continued fever (febris continua).** The circadian variation does not exceed 1 °C. It is observed in patients with acute lobar pneumonia or II stage, typhoid fever.

2. **Remittent fever (febris remittens).** The circadian variations exceed 1 °C, the morning **lowest** temperature being over 37 °C; it often occurs in tuberculosis, III stage typhoid fever, purulent diseases, and lobular pneumonia.

3. **Intermittent fever (febris intermittens).** The daily variations exceed 1 °C, with **complete apyrexia** in remissions.

4. **Hectic fever (febris hectica).** The temperature **rises sharply** (by 2°-4 °C) and drops to normal and subnormal level. The fever is often accompanied by excessive sweating. It usually occurs in grave pulmonary tuberculosis, suppuration, and sepsis.

5. **Inverse fever (typhus inversus).** The **morning** temperature is **higher** than
in the evening; it sometimes occurs is sepsis, tuberculosis, and brucellosis.

6. **Irregular fever (febris irregularis)**. Circadian variations are varied and irregular. It often occurs in rheumatism, endocarditis, sepsis, tuberculosis, etc.

According to the temperature curve (Fig. 8) recurrent (relapsing) and undulant (Malta) fevers are distinguished.

**Recurrent fever (febris recurrens)** is characterized by alternation of fever and afebrile periods; it occurs in relapsing fever.

**Undulant fever (febris undulans)** is characterized by periodic elevation of temperature followed by its drop; it often occurs in brucellosis and lymphogranulomatosis.

According to the temperature curve (Fig. 8) recurrent (relapsing) and undulant (Malta) fevers are distinguished.

The course of fever (Fig. 9) is characterized by a period of
- **elevation** of temperature (stadium incrementi), which is followed by the
- **period** of high temperature
- ending with the **period of decreasing** temperature (stadium decrementi).

The temperature may decrease gradually, during several days. This termination of fever is called **lysis**.

A sudden temperature drop (to norm within 24 hours) is called **crisis**. During abatement of fever in some diseases (e.g. in typhoid fever), the daily variation of temperature exceeds 1 °C (**amphibolic period**).

**Regular alternation** of fever attacks (chills, heat, temperature drop with sweating) and afebrile periods is characteristic of malaria. Attacks may occur every day (**febris quotidiana**), every other day (**tertian fever, or febris tertiana**) or every third day (**quartan fever, or febris quartana**). The temperature rise may be only transient, for few hours (one-day fever, or febris ephemera, febriculara.) It occurs in mild infection, excess exposure to the sun, after blood transfusion, sometimes after intravenous injections of medicinal preparations.

Fever lasting up to 15 days is called acute and over 45 days—chronic.

**Hypothermia** (subnormal temperature) often occurs in the critical fall of temperature; it persists for 1-2 days at about 35 °C; the pulse is full, slow, the patient's condition satisfactory. Subnormal temperature may be observed in grave circulatory collapse; the pulse becomes weak and frequent, respiration superficial, the skin pallid and covered with sweat. Hypothermia occurs after profuse bleeding, in starvation and asthenia, during convalescence after infectious diseases, and in overcooling.

In addition to measuring the body temperature with a thermometer, the temperature of various parts of the body should be felt by hand. Elevated temperature of the skin overlying a joint indicates its inflammation; cold extremities of patients with fever suggest peripheral circulatory failure (collapse, cardiac insufficiency).
The main groups of lymph nodes which should be palpated:

1) submandibular.
2) cervical (anterior, posterior)
3) supraclavicular
4) subclavicular
5) axillary.
6) inguinal lymph node.

Such characteristics of lymph nodes should be determined:
- size.
- mobility
- consistency
- presence or absence of tenderness.
- surface.
- fusing with skin or between each other (fixity).
- changes of skin over lymph nodes.

In the norm we may palpate only submandibular, axillary, inguinal, they must be painless, soft-elastic consistency, don’t fuse with skin or between each other, without changes, skin < 1 cm.

In metastasis of tumor – Lymph node is firm, tuberousosis painless or painful it fuse with skin.

Lymphadenitis – Elastic consistency, painful considerably movable, skin over it is red and hot.

Lymphogranulomatosis – Firm, painless; lymph nodes fuse together to form conglomerates but do not adhere to the skin.

Enlargement of lymph nodes

Cervical lymph nodes:
- Tonsillitis.
- Pharyngitis.
- Scarlatina (scarlet fever)
- Diptheria
- Lymphangioma
- Tumour of thyroid gland

Submandibular:
- Caries.
- Gingivitis.
- Tumour of larynx.
- Carcinoma of lips.

Supraclavicular:
- Tumour of mammary gland
- Tumour of gastric (virchovis metastasis)

Inguinal
- Paronychia, paraitium.
- Blister foot
- Syphilis
- Gonorrhea
- Bartholinitis

**Subclavicular**
- Tumour of thyroid gland
- Tumour of the lung

**Axillary**
- Furunculosis
- Paronychia
- Pararitium (felon, whitlow)
- Tumour of mammary gland
- Tumour of lung

**GENERALIZED ENLARGEMENT**
- Tbs
- Sarcoidosis
- Syphilis
- Mononucleosis
- Lymphoid leukaemia
- Lymphogranulomatosis
- Lymphosarcoma
- Systemic connective tissue diseases
- HIV

**Bedsores** - more properly known as pressure ulcers or decubitus ulcers.

Lesions caused by many factors such as:
- Unrelieved pressure;
- Friction;
- Humidity;
- Shearing forces;
- Temperature;
- Age;
- Continence and medication;

**Sequences of formation of the bedsores is:**

**Stage I** Paleness of skin – first reaction on pressure.

**Stage II** Redness - is the most superficial, indicated by non blanchable redness that does not subside after pressure is relieved. This stage is visually similar to reactive hyperemia seen in skin after prolonged application of pressure. Stage I pressure ulcers can be distinguished from reactive hyperemia in two ways: a) reactive hyperemia resolves itself within 3/4 of the time pressure was applied, and b) reactive hyperemia blanches when pressure is applied, whereas a Stage I pressure ulcer does not. The skin may be hotter or cooler than normal, have an
odd texture, or perhaps be painful to the patient. Although easy to identify on a light-skinned patient, ulcers on darker-skinned individuals may show up as shades of purple or blue in comparison to lighter skin tones.

**Stage III** Edema of skin - is damage to the epidermis extending into, but no deeper than, the dermis.

**Stage IV** Skin blistering - the ulcer may be referred to as a blister or abrasion

**Stage V** initiation of erosion - involves the full thickness of the skin

**Stage VI** Ulcer - may extend into the subcutaneous tissue layer. This layer has a relatively poor blood supply and can be difficult to heal. At this stage, there may be undermining damage that makes the wound much larger than it may seem on the surface.

**Stage VII** is the deepest, extending into the muscle, tendon or even bone.

**Areas of body where are most common bedsores appear:**

The most typical:

- Occiput, Elbows, Scapulas, Sacrum, Coccyx, Knees, Ankles, Heels

Less typical:

- Other parts of body over prominent parts of bony or cartilaginous areas.

**Proper care**

The most important care for a patient with bedsores is the relief of pressure. Once a bedsore is found, pressure should immediately be lifted from the area and the patient turned at least every two hours to avoid aggravating the wound. Nursing homes and hospitals usually set programs to avoid the development of bedsores in bedridden patients such as using a standing frame to reduce pressure and ensuring dry sheets by using catheters or impermeable dressings. For individuals with paralysis, pressure shifting on a regular basis and using a cushion featuring pressure relief components can help prevent pressure wounds. Camphor spirit (10%) is used for rubbing of the skin, aiming to avoid appearance of the bedsores.

**Suggested Reading List**

**Required Reading**

1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination. Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 1986
3. A system of case recording and clinical examination of patients on propaedeutic of internal diseases.
4. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
5. Methodical guideline for students
7. Website of department: www.cardiology.dsmu.edu.ua
8. Flow charts for Practice

**Additional Reading**

2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

**Sequence of Actions in the enquiry of the patient**

1 STEP. Determine consciousness
2 STEP. Determine position in bed; find out their diagnostic value (with the teacher’s help).
3 STEP. Determine a habitus (constitution) of the patient.
4 STEP. Ask the patient to undress over the belt, examine skin: color (pallor, acrocyanosis, pigmentation, scars), sweating, turgor (make fold of skin, then fast take off fingers), skin eruptions (their difference from hemorrhage by pressing with a finger).
5 STEP. Determine oedema (appearance of fosse after pressing with a finger), its symmetry, painfulness, degree; find out diagnostic value of available symptoms.
6 STEP. Examine lymph nodes (submandibular, parotid, cervical, occipital, supraclavicular, infraclavicular, axillary, cubital, inguinal, under knee) during survey and palpation, determine their sizes, surface, mobility, adherence together and with surrounding tissues, painfulness).
7 STEP. Pass to studying a locomotor system: muscles (level of development, atrophy, tenderness, tonus), joints (deformation, fluctuation, color of a skin, active and passive movements). Find out with the teacher diagnostic value of available symptoms.
8 STEP. Examine head (its form), face (puffy, cyanotic, sharp features, etc.), necks (pulsation of vessels, increases in a thyroid gland), eye (exophthalmia, reaction of pupils to light and accommodation, symptoms of the thyrotoxicosis), mouth (mucous membranes, tongue, teeth, tonsils); determine diagnostic value of the received symptoms.

**Revision Questions**

**Q1.** Patient C., 34 years, observes a constant dispnoea at rest, especially at night, weakness, palpitation, thirst, oliguria (insignificant amount of urine). Objectively: sits in armchair, with lean hands in armrests, frequency of breath 36 per 1 minutes, cyanosis of the lips, sharp features of face; significant oedema of the lower extremities, loin, forward belly wall – they are symmetric, on cruses – dense, on femurs – soft (doughy).
Note true about general condition of the patient:
A. Satisfactory
B. Moderate middle grave
C. Grave
D. Extremely grave
E. Good

Q2. Patient A. 66 years with cardiovascular pathology has specific changes of fingers and nails - clubbing of the fingers (bulbous swelling of the tip of the fingers) and nail in form of watch glass. What is pathogenesis of these changes?
A. Chronic hypoxia
B. Reduction in output of adrenocortical hormones
C. Anaemia
D. Increased concentration of bilirubin
E. Myxoedema

Q3. Patient C., 34 years, observes a constant dispnoea at rest, especially at night, weakness, palpitation, thirst, oliguria (insignificant amount of urine). Objectively: sits in armchair, with lean hands in armrests, frequency of breath 36 per 1 minutes, cyanosis of the lips, sharp features of face. Note true about position of the patient
A. Active
B. Passive
C. Forced

Q4. Determine the characteristic of sopor.
A. Unconsciousness.
B. Pathological deep sleep from which patient wake up only for short periods.
C. Twilling state.
D. Correct display of the reality in a brain of the person, the slowed answer on external irritant and signals.
E. Slow inadequate answers, disorientation in surroundings.

Q5. Determine the characteristic of coma.
A. Unconsciousness.
B. Pathological deep sleep from which patient wake up only for short periods.
C. Twilling state.
D. Correct display of the reality in a brain of the person, the slowed answer on external irritant and signals.
E. Slow inadequate answers

Q6. Patient O. 54 years complains of severe attack of dispnoea. Objective data: sits in bed, with lean hands in armrests, frequency of breath 30 per 1 min., cyanosis of the lips. Estimate the position of the patient.
A. Active
Q7. Patient 3, 45 years female was admitted to the endocrinological department. During physical examination enlargement of tongue was revealed. Which disease may cause these changes?
A. Anaemia
B. Thyrotoxicosis
C. Retrobulbar tumours
D. Acromegaly
E. Uraemia

Q8. Patient M, 44 years female was admitted to the hospital. During physical examination moist skin was revealed. Which condition may cause this change?
A. Dehydration
B. Myxoedema
C. Vomitting
D. Thyrotoxicosis
E. Acromegaly

Q9. Patient W, 64 years has skin changes - visible dilation of small subcutaneous blood vessels. Estimate these skin changes:
A. Teleangioectasia
B. Hyperpigmentation
C. Petechia
D. Urticaria
E. Vitiligo

Q10. Patient C, 35 years with herpes labialis – elevated above mucous membrane small lesions 0.5-1 cm in size filled transparent fluid. Estimate these changes:
A. Petechia
B. Urticaria
C. Vesicles
D. Teleangioectasia
E. Vitiligo

Key answers: 1-C, 2-A, 3-C, 4-B, 5-A, 6-C, 7-D, 8-D, 9-A, 10-C.
SUMMARY OF PROCEDURES

The practice lesson shall be begun in the study room. Checking of the homework, the test control is carried out. Then at the study room patient is invited. Demonstration of methodic of general assessment and examination of the different parts of body by the teacher: general condition, posture of the patient, consciousness, habitus, oedema, skin, mucous membranes, the locomotor system, the lymph nodes, checking of the oral cavitas, examination of pupils, palpation of the thyroid gland, pay much attention to normal data. Then lesson is transferred to ward: the teacher of group of students does the doctors round of patients, showing a different pathology, inviting in turn of each students on a fragment of research.

At the end of lesson in an educational room diagnostic value of available symptoms is discussed.

Final tests

Q1. Patient C. 45 years with cardiovascular pathology has cyanosis of the lips; significant symmetrical oedema of the lower extremities. What type of oedema does patient have?
A. General
B. Local
C. Hydrothorax
D. Anasarca
E. Ascites

Q2. Patient C., 34 years, observes a constant dispnoea at rest, especially at night, weakness, palpitation, thirst, oliguria (insignificant amount of urine). Objectively: significant oedema of the lower extremities, loin, forward belly wall – they are symmetric, on cruses – dense, on femurs – soft (doughy). What origin of oedema?
A. Inflammatory
B. Disturbance of outflow blood from veins.
C. Allergy

Q3. Patient V. 56 years with malignant tumour of stomach and metastasises of malignant tumour has enlargement of lymph nodes. Estimate features of lymph nodes after metastasis in them:
A. Smooth surface
B. Firm consistency
C. Formation of fistulae
D. Elastic consistency
E. Do not adhere to the skin

Q4. Patient R. 46 years with lymphogranulomatosis has enlargement of lymph
nodes. Estimate features of lymph nodes which are characteristic for lymphogranulomatosis:
A. Fuse with skin
B. Do not fuse with each other
C. Soft consistency
D. Painless
E. Elastic consistency

Q5. Patient J. 35 years has allergic reaction. Inspection of the skin reveals red round itching lesions elevated above skin. Estimate skin lesions:
A. Petechia
B. Hyperpigmentation
C. Urticaria
D. Teleangioectasia
E. Vitiligo

Q6. Among the following complaints, choose the main ones characteristic of pathologies of the cardiovascular system:
A. Oedema of the feet occurring in the evenings
B. Oedema that is localized on the face and occurs in the morning
C. Oedema of the feet, legs, fingers and arms
D. Oedema of the face, neck, upper extremities
E. Oedema localized mainly at the left foot and leg in the evening

Q7. The 24-hour range of temperature for a 41 year-old patient with fever was 4-5°C. For which type of fever is this a characteristic feature?
A. febris hectica (hectic fever)
B. febris undulans (undulant fever)
C. febris remittens (remittent fever)
D. febris recurrent (recurrent fever)
E. febris continua (continued fever)

Q8. The forced position of the patient is that:
A. Position which the doctor recommended for a quicker recovery
B. Position which the patient assumes due to the progressiveness of the disease
C. Position which the patient cannot change independently
D. Position which the patient assumes to reduce the occurrence of the illness (dyspnoea, cough, pain etc.)
E. Position with the patient assumes due to immobilization of the extremities (The use of skeletal traction, splints etc)

Q9. The passive position of the patient on the hospital bed refers to:
A. When the body and extremities of the patient are located under the influence of gravity and then the patient cannot independently change it
B. When the patient lies on the bed in such a way as to obtain maximum
relaxation and rest
C. When the patient is supine and the hands are stretched out around the body
D. When the patient is prone with the hands stretched out around the body
E. The most comfortable position for the patient.

Q10. During inspection of a 35-year old patient with chronic bronchitis, the doctor estimated his position in the bed as active. What does this mean?
A. The patient may assume any position he wishes
B. The patient assumes the position which reduces pain, dyspnoea and cough
C. The patient often needs to change his position to alleviate his condition
D. The patient intentionally assumes the position which alleviates expectoration of sputum
E. The patient sits with his legs drawn (bended) towards himself
The Health Ministry Of Ukraine  
Donetsk National Medical University

Approved  
at the meeting of  
Propedeutic and Internal Medicine  
Department  
Head of department  
Associate Member of NAMSc of  
Ukraine,  
Professor G. A. Ignatenko  
«________ »______________ 2011 p.

STUDENT’S SELF-STUDY GUIDELINES FOR  
PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>The main methods of examination of patient and the main symptoms and syndromes on internal diseases course</td>
</tr>
<tr>
<td>Topic 2 Module</td>
<td>Methods of examination and the main symptoms and syndromes in respiratory pathology</td>
</tr>
</tbody>
</table>
| Practice | Examination of the respiratory system. Enquiry, objective examination of patients with respiratory pathology. Methods of examination: percussion and auscultation of the lungs  
Instrumental diagnostics and laboratory investigation of the respiratory system.  
The main syndromes in respiratory pathology. Typical changes of tunica mucosa of mouth in respiratory pathology. Caring for those patients.  
First medical aid in patients with asphyxia and acute respiratory failure. |

| Course | 2 |
| Faculty | Dentistry |

Donetsk 2011
**Importance of the Subject**: Objective examination in addition with instrumental diagnostics and laboratory investigation of the respiratory system allow discover and identify a pathology of respiratory system. Some respiratory pathology shows up itself on mucous membrane of oral cavity and underlines connection oral cavity pathology and internal organs.

**Key Objective**: To master knowledge of and skills in enquiring, objective examination of the patients with pathology of the respiratory system including inspection, percussion, auscultation, vocal resonance and vocal fremitus, making an estimate of a diagnostic value of symptoms identifying necessary laboratory and instrumental investigations for certain syndrome of respiratory disorders and analyzing laboratory and instrumental investigations in respiratory pathology. Students should be able to reveal the main syndromes of respiratory pathology using all mentioned methods, provide caring for patients with respiratory pathology and render first aid in patients with asphyxia and acute respiratory failure.

**Specific Goals:**

1. To learn how to enquire patients with pathologies in respiratory organs about their most disturbing complaints.
2. To develop skills in carrying out examination of the respiratory system such as inspection of the chest, percussion and auscultation of the lungs, vocal resonance and vocal fremitus and in identifying the pathologies discovered.
3. To reveal changes and interpret findings of laboratory and instrumental investigations for certain respiratory pathology.
4. To be able provide caring for patients with respiratory pathology
5. To develop skills in render first aid in patients with asphyxia and acute respiratory failure.
6. To reveal changes of mucous membrane of the mouth in respiratory pathology

**Level of Knowledge and Skills before the Practice:**

1. To identify main parameters in the act of breathing (i.e. its frequency, depth, mode and rhythm) and factors which constitute them in normal and abnormal conditions. (Described in the Physiology course.)
2. To be able to distinguish features (i.e. mass, length, density and/or elasticity) of a vibrating body by the percussion note physical qualities (Described in the Biophysics course).
3. To develop understanding of the anatomic features of location of the lungs (Described in the Human Anatomy course.)
4. To know physiology of respiratory system (Described in the Physiology course)
5. To connect dependence of acoustical qualities of the percussion note with physical features of vibrating body (weight, length, density, elasticity)
Questions for Self-Assessment of the Pre-Practice Knowledge

Q1. A 70-year old patient L. suffers from a severe cardiac failure. During his inspection, the following abnormalities have been discovered: a periodic respiration, with the amplitude of respiratory movements increasing to reach its maximal length by cycle 6 or 7; with its further getting smaller to end with an interruption in breathing for 10-15 seconds, with a similar "wave" to follow without the patient feeling it. Which of the following refer to a pathological type of breathing in this case?
A. Kussmaul breathing
B. Biot breathing
C. Cheyne-Stokes breathing
D. Grocco breathing
E. Apnoea

Q2. A 56-year old patient H. Has a periodic respiration, with the amplitude of respiratory movements increasing to reach its maximal length by cycle 6 or 7; with its further getting smaller to end with an interruption in breathing for 10-15 seconds, with a similar "wave" to follow without the patient feeling it. Which of the following refer to a pathological type of breathing in this case? How are the breathing interruptions between respiratory "waves" called?
A. Tachypnoea
B. Bradypnoea
C. Asthma
D. Apnoea
E. Normopnoea

Q3. A 59-year old patient K. complains of the expiratory dyspnoea. Explain this term «expiratory dyspnoea»:
A. it is difficult to breathe in
B. it is difficult to breathe out
C. it is difficult to both breath in and out
D. asthma attacks occur
E. a periodic respiration takes place.

Q4. A 59-year old patient K. suffers from dyspnoea. Which of these figures refer to the respirations-per-minute rate of breathing in a healthy adult when at rest?
A. 10-12
B. 16-20
C. 22-28
D. 30-32
E. 30-36
Q5. A 67-year old patient T. suffers from dyspnoea, cough with purulent sputum. What complaint is not typical for pathology of respiratory organs?:
A. Cough
B. Cough out sputum
C. Dyspnoea
D. Vomitting
E. High temperature

Answer Keys: C, D, B, B, D

The following printed materials can be of help to improve your pre-practice knowledge and skills:
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

Contents of Practice

Topics of Theory:
1. A list of the most common complaints of patients suffering from a disease of respiratory organs. Pathogenesis of them.
2. Static and dynamic types of the chest inspections. Making an estimate of a diagnostic value of abnormalities in the shape of the chest. An enlargement / reduction in size of one side of the chest, abnormal changes in the respiratory frequency, mode and rhythm.
3. Static and topographic percussion of the lungs. Diagnostic value.
4. Auscultation of the lungs. The main breath sounds (vesicular and bronchial (laryngotracheal) sounds)) and added breath sounds (crepitations, rales, pleural rub).
5. Vocal fremitus and vocal resonance in identifying the syndromes of respiratory pathology.
6. Laboratory and instrumental investigations for certain respiratory pathology, diagnostic value of changes.
7. The main syndroms of respiratory pathology (syndrome of air and fluid in the pleural cavity, bronchial obstructive syndrome, syndrome of increased airiness of the lungs, syndrome of pulmonary consolidation, respiratory failure).
8. Caring for patients with respiratory pathology.
10. To determine changes of mucous membrane of the mouth in respiratory pathology.

After the above-mentioned topics have been studied, turn to get familiar with relevant Flow charts for practice given in the Appendices
**Practical skills:**

Students should be able to demonstrate mastery of the following practical skills:

1. To carry out an enquiry of patient with pulmonary pathology. To determine the main symptoms.
2. To carry out an inspection of patient’s chest with pulmonary pathology. To estimate data.
3. To carry out percussion of the lungs and determine clinical value of symptoms.
4. To carry out auscultation of the lungs and give clinical value.
5. To be able to provide first medical aid in patients with asphyxia and acute respiratory failure.
6. To be able to provide caring for patients with respiratory pathology.
7. To reveal changes of mucous membrane of the mouth in respiratory pathology.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>It is a reflex action aimed at clearing the air passages of phlegm, mucus, foreign body or other irritants</td>
</tr>
<tr>
<td>Haemoptysis</td>
<td>is expectoration of the blood with sputum during cough (bloody expectoration)</td>
</tr>
<tr>
<td>Bronchial asthma</td>
<td>A disease of respiratory system that involves inflammation of the bronchial tubes associated with attacks of dyspnoea, cough, wheeze and varying degrees of reversible airflow obstruction, typically due to an allergic reaction causes narrowed lumen of bronchi(spasm), inflammatory oedema of their mucous membranes, accumulation of viscous sputum</td>
</tr>
<tr>
<td>Static inspection of the chest</td>
<td>Inspection of the chest is estimated usual breathing (shape of the chest, symmetry of the chest)</td>
</tr>
<tr>
<td>Dynamic inspection of the chest</td>
<td>Inspection of the chest is estimated during deep breathing (involvement of two side of the chest - absence of lagging of one side, sites of indrawing or protrusion of intercostals spaces, involvement of accessory muscles in respiratory act)</td>
</tr>
<tr>
<td>Apnoea</td>
<td>Temporary arrest of respiration</td>
</tr>
<tr>
<td>Percussion</td>
<td>Tapping various parts of the human body produces sounds (notes) by which one can learn about the condition of the underlying organs.</td>
</tr>
<tr>
<td>Syndrome of consolidation of pulmonary tissue</td>
<td>The syndrome of focal consolidation of lung tissue is caused by filling of the alveoli with the inflammatory fluid and fibrin (pneumonia - inflammatory consolidation), blood (lung infarction), growing connective tissue in the lung (pneumosclerosis) or developing tumour, atelectasis (noninflammatory consolidation) .</td>
</tr>
<tr>
<td>Topographic percussion of the Lungs</td>
<td>This is percussion which includes determination the upper level of lung apices, width of pulmonary apices, lower border of the lungs for each of their topographic lines and the range of movement of the lower pulmonary borders (diaphragmatic movement)</td>
</tr>
<tr>
<td>Funnel chest (pectus excavatum, funnel- chest deformity)</td>
<td>Chest has a funnel-shaped depression in the lower part of the sternum. This deformity can be regarded as a result of abnormal development of the sternum or prolonged compressing effect.</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Foveated chest</td>
<td>It is almost the same as the funnel chest except that the depression is found mostly in the upper and the middle parts of the anterior surface of the chest. This abnormality occurs in syringomyelia, a rare disease of the spinal cord.</td>
</tr>
<tr>
<td>Vocal fremitus</td>
<td>Method is used for determining the strength of voice conduction to the chest surface by palpation. Examiner puts hands over symmetrical parts of the chest and asks the patient to say «one-one-one» or «ninety-nine» loudly. Vocal fremitus is of about the same intensity in the symmetrical parts of the chest of a healthy person. Vocal fremitus is intensified when a part of the lung or its whole lobe becomes airless because of a pathological process.</td>
</tr>
<tr>
<td>Lobar pneumonia</td>
<td>Pneumococcal pneumonia with inflammatory consolidation of whole lobe associated with pleural affection (dry pleuritis). It has 3 stages. 1 stage - acute hyperaemia of the lung tissue, exudation. Alveolar wall are impregnated by exudate, impaired - hyperresonant note is revealed during percussion. 2 stage - red and grey hepatization of lung tissue, lung tissue is airless by consolidation, dull note is revealed during percussion. 3 stage - resolution stage, impaired - hyperresonant note is found out during percussion.</td>
</tr>
<tr>
<td>Atelectasis</td>
<td>Decrease or absence of airness of pulmonary region caused by obstruction of bronchial lumen by tumour, foreing body (incomplete or complete obstructive atelectasis) or compression of lung tissue from the outside by pleural effusion, air (compressive atelectasis)</td>
</tr>
<tr>
<td>Syndrome of accumulation of pleural fluid</td>
<td>occurs in hydrothorax (accumulation of non-inflammatory effusion, i.e. transudate, for example in cardiac failure), or in pleurisy with effusion (inflammation of the pleura).</td>
</tr>
</tbody>
</table>

**Flow chart 1, 2, 3, 4.**
A Breakdown Chart of the Chest Inspection

- Inspection
  - A Type of Inspection
    - Static Type
    - Dynamic Type
  - A Purpose of the Inspection
    - Learn about
      - A shape of the chest
      - Symmetry of the chest
      - Involvement of two side of the chest
      - Mode of breathing
      - Respiratory frequency
A Breakdown Chart of the Percussion Examination Physical Basis

Percussion note

- Volume (loudness)
- Duration
- Pitch
- Timbre

Determining factor

Amplitude of vibration

- Duration of vibrations
- Frequency of vibrations
- Resonance of overtones

Physical characteristics of the percussion note

- Loud
- Soft
- Prolonged
- Short
- High
- Low
- Musical

Physical qualities of the percussion note

Components within the percussion zone

- Air
- Solid particles

Dependence of the note characteristics upon physical properties of a vibrating body

- The higher the density of a body (i.e. when one is of greater tension, lower weight, and shorter length to contain less air), the softer, shorter and higher the note is.
- The lower the density of a body (i.e. when one is of lower tension, higher weight, and greater length to contain more air) the louder, more prolonged and lower the note is.
The Break Down Chart of the Subject “Clinical variants of the percussion note”

Percussion note

- Resonant
  - Impaired (dullish)
    - Load prolonged low
      - Air: dense elements
      - Over the lunes

- Dull
  - Impaired-hyperresonant
    - Soft, short, more prolonged, lower than dull percussion note but is softer, shorter and higher than hyperresonant one
      - Over the liver, heart
      - Lower border of the left lung, axillary lines

- Hyperresonant
  - Load prolonged low, musical timbre
    - Air congestion in a large cavity
    - Over the gastric air bubble, loops of intestines

Clinical variants

Physical characteristics

Components of percussion zone

It is observed:

A) In the norm

B) In the pathology

- Layer of a fluid in a pleural cavity
- Localized pulmonary consolidation
- Layer of a fluid in a pleural cavity
- Considerable pulmonary consolidation
- Complete obstructive atelectasis
- Acute lobar pneumonia in its final stages
- Pulmonary edema
- Pneumothorax
- Large pulmonary cavities
"The Main Breath Sounds"

**Vesicular Breath Sounds**
- **Classification**
- **Mechanism of occurrence**
  - Vibration of the alveolar walls
- **Acoustic characteristic**
  - Soft
  - It is auscultated in inspiration and at the beginning of expiration (1/3)
- **Places of auscultation in the norm**
  - Along the whole length
- **Qualitative changes**
  - Harsh
  - Vesicular breath sounds with prolonged expiration
  - Interrupted
  - Increased
  - Diminished

**Bronchial Breath Sounds**
- **Classification**
- **Mechanism of occurrence**
  - Vortex-type motion of air when it passes through the vocal slit
- **Acoustic characteristic**
  - Rough
  - It is auscultated during inspiration and expiration
- **Places of auscultation**
  - Larynx, jugular fossa, manubrium of sternum
  - VII cervical vertebra, III-IV thoracic vertebra
- **Qualitative changes**
  - Consolidated
  - Compressive
  - Amphoric
  - Diminished

**Conditions**
- Bronchiectasis
- In the children
- Viscous
- Cheyne-Stokes breathing
- Emphysema of the lungs
- Pneumothorax
- Pneumonia
- Pleural effusion
- Acute lobar pneumonia in 1st III stages
- Incomplete obstructive atelectasis (collapse)
- Pneumothorax
- Acute lobar pneumonia in 1st stage
- Infiltrate of the lungs
- Lobar pneumonia
- Exudative pleurisy
- Tumor-walled cavity
- Pneumothorax - bronchial fistula
- >5 cm
<table>
<thead>
<tr>
<th>The mechanism of occurrence</th>
<th>Narrowed bronchi, presence of viscous sputum</th>
<th>Presence of watery sputum in bronchi</th>
<th>Presence of watery secretion</th>
<th>Impregnation of alveolar walls</th>
<th>Deposits on a pleura</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the bronchi, which is surrounded consolidated lung tissue</td>
<td>Exudate</td>
<td>Blood</td>
<td>Transudate</td>
<td>Fibrin</td>
<td>Tubercles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnostic value</th>
<th>Bronchitis</th>
<th>Acute bronchitis</th>
<th>Venous congestion in the lungs</th>
<th>Cavity, abscess</th>
<th>Pneumonia</th>
<th>Bronchiectasis</th>
<th>Acute lobar pneumonia at its I and III st.</th>
<th>Pulmonary infarction</th>
<th>Onset of pulmonary oedema</th>
<th>Dry pleurisy</th>
<th>Tuberculosis</th>
<th>Severe dehydration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bronchial asthma</td>
<td>Acute bronchitis</td>
<td>Venous congestion in the lungs</td>
<td>Cavity, abscess</td>
<td>Pneumonia</td>
<td>Bronchiectasis</td>
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<td>Onset of pulmonary oedema</td>
<td>Dry pleurisy</td>
<td>Tuberculosis</td>
<td>Severe dehydration</td>
</tr>
</tbody>
</table>
Investigation of Sputum

Macrosopic investigation of sputum

- Colour
- Character
- Consistence
- Visible Elements
  - Blood cells
  - Elastic fibres
  - Tumour cells
  - Alveolar macrophages
  - Chacot-Leyden crystals
  - Bacteriae
  - Curschmann spirals
  - Fungi
  - Epithelium cells
  - Hemosiderin crystals
  - Dittrich’s plugs
  - Clots of fibrin

Microscopic investigation of sputum

Bacteriological investigation of sputum

- Bacterioscopic investigation
- Inoculation of medium
Syndromes of pathology of lungs and pleura

Increased airiness of the lungs
- Pulmonary emphysema
- Bronchial asthma

Pulmonary inflammatory infiltration
- Pneumonia
- Tuberculous infiltration

Obstructive atelectasis (complete, incomplete)
- Obstruction by tumour
- Obstruction by foreign body

Compressive atelectasis
- Compression by fluid in pleural cavity
- Compression by air in pleural cavity

Fluid in pleural cavity
- Hydrothorax
  - Haemothorax
  - Chylothorax
- Exudative pleurisy

Air in pleural cavity
- Pneumothorax

Pulmonary cavity
- Tuberculous cavern
- Abscess
- Bronchiectasis
- Dry cyst of lung
- Echinococcus cyst of lung
Suggested Reading List

Required Reading
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 2000
5. First aid manual by British Red Cross Society
6. Davidson’s Medicine, Edited by Nicholas A. Boon, Nicki R. Colledge, Davidson, 2008
7. Manual for the Case Record, Edited by Ignatenko G.A., Department of Propaedeutics of Internal Medicine, Donetsk, 2009
8. Lecture: Examination of the respiratory system
9. Methodical guideline for students
10. Flow charts for Practice
11. Website of department: www.cardiology.dsmu.edu.ua

Additional Reading
2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005

Sequence of Actions in the Respiratory System Examination

STEP1. Making an enquiry of patient about his complaints in detail and of functional conditions of his respiratory organs
STEP 2. Inspecting the chest. Stand in a position with your back turned to the light, 1.5-2 m away from the patient undressed to the waist. Check his chest for symmetry, presence of supraclavicular and subclavicular fossae on each of its sides, intercostal spaces, their position, features of the epigastric angle (by tracing margins of the ribs with your thumbs), closeness of the shoulder blades to the chest, a ratio between anteroposterior and transverse dimensions of the chest, identify a type of its shape (by means of static inspection), involvement of each sides of the chest in the respiratory act (by means of dynamic inspection). Identify the abnormal changes discovered.
STEP3. Examining the breathing. Measure a rate of breathing in respirations per minute (by acting as if you take pulse), identify its type (mode of breathing) and rhythm, and make an assessment of data obtained.
STEP4. Practicing to work out the techniques of the direct and indirect percussion procedures by Obraztsov’s method (under instructor’s guidance), learning about differences in percussion sounds (resonant, dull, and
hyperresonant percussion notes).

**STEP 5. To perform topographic percussion**
To determine:
- a) an upper level of lung apices in the front side.
- b) an upper level of lung’s apices in the back side.
- c) a width of the Kroenig’s area.
- d) a lower border of the lungs for each topographic line
- e) range of movement of the lower pulmonary borders (diaphragmatic movement)

**STEP 6. To perform comparative percussion**

**STEP 7. To make palpation of the chest, determine vocal fremitus and vocal resonance**

**STEP 8. To perform auscultation of the lungs, determine the main breath sound and presence of the added breath sounds**

---

**The main complaints typical for respiratory pathology are dyspnoea, cough, hemoptysis, pain in the chest**

**Dyspnoea** is characterized by changes in the respiratory rate and/or depth, rhythm, duration of the inspiration or expiration

**Base on cause of dyspnoea**
1. physiological (caused by heavy exercise)
2. pathological (associated with pathology of the respiratory system, cardiovascula pathology and haemopoietic pathology, poisoning)

**Base on breathing phase**
1. Inspiratory dyspnoea
   - mechanical obstruction of the upper respiratory tract (tumour, diphtheria)
   - affection of the pleura (hydrothorax, pneumothorax, exudative pleuritis, lobar pneumonia)
   - pulmonary embolism
   - palmonary cancer
   - atelectasis, abscess
   - left cardiac failure
2. Expiratory dyspnoea - narrowed lumen in the fine bronchi, bronchioles due to inflammatory oedema and swelling of their mucosa or else spasm in the smooth muscle (bronchial asthma, obstructive bronchitis)
3. Mixed dyspnoea – reduction of the respiratory surface of the lungs
   - pneumonia
   - pneumosclerosis
   - emphysema
   - pulmonary infarction
   - pulmonary oedema
   - left cardiac failure
## Normal Shapes of the Chest

<table>
<thead>
<tr>
<th>Features</th>
<th>Asthenic chest</th>
<th>Normosthenic Chest</th>
<th>Hypersthenic Chest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shape</strong></td>
<td>long and narrow</td>
<td>conical</td>
<td>cylinder like</td>
</tr>
<tr>
<td><strong>Anteroposterior r/ longitudinal dimensions</strong></td>
<td>&lt; 0,65</td>
<td>0,65-0,75</td>
<td>&gt; 0,75</td>
</tr>
<tr>
<td><strong>Ratio</strong></td>
<td>limbs&gt;&gt;trunk thorax&gt;&gt;abdomen</td>
<td>limbs&gt;trunk thorax&gt;abdomen</td>
<td>limbs&lt;trunk thorax&lt;abdomen</td>
</tr>
<tr>
<td><strong>Epigastric angle</strong></td>
<td>&lt;90°-acute angle</td>
<td>90°-right angle</td>
<td>&gt;90°- obtuse angle</td>
</tr>
<tr>
<td><strong>Ludowici angle</strong></td>
<td>levelling</td>
<td>moderate</td>
<td>expressed</td>
</tr>
<tr>
<td><strong>Supraclavicular and subclavicular fossae</strong></td>
<td>sharply pronounced</td>
<td>slightly pronounced</td>
<td>invisible</td>
</tr>
<tr>
<td><strong>Position of shoulders</strong></td>
<td>sloping</td>
<td>horizontal</td>
<td>horizontal</td>
</tr>
<tr>
<td><strong>Position of scapulae</strong></td>
<td>separated from the chest</td>
<td>closely fit to the chest</td>
<td>closely fit to the chest</td>
</tr>
<tr>
<td><strong>Course of ribs</strong></td>
<td>more vertical</td>
<td>moderate horizontal</td>
<td>more horizontal</td>
</tr>
<tr>
<td><strong>Intercostal spaces</strong></td>
<td>wide</td>
<td>narrow</td>
<td></td>
</tr>
</tbody>
</table>

### Asymmetrical chest due to enlargement of one side of the chest
- Hydrothorax (exudative pleurisy)
- Pneumothorax
- Enlargement of liver or spleen
- Enlargement of heart
- Hydropericardium

### Asymmetrical chest due to diminution of one side of the chest
- Pleural adhesion
- Pneumosclerosis
- Resection of part or entire lung
- Atelectasis (collapse of lung)
Added respiratory parameters

The type (mode), frequency, depth and rhythm of respiration can be determined by carefully observing the chest and the abdomen.

Mode of breathing

*Mainly thoracic respiration.* Respiratory movements are carried out mainly by the contraction of the intercostal muscles. The chest markedly broadens and slightly rises during inspiration, while during expiration it narrows and slightly lowers. This type of breathing is known as costal and is mostly characteristic of women.

*Mainly abdominal respiration.* Breathing is mainly accomplished by the diaphragmatic muscles; during the inspiration phase the diaphragm contracts and lowers to increase rarefaction in the chest and to suck in air into the lungs. The intra-abdominal pressure increases accordingly to displace anteriorly the abdominal wall. During expiration the muscles are relaxed, the diaphragm rises, and the abdominal wall returns to the initial position. This type of respiration is also called diaphragmatic and is mostly characteristic of men.

*Mixed respiration.*
The respiratory movements are carried out simultaneously by the diaphragm and the intercostal muscles. In physiological conditions this respiration sometimes occurs in aged persons.

**Respiration rate.** Respiration rate can be determined "by counting the movements of the chest or the abdominal wall, with the patient being unaware of the procedure. The pulse rate should first be taken, with fingers held on pulse to avoid drawing the patient’s attention to breathing. The number of respiratory movements in a healthy adult at rest should be 16 to 20 per minute.

**Respiratory depth**
- Normal
- Superficial (shallow)
- Deep (Kussmaul breathing, high temperature, affection of the brain)

**Respiratory rhythm**
- Rhythmic breathing - equal depth and length of the inspiration and expiration phases
- Pathological (periodic) rhythm

**Changes of Percussion Note Over Lungs in the Pathology**

**Dull Note (only dense elements, absence of air)**
Lobar pneumonia in 2nd stage
Large pulmonary cavity with fluid (pus)
Tumour
Massive accumulation of fluid in pleural cavity
Complete obstructive atelectasis
**Dullish (impaired) Note (more dense elements, than air)**
Pulmonary fibrosis
Pleural adhesion
Lobular pneumonia
Obstructive atelectasis
Moderate hydrothorax
Pulmonary oedema

**Hyperresonant Note (>more air, than dense elements)**
Pneumothorax
Large thin-walled pulmonary cavity with air-tbs cavern (more than 6)
Emphysema, attack of bronchial asthma (bandbox note)
Diaphragmatic hernia
Large dry bronchiectasis

**Impaired -Hyperresonant Note**
Pulmonary oedema (onset)
Lobar pneumonia (1st and 3rd stages)
Compressive and obstructive (incomplete) atelectasis

**Features of Vesicular Breath Sounds**
Vesicular breath sounds are heard over pulmonary tissue during whole inspiration and only during first third (1/3) of expiration (decrease in vibration of alveolar walls)
Ratio between inspiration and expiration – 5 : 1
Soft sound (resemble sound « f »)
Inspiration - 120 Hertz, expiration - 100 Hertz
Transmission to chest is good

**Alterations in Vesicular Breath Sounds**
**A. Quantitative changes**

**Diminished Vesicular Breath Sounds**
physiological diminished vesicular breath sounds
pathological diminished vesicular breath sounds

**Increased Vesicular Breath Sounds**
physiological increased vesicular breath sounds
pathological increased vesicular breath sounds

**B. Qualitative changes**
vesicular breath sounds with prolonged expiration
harsh breathing
interrupted breathing

**Features of Bronchial Breath Sounds**
Certain places for their auscultation in the norm (over larynx, thyroid cartilage, jugular fossa, manubrium of sternum, VII cervical vertebra,
II-III thoracic vertebrae (in asthenics). Bronchial breath sounds are not heard over other parts of the chest because of large masses of pulmonary tissue found between bronchi and chest wall. When bronchial breath sounds are heard over other places they are called the pathological bronchial breath sounds. They are heard during inspiration and whole expiration (sounds are louder and longer with expiration than with inspiration)

Ratio between inspiration and expiration 4 : 5

Rough sound (resemble sound « ch»)

Inspiration - 300 - 400 Hertz, expiration – 500- 1000 Hertz

Transmission to chest is bad

Types of Pathological Bronchial Breath Sounds
- consolidated bronchial breath sounds
- compressive bronchial breath sounds
- amphoric bronchial breath sounds (may be with metallic tone (loud, high sound) - thin-walled cavity more than 5-6 cm)

Syndrome of pulmonary cavities
- Abscess
- Bronchiectasis
  - Kartagener's syndrome – situs viscerus inversus, sinusitis, bronchiectasis.
  - Williamsa-Kempebla – congenital bronchoectasis due to hypoplasia of bronchial cartilages.
- Tuberculous cavern
- Cystic lung hypoplasia
- Dry cyst
- Echinococcus cyst
- Lung infarction

Pulmonary cavity with communication with bronchus

Inspection - visual changes are absent; percussion- hyperresonant or impaired-hyperresonant (it depends on size of cavity, presence of inflammatory capsule which surrounds it, presence fluid in it); auscultation- bronchial amphoric breath sounds, moist consonating rales, vocal fremitus and vocal resonance are increased

Bronchiectasis - this is a condition characterized by local dilatation of the bronchi. Bronchiectatic conditions are divided into primary (congenital, which are very rare) and secondary (complication of various diseases of the bronchi, lungs and pleura). Bronchiectases develop in bronchitis only when the inflammatory process extends onto the muscular layer of the bronchial wall or onto all its layers.

The main symptom is cough with expectoration of seromucopurulent (three layers) or purulent sputum (sometimes foul-smelling). The daily amount of expectorated sputum varies from 50 to 500 ml and more. Blood streaks may be seen. Cough is paroxysmal in character and occurs mainly in the morning.
Haemoptysis, dyspnoea, excess sweating, weakness, headache, dyspepsia, deranged sleep and appetite, and wasting can also be observed.

The body temperature rises, leucocytosis develops, and ESR increases. General inspection of the patient reveals acrocyanosis (at later stages of the disease) and oedematous face; in some cases the terminal phalanges of the fingers become clubbed (Hippocratic fingers), and the nails resemble the watch glass.

**Bronchial obstructive syndrome**

**Complaints** – dyspnoea with difficulties in exhalation, dyspnœa with intensification at night and in cold weather, cough, wheezes

**Inspection** – protrusion of intercostals space, supra- and infraclavicular fossea.

**Palpation** – deacreased vocal fremitus.

**Percussion** – hyperresonant (bandbox note), elevation of upper level of pulmonary (apices), lowering of lower borders. Decrease in movement of both sides of the chest

**Auscultation** – harsh, vesicular breath sound with prolonged expiration, wheezes, rhonchi which increase during forced expiration

**Syndrome of increased airiness of the lungs – emphysema**

– vicarious- (pulmonectomy, pneumothorax, hydrothorax, so another lung works more severe)
  - primary
  - secondary (complication of chronic obstructive pulmonary diseases)
  - limited
  - diffuse

**Inspection** – barrel-like chest, protrusion of intercostals space, supra- and infraclavicular fossea.

**Palpation** – deacreased vocal fremitus.

**Percussion** – hyperresonant (bandbox note), elevation of upper level of pulmonary (apices), lowering of lower borders. Decrease in movement of both sides of the chest

**Auscultation** – deacreased vesicular breath sound

**Syndromes of pneumothorax**

- *Traumatical pneumothorax* (blunt trauma of the chest, fracture of ribs, penetrating wound of the chest by knife, bullet)
- *Iatrogenic pneumothorax* (after resuscitation - external cardiac massage, unsuccessful puncture of pleural cavity)

- *Spontaneous pneumothorax*
  – neonatal
  – primary (unknown reasons)
  – secondary (COPD, BA, pneumonia, infarction, tumor, endometriosis, tbs, X-Ray examination with contrast, cystic fibrosis, eosinophilic granuloma, Marfan's syndrome, pregnancy)
- *Tension pneumothorax* (when air can’t go out from pleural cavity and new portions come in it again) – it gives dullish note during percussion

**Syndrome of atelectasis**

*Obstructive atelectasis*
- complete (collapse) - indrawing of the intercostals spaces, lagging of affected side, dull note, absence of breath sounds, vocal fremitus and vocal resonance are absent
- incomplete – normal or small indrawing of the intercostals spaces, impaired-hyperresonant note, decreased vesicular breath sounds, vocal fremitus and vocal resonance are decreased
*

*Compressive atelectasis* (compression of lung tissue by tumour, hydrothorax, pneumothorax)

Cause of **complicated pulmonary compliance** which accompanied with dyspnoea:
- pneumosclerosis
- pleural adhesion

**Revision Questions**

**Q1.** During the inspection of a patient an accelerated respiratory rate of 24 per minute was observed. What does this mean?
A. Cheyne-Stokes breathing
B. apnoea
C. bradypnoea
D. breathlessness
E. normopnoea

**Q2.** Choose the pathological rhythm of breathing:
A. laryngotrachealis breathing;
B. vesicular breathing;
C. biot's breathing;
D. saccadic breathing;
E. bronchial breathing.

**Q3.** It is impossible to define by percussion border between:
A. lung lobes;
B. lung and muscles;
C. lung and liver;
D. lung and heart;
E. intestines and the lower border of liver.

**Q4.** First percussion stroke is done at comparative percussion over:
A. right side of chest;
B. left side of chest;
C. increased side of chest;
D. decreased side of chest;
E. side of chest with good amplitude of breathing.

Q5. Which of these diseases is likely to cause the appearance of the bronchial breath sounds?:
A. not expressed bronchiectasis;
B. cavernous tuberculosis;
C. complete obstructive atelectasis
D. small adhesive pleuritis;
E. pneumothorax.

Q6. Choose condition which is necessary for occurrence of pleural rub:
A. patency of the bronchi and inflammation of pleural layers;
B. infiltration of pulmonary tissue and inflammation of pleural layers;
C. collapse of pulmonary tissue and inflammation of pleural layers;
D. increased airness of the lungs and inflammation of pleural layers;
E. inflammation of pleural layers.

Q7. What does macroscopic investigation of sputum include:
A. presence of elastic fibres
B. presence of atypical cells
C. colour of sputum
D. inoculation of medium
E. presence of Charcot –Leyden crystals

Q8. A 48-year-old patient K., suffers from attack of severe dyspnoea («I can not exhale»). She is sitting on the bed, with resting on the bed, respiratory frequency is 24 respirations per minute, with prolonged expiration and a sound of wheezing heard. Her chest is found emphysematous, symmetric in shape, with the percussion note being of a hyperresonant type. The cause of respiratory failure in this is case:
A. accumulation of air in a pleural cavity;
B. accumulation of fluid in a pleural cavity;
C. massive low-lobe right pneumonia;
D. attack of bronchial asthma
E. expressed pleurae adhesions.

Q9. During inspection of patients with syndrome of complete obstructive atelectasis of lung can be revealed the following:
A. decrease of the affected half of the chest
B. levelling of the intercostals spaces
C. enlargement of the affected half of the chest
D. emphysematous (barrel-like) chest
E. levelling or protrusion of supraclavicular fossae

Q10. Which auscultatory data can be defined in patients with syndrome of inflammatory pulmonary consolidation (lobar pneumonia 1 and 3 stage):
A. diminished vesicular breath sounds
B. increased vesicular breath sounds
C. bronchial breath sounds
D. dry rhonchi
E. non-consonating moist rales
SUMMARY OF PROCEDURES

The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out. Another part of the practice shall be conducted in the hospital wards. Instructor will demonstrate to the students how to make enquiring, inspection of the chest and examination of the respiratory system. Before examination of patients in ward or at the end of practice lesson students listen to records of added breath sounds in a phonoclass. Then component elements of the examination of the respiratory system shall be practiced by each of the students individually. During it, the students shall enquire patients (one at a time) of their breathing condition, concentrating on any symptoms of abnormalities or disorders they noticed. After that, the patient’s chest shall be inspected, with a rate of breathing measured, its type (mode of breathing) and rhythm identified, students perform percussion and auscultation of the lungs and signs of abnormal changes in those with respiratory pathologies discovered. Diagnostic value of the revealed changes of breath sounds in examined patients shall be discussed outside of the ward. Instructor teaches to perceive the organism of man as single unit, underline connection oral cavity pathology and internal organs, to provide first aid to the patients before hospitalization and in urgent situations. At the end of the practice teacher makes short general conclusion concerning obtained findings and students do final tests.

Final Tests

Q1. Which of the following medications is indicated for a patient with haemoptysis?
A. Cupping glasses
B. Mustard plasters
C. Compress with camphor
D. Ice bag
E. leeches

Q2. Choose disease which is characterised by expiratory dyspnoea:
A. chronic obstructive bronchitis and bronchial asthma;
B. hydrothorax and cardiac asthma;
C. bronchial asthma and pulmonary embolism;
D. pneumothorax and full athelectasis;
E. foreign body in bronchus and bronchial asthma.

Q3. When is impossible to define border with topographical percussion:
A. lung and muscles;
B. lung and liver;
C. lung and heart;

Answer Keys : Q1: D; Q2: C; Q3: A; Q4: E, Q5: B; Q6: E; Q7: C; Q8: D, Q9: A; Q10: A.
D. liver and heart;
E. intestines and the lower edge of liver.

Q4. During recovery of the patient with exudative pleurisy percussion note on the affected side change from:
A. from dull note to impaired, and then to resonant;
B. from dull note to impaired-hyperresonant, and then to resonant;
C. from dull note to impaired-hyperresonant, and then again to dull;
D. from dull note to resonant, and then to impaired;
E. all time persistent dull note.

Q5. Choose extra-pulmonary factor which causes diminished vesicular breath sounds:
A. small amplitude of movements of alveolar walls during their expressed stretching;
B. small amplitude of movement of alveolar walls during their collapse;
C. increased amplitude of movement of alveolar walls;
D. accumulation of air in the pleural cavity;
E. thick chest wall.

Q6. Which of these diseases is likely to cause the appearance crepitations?
A. lobar pneumonia in 1-st stage;
B. lobar pneumonia in 2-nd stage;
C. cavernous tuberculosis;
D. acute bronchitis;
E. bronchiectasis.

Q7. Choose the pathology which is characterized by presence of hemorrhagic exudate:
A. heart failure
B. bronchial asthma
C. pneumothorax
D. pleural tumour
E. connective tissue disease

Q8. The division of types of respiratory failure (acute, chronic) according to classification is based on:
A. features of dyspnoea
B. features of cough
C. data of anamnesis
D. severity of cyanosis
E. swollen of cervical veins

Q9. The syndrome of inflammatory infiltration of pulmonary tissue is observed at:
A. pneumonia
B. pneumothorax
C. hydrothorax
D. tuberculous cavern
E. bronchial asthma
Q10. Choose the data of percussion which is characteristic of patients with syndrome of complete obstructive atelectasis of lung:
A. impaired (dullish) percussion note
B. hyperresonant (bandbox) percussion note
C. dull percussion note
D. dullish- hyperresonant (impaired-tympanitic) percussion note
E. resonant percussion note
STUDENT'S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>The Main Methods of Examination of Patients on Internal Diseases Course.</td>
</tr>
<tr>
<td>Subject Module 3</td>
<td>The Methods of Examination and Main Symptoms and Syndromes of the Cardiovascular System Pathology.</td>
</tr>
<tr>
<td>Course</td>
<td>2</td>
</tr>
<tr>
<td>Faculty</td>
<td>Dentistry</td>
</tr>
</tbody>
</table>

Donetsk 2011
Importance of the Subject: carrying out of an interview, examination and palpation of precordial region, properties of cardiac beat with the assessment in the identified changes plays an important role in the diagnosis of cardiovascular diseases. Ability to define the heart and vascular bundle borders with percussion and evaluate the changes of diagnostic value is essential in determining the nature of the pathology of the cardiovascular system and other organs. Ability to provide qualified first aid in emergency conditions is preventing their serious consequences and terminal conditions.

Key Objective: to carrying out an interview of patients with pathology of the cardiovascular system, examination and palpation of precordial region and vessels, to identify properties of apex-beat and to interpret revealed symptoms for the next diagnostic of diseases of the circulation organs. To learn percussion definition of the borders of absolute and relative heart and vascular bundle dullness and to estimate normal and pathological parameters that was revealed.

Specific Goals:
1. To interview a patient with sequential specification of patient complaints, characteristics of disease and life history anamnesis.
2. To describe characteristics of general patient examination with assessment of bed position, color of skin and mucous membranes, peripheral edema’s existence.
3. To conduct consecutive examination of precordial region and neck. To detect pathological changes (cardiac hump, pulsation in heart area and neck, varicose veins, etc.) and to estimate theirs diagnostic value.
4. To work for technique and method of palpation of precordial area following method and technique; to detect clinical properties of apex-beat (localization, abundance, depth, resistance, dislocation) and to estimate diagnostic value of revealed changes.
5. To detect and to interpret presystolic and systolic thrill (“cattish purr symptom”).
6. Give interpretation of diagnostic value of interview, examination and palpation information for definition the symptoms of cardiovascular pathology system.
7. To made heart percussion following method and technique.
8. To describe sonic information of percussion that represents absolute and relative heart dullness.
9. To shows and estimate the borders (right, upper, left) of absolute and relative dullness of heart, it changes at pathology.
10. Give interpretation of diagnostic value of physiological conditions that influence on a size and position of dullness of heart.
11. To definite and estimate width of vascular bundle.
12. Interpret the diagnostic value of changes of borders of relative and absolute dullness of heart, width of vascular bundle, configuration of heart for determination of pathology syndromes of the cardiovascular system of organs of breathing, mediastinum and abdominal region.
13. To measure the arterial blood pressure by Korotkoff (according to WHO recommendations).
14. To render first aid at hypertensive crisis, sudden stop of blood circulation, heart attack, loss of consciousness, collapse, acute pain at heart region.
15. To render first aid at acute bleeding. To prepare transfusion system and take part at transfusion of blood or its components.

Level of Knowledge and Skills before the Practice:
1. To clearly know anatomic and physiological bases of appearance of apex beat. To distinguish main cardiac cycle indexes (described in the Physiology course).
2. To know topographical anatomy of heart and main vessels (Described in the Anatomy course).

Questions for Self-Assessment of the Pre-Practice Knowledge

Q1. In healthy human heart rate at rest is in the range of
   A. 55-80 bpm
   B. 60-70 bpm
   C. 60-90 bpm
   D. 65-95 bpm
   E. 75-85 bpm

Q2. The resistance of blood flow at vessels of human proportionate depends on a few factors. What are the factors?
   A. Radius of vessels and blood viscosity.
   B. Radius of vessels and the $CO_2$ saturation of blood.
   C. Radius of vessels and erythrocyte sedimentation rate.
   D. Radius of vessels and the $O_2$ saturation of blood.
   E. Length, radius and pH of blood.

Q3. When pressing on the eye is a reflex:
   A. Increase of a heart rate.
   B. Decrease of a heart rate.
   C. Decrease of respiratory movement’s rate.
   D. Increase of respiratory movement’s rate.
   E. Widening of bronchial tree diameter.

Key answers: 1 – C, 2-A, 3-B.

Suggested Reading List for the initial level of knowledge


Contents of Practice

Theoretical questions to practice.
1. A list of the most common complaints of patients suffering from cardiovascular pathology. Main indexes of function of cardiovascular system violations.
2. Characteristics of disease and life anamnesis gathering.
3. Characteristics of general patient examination with pathology of cardiovascular system: forced position, colour of skin and mucous membranes, peripheral edema’s existence.
4. Diagnostic value of examination and palpation of precordial region.
5. Diagnostic value of pathological pulsation at precordial region, neck, epigastrical region.
6. Physical bases of percussion, rule of percussion of heart.
7. Basic types of cardiac dullness: relative and absolute are features of determination, formation and difference of acoustic properties of percussion sound.
8. Method and technique of determination, characteristic of normal borders (right, upper, left) of relative dullness of heart.
9. Method and technique of determination, characteristic of normal borders (right, upper, left) of absolute dullness of heart.
10. Diagnostic value of influencing of physiology condition on a size and position of dullness of heart.
11. Methods and technique of vascular bundle definition and estimating of it borders.
12. Diagnostic value of changing of borders (right, upper, left) of relative and absolute dullness of heart and heart configuration.

Practical skills that are performed on lesson.
1. Enquiry (interview) of the patients with cardiovascular pathology (their most disturbing complaints).
2. Estimation of position in bed, colour of skin and mucous membranes, peripheral edema’s existence.
3. Main skills of general and special nursing care of patient with pathology of circulation system.
4. Variants of rendering of patient’s comfortable position with pathology of circulation system, oxygen supply and parenteral introduction of medicines, application of styptic bandage.
5. Examination and palpation of precordial region and interpretation of the received information.
6. Definition and characteristics of the borders (right, upper, left) of relative
dullness of a heart in health and disease.

7. Definition and characteristics of the borders (right, upper, left) of absolute dullness of a heart in health and disease

8. To describe a vascular bundle and estimate it borders.

9. To measure the arterial blood pressure by Korotkoff (according to WHO recommendations).

10. To render first aid at hypertensive crisis, sudden stop of blood circulation, heart attack, loss of consciousness, collapse, acute pain at heart region.

11. To render first aid at acute bleeding. To prepare transfusion system and take part at transfusion of blood or its components.

12. Pulse and estimation of its main properties (frequency, rhythm, filling, tension). Pulse examination on radial, femoral, temporal, carotid arteries.

### Required Glossary to Practice

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute cardiac dullness</td>
<td>The area of the anterior wall of the heart (right ventricle) which is not covered by the lungs and directly contacts with anterior chest wall. Correspond to dull percussion note.</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>The dilatation of the lumen of blood vessels or the cavities of the heart due to pathological changes in their walls.</td>
</tr>
<tr>
<td>Acrocyanosis</td>
<td>Is cyanotic color of the remote parts of the body (fingers, nose, lips, and ears) in patients with cardiac failure.</td>
</tr>
<tr>
<td>Defect, malformation</td>
<td>Is congenital or acquired anatomic abnormalities of the body structures (cardiac valve, septum between its chambers etc)</td>
</tr>
<tr>
<td>Relative cardiac dullness</td>
<td>The projection of anterior surface of the heart onto the anterior chest wall. Correspond to impaired percussion note.</td>
</tr>
<tr>
<td>Exudates</td>
<td>Accumulation of liquor in the cavities of the body.</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>Excessive increase in size of organ, its part or part of body</td>
</tr>
<tr>
<td>Dilation</td>
<td>Expansion of a hollow organ</td>
</tr>
<tr>
<td>Epigastria pulsation</td>
<td>Pulsation of a liver, aorta, right ventricle.</td>
</tr>
<tr>
<td>Megalocardia</td>
<td>Increase in heart size</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>Disease is characterized by noninflammatory and noncoronary myocardial damage</td>
</tr>
<tr>
<td>Cyphosis</td>
<td>Curvature of the spine in the sagittal plane</td>
</tr>
<tr>
<td>Coarctation</td>
<td>Congenital limited vasoconstriction</td>
</tr>
<tr>
<td>Myocarditis</td>
<td>Inflammation of the myocardium with a violation of its contraction, activation, conduction</td>
</tr>
<tr>
<td>Pastose</td>
<td>Pallor, reduced skin elasticity and subcutaneous fat in their little edema</td>
</tr>
<tr>
<td>Pericarditis</td>
<td>Inflammation of the pericardium</td>
</tr>
<tr>
<td>Dulled</td>
<td>Percussion sounds on the border between distinct and dull</td>
</tr>
<tr>
<td>Pulsation of neck vessels</td>
<td>Pulsation of carotid arteries (synchronous to the heart beat), positive and negative venous cervical pulse (pulsation of jugular veins).</td>
</tr>
<tr>
<td>Cardiac hump</td>
<td>Deformity of the chest due to an increase of heart from childhood (congenital and acquired valvular defect).</td>
</tr>
<tr>
<td>Heart beat</td>
<td>Thrill of chest area synchronous to the rhythm of heart contractions</td>
</tr>
<tr>
<td>Symptom of Plesh</td>
<td>Increase of jugular veins edema at pressure on the liver. Positive for right ventricle of heart insufficiency.</td>
</tr>
<tr>
<td>Symptom of “cattish purr”</td>
<td>Palpation feeling of intracardiac murmur (aortic and mitral stenosis) like thrill of chest.</td>
</tr>
<tr>
<td>Scoliosis</td>
<td>Curvature of the spine in the frontal plane</td>
</tr>
<tr>
<td>Splanchnoptosis</td>
<td>Condition characterized by falling of the internal organs</td>
</tr>
<tr>
<td>Stenosis</td>
<td>Constriction of the tubular organ, the external orifice</td>
</tr>
</tbody>
</table>
Flow chart 1

The break down chart of the subject "inquiry, examination and palpation heart region, cardiac beat, diagnostic value..."
Palpation of apical impulse

- The largest inclination of patient trunk ahead
- During deep exhalation of patient

Localization of apical beat:
- 1 - 1.5 cm inside from a midclavicular line in V intercostals space

Height (amplitude) of apical beat:
- Low (at the physical loading a height increases)

Width (area of beat):
- Above 2 cm in a diameter

Resistance (force) of beat:
- Of moderate resistance

It is determined at 2/3 people (at other covered by a rib)
Topography of heart

Front surface of heart

On the right
- Strip of right auricle

Greater part
- Right ventricle

On the left
- Strip of left auricle

Topography of heart contours

Right contour
- Vena cava superior (to III rib)
- Right auricle (from III to VI rib)

Left contour
- Left part of aortic arch
- Pulmonary artery
- Left atrial auricle (level of III rib)
- Left ventricle

Lower contour
- Right ventricle
Normal borders of heart

Relative dullness of heart

- **Right border**: 0.5 - 1 cm ectad from right margin of breastbone
- **Upper border**: III rib (upper margin of III rib is more frequent)
- **Left border**: 1-1.5 cm from midclavicular line

Absolute dullness of heart

- **Right border**: left margin of breastbone
- **Upper border**: IV rib (lower margin of IV rib)
- **Left border**: 1.5-2 cm inside from midclavicular line
Flow Chat 5

The changes of the borders of relative and absolute dullness of heart in pathology

Borders of the heart

↓

Diagnostic value of change of heart borders

↓

Relative heart dullness

↓

decrease
(move inside)

- weight loss,
splanchno
ptosis

↓

Increase
(move outside)

- auriculus
- ventricle

↓

Increase:
-truncus
-pulmona
lis,
-aortae

↓

Increase:
-increase of right
-ventricle,
-fluide in the
-pericardium,
-pneumosclerosis,
-cancer of
-mediastinum

↓

Absolute heart dullness

↓

Increase
(move outside)

↓

Decrease
(move inside)

↓

-emphi-
-sema of
-lungs,
-left side
-pneumo-
-thorax
Flow Chart 6  Investigation of the Pulse

Arterial Pulse

Equal on both radial arteries

Rhythm

Regular (Pulsus regularis)

Irregular (Pulsus irregularis)

Frequent (Pulsus frequens)

Rate

Rare (Pulsus rarus)

Normal

Tension

High tension pulse (Pulsus durus)

Low tension pulse (Pulsus molliss)

Normal

Special parameters (in pathology)

Dimension

Dicrotic

Configuration

Paroxical
Suggested Reading List

Required Reading
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 1986
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: Examination of the cardiovascular system: semiotics, inspection of the heart, percussion: methodic and technique of determining normal borders of the relative and absolute cardiac dullness, in the norm and pathology
5. Methodical guideline for students
6. Flow charts for Practice
7. Website of department: www.cardiology.dsmu.edu.ua

Additional Reading
2. History and Physical Examination . Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

Estimated base operations (EBO).

Sequence of Actions in the Precordial Area Palpation and Examination

I step: Examination of heart region: pay attention in the presence of explosion in a heart region, pulsations, expansion of skinning veins. Define what places (on intercostals spaces and lines) the places of pulsations are present. Then it is necessary to synchronize them with a cardiac beat, for determination of which inspection is needed to add the palpation. For this purpose attach a right hand palm on the breast of patient in the area of apex of heart (that hands must be between parasternal and axillaries anterior lines and occupied the area - limited from above by the IIIrd rib and from below IVs rib). Farther with finger-pad of distal phalanx of index finger setting her strictly athwart find a lowermost and most lateral point, taking her for the place of cardiac beat.

II step: Learn properties of cardiac beat: localization, width, height, resistance. It is needed to remember about possibility of negative cardiac beat, when during the systole of ventricles there is no explosion of pectoral wall, and retraction her (this sign characteristic at adhesion of both layer of pericardium between itself and external layer of him with a pectoral wall).

III step: At presence of visible filing pulsations on the separated areas of heart region begin their study:
   a) define their localization; whether it belong to location of dissecting aneurysm of aorta, pulmonary artery, atriums, epigastria or livers;
b) for differentiation of pulsations of right ventricle from the pulsations of abdominal aorta it is possible to use a few signs: the pulsation of right ventricle is visible directly under the xiphoid process, and abdominal aorta a few lower, greater noticeable retraction, than explosion of epigastric area, at deep breath pulsation of right ventricle becomes more present (a diaphragm goes down, and with it and right ventricle too). At palpation of liver it is needed to remember about 2 it variety: true (systolic), which appears in the intermittent swelling and diminishments at enlargement liver which is at insufficiency of tricuspid valve and "transmission" - from an abdominal aorta.

**Data of palpation of the apical (cardiac) beat in the normal**

<table>
<thead>
<tr>
<th>Localization of apical (cardiac) beat</th>
<th>Topographical location of the heart apex relative to anatomical landmarks - 0.5-1 cm on the right of the midclavicular line in normal 5th intercostal space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence</td>
<td>Width (square) of beat in normal 2 cm in diameter</td>
</tr>
<tr>
<td>Altitude</td>
<td>Distance to which intercostal space rises during systole in normal conditions is low</td>
</tr>
<tr>
<td>Resistance</td>
<td>Power of the heart muscle during systole in normal is moderate</td>
</tr>
</tbody>
</table>

**Sequence of Actions in the Relative and Absolute Heart Dullness Examination.**

1 STEP. To determine the right border of the relative dullness of heart on the right midclavicular line determine an altitude standing of the diaphragm, to come up on 2 intercostals space above, turn the plessimeter finger parallel to searching border and percuss with average force from clear sound to dullness, mark the border of the clear sound and estimate it relatively to right sternal line.

2 STEP. To determine the right border of the absolute dullness of heart made percussion from low to dull sound, mark the border on the external margin of plessimeter finger and estimate it relatively to left sternal line.

3 STEP. To determine the upper border of the relative dullness of heart place plessimeter finger parallel to searching border and percuss with average force from clear sound to dullness, mark the border from the side of clear sound and estimate it ( intercostals space, upper, lower rib’s margin ).

4 STEP. To determine the upper border of the absolute dullness of heart from the border of relative dullness percuss low to dull sound, mark the border on the external margin of plessimeter finger and estimate it.

5 STEP. To determine the left border of the relative dullness of heart find apex beat and back up outer from it on 3-4 cm and place the plessimeter finger
parallel to searching border in this intercostals space, percuss with average force from clear sound to dullness, mark the border from the side of clear sound and estimate it relatively to the left midclavicular line.

6 STEP. To determine the left border of the absolute dullness of heart percuss quite to dull sound from the border of relative dullness, mark the border on the external margin of plessimeter finger and estimate it.

**Sequence of Actions in the Relative and Absolute Heart Dullness Examination with Pathology.**

1 STEP. Determine the borders of the relative dullness of heart.
2 STEP. Determine the borders of the absolute dullness of heart.
3 STEP. Estimate the configuration of the heart.
4 STEP. Determine the width of vascular bundle: place the plessimeter finger at 2\textsuperscript{nd} intercostals space parallel to searching border and mark the borders from clear sound by quite percussion from clear sound to dullness from right and left sides and estimate diameter in centimeters.
5 STEP. Note the diagnostic value of revealed changes of the heart borders, width of vascular bundle, configuration.

**Situational Tasks**

**Q 1.** Patient with acute cardiac infarction has rapid breathing and heartbeat. What changes of functional bed should be made for relief of his condition?
   A. Raise the head end
   B. Raise the pedal end
   C. Turn the bed with incline on the right side
   D. Turn the bed with incline on the left side
   E. Pull down the head end

**Q2.** Patient С., 40 years, a few years suffer on mitral stenosis, the last year often feels the attacks of difficulty in breathing, expectoration of blood, asthmatic cough with the expectoration of foamy pink sputum. Apex beat at IV intercostals space and on 2 cm to the left from midclavicular line at palpation, with area more than 2 cm\textsuperscript{2}, resistant.

On what patient’s complaints are indicate?
   A. Progressive dilatation of mitral orifice
   B. Development of severe hypertension of greater circulation
   C. Development of severe hypertension of lesser circulation
   D. Progressive dilatation of tricuspid orifice
   E. Progressive constriction of tricuspid orifice
Q3. Patient N., 49 years, has been detected relative dullness by method of indifferent percussion with sequential determination of the borders of heart (right, upper, left) by technique of average force of percussion from clear sound to dullness and after that absolute dullness of heart by quite method to dull sound has been detected. The borders of heart are normal. Explain the origin and changes of these dull sounds at determination of the relative and absolute dullness of heart.

Q4. Student L., 20 years, with proper constitution, the borders of the relative and absolute dullness of heart are corresponding to the norm, increasing of the borders of relative dullness of heart into the right and left sides was revealed in the phase of deep exhalation. Estimate these changes from a physiological point of view.

A. Downshift of diaphragm, as a result of this heart is keeping vertical position.
B. Downshift of diaphragm, as a result of this heart is keeping horizontal position.
C. Upward dislocation of diaphragm, as a result of this heart is keeping vertical position.
D. Upward dislocation of diaphragm, as a result of this heart is keeping horizontal position.
E. Downshift of diaphragm, as a result of this heart is keeping indefinite position.

Q5. At patient examination with splanchnoptosis B, 19 years, was revealed next borders of the relative and absolute dullness of heart: right - by 0,5cm outwards from right margin of sternum; upper – IV rib, left – on 2,5cm to the left from midclavicular line. Estimate and explain these changes of the borders of heart.

Q6. At patient examination D, 47 years, asthenic, by the method of indifferent percussion with sequential determination of the borders of heart (right, upper, left) by technique of average force of percussion from clear sound to dullness and after that absolute dullness of heart by quite method to dull sound has been detected. The borders of heart that was revealed are reduced relatively to normal. Pathology of internal organs that can change the borders and area of heart wasn’t revealed. Explain these changes.

A. Low standing of diaphragm, as a result of this heart is keeping vertical position.
B. Low standing of diaphragm, as a result of this heart is keeping horizontal position.
C. High standing of diaphragm, as a result of this heart is keeping vertical position.
D. High standing of diaphragm, as a result of this heart is keeping horizontal position.
E. Low standing of diaphragm, as a result of this heart is keeping indefinite position.

Q7. Patient with chronic cardiac insufficiency has evident acrocyanosis. What is acrocyanosis?
   A. Cyanosis of only the lower extremities
   B. Cyanosis of only the upper extremities
   C. Cyanosis of only the face and neck
   D. Cyanosis of only the nasolabial triangle
   E. Cyanosis of only the peripheral parts of body

   **Key answers:**
   Q1 – A.,
   Q3: the relative dullness of heart is covered by margin of lung and made dullness of pulmonary sound in contrast to the absolute dullness that not covered by lung and it sounds like absolutely dull sound of airfree organ.
   Q4 – D.
   Q5. At splanchnoptosis downshift of diaphragm is visualize, as a result of this heart is keeping vertical position, displacement of upper border of the relative dullness of heart to down and the right one – to medial.
   Q6. – A.

   **Revision Questions**
   Q1. Patient M, 18 years, is directed by military registration for consultation with suspicion on the valvular heart disease. Complaints are not present. On examination is the expressed pulsation of carotid, clavicles arteries, an apex beat in VI intercostals spaces on 2 cm to the left of medioclavicular line, its area are more than 2 cm², resistant. What is the name of such an apex beat?
      A. Widespread (diffuse)
      B. High
      C. Arched
      D. Restricted
      E. Low

   Q2. Patient T., 46 years, is suffering by aortal valvular disease during a few years.
   She began often see a pulsating of neck vessels in the last year. Under the pulsation of the carotid arteries should be understood:
   A. Their excessive filling at phase of isometric filling and falling at phase of expulsion
   B. Filling and falling of the carotid arteries at systole phase
   C. Filling and falling of the carotid arteries at diastole phase
   D. Their excessive filling at systole phase, and falling at diastole phase
   E. Their excessive filling at diastole phase, and falling at systole phase
Q3. Patient C., 40 years, a few years suffer on mitral stenosis, the last year often feels the attacks of difficulty in breathing, expectoration of blood, asthmatic cough with the expectoration of foamy pink sputum. On what respiration rate dyspnea at heart disease is typify:
   A. Not changing
   B. Significantly increasing (to 30-35 per minute)
   C. Decreasing to 8-12 per minute
   D. Not changing but periods of apnoea are appears
   E. All above listed variants of answers.

Q4. Patient C., 20 years, a few years suffers on mitral stenosis, complaints indicate on progressive constriction of mitral orifice and lesser circuit hypertension development. What additional pulsation may occur at examination of precordial region of such patient?
   A. carotid arteries
   B. right ventricle of heart
   C. liver
   D. pulmonary trunk
   E. left ventricle of heart

Q5. Patient C., 40 years, a few years suffers on mitral stenosis, complaints indicate on progressive constriction of mitral orifice and lesser circuit hypertension development. What configuration will take heart?
   A. aortic
   B. mitral
   C. drop-shaped
   D. trapeziform
   E. not changing

Q6. Patient K., 35 years, asthenic, is in the clinic on examination about chronic gastritis, at detection of heart borders was revealed their changes, particularly – the absolute dullness of heart: right border – on 0.5cm medially from left parasternal line, upper – IV intercostals space, left – on 2.5cm medially from midclavicullar line. Estimate the borders of absolute dullness of a heart and heart configuration.
   A. Right border increasing
   B. Right and upper borders decreasing
   C. Upper border decreasing
   D. Decreasing of all borders, result of low standing of diaphragm, horizontal heart configuration
   E. Physiological decreasing of heart borders, result of low standing of diaphragm, vertical heart configuration.

Q7. Patient C., 38 years, asthenic, lower border of right lung on midclavicular line at 7 intercostals space. At what intercostals space right border of relative dullness of heart should be percuss?
   A. In the 4 intercostals
B. In the 5 intercostals
C. In the 6 intercostals
D. In the all intercostals
E. Right border is not percussing

Q8. Patient has absolute atelectasis of superior lobe of left lung. Heart beat at 4-5 intercostals on 1.5 cm outside from left midclavicular line, resistant. The borders of relative dullness of heart: right – right margin of sternum, upper – is not detecting because of merged with pulmonary dullness, left – on 2 cm medially from midclavicular line. Estimate this borders of heart.
A. The border of heart dullness is increase to the right at the expense of heart parts increasing to the right
B. The border of heart dullness is increase to the left at the expense of heart displacement to the left
C. The border of heart dullness is increase to the right at the expense of heart displacement to the right
D. The border of heart dullness is increase to the left at the expense of heart parts increasing to the left
E. The borders of heart dullness are not changed.

Q9. Patient P., 43 years, a heart beat at 5-6 intercostals, high, on 1.5-2 cm externally from left midclavicular line. The borders of relative heart dullness: right – on 2.5 cm externally from right margin of sternum, upper – at 2 intercostals, left – on 1, 5 cm externally from left midclavivular line. Estimate this heart borders.
A. Increasing of right border
B. Increasing of upper border
C. Increasing of left border
D. Increasing of right, upper and left borders
E. Increasing of upper and left borders

Q10. Patient H., 26 years, combined aortic heart-disease. Cardiac beat diffuse, is palpated in 5, 6, 7 intercostal spaces. In which intercostal space is it necessary to percuss left border of relative cardiac dullness?
A. In the 7 intercostal space.
B. In the 6 intercostal space.
C. In the 5 intercostal space.
D. Left border of relative dullness not percuss.
E. In the 5, 6 and 7 intercostal spaces.

**Key answers:** 1-A, 2-D, 3-B, 4-D, 5-B, 6-E, 7-B, 8-B, 9-D, 10-A.

**SUMMARY OF PROCEDURES**

The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out.

Then the teacher demonstrates students the technique of examination of precordial region, definition of heart beat and heart percussion on invited
Another part of the practice shall be conducted in the hospital wards. During it the teacher demonstrates to the students 1-2 patients with precordial region deformation, occurrence of pathological pulsation areas, changing properties of heart beat, heart borders, evaluating revealed changes, main indices of patients vital functions, discussing measures of general and special nursing care for patients with pathology of circulation organs (discussing of diagnostic value is holding outside ward from the deontological point of view). Discussing phases of first help at emergency conditions. During 20-25 minutes students working off technique of palpation of precordial region, beat of heart and vessels, percussion of heart borders (on students), determination of pulse behaviors, measuring of the arterial blood pressure. Technical details are worked off individually with every student, a teacher regular checks up student’s work.

Lesson is continuing in the training room where students are invited to solve checking tasks to factual topics. At the end of lesson is worked out the totals.

**Final test questions**

**Q1.** Patient 58 years, during 20 years suffers from essential hypertension. Against high arterial pressure left ventricle is dilate and relative aortic insufficiency was formed. What properties of heart beat at patient you can admit?
   A. Displaced to the left and down
   B. Displaced to the up
   C. Displaced to the left
   D. Limited
   E. Low

**Q2.** The apex beat becomes high at the following:
   A. subcutaneous emphysema
   B. pulmonary emphysema;
   C. wide intercostals
   D. exudative pericarditis
   E. right-side hydrothorax

**Q3.** Patient L., 18 years, expressed mitral stenosis in the stage of cardiac failure. In 2-3 intercostal spaces on the left near a breastbone a pulsation is determined, that is felt also a hand.

At what diseases can be such situation?
   A. tricuspid deformity of heart
   B. aortal valvular disease
   C. congenital heart malformation with hypervolemia of lesser circulation
   D. aortic aneurysm

**Q4.** Patient complaints on breathlessness in horizontal position. On what respiration rate dyspnea at heart disease typifies:
   A. Not changing
   B. Significantly increasing (to 30-35 per minute)
   C. Decreasing to 8-12 per minute
   D. Not changing but periods of apnoea are appears
E. All above listed variants of answers.

Q5. Changes of objective condition were revealed at patient. As a rule examination is used for determination of:
A. subjective feeling at heartbeat
B. Absolute heart dullness
C. Pulsation of liver
D. Duration of pain syndrome
E. any of the variants offered is correct

Q6. Determination of left cardiac border begins from:
A. installation of plessimeter finger at 5 intercostals
B. installation of plessimeter finger at 6 intercostals
C. determination of an apex beat localization
D. determination of Louis corner
E. determination of standing level of diaphragm

Q7. Position of plessimeter finger at the left heart border percussion:
A. in the 5 intercostals and parallel to rib
B. in the 5 intercostals and perpendicular to rib
C. in the 6 intercostals and parallel to rib
D. in the 6 intercostals and perpendicular to rib
E. in the intercostals space at the place of an apex beat palpation and perpendicular to rib

Q8. Determination of relative cardiac dullness admits the use:
A. quiet percussion (the border is the place of appearance of dullness percussion sound)
B. middle sonority percussion (the border is the place of appearance of dullness percussion sound)
C. loud percussion (the border is the place of appearance of dullness percussion sound)
D. middle sonority percussion (the border is the place of appearance of dull percussion sound)
E. loud percussion (the border is the place of appearance of dull percussion sound)

Q9. The right border of the absolute cardiac dullness in health is located:
A. on 1 cm to the left from right margin of sternum
B. on 2-3cm to the right from right margin of sternum
C. on 1-1,5cm to the right from right margin of sternum
D. on 1-1,5cm to the left from left margin of sternum
E. on left margin of sternum

Q10. Displacement of absolute cardiac borders medially (that is their decreasing) typical for:
A. tumour of mediastinum
B. hydropericardium
C. liquid in pericardium cavity
D. pulmonary emphysema;
E. All above listed variants of answers.
STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject Module 1</th>
<th>The Main Methods of Examination of Patient on Internal Diseases Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Module 2</td>
<td>Physical Examination of the Respiratory System</td>
</tr>
<tr>
<td>Practice</td>
<td>Auscultation of the heart. Methods, technique. Origin of the heart sounds and heart murmurs</td>
</tr>
<tr>
<td></td>
<td>Caring for the sick with disorders of the cardiovascular system. Firs aid in case of hypertensive crisis, syncope, cardiac arrest, collapse, angina pectoris.</td>
</tr>
<tr>
<td>Course</td>
<td>2</td>
</tr>
<tr>
<td>Faculty</td>
<td>Dentistry</td>
</tr>
</tbody>
</table>

Donetsk 2011
A topical issue: the ability to auscultate the heart and evaluate the detected heart sounds and murmurs, has important diagnostic value in interpreting the nature of the pathology of the cardiovascular system and other organs. The ability to provide first aid emergency conditions to save the life of patients.

General objectives: Master the methods of examination and identification of key symptoms and syndromes in diseases of internal organs in the internal diseases clinic.

Specific objectives:
1. Conduct auscultation of the heart guided methods and techniques.
2. Identify and characterize the heart sounds.
3. Evaluate changes in the volume of the two heart sounds in health and disease.
4. Identify and characterize the cardiac and extracardiac murmurs.
5. Perform medical manipulations of care and provide first aid at the basic emergency conditions in the pathology of the cardiovascular system.

Level of knowledge and skills before the practice
1. Determine the structure of heart valves and its membranes. "Anatomy"
2. Represent the projection of heart valves on the frontal surface of the thorax. "Anatomy"
3. To call the main parameters of the cardiac cycle, the origin and dependence of auscultatory data from the physiological properties of the "Physiology"
4. Evaluate the different physical characteristics of the extracardiac factors for the interpretation of the changes. Physiology

Questions for self-assessment of the pre-practice knowledge

Task 1.
What are consistently of the heart lining from the outside:
A. myocardium, endocardium, pericardium.
B. pericardium, myocardium, endocardium
S. myocardium, pericardium, endocardium.
D. endocardium, pericardium, myocardium.
E. endocardium, myocardium, pericardium.

Task 2.
Call from any of the phases (series) compiled systole and diastole of the ventricles of the heart.

Task 3.
During the cardiac cycle the two short moment when the wing and the semilunar heart valves are closed. In what phase of the cycle is observed?

Task 4.
In what phase of the cardiac cycle occur main components I, II, III and IV heart heart sounds?
**Task 5:**
Select the correct statement:
A. Turbulence occurs before narrowing because of increased velocity of blood at the site of narrowing
B. laminarity arises narrowing because of increased velocity of blood at the site of narrowing
C. turbulence occurs in the restriction of the increase velocity of blood at the site of narrowing
D. laminarity occurs before narrowing because of increased velocity of blood at the site of narrowing

Standards of answers to problems.

**Task 1:** B

**Task 2:**
I: ventricular systole:
1. Frequency Voltage (0,08-0,09 sec):
   a) phase asynchronous reduction (0,05-0,06 sec);
   b) phase of isometric contraction (0,03-0,04 sec);
2. The period of exile (0,25-0,28 sec);
II. Diastole
   1. Phase of isometric relaxation of the ventricles (0,6-0,07 sec);
   2. Phase ventricular filling (the duration depends on the frequency of rhythm):
      a) The phase of rapid filling (0,14-0,18 sec);
      b) phase of slow filling (depends on the frequency of rhythm);
      c) Phase atriosystolic content (≈ 0,10 sec).

**Task 3:** Phase of isometric relaxation of the ventricles (0,6-0,07 sec);

**Task 4:** I heart sound - ventricular systole: a period of tension and exile; II heart sound - in early diastole (phase of isometric relaxation of the ventricles), III - heart sound phase of rapid filling; IV - heart sound phase atriosystolic content.

**Information for entry-level knowledge can be found in the following textbooks:**
A list of key terms that students must learn in preparation for the occupation:

Content topics:
Theoretical issues to engage in:
2. The projections of the valves of the heart on the front chest wall, the place of their hearing, the sequence of listening.
3. The symptoms I and II heart sounds that allow them to distinguish.
4. Changes in volume (amplification, attenuation) heart sounds, the mechanism changes, the acoustic properties.
5. Classification, the mechanism of formation of additional heart sounds of the heart during diastole and systole.
6. The mechanism of murmurs conditions, the laws of their conduct.
7. The ratio of murmurs to the phases of the cardiac cycle, the classification of murmurs.
8. Provide first aid in emergency conditions.

Practical tasks that are performed on the job:
1. Identification and characterization of heart heart sounds were normal.
2. Determination and interpretation of changes in heart heart sounds in pathology.
3. Determination and interpretation of organic sounds.
5. Provide first aid in emergency conditions.

List of basic skills that students should learn in preparation for the occupation:
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduplication of the heart sounds</td>
<td>Two short sounds which quickly follow one another are heard instead of one. The pause between both components is 0.04 – 0.08 s. The total duration of the heart sound becomes increased.</td>
</tr>
<tr>
<td>Splitting of the heart sounds</td>
<td>The sound starts to reduplicates but not finishes, we can not clearly distinguish to sounds. The pause between both components is not more than 0.03s. The total duration of the heart sound remains normal.</td>
</tr>
<tr>
<td>Opening snap</td>
<td>In mitral stenosis, elevated left atrial pressure causes forceful opening of the thickened valve leaflets. This generates an added sound - <em>opening snap</em> early in diastole that precedes the mid-diastolic murmur.</td>
</tr>
<tr>
<td>Gallop rhythm</td>
<td>The presence of an S3 or an S4 creates a cadence resembling the gallop of a horse. These sounds are, therefore, called <em>gallop sounds or rhythms</em>.</td>
</tr>
<tr>
<td>Midsystolic click</td>
<td>Occurs in the middle of systole. It may be single or multiple, and it may change in position during the cardiac cycle with various maneuvers that change ventricular geometry. The most common condition associated with a midsystolic click is prolapse of the mitral or tricuspid valve.</td>
</tr>
<tr>
<td>Organic murmurs</td>
<td>Occur in anatomical changes in the structure of the heart valves, atrial and ventricular septa or/and morphological changes of aorta and pulmonary trunk.</td>
</tr>
<tr>
<td>Functional murmurs</td>
<td>Occur with increased rate of blood flow, decreased blood viscosity, decreased heart sound of the papillary muscles or/and rapid growth of the hearth in adolescents and children.</td>
</tr>
<tr>
<td><strong>Organo-functional murmurs</strong></td>
<td>Occur in dysfunction of the intact valves, due to: dilatation of the ventricles which results in dilatation of mitral or tricuspid orifice, when normal leaflets (cusps) cannot completely cover dilated AV-orifice, inflammatory-degenerative lesion of the papillary muscles.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Protosystolic murmur</strong></td>
<td>Arises at the very beginning of systole, immediately after the second heart sound.</td>
</tr>
<tr>
<td><strong>Protodiastolic murmur</strong></td>
<td>Arises at the very beginning of diastole, immediately after the second heart sound.</td>
</tr>
<tr>
<td><strong>Midsystolic murmur</strong></td>
<td>Arises in the pause after S1</td>
</tr>
<tr>
<td><strong>Middiastolic murmur</strong></td>
<td>Arises in the pause after S2</td>
</tr>
<tr>
<td><strong>Presystolic murmur</strong></td>
<td>Arises at the end of diastole</td>
</tr>
<tr>
<td><strong>Telysystolic murmur</strong></td>
<td>Arises at the end of systole</td>
</tr>
</tbody>
</table>
**Pericardial friction murmur**

Are connected with the changes in the visceral and parietal pericardial layers in which fibrin is deposited (in pericarditis), cancer nodes develop, etc. The mechanism by which pericardial friction sounds are generated is similar to that of the pleural friction sounds, except that they depend not on the respiratory movements but on the movements of the heart during systole and diastole. It resembles the crisping sounds of snow, and sometimes they are very soft, as if produced by rattling of paper or scratching. The following signs can be used to differentiate pericardial friction sounds from intracardiac sounds: (1) there is no complete synchronism of pericardial friction sounds with systole and diastole; friction sounds are often continuous, their intensity increasing during systole or diastole; (2) friction sounds can be heard for short periods during various phases of the heart work, either during systole or during diastole; (3) pericardial friction sounds are not permanent and can reappear at intervals; (4) friction sounds are heard at sites other than the best auscultative points; they are best heard in the areas of absolute cardiac dullness, at the heart base, at the left edge of the sternum in the 3rd and 4th intercostal spaces; their localization is inconstant and migrates even during the course of one day; (5) friction sounds are very poorly transmitted from the site of their generation; (6) the sounds are heard nearer the examiner's ear than endocardial murmurs; (7) friction sounds are intensified if the stethoscope is pressed tighter to the chest and when the patient leans forward, because the pericardium layers come in closer contact with one another.
<p>| Pleuropericardial friction murmur | Arise in inflammation of the pleura adjacent to the heart and are the result of friction of the pleural layers (synchronous with the heart work). As distinct from pericardial friction sounds, pleuropericardial friction is always heard at the left side of relative cardiac dullness. It usually combines with pleural friction sound and changes its intensity during the respiratory phases: the sound increases during deep inspiration when the lung edge comes in a closer contact with the heart and decreases markedly during expiration, when the lung edge collapses. |</p>
<table>
<thead>
<tr>
<th><strong>First heart sound (S_I).</strong></th>
<th>It arises during isometric contraction phase, when atrioventricular valves closer occurs (main valvular component). It is produced during systole, after a long pause. It is best heard at the heart apex since the systolic tension of the left ventricle is more pronounced than that of the right ventricle. The first sound is longer and louder than the second heart sound.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First heart sound (S_{II}).</strong></td>
<td>It arises during protodiastolic period, when semilunar valves closer occurs (main valvular component). It is generated during diastole, after a short pause. As distinct from the first sound, the second sound is shorter and higher.</td>
</tr>
<tr>
<td><strong>First heart sound (S_{III}).</strong></td>
<td>It is caused by vibrations generated during rapid passive filling of the ventricles with the blood from the atria during diastole of the heart; it arises in 0.15-1.12 s from the beginning of the second heart sound. The third and fourth sounds are low-pitch and soft and are therefore hardly heard in normal subjects. But they are clearly seen on a phonocardiogram. These sounds are better heard in immediate (direct) auscultation. The presence of the third and fourth sounds in the middle-aged usually indicates severe affection of the heart muscle and decreased contractility of the myocardium of the ventricles.</td>
</tr>
<tr>
<td><strong>First heart sound (S_{IV}).</strong></td>
<td>It is heard at the end of ventricular diastole and is produced by atrial contractions during rapid filling of the ventricles with blood and vibrations of the ventricular walls.</td>
</tr>
<tr>
<td><strong>Botkin-Erb point</strong></td>
<td>The added auscultatory area located to the left of the sternum at the 3rd and 4th costosternal articulation. Should be used for detection of protodiastolic murmur of aortic regurgitation.</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Marfan syndrome**  | It is a genetic disorder of connective tissue with affection of the skeletal system, cardiovascular system, eyes, and skin. Persons with Marfan syndrome are usually tall with long, thin arms and legs and spider-like fingers - a condition called arachnodactyly. When they stretch out their arms, the length of their arms is significantly greater than their height. Other symptoms include:  
- Highly arched palate and crowded teeth  
- Nearsightedness  
- Dislocation of the lens of the eye  
- Funnel chest (pectus excavatum) or pigeon breast (pectus carinatum)  
- Scoliosis  
- Flat feet  
- Learning disability  
- Thin, narrow face  
- Micrognathia (small lower jaw)  
- Coloboma of iris  
- Hypotonia  
- Hypermobile joints  
Complications may include:  
- Aortic regurgitation  
- Aortic rupture  
- Bacterial endocarditis  
- Dissecting aortic aneurysm  
- Enlargement of the base of the aorta  
- Heart failure  
- Mitral valve prolapse  
- Scoliosis  
- Vision problems |
For learning content of the topic read the graphs of logical structures:

### Flow chart 1

#### Auscultation of the heart sounds

<table>
<thead>
<tr>
<th>1st heart sound: frequency-60-120 hertz, duration-0.07-0.15 sec.</th>
<th>2nd heart sound: frequency-70-170 hertz, duration-0.06-0.09 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components of the heart sounds</td>
<td>Valved: 2nd aortal; 2nd pulmonary, vascular</td>
</tr>
<tr>
<td>Muscular, valved: 1st mitral, tricuspid, vascular, atrial</td>
<td></td>
</tr>
<tr>
<td>Diagnostic value of changes in volume of one of the heart sounds</td>
<td></td>
</tr>
<tr>
<td>Increase: mitral stenosis (timbre-slapping), tricuspidal stenosis</td>
<td>Decrease: insufficiency of the mitral valve, insufficiency and (or) stenosis of the aortal valve, insufficiency of the tricuspid valve</td>
</tr>
<tr>
<td>Increase: arterial hypertension, atherosclerosis, aortosclerosis (timbre-‘metallic’), pulmonary hypertension, physiologic accent</td>
<td>Decrease: insufficiency and (or) stenosis of the aortal valve, insufficiency and (or) stenosis of the pulmonary artery valve</td>
</tr>
</tbody>
</table>

#### Diagnostic value of changes in volume of both heart sounds

<table>
<thead>
<tr>
<th>Extracardiac causes</th>
<th>Intracardiac causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase: thin chest wall, wrinkling of the lung, resonance: gastric air bubble, cavity in the lung, pneumothorax, (timbre-‘metallic’”)</td>
<td>Decrease: obesity, exudative pericarditis, oedema of the chest wall, emphysema, left-sided exudative pleuritis</td>
</tr>
<tr>
<td>Increase: cardioneurosis, physical work, thyrotoxicosis, excitement</td>
<td>Decrease: myocarditis, myocardial infarction, cardiomyopathy, acute vascular insufficiency</td>
</tr>
</tbody>
</table>
Flow chart 2

Changes of the heart sounds volume

I sound

Reduction on the heart apex

Mitral regurgitation

Aortic regurgitation

Aortic stenosis

Strengthening on the heart apex

Mitral stenosis

II sound

Reduction on an aorta

Aortic regurgitation

Aortic stenosis

Strengthening

On an aorta

Arterial hypertension

Atherosclerosis, aortosclerosis

On pulmonary artery

Pulmonary hypertension

Physiological accent
Flow chat 3  
Splitting of the I-st heart sound.

Physiological

- Young age of inspected
- Correlation with breathing
- Connection with the change of body
- Connection with the physical loading

Always on apex

Pathological

On apex
- Mitral stenosis
- Tricuspid stenosis
- Insufficiency of aortic valve
- Coarctation of aorta

On aorta
- Arterial hypertension
- Aortic aneurysm
- Atherosclerosis of aorta
- Syphilis (mesoarthritis)
- Aortic stenosis

On pulmonary artery
- Diseases of lungs
- Mitral valvular diseases
- Hypertrophic cardiomyopathy
Flow chat 4

**Gallop rhythm**

Frequent trinomial rhythm

- Protodiastolic gallop rhythm
  - Audible increased III sound in ptotodiastole
    - Sharp abatement of myocardium heart sound
      - Cadence TAM-ta-ta
        - Auscultate on apex (at exhalation on left flank)
          - Left ventricular
            - Cardiac infarction
            - Arterial hypertension
          - Myocarditis, cardio-sclerosis
          - Congenital heart deseases
          - Pulmonary heart
        - Auscultate in IV - V intercostals spaces at the left edge of breastbone (at inhalation)
          - Right ventricular
            - Heart deseases
            - Congenital heart deseases
            - Pulmonary heart
          - Prognosis is better than at the protodiastolical gallop rhythm
            - Arterial hypertension
            - Myocarditis, cardio-sclerosis
            - Aortic heart deseases
Cardiac Murmurs

Flow Chart 5

Intracardiac murmurs

Turbulent (Vortex, Eddy)  Tissural

Cardiac murmurs provoking factors

Strength of the heart contraction (Velocity of the bloodflow)  Heart sound of the myocardium, papillary and annular muscles  Degree of hydraemia (haemoglobin and RBC content)  Blood viscosity  Diameter of the vessels (narrowing degree)

Intracardiac murmurs character

Organic murmurs  Organo-functional murmurs  Functional murmurs

Extracardiac murmurs

Pericardial friction rub  Pleuro-pericardial friction rub  Cardio-pulmonary murmur
Sealed chambers of the ventricles depends on the density of the closure of atroioventricular valves during isometric contraction. Volume I heart sound it depends on the speed, rather than the strength of contractions of the ventricles in the phase of isometric contraction. The more filled ventricles, the lower its rate reduction, and hence the volume of heart sound I. Volume II heart sound depends on the fluctuations of semilunar valves of the aorta and pulmonary artery during protodiastolic period. The faster atrioventikulyarnoe conduction of excitation, the wider the doors open the valve, the greater the oscillation of I colors. Loudness of heart sounds depends on the properties of the conducting medium (lung, chest wall) and resonance adjacent organs (stomach, availability, pneumothorax, or voids in the lung).

**Suggested Reading List**

**Required Reading**
1. Internal Diseases, an Introductory Course. Edited by V.Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 1986
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: “Auscultation of the heart: origin of the heart sounds, changes in volume. Basics of phonocardiography”.

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5. Methodica
guideline for students
6. Flow charts for practice: “Auscultation of the heart: the heart sounds”.
7. Website of department: www.cardiology.dsmu.edu.ua

**Additional Reading**

2. History and Physical Examination . Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
   4. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

**Estimated base actions.**

1. **Algorithm actions at listening heart heart sounds**

   Step1. Check valves in projection chest wall and place of their hearing.
   Step2. Spend consistently auscultation of the heart: the top (mitral valve), aortic, pulmonary, three-leaved, cutting heart sound of I II, estimate the volume of normal heart sounds depending on the zone listening, heard Create the image in a scheme PCG.
   Step3. Independently conduct in 1.2 STEPS selected patients, evaluate the changes in volume and timbre heard heart sounds.
   Step 4. Indicate the diagnostic value of the detected changes.

**Algorithm actions during auscultation of patients**

Step1. Under the guidance of a teacher in the chamber in young patients without cardiovascular pathology of conduct auscultation of the heart. Emphasizing heart sound I and II, the best places in auscultation, make them "in one component, uniformity.

**Create the image in the form of the scheme heard PCG:**

**Approximate base action**

**The algorithm acts when listening heart sounds**

STEP 1. Mark projection valves on the chest wall and place of listening.
STEP 2. Spend consistently auscultation of the heart: the top (mitral valve), aortic, pulmonary, tricuspid, the difference of heart sound I II, estimate the volume of normal colors, depending on the areas of listening, heard in the form of sketch schemes PCG.
STEP 3. Self spend STEPS 1,2 have selected patients, evaluate the changes the volume and timbre listening to heart sounds.
STEP 4. Check the diagnostic value of the identified changes.
The algorithm of action in patients auscultation

STEP 1. Under the guidance of a teacher in the ward, the young patient with no abnormalities of the circulatory heart should be listened. Separating I and II of the heart sound in the best places of listening, make sure their "one-component", "homogeneity".

Draw heard in the form of schemes PCG:

```
I   II  I   II  I
|     |     |     |     |
upper pulmonary artery
```

2 Step. Listen to the heart sound I consistently at the top (mitral valve), II heart sound on the basis of the heart (within the projection, the best listening to the pulmonary valve) on the inhale and exhale, when you change your body position, at rest or physical exertion. It received auscultative data illustrated in the schematic of PCG, the correctness of perception, talk to your teacher in the individual interview. In the absence of splitting or doubling of heart sounds listen to each patient, said the teacher.

STEP 3. Learn the different PCG with additional heart sounds - to determine the nature of heart sound in protodiastole and presistole, note the time interval between the basic and additional heart sounds in the scheme of their registration, the maximum amplitude, rate response, determine the duration of systole and diastole, and their relation and the amplitude of 1 and 2 heart sounds at the top of the heart. Determine the nature of the pathological rhythm.

STEP 4. LISTEN Heart of patients with pathology of the cardiovascular system (heart disease, atherosclerotic, myocardial infarction, hypertension, etc.) - first with the previous explanation of the teacher and then themselves. In each case (heard on the splitting or split heart sounds, additional heart sounds) in the form of a schematic sketch of PCG.

STEP 5. Actively participate (under the guidance of the teacher) to discuss the mechanism and diagnostic value of abnormal splitting heart sounds or additional heart sounds presented for Curation patients.

3. The algorithm acts in auscultation of patients with aortic and tricuspid valvular

1 step. Identify the characteristics of murmurs in the PCG with aortic stenosis (the ratio of I and II heart sounds of murmurs in general and its maximum, the
shape), aortic disease (related to the II heart sound, shape, duration), tricuspid stenosis (the ratio of I hue (presystolic) to II heart sound (middiastolic), shape, change in amplitude and duration during inspiration), tricuspid insufficiency (the ratio of murmurs to the heart sound I, II change in the amplitude of heart sound and inspiratory).

2 Step. Auscultation of patients with aortic stenosis: Pay attention to the existence of the interval between I heart sound and murmurs, the epicenter, issued by the holding, the timbre of the murmurs.

STEP 3. Auscultation of patients with aortic insufficiency: Pay attention to the relationship of murmurs with heart sound II, the epicenter (the aorta, the point Botkin), directed the holding of the left (top, axillary region). Listen to the patient in standing and lying down.

STEP 4. Auscultation of patients with tricuspid stenosis: note the presence of murmurs before I voice in the zone listening to the tricuspid valve, the murmurs from the interval after the heart sound II, the dependence of their amplitude and duration of breath - a symptom River Korvalo), position on the right side.

STEP 5. Auscultation of patients with tricuspid insufficiency: in the zone of the tricuspid valve, pay attention to the relationship of murmurs with heart sound, increase its volume to the II-th heart sound of the inspiratory (pp. River Korvalo) in position on the right side, on the direction of the (left, his sharp attenuation outside of cardiac dullness).

4. The algorithm of action in the investigation of patients with the presence of functional, organic-functional and extracardiac murmurs.

1 step. Listen to 2-3 selected patients with functional systolic murmurs on top of the heart, the pulmonary artery: Define the epicenter of the murmurs, I link it with the heart sound, timbre. Match the features of the functional murmurs with organic in another patient.

2 Step. Listen to the patient with a relative insufficiency of the tricuspid valve: define the nature of phase murmurs, the epicenter, the ratio of I pitch, duration, changes during inspiration; analyze the PCG of the patient.

STEP 3. Listen to the patient with fibrinous pericarditis: define the nature of murmurs, listening to his band, the ratio of the phases of the cardiac cycle, changes during inspiration, expiration, pressing a stethoscope; analyze the PCG of the patient.

STEP 4. Explain the diagnostic value of these murmurs in the studied patients.
5. Hypertensive crisis - high blood pressure to high levels individually, which is accompanied by the deterioration of the patient and may be complicated cerebrovascular and coronary circulation.

**Algorithm for action in hypertensive crisis**

STEP 1 - immediately call a doctor  
STEP 2 - to ensure complete relaxation to the patient  
STEP 3 - to ensure access to fresh air  
STEP 4 - use of hypertensive medications prescribed by a doctor.

Sudden circulatory arrest - the sudden disappearance of the cardiac activity due to asystole or fibrillation ventricles. It is characteristic signs of clinical death: loss of consciousness, lack of response to external stimuli, the lack of photoreaction, respiratory arrest (or single-respiratory movements), lack of pulse in the radial and carotid arteries, acrocyanosis and marble pallor leather covers.

**The algorithm acts in a sudden stop of blood circulation**

STEP 1 - Carefully put the patient on a flat and firm surface (eg on the floor.)  
STEP 2 - to 2.1 precardiac blows to the sternum (beats the average force applied fist from a distance of 25-30 cm).  
STEP 3 - check and ensure the airway  
STEP 4 - to start artificial ventilation of lungs  
STEP 5 - start of indirect cardiac massage.

6. Loss of consciousness - (Greek synkope; Syncope) - brief loss of consciousness caused by insufficient blood circulation of the brain, appeared suddenly. Usually occurs when significant neuropsychiatric effects (Fear, severe pain, the sight of blood), in the stuffy room, with extreme fatigue. Loss of consciousness is often preceded by tinnitus, vertigo, dimness of the eyes, etc. In case of loss of consciousness (as distinct from an epileptic seizure), there is no uncontrolled urination, stops breathing, biting tongue. Loss of consciousness usually occurs in the upright position, lasts 20-30 seconds, after which the patient regains consciousness.

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Case problem.

Task 1.
Patient N., aged 30, the boundaries of the heart have not changed, the apex of the heart is auscultated two heart sounds: one more loud, ends a long pause and start small, with a quieter heart sound comes at the end of a short pause. Assess a louder heart sound.

8. Faint - (Greek synkope; syncope camp) - korotkochasova vtrata consciousness, scho zumovlena failure krovozabezpechennya cerebral mozku yak vinikla raptovo.

Zazvichay occurs valued at nervovo-mental vplivah (perelyak, strong pain, view the blood), a stuffy room at fatigue. Loss of consciousness often pereduyut murmurs in vuhah, dizziness, darkening at the sight of that other. When fainting (at Unlike epileptic attack) is not going nekontrolovanogo urination, zupinki dihannya, prikupuvannya Yazikov. Painting occurs zazvichay a vertical position, lasts 20-30 seconds, after chogo ailments come up tical.

Algorithm in Action of Faint:
STEP 1 - give a patient ka horizontal position with raised several feet.
STEP 2 - to free the patient from lasting wear.
STEP 3 - to ensure access of fresh air
STEP 4 - Grind the temple and chest of the patient
STEP 5 - pobryzkaty face with cold water
STEP 6 - to smell the patient vatku with liquid ammonia.

9. Collapse (Latin collapsus) - clinical manifestation of acute vascular insufficiency of the fall of vascular heart sound, decrease myocardial contractile function, reduction of bcc and fall of AT. It can occur in acute blood loss, myocardial infarction znevodzhuvanni, poisonings, hypotensive drugs overdose.
The clinical picture includes skin pallor, cold sweat tacky, low blood pressure, rapid pulse, low content. Consciousness can be lost and saved (with the patient usually retarded) advanced pupil.

Action to collapse algorithm:
Step 1 - remove the cause if possible (eg to stop bleeding).
STEP 2 - horizontal position to provide patient with multiple head lowered.
STEP 3 - to free the patient from lasting wear.
STEP 4 - To provide access fresh air
STEP 5 - for the doctor to enter medication to increase the bcc and / or drugs that increase vascular heart sound.

Case assignment.
Task 1.
Patient N., aged 30, the boundaries of the heart have not changed, the apex of the heart vishlushivaetsya two-heart sound: The first of these, more than a loud, ends a long pause, and starts to short, with a quieter heart sound is at the end a short pause. Enjoy a louder heart sound.
A. I heart sound is the norm.
B. I heart sound this pathology.
S. II heart sound, is the norm.
D. II heart sound, this pathology.

Task 2.
In the recruit, D., 18 years, the boundaries of the heart have not changed, pathology of the respiratory system is not on the pulmonary artery be heard two heart sounds: one more loud and occurs at the end of a short pause, and here it is much louder (on inspiration) than in the aorta ; more quiet heart sound on both vessels are at the end of a long pause.
Rate II heart sound on the pulmonary artery.
A. Over a loud and a pathology - Accent II heart sound.
B. A loud and this is the norm - a physiological stress II heart sound.
C. A quiet and is the norm.
D. A quiet and a weakening of the P heart sound.

Task 3.
The patient K., 20 years of cardiac-type neurocirculatory dystonia, tachycardia 120 in 1 min. At the apex of the heart is auscultated two heart sounds: one louder, the other quiet. Since both pause practically the same, on this basis to determine which of these I-II-nd and the second heart sound is impossible. A loud heart sound coincides with the apical impulse. Which of these I-th and n-th heart sound? What it is: a rule or pathology?
A. Over a loud heart sound and the I is the norm.
B. A loud heart sound of I and this pathology (gain).
C. More than a quiet heart sound and the I is the norm.
D. A quiet heart sound II and this pathology (weakening).
E. More than a loud heart sound and II is the norm.

Task 4.
In a patient st., 20 - years in the pulmonary artery listened two heart sounds, of
which the one that occurs at the end of a long pause, - bifurcated, with the second half of his loudest first.

Which component heart sound is late?
A. triple-component 1 - the first pitch
B. mitral component 1 - th heart sound
C. vascular component 1 - th heart sound
D. pulmonary component of the II colors
E. aortic component of the II colors

Task 5.
Physiological third heart sound be heard:
A. in diastole (between 2 nd and 1 st heart sound, but closer to the 1 st heart sound);
B. in diastole (between 2 nd and 1 st heart sound, but closer to the 2 nd heart sound);
C. in systole (between 1 st and 2 nd heart sound, but closer to the 1 st heart sound);
D. in systole (between 1 st and 2 nd heart sound, but closer to the 2 nd heart sound);
E. in systole (between 1 st and 2 nd heart sound, at an equal distance between the heart sounds).

Task 6.
F. The patient, 20 years of heart disease - mitral insufficiency.
At the top, in the armpit to the left, along the left edge of the sternum be heard the murmurs.
What are the characteristics of murmurs in the mitral valve insufficiency?
Specify characteristics of the murmurs.
A. systolic murmur, a place of education - the left ventricle
B. systolic murmur, a place of education - the left atrium
C. place the best possible listening - intercostal space left of the sternum
D. best be heard in an upright position
E. direction of - on the neck vessels

A: Objective 1. A; Task 2. B; Objective 3.A; Task 4. D; Objective 5.A; Task 6. A

Challenges to verify the achievement of specific learning objectives.
Task 1.
The patient was examined by a dentist suddenly became pale and lost consciousness.
What position should provide the patient?
A. Vertical.
B. sat.
C. half-sitting.
D. Lying with lowered legs.
E. Lying slightly elevated legs.

Task 2.
Select the correct sequence of resuscitation with a sudden stop of blood circulation:
A. Artificial ventilation - indirect heart massage - airway
V. indirect heart massage - airway - mechanical ventilation
S. indirect heart massage - mechanical ventilation - airway
D. Artificial ventilation - airway - indirect heart massage
E. airway - mechanical ventilation - an indirect heart massage.

Task 3.
Conscript, D., 18, complained of stabbing pains in the heart, palpitations, weakness, shortness of breath with excitement (and periodically desire to breathe deeply 2-3 times). Build asthenic. Excited, the thyroid gland was not enlarged. Pulse 100 in 1 min., Regular, BP 110/80 mm Hg. Art. Heart - not expanded. At verhuschke I heart sound louder II th, systolic murmur at the beginning of systole, in protodiastolic - additional heart sound low heart sound, nowhere is conducted, inconstant, disappears in a horizontal position; on pulmonary artery heart sound accent II. ECG - normal. Lungs and abdominal cavities were normal. Evaluate additional heart sound protodiastolic.
A. III heart sound, physiological.
B. III heart sound, pathological.
S. IV heart sound, physiological.
D. IV heart sound, pathological.

Task 4.
II heart sound in the II-th intercostal space on the right of the sternum in the norm:
A. louder than I heart sound (as well as in the pulmonary artery);
B. louder than I heart sound (as well as on the apex of the heart);
C. quieter than I heart sound (as well as in the pulmonary artery);
D. quieter than I heart sound (as well as on the apex of the heart);
E. quieter than I heart sound (as well as on the tricuspid valve).

Task 5.
I heart sound at the top of the heart is normal:
A. louder than the II-th heart sound (as well as on the tricuspid valve);
B. louder than the II-th heart sound (as well as on the aortic valve);
C. quieter than II heart sound (as well as in the pulmonary artery);
D. quieter than II heart sound (as well as on the aortic valve);
E. quieter than the heart sound II (as well as on the tricuspid valve).

Task 6.
I differ from the heart sound II heart sound that auscultated:
A. at the end of a long pause, and does not coincide with cardiac impulse;
B. at the end of a short pause and do not coincide with the cardiac impulse;
C. at the end of a long pause, and coincides with cardiac impulse;
D. at the end of a short pause, and coincides with cardiac impulse;
E. not differ according to pauses and with a push.

Target 7.
The volume of the two heart sounds increases in case:
A. mitral stenosis;
B. mitral insufficiency;
C. tricuspid stenosis;
D. hypothyroidism;
E. thyrotoxicosis.

Task 8.
B. The patient, aged 40, who suffers from rheumatism, formed the heart defect. On auscultation the patient to the top of the heart is auscultated rude murmurs, which merges with 1 - m voice and follow him. What a murmurs auscultated the patient?
A. protosistolichesky
VI diastolic
S. presystolic
D. protodiastolic
E. middiastolic

Target 9.
Indicate which sounds better place?
A. rf
B. systolic
C. low amplitude
D. diastolic
E. not accompanied by tremor

Task № 10
The patient's aortic valve insufficiency. What is the nature of the murmurs at a given heart defects?
A. Protodiastolic.
B. Middiastolic
C. Presystolic
D. Midsystolic
E. pansystolic

Standards of answers to problems.
Task 6: S. Task 7: E. Task 8: A. Target 9: V. Target 10: A.

**Brief guidelines for use in class**

Classroom work begins in the training room to be checked and corrected problems entry-level knowledge.

Then, the teacher considers the role of the physician and the relevance of the method of auscultation of the heart in diagnosing and treating patients. Then the instructor using the computer multimedia program demonstrates the audio
recording of normal and altered heart sounds with simultaneous images on the screen.

Classes continued in the wards. Students under the guidance of the teacher determine the patient's projection of the valves on the anterior chest, and place them listening. Teacher shows students the method of auscultation, how differences in heart heart sounds. Next to the House after a preliminary explanation of the teacher, students listen to a few patients with normal and altered heart sounds, murmurs. Then listen to each independently selected patients, checking the correctness of determining the identified changes in individual conversation with the teacher. Discussion of diagnostic value of the identified changes were made in the training room.

Classes are continuing in the training room, where students discussed with the algorithms of action in urgent situations. At the end of classes offered to solve the control task on factual topics, summarizing the classroom.

**Test control tasks**

Task 1. The patient at the apex of the heart is auscultated two heart sounds: one loud, another - a quiet, and loud heart sound comes after a short pause, but still - long after that, specify colors in this case: A. I heart sound - a loud, II heart sound - quiet, I> II, then II heart sound is weak and this pathology.
B. II heart sound - a more quiet, I heart sound loud - , II <I, I mean the heart sound is reinforced and this pathology.
C. I heart sound - a loud, II heart sound - quiet, I> II; II, then II heart sound is weak and the norm.
D. II heart sound - louder, I heart sound - a quiet, II> I, II means the heart sound is reinforced and is the norm.
E. I heart sound - a quiet, II heart sound - loud, I <II, I denotes the heart sound of relaxation and this pathology.

Task 2. The patient listened to the aorta, two heart sounds: one of them loudly, another quiet, and loud heart sound comes after a long pause, but still - after a brief that, specify colors in this case:
A. I heart sound - a loud, II heart sound - quiet, I> II, II mean the heart sound is weak and this pathology.
B. II heart sound - louder, I heart sound - a quiet, II> I, II means the heart sound is reinforced and this pathology.
C. I heart sound - a loud, II heart sound - quiet, I> II, II mean the heart sound is weak and this is the norm.
D. II heart sound - louder, I heart sound - a quiet, II> I, II means the heart sound is reinforced and is the norm.
E. I heart sound - a loud, II heart sound - quiet, I> II, I mean the heart sound is reinforced and is the norm.

Objective 3. Physiological third heart sound be heard:
A. in diastole (between 2 nd and 1 st heart sound, but closer to the 1 st heart sound;
B. in diastole (between 2nd and 1st heart sound, but closer to the 2-th heart sound.
C. in systole (between 1st and 2nd heart sound, but closer to the 1st heart sound.
D. in systole (between 1st and 2nd heart sound, but closer to 2-second heart sound.
E. in systole (between 1st and 2nd heart sound, at an equal distance between these signals.

Task 4. The patient with auscultation at the top heard amplified, loud two-heart sound, point at which the pathological condition is it possible that the melody of the heart:
A. Thyrotoxicosis
B. Myocarditis
C. myocardial infarction
D. Emphysema
E. Cardiomyopathy

Task 5. In mitral valve prolapse additional heart sound occurs:
A. in conjunction with the 2nd heart sound:
B. in between the 1st heart sound and 2nd heart sound:
C. in protodiastolic;
D. in middiastolic;
E. in presystolic

Task 6. The patient tricuspid valve. Name the character of murmurs in this heart defects:
A. Protodiastolic.
B. Systolic.
C. Middiastolic
D. Presystolic
E. Presystolic and middiastolic

Target 9. The patient's aortic valve insufficiency. What is the nature of the murmurs at a given heart defects?
A. Protodiastolic.
B. Middiastolic
C. Presystolic.
D. Midsystolic
E. Pansystolic

Target 10. The patient tricuspid valve. Specify the appearance of murmurs at a given heart defects:
A. Left atrium.
B. Left ventricle.
C. Right ventricle.
D. Right atrium.
E. Aorta.
STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

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Donetsk 2011
**Importance of the Subject:** competent in methodic and technique performance of questioning of patient, inspection, percussion, auscultation and superficial palpation of abdomen allows in many cases to diagnose pathological changes of abdominal viscera, to analyze interconnection between results of questioning and physical examination of digestive apparatus and identify basic syndromes of its affection including emergency states. Nursing of patients with pathology of digestive apparatus and rendering first aid.

**Key Objective:** to master questioning and physical examination of patients with pathology of digestive apparatus. To note changes in patient’s oral cavity at diseases of digestive apparatus. To conduct auxiliary examination methods of gastroenterology and use peculiarities of patients’ nursing and rendering first aid. To interpret basic syndromes and to give clinical assessment of findings.

**Specific Goals:**
1. To conduct methodically correct questioning of patient on digestive system, to assess findings.
2. To make an inspection of oral cavity.
3. To make an inspection, percussion and auscultation of abdomen and assess findings.
4. To make an inspection of abdomen, to determine clinical significance of symptoms.
5. To conduct palpation of abdomen, to determine clinical significance of symptoms.
6. To conduct palpation of the liver, to determine clinical significance of symptoms.
7. During questioning of patient to pay attention to features of anamnesis and physical examination at diseases of digestive apparatus and hepatobiliary system.
8. To determine guiding syndromes of digestive apparatus.
9. To be able to interpret laboratory findings at diseases of digestive apparatus.
10. To determine basic and additional methods of gastrointestinal tract examination.

**Level of Knowledge and Skills before the Practice:**
1. Thorough inspection of oral cavity (anatomy department)
2. To delimit abdominal region, determine projection of anteroventral muscles and venous collaterals (anatomy department).
3. To interpret relationship of percussion sound and physical properties of fluctuating body (physics department).

**Questions for Self-Assessment of the Pre-Practice Knowledge**
**Q1.** A 47-year old patient complains of bloating pain in the right part of abdomen with periodic cramp-like increase, nausea, vomiting. Appendectomy complicated by circumscribed peritonitis has been made one year ago. During inspection asymmetric abdominal distension was found. During palpation it was
found out that there is painfulness in the right part of abdomen, intestine is increased in diameter and it’s dense. Auscultation revealed absence of intestinal murmurs. Which bowel segments are projected on the right half of iliac region?  
A. Ascending segment of large intestine and blind gut.  
B. Descending segment of large intestine.  
C. Sigmoid colon.  
D. Jejunum.  
E. Transverse colon.

**Q 2.** Patient complains of extended moderate abdominal pain, feeling of swelling, nausea. Which patient’s complains may be a confirmation of meteorism?  
A. Feeling of abdominal swelling.  
B. Abdominal pain.  
C. Nausea.  
D. All of the mentioned complains.  
E. None of the mentioned complains.

**Q 3.** During superficial palpation of patient’s abdomen there is acute painfulness in the right iliac region, abdominal wall is hard. After long light stroking and changing of patient’s attention fro conversation hardening disappears. Assess findings of superficial palpation of the right iliac region:  
A. Variant of norm.  
B. There is resistance of abdominal wall.  
C. There is muscular defense.  
D. There is hypertrophy of abdominal wall’s muscles.  
E. There is pathological mass of abdominal wall.

**Q 4.** 38-year old patient K. complains of intensive pain in epigastrium, feeling of abdominal swelling, severe general weakness. Complains appeared suddenly. It is known from the anamnesis that during 10 years patient has been suffering from duodenal ulcer. On abdominal percussion the percussion sound is loud, long, low-pitched and ringing throughout including liver region. Doctor suspected perforation of ulcer into abdominal cavity and it was confirmed after the further examination. What kind of percussion sound is determined throughout the abdomen?  
A. Dull.  
B. Impaired.  
C. Tympanic.  
D. Impaired -tympanic.  
E. Clear.

**Q 5.** 52-year old patient was admitted to the hospital with complains of the feeling of heaviness in epigastric zone, low appetite, edema of low extremities, loss of weight for 6 kg per year. During inspection of patient’s abdomen (normosthenic) it was found that: abdomen is expanded, protruding umbilicus,
on percussion there is dull sound from the umbilicus level up to the bottom. Deep palpation of abdomen is complicated. Greater curvature of stomach was found by auscultatory-affrictional method on 6sm higher than umbilicus. Assess position of greater curvature of stomach.

A. Norm for asthenic.
B. Norm for normosthenic person.
C. Norm for hypersthenic person.
D. Elevated.
E. Descended.

Q 6. What quantity of human gastric juice is exuded during the day?
A. 1 liter
B. 2 - 2.5 liters
C. 3.5 - 4 liters
D. 0.5 - 1 liter
E. 3 liters

Q 7. What kind of cells produce hydrochloric acid in stomach?
A. Chief cells
B. Accessory cells
C. Goblet cells
D. Accessory cells
E. Columnar cell

Q 8. Select sign of gallbladder inflammation:
A. Presence of leukocytes during the 1st phase
B. Presence of leukocytes during the 2nd phase
C. Increase of leukocytes in portion A
D. Increase of leukocytes in portion B
E. Increase of leukocytes in portion C

Q 9. Hippocratic face is typical for:
A. Renal colic
B. Inflammation of parietal peritoneum at appendicitis
C. Meteorism
D. Hyposecretory syndrome
E. Hepatic colic

Q 10. Increase of unconjugated bilirubin is observed at:
A. Pernicious anemia
B. Obstructive jaundice
C. Asiderotic anemia
D. Acholuric jaundice
E. Posthemorrhagic anemia
Key answers:  1- А;  2- А;  3- В;  4- С;  5- Е;  6- В;  7- В;  8- Д;  9- В;  10- Д.

Contents of Practice

**Topics of the Theory:**
1. General rules, technique of patient’s questioning, specificity of complaints of patients with digestive apparatus pathology.
2. Scheme of abdominal wall regions.
3. Topographical-anatomical features of organs’ position in the abdominal cavity
4. Anatomical features of organs’ structure.
5. Principles, technique of oral cavity examination
6. Percussion of abdomen, physical bases of percussion.
7. Diagnostic value of findings of oral cavity examination.
8. General rules, technique, stages of superficial and profound palpation, diagnostic value of findings.
9. Guiding syndromes of digestive organs and hepatobiliary system.
10. Diagnostic value of findings received by basic and additional laboratory methods.

**Practical skills:**
Students should be able to demonstrate mastery of the following practical skills
1. To conduct questioning of patient with pathology of digestive organs.
2. To assess findings of oral cavity examination.
3. To assess form and size of abdomen.
4. To conduct abdominal percussion.
5. To perform auscultation of abdomen.
6. To fulfill superficial palpation of abdomen.
7. To perform palpation of digestive organs according to Obraztsov-Strazhesko method.
   a) To determine normal parameters of sigmoid colon.
   b) To determine normal parameters of blind gut.
   c) To determine normal parameters of ileum terminal portion.
   d) To determine normal parameters of ascending and descending colon.
   e) To determine normal parameters of transverse colon.
8. To master methodic of gastric juice extraction by fractional method, to assess state of secretory function, to determine and assess hourly tension of basal and stimulated secretion (mg/L), state of evacuation function at “residue” of contents in 25 minutes after test meal.
9. To master methodic of duodenal intubation, macro- and microscopic investigation of A, B and C bile and diagnostic value of changes.
10. To master indications and methodic of fiberoptic colonoscopy and roentgenological methods of gastrointestinal tract examination.
11. To master methodic of stool investigation and to be able to assess findings.
12. To be able to use clinical, instrumental and laboratory methods of examination for detection of syndromes of gastrointestinal tract pathology.
13. To assess diagnostic value of symptoms.

**Required Glossary to Practice**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glossitis</td>
<td>It’s superficial tongue inflammation that can be found in many infectious and noninfectious diseases.</td>
</tr>
<tr>
<td>Parodontosis</td>
<td>Inflammation of dentogingival recess and denudation of dental cervix</td>
</tr>
<tr>
<td>Anorexia</td>
<td>Total loss of apetite.</td>
</tr>
<tr>
<td>Heartburn</td>
<td>Feeling of heat and burning in epigastric and retrosternal region.</td>
</tr>
<tr>
<td>Cachexia</td>
<td>Abrupt loss of weight as a result of which subcuataneous layer of fat disappears and muscles atrophy.</td>
</tr>
<tr>
<td>Distension pain</td>
<td>Pain in consequence of distension of intestine by gases and tension of mesentery. Pain has long term character and accurate localization.</td>
</tr>
<tr>
<td>„Medusa head”</td>
<td>Dilated swollen venous collaterals are located near umbilicus and radiating from it.</td>
</tr>
<tr>
<td>Epigastrium</td>
<td>The upper region of abdomen limited by line that connects the lower edges of both tenth ribs.</td>
</tr>
<tr>
<td>Bimanual palpation</td>
<td>Palpation by both hands. It’s used in examination of ascending and descending colon, kidneys, liver and spleen.</td>
</tr>
<tr>
<td>Penetrating palpation</td>
<td>It is a kind of profound palpation when the tip of two - three vertically positioned fingers gradually but strongly press on the restricted space.</td>
</tr>
<tr>
<td>Ascites</td>
<td>Accumulation of fluid in the abdominal cavity</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Staining of skin and visible mucous membranes in yellow color.</td>
</tr>
<tr>
<td>Dysphagy</td>
<td>declares itself by complication or impossibility of swallowing, pains in the moment of swallowing, ingress of food or liquid into nose, larynx, trachea.</td>
</tr>
<tr>
<td>Dyspeptic signs</td>
<td>Are typical for nausea, vomiting, constipation and diarrhea</td>
</tr>
<tr>
<td>Meteorism</td>
<td>declares itself by abdominal distension, distensing pain in abdomen; intensive (explosive) discharge of great amount of flatus is possible.</td>
</tr>
<tr>
<td>Telangiectasia</td>
<td>venous spiders, venous lakes – it is dilatation of minute blood vessels (capillaries) that accumulate and appear</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Alkaline phosphatase (AP)</td>
<td>Alkaline phosphatase, 1.0-3.0 mmole/L. Index of cholestasis</td>
</tr>
<tr>
<td>GGT</td>
<td>Gamma Glutamyl Transpeptidase 0.6-3.9 mmole/L. Index of cholestasis</td>
</tr>
<tr>
<td>Child-Pugh score</td>
<td>This score is suggested for assessment of liver cirrhosis severity. It is based on data of biochemical investigations (bilirubin, albumin, prothrombin) and clinical signs – ascitis and encephalopathy.</td>
</tr>
<tr>
<td>Hepatargia</td>
<td>(hepatargia; hepat- + Greek. argia inactivity; syn.: hepatargy, hepatic encephalopathy, portal systemic encephalopathy) – clinical syndrome that develops at severe hepatic failure or hepatic intoxication and declares itself in neuropsychic disorders, appearance of fetor hepaticus, possible development of hepatic coma.</td>
</tr>
<tr>
<td>Cytolysis</td>
<td>Insult to hepatocytes by virus, toxic agent etc. Analogous activity at chronic hepatitis and liver cirrhosis. Declares itself by jaundice, dark urine, light-colored stool. Transaminase increases more than 2-5 times.</td>
</tr>
<tr>
<td>Cholestasis</td>
<td>Intrahepatic, develops as a result of impairments of biliary excretion in bile capillaries. It is observed at cholestatic hepatitis, biliary liver cirrhosis.</td>
</tr>
<tr>
<td>Portal hypertension</td>
<td>Impairment of venous outflow from unpaired organs of abdominal cavity as a result of complication of blood flow on portal vein, through the cirrotic liver.</td>
</tr>
<tr>
<td>Small liver signs</td>
<td>Venous spiders, angiomas on chest, back, legs, palmar and plantar erythema, gynecomastia.</td>
</tr>
<tr>
<td>Hypersplenism</td>
<td>Increase and distortion of spleen functions on removal of destroyed blood corpuscles; it is usually associated with hypersplenism. It is observed at liver cirrhosis with portal hypertension.</td>
</tr>
<tr>
<td>HBsAg</td>
<td>Superficial antigen of hepatitis B that appears in 4 weeks after infection by hepatitis B and disappears after 3-6 months, may stay for years.</td>
</tr>
<tr>
<td>HBeAg</td>
<td>Antigen of hepatitis B. Indicates viral reproduction. Test of contagiousness.</td>
</tr>
<tr>
<td>Anti HBe</td>
<td>Antibodies to antigen E indicate excretion of virus from the organism (absence of viral reproduction).</td>
</tr>
<tr>
<td>Anti HDV</td>
<td>Antibodies to virus of hepatitis D are evidence of delta infection</td>
</tr>
<tr>
<td>Syndrome of malabsorption</td>
<td>disturbances of absorption and uptake of food.</td>
</tr>
<tr>
<td>Irritable colon</td>
<td>Impairment of secretory and movement function of the</td>
</tr>
<tr>
<td>Syndrome</td>
<td>Colon without reliable organic changes.</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Dyspeptic syndrome</td>
<td>Symptom complex that is characterized by indigestion in digestive tract.</td>
</tr>
<tr>
<td>Syndrome of encelialgia</td>
<td>Pains of psychogenic nature which demand treatment directed at correction of psychic disorders.</td>
</tr>
</tbody>
</table>

**Characteristic of pains in abdomen of different nature**

<table>
<thead>
<tr>
<th>Variant of pain</th>
<th>Mechanism of development</th>
<th>Clinical characteristic</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crampy abdominal</td>
<td>Spasm of unstriped muscles of organs.</td>
<td>Acute, intensive, cramping that suddenly appear and the same way disappear. May be accompanied by vomiting, abdominal muscles’ tension.</td>
<td>Hepatic (biliary), renal, intestinal and stomachal colic.</td>
</tr>
<tr>
<td>Distension</td>
<td>Distension of hollow organs’ walls and tension of their ligamentous apparatus.</td>
<td>Dull, tensive, low-intensive, extended without pair localization and irradiation.</td>
<td>Meteorism, hyposecretory syndrome.</td>
</tr>
<tr>
<td>Peritoneal</td>
<td>Inflammation of parietal peritoneum and its irritation at perforation (break) of hollow organs.</td>
<td>Arise gradually or acute (in case of break), constant, continuously increase up to excruciating. Accompanied by general signs of intoxication, vomiting, restriction of abdominal respiratory movements, tension of abdominal wall, weakening of peristalsis, positive Blumberg's sign.</td>
<td>Peritonitis as a result of appendicitis, cholecystitis, perforation of gastric and duodenal ulcer.</td>
</tr>
<tr>
<td>Vascular</td>
<td>Acute blood supply disturbance.</td>
<td>Appear suddenly, extended, constantly increase, intensive</td>
<td>Mesenteric ischemia, artery embolism, abdominal angina (spasm).</td>
</tr>
</tbody>
</table>
Flow Chart 1:

**Secretory function of stomach**

- **Basal secretion**
  - Introduction of thin gastric tube into antral part of the stomach
  - Removal of fasting gastric contents
  - Removal of gastric juice portions every 15 minutes (4 during one hour)
  - Assessment of volume of 4 portions (hour-long tension of secretion – basal secretion)
  - Estimation of free hydrochloric acid content
  - Calculation of hydrochloric acid discharge

**Stimulated secretion**

- Submaximal simple test of histamine (introduction of 0.5 ml of 0.1% solution of histamine)
- Submaximal double test of histamine (double introduction of 0.5 ml of 0.1% solution of histamine with 30 min break)
  - Removal of gastric juice portions every 15 minutes (4 during one hour)

- Pentagastrin test (mcg/kg of patient’s weight)

- **BAO** (Basal Acid Output)
  - Excitation of 15% of accessory cells
- **SAO** (Submaximal Acid Output)
  - Excitation of 45% of accessory cells
- **MAO** (Maximal Acid Output)
  - Excitation of 90% of accessory cells

- Ratio
  - $\text{BAO : BAO : MAO} = 1 : 3 : 6$
Methodic of fractional duodenal intubation.
In the morning patient swallows gastric tube on an empty stomach up to mark 45sm (distance is checked by aspiration of gastric content). After that patient is put to bed on the right side with roll. Patient continues to swallow tube slowly but now up to the mark 75sm – to the duodenum. 25% solution of sulfuric magnesia, vegetable oil, 10-20% solution of glucose are used as cholecystokinetic agent, 3 mg of cholecystokinin are introduced intravenously.

Flow Chart 2:

Investigation of bile

<table>
<thead>
<tr>
<th>Phases</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before introduction of cholecysto-kinetic agent</td>
<td>Bile from the common bile duct</td>
<td>Phase of the closed Oddi’s sphincter</td>
<td>Latent period of cystic reflux</td>
<td>Phase of cystic bile</td>
<td>Phase of hepatic bile</td>
</tr>
<tr>
<td>Bile from the common bile duct</td>
<td>Cessation of bile inflow</td>
<td>Up to the appearance of cystic bile</td>
<td>Bile from gallbladder</td>
<td>Bile from bile ducts</td>
<td></td>
</tr>
<tr>
<td>20 minutes</td>
<td>3-6 minutes</td>
<td>3-4 minutes</td>
<td>30 minutes</td>
<td>30 minutes</td>
<td></td>
</tr>
<tr>
<td>Golden yellow color</td>
<td>Dark olive green color</td>
<td>Clear yellow color</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portion A</td>
<td>Portion B</td>
<td>Portion C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Syndrome of jaundice  
(Pathogenesis)

- **Jaundice**
  - **Obstructive**
    - Disorder of bile outflow on extrahepatic bile ducts as a result of their blockade, there is disturbance of conjugate bilirubin excretion through extrahepatic bile ducts and its regurgitation to blood.
  - **Hepatocellular**
    - Lesion of hepatocytes, bile capillaries, disorders of capture, conjugation and excretion of bilirubin, its regurgitation to blood.
  - **Hemolytic**
    - Increase of unconjugated bilirubin production that exceeds possibility of liver for metabolism and discharge.
Flow chart 4:

Stool analysis

Chemical investigation

pH reaction

Alkalescent or neutral (according to litmus paper)

Reaction on the stercobilin

Positive pink coloration under sublimate influence

Weber's test with resin

Investigation on the hidden blood

Investigation on the hidden blood

Gregersen's test with benzidine

Oxidation of resin in the presence of hemoglobin

Diagnostic of gastrointestinal disturbances

Diagnostic of hematologic disturbances

Oxidation by hydrogen peroxide and reduction by benzidine in the presence of hemoglobin

Coloration of resin in the blue color

Bacteriologic study

Coloration in dark blue or purple

Microscopic investigation

Eggs and cysts of parasites

Soaps

Non-digested vegetable cellulose

Neutral fat

Fatty acid

Non-digested muscle fibers

Erythrocytes

Macrophages
### Flow chart 5:

**Malabsorption**

**Are not absorbed**

Fats, proteins, carbohydrates, vitamins K and B, iron, calcium, bile acids

**Clinical signs**

<table>
<thead>
<tr>
<th>Complaints</th>
<th>Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>loss of weight, general weakness, abdominal swelling, diarrhea, gingival, nasal hemorrhages, ostealgia, cramps</td>
<td>puleness, dryness of skin, stomatitis, glossitis, bone fractures, edema</td>
</tr>
</tbody>
</table>

**Laboratory diagnostic**

Steatorrhea, anemia, hypoalbuminemia

**Causes**

Chronic pancreatitis, biliary tract obstruction, decrease of absorption surface after intestine resection, gluten enteropathy, infiltration of mucous membrane (amyloidosis, Crohn's disease), presence of pathological flora, exudative enteropathy, lymphoma of abdominal cavity, tuberculosis of mesenterial lymph nodes.
Flow chart 6:
Dyspeptic syndrome is the symptom complex that is characterized by indigestion in digestive tract.

Dyspeptic syndrome

Forms

Disorders of cavitary digestion
Disorders of parietal digestion
Mixed forms

Causes

Primary or secondary deficiency of enzymes, disorders of nutrition, intoxication, abnormalities of nervous regulations, enteric infections

Clinical signs:

Complaints: pressure and heaviness, pain in the abdomen, eructation, nausea, lowering of appetite, feeling of gurgling and pouring in the abdomen, meteorism, disturbances of stool

Laboratory diagnostic

Steatorrhea, amylorrhea, creatorrhea, achlorhydria, achylia, anemia, dyselectrolytemia
Irritable colon syndrome. Derangement of secretory and motor function of the colon without reliably established organic changes.

Suggested Reading List

Required Reading
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by John Macleod, Jonh Munro, Churchill Livingstone, 1986
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: “Auscultation of the heart: origin of the heart sounds, changes in volume. Basics of phonocardiography”.
5. Methodical guideline for students
6. Flow charts for practice: “Auscultation of the heart: the heart sounds”.
7. Website of department: www.cardiology.dsmu.edu.ua
### Additional Reading

2. History and Physical Examination . Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
4. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

### Sequence of Actions during questioning, inspection, superficial palpation of patient with diseases of abdominal cavity:

1. **Collection of complaints**
2. **Questioning of patients**
   - **History taking**
   - **Inspection:**
     - general
     - inspection of abdomen
3. **Form, sizes, symmetry of abdomen**
4. **State of skin and umbilicus**
5. **Nutritional state**
6. **State of subcutaneous vessels, hairiness**
7. **Superficial palpation**
Sequence of Actions during profound palpation of the abdomen:

**METHODIC OF EXAMINATION OF PATIENT WITH ABDOMINAL CAVITY DISEASES**

**EXAMINATION OF ORAL CAVITY**

Diagnostic findings of tunica mucosa of mouth, speech, teeth, tongue, salivation function, gustatory function may indicate manifestations of pathological changes and confirmation of pathological syndromes of digestive tract. For example, in case of irritation of stomach and intestine there will be ulcers in the oral cavity, in case of irritation of colon – rash and ulcers: in case of cholecystitis - erosive areas on the mucous membranes of cheeks. Patients with gastric ulcer suffer from inflammatory form of parodontosis (*inflammation of dentogingival recess and denudation dental cervix*). Often gastric ulcer is accompanied by abundant precipitation of dental calculus and decrease of quantity of functioning small salivary gland. At inspection of oral cavity Filatov spots (measles), white spots of thrush (weakened patients), grayish brown spots (Addison's disease) can be found.
**Change of taste.**

Changes of taste has significant diagnostic value. They can be found at infectious and gastrointestinal disturbance, pathology of oral and nasal cavity, organic diseases of brain, long intake of some drugs.

In the basis of taste changes there is insufficient content of copper and zinc in the organism. Deficiency of zinc in the saliva plays especially great role in changes of taste.

**Salivation**

Analysis of salivation function plays significant role in diagnostic of some diseases. Increased salivation or hypersalivation depends for a variety of reasons and can be observed at the following physiological and pathological states: irritation by food, influence of parasympathomimetic substances – pilocarpine, muscarine etc; increased secretion of big digestive glands in patients with gastric ulcer and pathology of pancreas, mercury or iodine poisoning, reflex irritation of salivary glands in patients with helminthic invasion, Parkinson's disease, rabies, pregnancy and vomiting and also at strong irritation of rectal ampulla, urinary bladder, genitals. Decreased salivation or hyposalivation appears in different cases: reflex impairment of salivary glands and influence of anticholinergic drugs, nervousness and increased sweating, water imbalance, after massive bleeding and long diarrhea, botulism, kidneys’ diseases, malignant anemia, bilateral paralysis of facial nerve, progressive paralysis.

**Tongue inspection.**

Great value in diagnostic of organism state according to state of tongue has its color, character of incrustation, state of papilla, density and mobility of corpus linguae. Angulation of tongue may be caused by somatic disorders. Affection of the left part of the body (spleen, left lung) or right (liver, right lung) causes changes of tongue volume and deviation of apex of the tongue to the corresponding side. In norm tongue is pink colored with slight yellow incrustation, apex of tongue does not deviate and does not quiver.

Lacquered tongue is characterized by bright-red color, it becomes bright and smooth as a result of papilla atrophy. It can be found at oncological diseases of gastrointestinal tract, severe chronic colitis, full-blown hypovitaminosis.

Folded tongue is met at central nervous system and endocrine organs affection, including affection of hypophysis. In case of very thick tongue with rough transverse sulcus it is called “scrotal tongue”. This symptom is characteristic for severe mental deficiency and psychic diseases especially if patient doesn’t maintain hygiene of oral cavity. Folded tongue can also be an evidence of Melkersson-Rosenthal syndrome – diseases of unknown etiology characterized by recurrent swelling of cheeks, lips and tongue accompanied by paresis of facial nerve. Stomatologists differentiate folded tongue of adults with sclerosing glossitis which develops at tertiary syphilis.
**Typhoid tongue** – is one of the first signs of typhoid fever. It is characterized by thickening, presence of grayish-white incrustation with bright hyperemia of the free of incrustation edges and apex.

**Raspberry tongue** is typical for scarlet fever.

Dark-red color of tongue “ham” is typical for obesity and chronic alcoholism.

**Cyanotic** - cardiovascular collapse.

**White tongue** is characteristic for inflammatory diseases of digestive organs especially intestine.

Appearance of white areas on the tongue or mucous membranes of cheeks – **leukoplakia** demands necessary stomatological supervision and thorough examination. Such white spots that are not covered with incrustation and connected with epidermidalization are considered to be precancer. Often **leukoplakia** develops as a result of vitamin A deficiency.

Twitching of tongue muscles or **fasciculation** develops at serious cerebral affections, thyrotoxicosis, emotional excitement, fear.

**EXAMINATION OF ABDOMINAL CAVITY**

1. To conduct inspection of the abdomen in vertical position of patient: assess form (usual, protruding, pendulous, hollow), symmetry, umbilicus (smoothed, drawn-in, protruding), state of skin (color, elasticity, presence of rash), determine presence of venous collaterals and direction of blood flow in them, dehiscence of rectus muscle of abdomen, hernia.

2. To conduct percussion of abdomen in vertical position of patient (for detection of ascites): for that finger- plessimeter is positioned under umbilicus on the midline (perpendicularly to it) and quiet downward percussion is conducted with analysis of the sound that is created (transfer of tympanic sound into the dull one that indicates presence of fluid).

3. To conduct inspection of the abdomen in horizontal position of the patient: to assess form, symmetry, participation in breathing (active, weak, doesn’t participate (locally, diffusely)), visible peristalsis.

4. To conduct percussion of abdomen in horizontal position of patient (for detection of ascites): for that finger- plessimeter is positioned under umbilicus on the midline (parallel to it) and quiet percussion toward flanks is conducted with analysis of the sound that is created (transfer of tympanic sound into the dull one that indicates presence of fluid).

5. To conduct auscultation of abdomen: to sound systematically (in vertical and horizontal positions of the patient) all abdominal regions (beginning with left inguinal and then clockwise) analyzing intensity of intestinal murmurs (normal – weak, increased, absent), presence or absence peritoneal murmur.

6. To conduct superficial palpation of abdomen: patient has to be laid on the back with low head of the bed, hands are laid along the body (the same position is for profound palpation), right hand of the doctor is placed flatwise (first in the left inguinal region) and slightly presses by finger bones moving
them on 3-4sm to both sides analyzing painfulness, consistency, compliance of abdominal wall and then all characteristics are compared with symmetric region on the right side. The same way mesogastric and epigastric regions are compared.

7. To conduct profound palpation of the abdomen according to Obraztsov-Strazhesko method.

**INVESTIGATION OF DUODENAL CONTENT AND BILE**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I phase - of the common bile duct</td>
<td>Is characterized by the”A” bile portion time of discharge 10-20min, quantity 20ml color is golden-yellow</td>
</tr>
<tr>
<td>II phase – of the closed Oddi's sphincter</td>
<td>duration 2-6 min, bile is absent</td>
</tr>
<tr>
<td>III phase- bile of the portion “A” of the distal part of common duct</td>
<td>time of discharge 3-5 min, quantity 3-5 ml</td>
</tr>
<tr>
<td>IV phase – of the portion &quot;B&quot;</td>
<td>time of discharge 20-30 min, quantity 30-50 ml dark olive green or brown color</td>
</tr>
<tr>
<td>V phase – of the portion &quot;C&quot;</td>
<td>time of discharge 20-30 min, quantity exceeds portion &quot;B&quot; golden-yellow color</td>
</tr>
</tbody>
</table>

**Assessment of results** of fractional duodenal intubation permits to determine different impairments of motor function of gallbladder and bile ducts.

1. **hypotension of Oddi's sphincter** – shortening of the phase of closed Oddi’s sphincter less than 3 min and discharge of bile with speed more than 2ml/min.

2. **hypertension of Oddi's sphincter** – increase of closed Oddi’s sphincter duration more than 6 min., discharge of B and C bile is discontinuous, delayed, pain is possible, introduction of novocaine increases volume velocity of bile flow.

3. **hypotension of gallbladder** - prolongation of discharge time of portion B – more than 60 min, decrease of volume velocity of biliary excretion and increase of portion B volume – more than 100 ml.

4. **hypertension of gallbladder** – decrease of discharge time of portion B – less than 20 min, increase of volume velocity of biliary excretion – more than 5ml/min; volume of portion B is not changed significantly.

5. **hypertension of bile duct** – difficulty of bile discharge.

**Microscopic study.**

**Leukocytes.** Large quantity of leukocytes in portions B and C may indicate presence of inflammatory process in bile ducts (cholecystitis,
cholecystocholangitis) and its non-bile origin (admixture of gastric and pancreatic juice, migration from the mucous membrane of duodenum).

**Epithelial cells** – great amount of round epithelial cells in portions B and C indicates on pathological changes in duodenum; column epithelial cells – inflammation of bile ducts.

**Bilirubin calcium and crystals of cholesterol.** Detection of them is typical for cholestasis, that is often met at cholelithiasis

**Protozoa and helminthes.** It is recommended to conduct investigation of duodenal content if there is suspicion of liver and gallbladder helminthiasis (opisthorchiasis, fascioliasis, clonorchiasis, dicroceliasis) and duodenum (strongyloidiasis, trichostrongyloidiasis)

**Bacteriological study of bile** is conducted for determination of microflora content and its antibiotic susceptibility.

**Biochemical study of bile** provides insight into concentration function of gallbladder and colloidal stability of bile, presence of inflammatory process.

But these methods demand expensive equipment and because of their complexity are mostly used in scientific researches.

**Situational tasks**

**Task 1**
28 years old patient P. complains of weakness, abdominal swelling, diarrhea (stool is 4-5 times during the day, profuse). Coprological study: consistency is porridge-like, color is grey-yellow with greasy luster, positive reaction on bilirubin. Microscopy: increased quantity of fatty acids and soap, moderate amount of neutral fat, petty amount of muscular fibers, digested cellulose, significant amount of starch. In which part of gastrointestinal tract insufficiency of digestion may give such picture of stool:
- A. Insufficiency of gastric digestion
- B. Insufficiency of pancreas
- C. Insufficiency of digestion in intestine
- D. Insufficiency of gastric digestion and pancreas
- E. Insufficiency of digestion in intestine and insufficiency of pancreas

**Task 2**
27-years old patient S. complains of general weakness, skin is pale with pateritious color, liver is not increased, spleen is on 2 sm lower than ribs’ edge. Bilirubin in blood: total – 52,64 mcmole/l, conjugated – 0, unconjugated – 52,64 mcmole/l, reaction of Van der Berg – indirect. Bilirubin of urine – reaction is negative, urobilin – reaction is sharply positive. Stool is of saturated yellow color, reaction on the stercobilin is sharp positive. Increase of unconjugated bilirubin in the blood can be found at:
- A. pernicious anemia
- B. obstructive jaundice
C. asiderotic anemia
D. cythemolytic icterus
E. posthemorrhagic anemia

Task 3
48 years old patient complains of periodical edema of legs during the last year. During the last 3 months abdomen began to increase in volume. In the past patient abused alcohol. Investigation: skin and mucous membranes are subicteric. On the skin of trunk there are single vascular spiders. Tongue is lacquered. Abdomen is increased by the expense of presence of free liquid and meteorism. In horizontal position it is spread. Liver is beyond the right costal margin on 5sm, its edge is acute, surface is dense, uneven and painless. Spleen is on 3 sm lower of left costal margin. There are oedema of shins and feet. Laboratory investigation: common blood analysis: Er – 3,3T/l, Hb-126g/l, L-5,6 M/l; ESR -18mm/hour. Total bilirubin - 27,6 mcmole/l; conjugated-14,6 mcmole/l, unconjugated -13,0 mcmole/l. AST-0,7mmole/ h l; ALT-1,2mmole/ h l. Alkaline phosphatase – 2,5mmole/ h l, whole protein – 50g/l, albumin – 49%, urea – 4,5 mmole/l. Fiber-optic gastroduodenoscopy: varix dilatation of esophagus’s veins. Scintigraphy of the liver: liver is diffusely increased. Accumulation of radiopharmaceutical is uniformly decreased. Spleen is increased and actively accumulates radiopharmaceutical. What causes such changes?
A. Liver cirrhosis
B. Cholelithiasis
C. Heart failure.
D. Chronic hepatitis.
E. Fatty hepatosis.

Task 4
During patient’s examination it was found: abdomen is swollen , asymmetric, there is visible peristalsis, on the percussion – tympanic sound, splashing sound. At superficial palpation: moderate painfulness in the left iliac area, abdominal wall in that place is dense, after long slight stroking it becomes softer. Indicate level of impediment that causes painfulness in the left iliac area.
A. Caecum.
B. Ascending part of colon.
C. Descending part of colon.
D. Transverse colon.
E. Sigmoid colon

Task 5
38 years old patient K. complains of very intensive pain in epigastrium, feeling of abdominal swelling, general weakness. Complaints appeared suddenly. From the case history it is known that patient has been suffering from duodenal ulcer for 10 years. On percussion of the abdomen sound is laud, long, low, ringing and
is determined throughout the abdomen and under liver. Doctor suspected free perforation and it was approved during the further examination of patient. What kind of percussion sound is throughout the abdomen?
A. Dull.
B. Impaired.
C. Tympanic.
D. Impaired - tympanic.
E. Clear.

Task 6
67 years old patient D. was admitted to the hospital with complaints on swelling pains in the left iliac area, 2-3 days of constipation, loss of appetite, loss of weight on 5-6 kg during the last year. Examination: nutritional state is decreased, abdomen is of usual form, painless at superficial palpation. Profound palpation: sigmoid colon is located in the typical place, increased in diameter, dense, painfulness. Other parts of colon are in the typical places, of the normal sizes, painless, rumble. Which parts of the colon are projected in the left iliac area?
A. Descending part of colon.
B. Ascending part of colon.
C. Distal part of intestine.
D. Sigmoid colon
E. Caecum.

Task 7
43 years old patient B. complains of intensive pain in the right iliac area, nausea, single vomiting. At superficial palpation of the right iliac area there is acute painfulness and expressed tension of abdominal wall muscles. Which parts of the colon are projected in the left iliac area?
A. Caecum and appendage.
B. Ascending part of colon.
C. Descending part of colon.
D. Sigmoid colon.
E. Duodenum.

Task 8
36 years old patient D. complains of pains in the lower part of the abdomen in the area of flanks. Pains appear after intake of fruits, milk, fatty food and are dull, aching. Pains decrease after passage of gases and defecation. Examination: patient is of normosthenic type, little bit decreased nutrition, tongue is with grayish incrustation. Abdomen is swollen, there is moderate diffuse painfulness during palpation. Profound palpation: sigmoid colon is painfulness, 4sm in diameter, dense, moves on 6-7sm; caecum, ascending, descending and transverse colon are painfulness, up to 4-5sm in diameter, rumble. Doctor suspected colitis. Assess characteristics of sigmoid colon according to palpation
findings.
A. Norm.
B. Only diameter is changed.
C. Only consistency is changed.
D. Only mobility is changed.
E. All of the characteristics are changed.

Task 9
58 years old patient was admitted to the hospital with complaints on swelling pains in the right iliac area, 2 days constipation, loss of appetite, loss of weight on 6 kg during the last year. Profound palpation of the abdomen revealed: sigmoid colon is painless, smooth, its diameter is 1.5-2sm, elastic consistency, doesn’t rumble; ascending, descending and transverse colon can not be palpated because of the marked subcutaneous fat.
Assess findings:
A. Norm.
B. Diameter of caecum is changed.
C. Diameter of sigmoid colon is changed.
D. Diameter of both colons is changed.
E. Consistency of both colons is changed.

Task 10
52 years old patient D. complains of weakness, absence of appetite, heaviness in epigastric area after food intake. Examination of gastric secretion: total acidity – 0 t.u., free hydrochloric acid – 0 t.u.; first phase of secretion; basal secretion – 34ml, total acidity – 20 t.u., free hydrochloric acid – 0 t.u.; after test-breakfast there were 190ml of residue; second phase of secretion: stimulated – 48ml, total acidity – 20 t.u., free hydrochloric acid – 0 t.u. What kind of gastric juice does the patient has?
A. Normal
B. Hypoacid
C. Anoacid
D. Hyperacid
E. Increased

Key answers:

Revision tasks.

Task 1
During superficial palpation of patient’s abdomen there is acute pain in the right iliac area, abdominal wall is dense, after long slight stroking and changing of attention hardening doesn’t disappear. Assess findings of iliac area superficial palpation:
A. Variant of norm.
B. There is autodefense of the abdominal wall.
C. There is muscular defense.
D. There is hypertrophy of abdominal wall muscles.
E. There is pathological mass of abdominal wall.

Task 2
52 years old patient Z. was admitted to the hospital with complaints on the feeling of heaviness in the epigastrium, loss of appetite, fast satiation and feeling of repletion even at small amount of food, foul-smelling eructation, frequent nausea and vomiting with unpleasant smell and admixtures of food eaten 1-2 days ago, constipation, considerable weight loss. During 20 years patient has been suffering from gastric ulcer. Examination: patient is of decreased nutrition, scaphoid abdomen, painfulness at palpation especially in epigastrium and paraumbilical area. Profound palpation: greater curvature of stomach is on 2sm lower than umbilicus, painless, in a way of stairs, soft-elastic consistency, movable in borders of 3-4sm.
Assess palpatory characteristics of greater curvature of stomach:
A. Only mobility is changed.
B. Only consistency is changed.
C. Only topography is changed.
D. All of the characteristics are changed.
E. Norm

Task 3
70 years old patient S. complains of weakness, subfebrile temperature, almost constant pains in the right side of the abdomen, weight loss, constipation. Patient is ill for 6 months. Profound palpation of ascending colon gave the following results: moderate painfulness, diameter is about 6sm, gibbous, absolutely immovable. Assess palpatory characteristics of the colon:
A. Only diameter is changed.
B. Only consistency is changed.
C. All of the characteristics are changed.
D. Only state of surface is changed.
E. Only mobility is changed.

Task 4
What for is barium suspensium used in contrast radiography?
A. Increase of peristalsis
B. Cleansing of stomach
C. Spasmolytic effect
D. Contrast study of the examined organ, its relief and evacuator function
E. Increase of gas-formation
Task 5
In the given list of diseases indicate diseases for which introduction of tube for fractional analysis of gastric content is prohibited.
A. Exacerbation of ulcer
B. Gastric ulcer, gastric bleeding 3 weeks ago
C. Chronic gastritis
D. Chronic cholecystitis
E. Exertional and rest angina

Task 6
What is amylorrhea?
A. Presence of undigested meat food debris in excrements
B. Presence of pus in faeces
C. Presence of bundles, flakes, dense masses
D. Considerable content of fats in faeces
E. Discharge of indigested food rich in starch

Task 7
Increase of combined hydrochloric acid testifies about:
A. Mistake in determination of free acid
B. Presence of proteins in gastric juice
C. Presence of bicarbonates in gastric juice
D. Deficiency of free hydrochloric acid in gastric juice
E. Increased formation of lactic acid

Task 8
In mentioned above conditions determine source of bile in portion B:
A. Common bile duct
B. Gallbladder
C. Bile ducts
D. -------
E. -------

Task 9
Common bile duct is located toward the duodenum in such a way that it adjoins with:
A. Head of pancreas
B. Body of pancreas
C. Tail of pancreas
D. Tail and body of pancreas
E. Adjoins all parts of pancreas

Task 10
Sphincter Oddi is located:
A. In the area of cystic duct (sphincter of gallbladder)
B. In the area of major duodenal papilla (sphincter of common bile duct)
C. In the area of common hepatic duct (sphincter of common hepatic duct)
D. In the area of right hepatic duct
E. In the area of left hepatic duct

Key answers

**SUMMARY OF PROCEDURES**

The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out. Another part of the practice shall be conducted in the hospital wards. During it the teacher demonstrates to the students clinical topography of the abdomen (its differentiation on floors, areas) and conducts its inspection as in the vertical as in the horizontal positions. Teacher demonstrates patients with pathological forms and sizes of abdomen, meteorism, obesity, ascites. Every student masters different methods of determination of free fluid in the abdominal cavity (percussion in different positions of patient, fluctuation etc.).

Teacher demonstrates technique of superficial palpation of the abdomen emphasizing its purposes: determination of painfulness, resistance, tension. Teacher controls correctness of this investigation of every student, correcting position of hands, their movement, “depth of immersion” etc.

Discussion of diagnostic value of obtained finding is conducted outside wards. At the end of the practice students decide control tasks. Teacher makes short general conclusion concerning obtained findings. At the end of the class – test control.

**Test control tasks**

**Task 1**
Patient complains of diffuse, moderate intensive pains in the abdomen, feeling of swelling, nausea. Examination: abdomen is increased in volume, its form doesn’t change with change of body position. Umbilicus is protruding, skin fold is hard to capture. Percussion: tympanic sound on symmetric areas. Name reason of abdomen extension:
A. Meteorism.
B. Obesity.
C. Ascites.
D. Pathological mass in abdominal cavity.
E. Pregnancy.

**Task 2**
Patient complains of acute distension pain in the left side of abdomen, swelling, constipation during 5 days, loss of appetite, general weakness. Examination: at superficial palpation there is moderate painfulness in the left iliac area,
abdominal wall is dense, after long slight stroking becomes softer. Assess findings of superficial palpation of the left iliac area
A. There is resistance of abdominal wall.
B. Variant of norm.
C. There is muscular defense
D. There is hypertrophy of abdominal wall muscles.
E. There is pathological mass in the abdominal wall.

Task 3
Patient complains of diffuse, moderate intensive pain in the abdomen, feeling of “swelling”, nausea. Which patient’s complains may be a confirmation of meteorism?
A. Abdominal pain.
B. Feeling of abdominal swelling
C. Nausea.
D. All of the mentioned complains.
E. None of the mentioned complains.

Task 4
69 years old patient O. complains of weakness, subfebrile temperature, almost constant pains in the right side of the abdomen, weight loss, constipation. Patient is ill for 6 months. Profound palpation of ascending colon gave the following results: moderate painfulness, diameter is about 6sm, gibbous, absolutely immovable. Assess palpatory characteristics of the colon:
A. All of the characteristics are changed.
B. Only consistency is changed.
C. Only mobility is changed
D. Only state of surface is changed.
E. Only diameter is changed

Task 5
61 years old patient undergoes fractional intubation, portions:
At empty stomach – 0ml, total acidity – 0 t.u., free hydrochloric acid - 0 t.u.; first phase of secretion; basal secretion - 10,0, 0,5 t.u., total acidity –10,0, 0,12 t.u., free hydrochloric acid - 0, 0, 0, 0, t.u.; second phase of secretion: stimulated (histamine 01% ml subcutaneous introduction) –5,8,5,0 ml, total acidity – 10,12,10,0 t.u., free hydrochloric acid – 0, 0, 0, 0, t.u..
Assess obtained data of total and free hydrochloric acid:
A. Histamine-resistant achlorhydria
B. Non- histamine-resistant achlorhydria
C. Expressed hyperchlorhydria
D. Moderate secretory deficiency
E. Moderate hyperchlorhydria

Task 6
What kind of faeces is typical for gastric bleeding?
A. With admixtures of fresh blood  
B. With admixtures of mucus  
C. Tar-like  
D. Normal  
E. Colorless

**Task 7**
In the given list of diseases indicate diseases for which introduction of tube for fractional analysis of gastric content is prohibited.
A. Exacerbation of ulcer  
B. Gastric ulcer, gastric bleeding 3 weeks ago  
C. Chronic gastritis  
D. Chronic cholecystitis  
E. Exertional and rest angina

**Task 8**
42 years old patient, engineer, complains of dull pain in the right hypochondrium after food intake (especially after fattening and fried), nausea, bitter taste, loss of appetite, increase of temperature up to 37,2-37,4°C, constipations. Liver is on 2sm beyond the ribs, painfulness. Duodenal intubation: portion A – clear yellow, leukocytes – 6-8 in sight, portion B – olive color, lots of mucus, flakes, leukocytes – ½ in sight, portion C – clear yellow, leukocytes – 10-15 in sight (are colored by peroxidase in all portions). Which laboratory findings indicate on syndrome of cholestasis?
A. Increase of unconjugated bilirubin  
B. Decrease of blood cholesterol  
C. Decrease of alkaline phosphatase in the blood  
D. Stercobilin in faeces  
E. Absence of urobilin in the urine

**Task 9**
55 years old patient G. Suffers from intensive jaundice with green-tinged skin, weight loss, scratches on the skin. Scab of skin is mostly typical for:
A. Obstructive jaundice  
B. Cythemolytic icterus  
C. Increase of urobilinogen content  
D. Increase of stercobilinogen

**Task 10**
Spread of inflammation beyond the walls of gallbladder at cholecystitis causes pain:
A. Peritonealgia
B. Distension  
C. Vascular  
D. Spastic  
E. Any of the listed above
STUDENT'S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Inspection methods and the main symptoms and syndromes in internal diseases in the clinic of Internal Medicine</td>
</tr>
<tr>
<td>Subject Module 2</td>
<td>Research Methods and the main symptoms and syndromes in diseases of the digestive and urinary system</td>
</tr>
<tr>
<td>Practice</td>
<td>A technique for investigation of urinary tract. Collection of complaints, medical history and physical examination of patients with pathology of the urinary system. Care and the providing of first aid. Supporting research methods in nephrology. The main syndromes in nephrology. Changes in the oral cavity in diseases of the genitourinary system.</td>
</tr>
</tbody>
</table>

Course: 2  
Faculty: Dentistry

Donetsk 2011
**Importance of the Subject**: correct according to the method and technique required anamnesis, inspection, percussion, auscultation, abdominal palpation of the surface can often quickly identify pathological changes in abdominal organs, including the state of emergency, to use additional methods of investigation. In the study of abdominal palpation is given paramount importance. Methodically carried out correctly palpation can detect not only the localization of the pathological process, get an idea of his character, but also to determine the subsequent tactics surveys using complementary techniques (X-rays, sigmoidoscopy, etc.). Ability to palpate the kidneys, to assess their physical properties is of great importance in the diagnosis of internal diseases, it often allows the diagnosis. Early diagnosis of clinical signs of kidney damage, the use of instrumental and laboratory studies allow them to optimize the subsequent search for diagnostic and early treatment of patients, which improves the prognosis. Proper care of patients with pathology of urinary system and timely first aid to help in the treatment and future prognosis for patients.

**Key Objective**: to be able to carrying out an interview anamnesis of urinary system, abdomen studies, to give the clinical evaluation of the data; palpate the kidneys, to determine their physical properties and to evaluate the diagnostic significance of the changes that are being detected; identify the leading symptoms and signs in the clinic of internal diseases, in particular, in the pathology of urinary, analyze the results of basic laboratory and instrumental methods; to care for patients with kidney disease and urinary tract and first aid.

**Specific Goals**:
1. Provide inquiries and general inspection of the patient with the pathology of urinary system and evaluate the data obtained.
2. Palpation of the kidneys to hold on a method Obraztsova - Strazhesko, learn research methodology palpation of kidneys in a standing position and lying and symptom a beating in the lumbar region, to assess the findings.
3. Learn methods of clinical and bacteriological examination of urine, urine analysis for Nechiporenko, Zimnitsky and interpret the results obtained in renal pathology.
4. Learn techniques of biochemical blood tests for renal disease (urea, creatinine, total protein, cholesterol) and interpret their results.
5. Characterized by instrumental methods of investigation of the urinary tract - ultrasound and X-ray, biopsy. Evaluate and interpret the results of these studies.
6. Identify the main syndromes in diseases of the urinary flow according to the physical and complementary research methods.
7. Identify and evaluate the typical changes in the mucosa and the teeth-jaw system in renal disease.
8. Own method of catheterization of the bladder catheter is soft.
9. Spend caring for patients with kidney disease and urinary tract infections, and provide first aide.
Level of knowledge and skills before the practice
1. Know the structure of the kidneys and urinary tract. "Anatomy".
2. Know the function of kidneys and urinary tract. "Physiology."
3. Know the basic biochemical processes that occur in the kidneys and urinary tract. Biochemistry.
4. Ethical relationships in society. "Philosophy".

Questions for self-assessment of the pre-practice knowledge

Q1. Doctor needs to know how many nephrons in each kidney contains a healthy person?
   A. 1-1.3 million nephrons
   B. 20 million nephrons
   C. 30 million nephrons
   D. 0.2 million nephrons
   E. 18-20 thousand nephrons

Q2. To assess kidney function, nephrologists need to know what function to perform kidney nephron?
   A. Glomerular filtration, tubular reabsorption and secretion.
   B. Glomerular filtration rate, osmotic dilution and concentration of urine.
   C. Glomerular filtration, secretion, osmotic dilution and concentration of urine.
   D. Glomerular filtration, tubular reabsorption, osmotic dilution and concentration of urine.
   E. Glomerular filtration rate, glomerular reabsorption and secretion.

Q3. To estimate the glomerular filtration rate in patient S., aged 30, a nephrologist should use:
   A. Uric acid
   B. Glucose
   C. Creatinine
   D. Indikan
   E. Albumin

Q4. Which material to choose a doctor to assess the glomerular filtration rate:
   A. Which only filters
   B. What is the only secreted
   C. Which only reabsorption
   D. Which is filtered and secreted
   E. Which is filtered and reabsorbed

Q5. On a section of the drug kidney shows that the medulla has a striped appearance. What anatomical structures provide this picture?
   A. renal corpuscles and vessels bringing
   B. convoluted part and the efferent vessels
C. Henle Loop collected in tubes
D. Renal columns and arched artery
E. Slice the kidneys and mutual artery

Q6.
Normally, when a mixed meal urine is acidic or weakly acidic (pH = 5.3-6.8). In this case, the acid reaction of urine is predetermined, mainly due to:
A. NaH 2PO4 and KH2PO4
B. NaH 2PO4 and K2HPO4
C. H3PO4 and Na2HPO4
D. NaH2PO4 and K2HPO4

Key answers: Q 1- A. Q 2- A. Q 3- C. Q 4- A. Q 5- S. Q 6- A.

Suggested Reading List for the initial level of knowledge

Contents of Practice
Theoretical questions to practice.
1. Questions and a general inspection of the patient with the pathology of urinary flow.
2. Methods palpation of kidneys by the method of Strazhesko, palpation study of kidneys in a standing position and lying down, check symptoms a beating in the lumbar region.
5. Ultrasound and X-ray examination in diseases of the kidneys and urinary tract, kidney biopsy.
6. The main syndromes in diseases of the urinary system and symptoms on physical data and additional research methods.
7. Typical changes of the mucous membrane of the mouth and teeth-jaw system in renal disease.
8. The technique of catheterization of the bladder catheter is soft.

Practical skills that are performed on lesson.
1. Conduct inquiries and general inspection of the patient with kidney disease and urinary tract infections and to evaluate the data obtained.
2. Hold palpation of kidneys by the Strazhevsko method, palpation study of
kidneys in a standing position and lying down, check symptoms a beating in the lumbar region and assess the data obtained.

3. Interpretation of the results of clinical and bacteriological examination of urine, urine analysis for Nechiporenko, Zimnitsky.

4. Interpretation of the results of biochemical studies of the blood in renal disease (urea, creatinine, total protein, cholesterol).

5. Interpretation of the results of instrumental studies of kidney and urinary tract (ultrasound, X-ray, biopsy).

6. Identify the main syndromes in pathology of urinary system according to the physical and complementary research methods.

7. Determine the typical changes in oral mucosa and teeth-jaw system in renal disease.

8. Spend caring for patients with nephrological and first aid.

9. Catheterization of the bladder to hold a soft catheter.

### Required Glossary to Practice

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematuria</td>
<td>The presence of red blood cells in urine</td>
</tr>
<tr>
<td>Leucocyturia</td>
<td>The presence of an increased number of leukocytes in urine</td>
</tr>
<tr>
<td>Proteinuria</td>
<td>The presence of protein in the urine</td>
</tr>
<tr>
<td>Polyuria</td>
<td>A large amount of urine, which identifies a person within a day. More than 2 liters</td>
</tr>
<tr>
<td>Oliguria</td>
<td>Decrease in urine output of less than 500 ml per day</td>
</tr>
<tr>
<td>Anuria</td>
<td>The absence or reduction of urine output less than 50-100 ml per day</td>
</tr>
<tr>
<td>Nocturia</td>
<td>The predominance of nocturnal diuresis on day</td>
</tr>
<tr>
<td>Gipostenuriya</td>
<td>The presence of urine with a low density</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>clinical and laboratory syndrome associated with long-term and significant increased permeability of the nephron structures for a protein that shows more than 3,5 g/l proteinuria,</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>hypoproteinemia, hypoalbuminemia, hyperlipidemia and edema</td>
<td>Nephritic syndrome Pathological condition manifested mandatory laboratory changes in the urine, hypertension and edema</td>
</tr>
<tr>
<td>Tubulo-interstitial syndrome</td>
<td>Presented by a group of inflammatory, noninflammatory, toxic and metabolic diseases that occur with the overwhelming defeat of the interstitial tissue of the kidney and tubular apparatus</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td>Morphologically heterogeneous group of immune inflammatory diseases of the kidneys, mainly affecting the nephron</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>Group of infectious and inflammatory diseases of the kidneys with an overwhelming defeat pyelocaliceal apparatus</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>The final stage for any chronic kidney disease, which is based on the processes of irreversible decline in kidney function and development of uremic poisoning</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>Acutely emerged, but potentially reversible renal dysfunction with oligo-anuria and signs of uremic poisoning</td>
</tr>
<tr>
<td>Coma</td>
<td>Complete lack of consciousness with preservation of corneal, vomiting, and tendon reflexes</td>
</tr>
</tbody>
</table>
Flow chart 1

**Uranalysis**

<table>
<thead>
<tr>
<th>Physical and biochemical parameters of urine</th>
<th>Microscopic examination of urine sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity ≥ 1.018</td>
<td>Epithelial cells - 1-2 in a field of vision</td>
</tr>
<tr>
<td>Colour - straw-coloured</td>
<td>Leucocytes - 1-3 in a field of vision</td>
</tr>
<tr>
<td>Transparency - transparent</td>
<td>Red blood cells - 0-1 in a field of vision</td>
</tr>
<tr>
<td>Reaction (pH) - 4.5-8.5</td>
<td>Casts - absent</td>
</tr>
<tr>
<td>Protein - absent, &lt; 50 (30) mg for twenty-four hours</td>
<td>Mucosa - absent</td>
</tr>
<tr>
<td>Glucose, acetone, ketone bodies - absent</td>
<td>Bacteria &lt; 50000 in ml</td>
</tr>
</tbody>
</table>
# Disorders of the Renal Perfusion

- **Disorders of the renal perfusion**
  - Prerenal
  - Renal
  - Postrenal

## Laboratory and Instrumental Features

<table>
<thead>
<tr>
<th>Clinical periods</th>
<th>Laboratory and instrumental features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Azotaemia</strong></td>
<td>increased concentration of creatinine and urea</td>
</tr>
<tr>
<td><strong>Water-electrolyte disbalance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Acid-base disbalance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Anaemia</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Arterial hypertension</strong></td>
<td></td>
</tr>
</tbody>
</table>
Suggested Reading List

Required Reading
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 1986
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: Examination of the cardiovascular system: semiotics, inspection of the heart, percussion: methodic and technique of determining normal borders of the relative and absolute cardiac dullness, in the norm and pathology
5. Methodical guideline for students
6. Flow charts for Practice
7. Website of department: www.cardiology.dsmu.edu.ua

Additional Reading
2. History and Physical Examination . Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006
Estimated base operations (EBO).

**Sequence of Actions in the Precordial Area Palpation and Examination**

1. Algorithm of actions during the questioning, inspection, palpation of the surface of patients with diseases of the abdominal cavity:

   - **STEP 1**: Collection complaints
   - **STEP 2**: Anamnesis
   - **STEP 3**: History taking
     - Shape, size, symmetry, stomach
     - Skin & navel
     - Fatness
     - Status subcutaneous blood vessels, body hair
   - **STEP 4**: Surface palpation
2. Algorithm of actions with deep palpation of the abdomen:

**STEP 1**
Teaching the patient “belly breathing”
- Installation of hands
- Skin fold
- Dive on inspiration
- Slide finger

**STEP 2**
Sequence
- Sigmoid colon 1
- Cecum
- Ascending, descending colon
- Transverse Colon

**STEP 3**
Ileum 3

**STEP 4**

3. Algorithm of actions on palpation of liver, spleen, kidney:

Deep palpation
- Installation of hands
- Skin fold
- Immersion
- Slide finger

Sequence
- Liver
- Spleen
- Kidneys
Method of palpation of the kidneys

Method of palpation of the right and left kidneys in the first horizontal and then in the vertical position of the patient for this:
- Fingers of his left hand set in the most compliant portion of the corresponding lumbar region, between the XII rib and the iliac wing.
- The right hand with a slightly bent middle (III) to put your finger flat on the corresponding flank abdomen, slightly outward from the edge of the rectus abdominis muscle, 2-3 cm above the navel, that is perpendicular to the direction of his left hand.
- Using the relaxation of abdominal muscles during expiration (the patient breathes "abdomen"), fingers of his right hand immersed in the abdomen, while pushing with your left hand on the lumbar area to the fingers close together for 2-3 respiratory cycles.
- And then invite the patient to breathe deeply "belly" (the movable kidney is displaced downward, but the anterior abdominal wall slightly raises his right hand).
- During the next exhalation the patient to make a rapid convergence of hands, mostly to the right (the kidney does not have time to shift up and you can assess its consistency, tenderness, the state of edges and surfaces). If at this level to probe the kidney fails, repeat the technique, slipping his right hand for 2-3 cm above the lower is.

Situational Tasks

Q1. Patient D., aged 65, from childhood diabetes. Past 6 years, notes the increase in BP up to 160/110 mmHg. Art., swelling of fingers, legs mainly in the morning. Admitted to the clinic, undergoing tests. Prescribed tests: a general clinical, analysis Zimnitsky, daily urine for protein.
What portion of urine is used for the overall clinical study of urine? What boundaries can vary the pH of urine? What pathological states lead to a shift in urine pH in the acid side?

Q2. 17-year-old boy turned to the doctor with complaints about the appearance of the urine-colored "slops meat, reduction of daily urine output, a little swelling around the eyes.
What is the value of daily diuresis in healthy people? What does it depend on? What syndrome is seen in young men?

Q3. The patient under examination in a urine analysis: relative density - 1.010, protein 0.13 g / l, erythrocyte unmodified 0-1 in the field of view, the modified
2-4 in field view, 60-80 leukocytes in the field of view, the cylinders are hyaline, granular, leukocyte, - 2-4 in sight, the renal epithelium. Evaluate the data analysis. What tests (survey) it is expedient to appoint the person and for what purpose?

Q4.
The patient L., 48 pulmonary tuberculosis 7 years. Edema of the lower limbs last 2 weeks. In urine analysis: specific gravity 1.030, protein 8.5 g / day, 0-2 leukocytes, red blood cells 0-2 in a field of view. Enter the most accurate cause of nephritic syndrome.
A. Amyloidosis of the kidneys.
B. Chronic pyelonephritis.
S. Kidney injury.
D. Acute pyelonephritis.
E. A acute cystitis.

Q5.
The patient, 39 years developed edematous syndrome. Suspected renal amyloidosis. What research should be carried out to exclude renal disease as a cause nephrotic syndrome.
A. Urine.
B. Sigmoidoscopy.
S. Scintigraphy kidneys.
D. Computed tomography of the kidneys.
E. Isotope radiorenografia.

Q6.
The patient, D., 67 years against a background of chronic obstructive bronchitis appeared massive edema of the lower extremities. In urine analysis: specific gravity 1019, protein 6.5 g / liter. Leucocytes 1-2, erythrocytes 3-4, hyaline cylinders 2-3 in the field of view. What is the likely cause of edema.
A. Heart failure.
B. Thrombosis of the portal vein.
S. Amyloidosis of the kidneys.
D. Acute thrombosis of lower limb veins.
E. Coronary heart disease.

Revision Questions

Q1.
The patient asked the doctor complaining of dull pain in the lumbar region, headache, dizziness, which are associated with increased blood pressure (up to 180/100 mm Hg.), Frequent urination at night - fever up to 37.2-37 , 5C. With deep palpation on both sides feel your kidneys, dense, hilly, of up to 23-25 cm Estimate palpation properties of kidney:
A. Norm.
B. Changed only consistency.
C. Changed only the surface condition.
D. Changed only by size.
E. Changed all performance.

Q2.
Which of these laboratory studies can differentiate leukocyturia as a result of prostatitis or urethritis leukocyturia of renal origin, or of the bladder:
A. Analysis of the urine Nechiporenko
B. Analysis of the urine Amburzhe
C. Analysis of the urine Zimnitsky
D. Bacterial urine culture
E. 3-cup test

Q3.
When examining a patient with nephrotic syndrome detected changes in the clinical analysis of urine. Which of the following changes in the clinical analysis of urine is most characteristic of this syndrome?
A. Proteinuria above 3.5 g / d
B. Eritrotsituriya
C. The shift urine pH to the alkaline side
D. Leukocyturia
E. The emergence of active leukocytes

Q4.
Patients with chronic glomerulonephritis in the clinical analysis of urine revealed the changes: the relative density - 1.005, protein 0.99 g / L, 15-20 red blood cells to change in view. Appointed a urine sample for Zimnitsky. What indicators of the relative density of urine sample Zimnitsky typical hypoizostenuria?
A. 1020 - 1022
B. 1012-1014
C. 1015-1018
D. 1018-1020
E. 1020-1025

Q5.
The patient L., 48 pulmonary tuberculosis 7 years. Edema of the lower limbs last 2 weeks. In urine analysis: specific gravity 1030, protein 8.5 g / day, leukocytes 0-2, 0-2 red blood cells in the field of view. Enter the most accurate cause of the nephrotic syndrome.
A. Amyloidosis of the kidneys.
B. Chronic pyelonephritis.
S. kidney injury.
D. Acute pyelonephritis.
E. Acute cystitis.
Q6. The patient had chronic glomerulonephritis 50 years. Select a symptom that often occurs with nephritic syndrome
   A. Pyuria
   B. Nocturia
   C. Anuria
   D. Hypoproteinemia
   E. Oliguria

Q7. The patient had end-stage chronic renal failure. The defeat of any systems of the body is characteristic of this stage chronic renal failure:
   A. Cardiovascular system;
   B. Nervous system;
   C. Hematopoietic system;
   D. Gastrointestinal tract;
   E. All of these systems.

Q8. The patient, aged 59, was admitted to the emergency room unconscious. Mouth smell of ammonia. Seen from the oral mucosa found whitish coating. Pathology of any organ system can be suspected?
   A. Respiratory
   B. Cardiovascular
   C. Urinary
   D. Digestive
   E. Endocrine

Q9. What is the frequency of urine is collected for her research on Zimnitsky?
   A. 12 hours
   B. 6 hours
   C. After 4 hours
   D. 3 hours
   E. After 1 hour

Q10. Patients with acute urinary retention. What activities should be carried out for emptying the bladder?
   A. Catheterization
   B. Adoption of 0.3 l mineral water
   C. Receiving diuretic drugs
   D. Ice pack on the lower abdomen
   E. Half-sitting position
Standards of answers to problems.
Q 1: E Q 2: E Q 3: A Q 4: B Q 5: A.
Q 6: E Q 7: E Q 8: C Q 9: D Q 10: A.

SUMMARY OF PROCEDURES
Classes begin in the classroom by checking the source of knowledge by means of tests. In the future teacher in the classroom demonstrates questioning technique, the general inspection and palpation of the kidneys in nephrological patient, interprets the data of laboratory and instrumental examination of the patient, determines the particular examination in the pathology of urinary flow, reveals the main syndromes of renal disease and urinary tract in this case. Then the students themselves in the House in the presence of a teacher conducting a study of patients with renal and then evaluate and interpret results of physical and additional research patients, especially care for it in the classroom. At the end of the session summarizes their results and conducted a test control (supervisory job type).

Final test questions
Q1.
Patients with acute urinary retention. What activities should be carried out for emptying the bladder?
A. Catheterization
B. Adoption of 0,3 l mineral water
C. Receiving diuretic drugs
A. Blister with ice on the lower abdomen
B. Half-sitting position
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E. Endocrine
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The patient had end-stage HNN. The defeat of any systems of the body is characteristic of this stage HNN:
A. Cardiovascular system;
B. Nervous system;
C. Hematopoietic system;
D. Gastrointestinal tract;
E. All of these systems.

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The patient had chronic glomerulonephritis 50 years. Select a symptom that often occurs with nephritic syndrome
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C. Analysis of the urine Zimnitsky
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Q.10
The patient asked the doctor complaining of dull pain in the lumbar region, headache, dizziness, which are associated with increased blood pressure (up to 180/100 mm Hg.), Frequent urination at night - fever up to 37,2-37,5°C. With deep palpation on both sides feel your kidneys, dense, hilly, of up to 23-25 cm Estimate palpation properties of kidney:
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### STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1</strong></td>
<td>The main methods of examination of patient and the main symptoms and syndromes on internal diseases course</td>
</tr>
<tr>
<td><strong>Topic 3 Module</strong></td>
<td>Methods of examination, the main symptoms and syndromes in cardiovascular pathology</td>
</tr>
<tr>
<td><strong>Practice</strong></td>
<td>ECG: Laboratory and instrumental investigation in the cardiology. The main syndromes. Typical changes of mucous membrane of the mouth in cardiovascular pathology.</td>
</tr>
<tr>
<td><strong>Course</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Faculty</strong></td>
<td>Stomatological</td>
</tr>
</tbody>
</table>

**Donetsk 2011**
Importance of the Subject:
ECG is unique and reliable method of early diagnostics of arrhythmias, myocardial infarction in cardiology so it is important for doctors all specialities determining the management and prognosis for patient

Key Objective: to develop skills in estimating technical characteristics of an ECG in 12 standard leads, in carrying out the analysis of normal and pathologic elements in the main cardiac disorders.

Specific Goals:
1. To determine the main attributes during interpretation of ECG: heart rate, regularity, position of electrical axis QRS, configuration of waves and intervals of ECG in norm and pathology.
2. To reveal ECG signs in the arrhythmia, heart block, ischemia, myocardial infarction
3. To estimate laboratory sings in myocardial infarction (clinical blood analysis, cardiac enzymes)
4. To know the main changes of mucous membrane in cardiovascular pathology.

Level of Knowledge and Skills before the Practice:
1. To have knowledge of the structure and features of different parts of cardiac system (Described in the Human Anatomy course.)
2. To have knowledge of the basic cardiac electrophysiology (Described in the Physiology course.)
3. To have knowledge of the lead system for recording ECG (Described in the Physiology course.)
4. To identify the main parameters of the cardiac cycle (Described in the Physiology course)
5. To identify the main components of the normal ECG (Described in the Physiology course)

Questions for Self-Assessment of the Pre-Practice Knowledge
Q1. Processes of repolarisation are disturbed in ventricular myocardium in examined person. It will cause amplitude abnormalities of configuration and duration of the wave:
   A. R
   B. P
   C. Q
   D. S
   E. T

Q2. Person has stable HR, not more than 40 bpm. What is the pacemaker of the heart rhythm in this person?
   A. Sinoatrial node
   B. Purkinye' fibers
C. Branches of His' bundle  
D. Atrioventricular node  
E. His' bundle  

**Q3.** What tissue shows the best electrical conducting?  
A. Muscles  
B. Liver  
C. Kidneys  
D. Blood  
E. Lungs  

**Q4.** Due to activation of ion channels of external membrane of excitable cell it's rest potential has significantly increased. What channels were activated?  
A. Natrium channels  
B. Slow calcium channels  
C. Natrium and calcium channels  
D. Potassium channels  
E. Fast calcium channels  

**Q5.** While emotional excitement the heart rate in a 30-year-old person run up to 112 Bpm. What part of the conducting system of the heart caused it?  
A. Intraventricular node  
B. Synoatrial node  
C. His bundle branches  
D. His bundle  
E. Purkinje's fibers  

**Answer Keys:** E, D, A, D, B  

**Contents of Practice**  
**Topics of Theory:**  
1. Characteristics of the main attributes of ECG, to determine heart rate, regularity, position of electrical axis QRS, configuration of waves and intervals of ECG in norm and pathology.  
2. ECG signs of sinus tachycardia, sinus bradycardia and estimate their diagnostic value  
3. ECG signs of sinus arrhythmia and ECG signs of the premature contractions, estimate their diagnostic value  
4. ECG signs of the paroxysmal tachycardia, flutter and fibrillation and diagnostic estimation of the analysis data obtained  
5. ECG signs of atrioventricular block of different degrees  
6. ECG signs of ischemia, myocardial infarction  
7. Laboratory sings in myocardial infarction (clinical blood analysis, cardiac enzymes)  
8. The main changes of mucous membrane of the mouth in cardiovascular pathology
**Practical skills:**

Students should be able to demonstrate mastery of the following practical skills

1. Set electrodes, to record and evaluate the technical quality of ECG.
2. To determine the source of the driver's heart rate, regularity and rate, electrical axis of heart, intrinsic interval.
3. Analyzing the duration, amplitude, the configuration of wave and spacing ECG is normal and pathology.
4. To identify the sinus tachycardia, sinus bradycardia, premature contractions, paroxysmal tachycardia, flutter, fibrillation, ischemia and myocardial infarction on ECG and know their diagnostic value.
5. Estimate laboratory sings of necrosis in myocardial infarction.
6. To determine main changes of mucous membrane of the mouth in cardiovascular pathology.

**Required Glossary to Practice**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatism</td>
<td>Ability of organs to work rhythmically irrespective of connection with external stimuli</td>
</tr>
<tr>
<td>Heart arrhythmia</td>
<td>Disturbance of an organ rhythmical activity(frequency, succession of cardiac contractions and cardiac stimulation)</td>
</tr>
<tr>
<td>Asysote</td>
<td>Absence of cardiac contractions at the absence of bioelectric activity</td>
</tr>
<tr>
<td>Interval of intrinsic deflection</td>
<td>Distance from the beginning of ventricular complex to the apex of wave R</td>
</tr>
<tr>
<td>Interval of adhesion</td>
<td>Distance from the previous extrasysole regular cycle PQRST of the main rhythm to extrasysole</td>
</tr>
<tr>
<td>Compensatory pause</td>
<td>Distance from extrasysole to the next cycle PQRST of the main rhythm</td>
</tr>
<tr>
<td>R- on T phenomenon (early premature contraction)</td>
<td>VPCs occurs on or near the peak of previous T wave.</td>
</tr>
<tr>
<td>Interpolated premature contraction</td>
<td>Ventricular contraction occurring between two normal beats without compensatory pause.</td>
</tr>
<tr>
<td>Allorhythmia</td>
<td>Extrasystoles have certain order for their occurence (bigeminy, trigeminy, guadrigemeny)</td>
</tr>
<tr>
<td>Ventricular bigeminy</td>
<td>Occurs when ventricular premature contractions alternate with normal contractions</td>
</tr>
</tbody>
</table>
| **Excitation of the heart** | initially the right atrium than left atrium, left side of interventricular septum then right side, right ventricle, left ventricle, inferior parts of left ventricle and right ventricle  
Common direction of transmission of excitation is from endocardium to epicardium. |
| --- | --- |
| **Sinoatrial node (SA)** | is the main pacemaker of the heart, its cells initiate electrical impulses that override other potential pacemaker in the heart.  
Its location is in the upper side of the right atrium near the root of the superior vena cava. Impulse from the sinus node passes to the AV node by three special conducting internodal pathways. |
<p>| <strong>Bachmann's bundle</strong> | is anterior internodal tract, connecting sinoatrial node and AV node, it gives also added interatrial pathway for left atrium |
| <strong>Weackebach's bundle.</strong> | is middle internodal tract connecting sinoatrial node and AV node |
| <strong>Torel's bundle</strong> | is posterior internodal tract connecting sinoatrial node and AV node |
| <strong>Kent and James internodal tracts</strong> | are abnormal internodal tracts connecting sinoatrial node and AV node, which conduct impulse faster than in the norm. |
| <strong>Cardiac arrhythmias</strong> | Any deviations from the normal rhythm of the heart are called arrhythmias. These imply alterations in the heart rate, changes in the regularity, changes in the site of the pacemaker and also abnormalities of conduction |
| <strong>Sinus arrhythmia</strong> | the impulse is initiated in the sinus node, but the rate varies with respiration (so respiratory sinus arrhythmia). Rate increases with inspiration and |</p>
<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non- sinus rhythm</td>
<td>Generation of impulses does not happen in sinus node, changes in the site of the pacemaker (atrioventricular escape rhythm, ventricular escape rhythm)</td>
</tr>
<tr>
<td>Atrioventricular escape rhythm</td>
<td>Is non-sinus rhythm if SA node fails then a lower escape pacemaker site in the atrioventricular junction (with rate 40-60 beats per min) take over to drive the heart</td>
</tr>
<tr>
<td>Ventricular escape rhythm</td>
<td>Is non-sinus rhythm if SA node fails lower escape pacemaker site in the ventricles (with rate 25-45 beats per min) may take over to drive the heart</td>
</tr>
</tbody>
</table>
To master the material on the subject study the following flow charts:

**Analysis of ECG**

**I. Analysis of heart rhythm**

- **Rhythmicity analysis of P wave and QRS appearance**
  - P waves and QRS complexes appear simultaneously with rate 60-80 per minute

- **Analysis of P waves**
  - P waves: 1) positive in I, II and negative in aVR; 2) have permanent form; 3) P waves appear before each QRS

- **Analysis of QRS complexes**
  - QRS complexes appear rhythmically. Have normal duration (0.06-0.1 sec)

- **Sinus rhythm of heart**

**II. Determination of heart electrical axis**

**visual method**

- Analysis of amplitude of waves of QRS complexes in I, II, III, aVR, aVL, aVF.

**on tables**

- Analysis of amplitude of waves of QRS complexes in I and III.

- Variants of heart electrical axis: 1) normal position of heart electrical axis; 2) horizontal position of heart electrical axis; 3) vertical position of heart electrical axis; 4) heart electrical axis deviation to the left; 5) heart electrical axis deviation to the right; 6) indefinite position of heart electrical axis (type SI-SII-SIII).

**Analysis of separate fragments of ECG**

- **P wave**
  - Amplitude, duration, polarity and form
  - Duration 0.12-0.2 sec

- **PQ interval**

- **QRS complex**
  - Amplitude, duration of all complex and separate waves
  - Duration no more than 0.1 sec, amplitude substantially differs in different leads

- **ST segment**
  - Difference relative to isoelectric line on isoleine

- **T wave**
  - Amplitude, duration, polarity and form
  - Positive in most leads, obligatory negative in aVR, can be negative in V1

- **QT interval**
  - Duration 0.35-0.40 sec

**NORM**
Flow chart 1

Altered automaticity of the sino-atrial node

- Sinus tachycardia
  - Increased heart rate to 90-180 beats per minute
  - Decreased duration of the R-R intervals
  - Regular sinus rhythm

- Sinus bradycardia
  - Slow heart rate 59-40 beats per minute
  - Increased duration of the R-R intervals
  - Regular sinus rhythm

- Sinus (respiratory) arrhythmia
  - Alterations of cardiac rhythm associated with respiration
  - Alterations of duration of the R-R intervals
  - Sinus rhythm

- Sick-sinus syndrome
  - Constant bradycardia
  - Bradycardia-tachycardia syndrome
  - Periodic ectopic (non-sinus) rhythms and SA block
**Pacemaker of the Heart**

**Norm**

- Sinus rhythm
  - P wave
    - Positive P wave before QRS in the II lead
    - Constant, the same P wave in the one lead

**Pathology**

- Non-sinus rhythm
  - Atrioventricular rhythm
    - Biphasic P waves before QRS complexes
    - QRS configuration is normal
    - With prior atrial excitation-inverted P wave before QRS
    - Atria and ventricles are excited synchronously
      - P wave is absent (buried within QRS complex)
    - With prior ventricular excitation-inverted P wave after QRS
  - Ventricular (idioventricular) rhythm
    - Heart is less than 40 bpm
    - Wide and deformed (abnormal) QRS complexes
    - P waves may be seen but they have no relation to QRS complexes
Flow chart 3

Premature contractions

Atrial premature contraction
- Changes of P wave polarity, its deformation
  - QRS configuration is normal
    - Presence of not fully compensatory pause

Atrioventricular premature contraction
- P wave is absent or negative P wave before or after QRS complex
  - QRS configuration is normal
    - Presence of not fully compensatory pause

Ventricular premature contraction
- P wave is absent
  - Wide and deformed ORS, ST segment and T wave opposite in direction to the main deflection of QRS complex
    - Presence of fully compensatory pause
Ectopic arrhythmias caused by increased excibility of the myocardium (re-entry)

**Types of Arrhythmia**
- Atrial Flutter
- Atrial Fibrillation
- Ventricular Flutter
- Ventricular Fibrillation

**Electrophysiological mechanism**
- Frequent (200-400 bpm) regular depolarization of atria from ectopic focus. AV block 2:1; 3:1; 4:1. Ventricular rhythm depends on AV block.
- Frequent (400-700 bpm) chaotic depolarization of separated groups of cardiomyocytes of atria from multiple ectopic foci. Ventricular rhythm is irregular.
- Frequent (200-300 bpm) depolarization of ventricles from ectopic focus.
- Frequent (400-600 bpm) chaotic depolarization of separated groups of cardiomyocytes of ventricles from multiple ectopic foci.

**ECG signs**
1. Presence of frequent (200-400 bpm) regular, uniform P waves (now toothy wave)
2. QRS are normal
3. AV block 2:1; 3:1; 4:1 (more rarely)
4. Ventricular rhythm depends on permanency of AV block

1. P waves are absent
2. Irregular P waves irregular undulations of varying shape and amplitude - f waves
3. QRS usually are normal
4. Irregular ventricular rhythm

1. P waves are absent
2. Duration QRS ≥ 0.15 s (regular equal oscillating waves of large amplitude)
3. ST segments and T waves are absent
4. No isoelectrical intervals

1. Irregular waves of varying amplitude and shape occurring (400-600 bpm)
2. QRS and T are not differentiated

**Clinical types**
1. Paroxysmal
2. Persistent
3. Permanent

**ECG**
- Irregular waves
**Flow chart 5**

**Hypertrophy of heart chambers**

- Hypertrophy of atriums
  - Analysis of P waves
    - P waves are dilate (duration more than 0.1 sec) and often two-humped
    - P waves are high (amplitude 3 mm and more) and often sharp
  - Hypertrophy of left atrium
  - Hypertrophy of right atrium

**Hypertrophy of ventricles**

**I. Analysis of QRS complexes**

- Horizontal position of heart electrical axis or its declination to the left, R wave is high in aVL (amplitude more than 11 mm), V5-6 (bigger than V4), deep S in V1-2, R amplitude in V5 + S amplitude in V1 or in V5 > 35 mm
- Vertical position of heart electrical axis, declination to the right or indefinite position. R is high in VF (amplitude more than 11 mm, S wave in V5-6 > R or S=R, S amplitude V5-6 >7 mm, R wave in V1-2 = S or R>S

  - Hypertrophy of left ventricle
  - Hypertrophy of right ventricle

**II. Analysis of ST segments and T waves**

- Depression of ST segment and negative T wave in I, aVL, V5-6
- Depression of ST segment and negative T wave in III, aVF, V1-2

  - Combination of changes of QRS complexes and ST segments and T waves
  - Hypertrophy of left ventricle with it overload
  - Hypertrophy of right ventricle with it overload
ECG – diagnostic of myocardial infarction

Transmural
Necrosis of all myocardium thickness

Large focal
Necrosis of part of myocardium thickness

Small focal
Small (1-2mm) foci of necrosis under endocardium or

prevalence

Topical diagnostics

localization
Anterior sental
Anterior
Lateral
Anterior extensive
Posterior diaphragmatic

informative leads
V1, V2, V3
I, II, V1, V2, V3, V4
I, aVL, V5, V6
I, II, aVL, V1, V2, V3, V4, V5, V6
II, III, aVF
ECG diagnostic of anterior or posterior hemiblock with right bundle block

Duration of QRS complex → Electric axis of heart position → Changes in different leads → Topic diagnostic

- Deviation to left: 0.10-0.11 c
- Deviation to right: 0.12-0.16 c

Right bundle block with anterior hemiblock of left bundle
Right bundle block with posterior hemiblock of left bundle
**Suggested Reading List**

**Required Reading**
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 2000
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: ECG in hypertrophy of the atriums and ventricles, myocardial infarction, cardiac rhythm disorders (arrhythmias).
5. Methodical guideline for students
6. Flow charts for Practice
7. Website of department: www.cardiology.dsmu.edu.ua

**Additional Reading**
2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

**Guide Sequence of Actions.**

**Algorithm of actions at analysis of ECG**

STEP 1. Estimating possible technical defects of the curve (“induction”) which can arise at overlapping of alternating current or as a result of inappropriate grounding of the equipment, as well as at an insufficient contact of electrodes with the body. An obligatory check of the accuracy of control millivolt adjusted before ECG.

STEP 2. Determining rhythm characteristics (sinus or nonsinus), regular or irregular, measuring interval R-R and determining cardiac contraction rate.

STEP 3. Determining the position of electrical axis QRS in the frontal area (angle alpha) by amplitude (algebraic sum) of waves QRS in standard leads I and III and giving their assessment (R.Y. Pismenny’s tables).

STEP 4. Determining time of local electronegativeness (time of pulse propagation from endocardium to epicardium – in Vı for the right ventricle, in the position V₆ for the left ventricle) and estimating it.

STEP 5. Determining systolic index – the ratio of electric systole to cardiac cycle R-R, in percent and comparing it with the corresponding quantities (R.Y. Pismenny’s tables).

STEP 6. Analyzing amplitude, duration, configuration, position of the waves and intervals of ECG and estimating them.

**Methods and techniques of ECG registration**

Necessary equipment.
1. Electrocardiograph (components):
• receiving facility – electrodes applied to a patient’s body should be well wetted in advance with isotonic solution or resistant gel for a better contact.
• amplifiers that increase low voltage of the heart electromotive force so that it can be registered.
• galvanometer, which measures voltage.
• recording unit (tape transport mechanism and time register)

2. Order of electrode application.
(-) – negative electrode;
(+) – positive electrode;
red electrode – to the right arm;
yellow electrode – to the left arm;
green electrode – to the left leg;
black electrode – to the right leg (grounding wires)

Standard leads:
I- right arm (-) + left arm(+) 
II-right arm (-) + left leg(+) 
III-left leg(+) + left arm(-)
Amplified unipolar leads:
aVR – from the right arm;
aVL – from the left arm;
aVF – from the left leg.

Chest leads:
V1 – IV intercostal space at the right sternal border
V2 – IV intercostal space at the left sternal border
V3 – IV rib parasternal boundary on the left
V4 – V intercostal space midclavicular boundary on the left
V5 – V intercostal space anterior inguinal boundary on the left
V6 – V intercostal space middinguinal boundary on the left

3. Writing down a patient’s full name, age (date of birth); date and time of the investigation, registering control millivolt followed by ECG registration.
4. After the procedure is accomplished, ECG device must be switched off, electrodes should be removed.
5. Carrying out ECG analysis.
6. Making a conclusion.

Arrhythmias associated with altered automaticity of the sinoatrial node
Sinus tachycardia- increased automaticity of the sinus node
Impulses are initiated in the sinus node at a rate from 90 to 180 beats per minute. It develops on intensified effect of the sympathetic nervous system.

Physiological conditions: Physical and emotional exertion.
Pathological conditions: myocarditis, hemorrhage, shock, heart failure, fever, hyperthyroidism
1. increased heart rate from 90 to 180 beats per minute
2. decreased durations of the R-R interval
3. regular sinus rhythm

**Sinus Bradycardia** - decreased automaticity of sinus node
Increased influence of parasympathetic nervous system of the heart.
*Physiological* - in sportsmen
*Pathological* - hypothyroidism, increased intracranial pressure, typhoid fever, jaundice, some drugs.
1. slow heart rate (less than 60 bpm)
2. increased durations of the R-R interval
3. regular sinus rhythm

**Sinus Arrhythmias**
The impulse is initiated in the sinus node, but the rate varies with respiration (respiratory sinus arrhythmia)
Rate increases with inspiration and decreases with expiration
May be in the norm - in children, in young adults, in patients convalescing from infection diseases
1. R-R intervals length may vary (more than 0.16 seconds), it is associated with respiration
2. Sinus rhythm

**Sick Sinus Syndrome**
1. Constant bradycardia
2. Periodic ectopic rhythm (escape rhythms)
3. SA block
4. Bradycardia-Tachycardia syndrome

**Escape Passive Rhythms (Non-Sinus Rhythms)**
They appear secondary to depression of the higher sinus pacemaker.

**Atrial Rhythm** - biphasic P wave before QRS complex.

**Junctional (AV) rhythm** - heart rate is 40-60 beats per minute, QRS configuration is normal.
1. **with prior atrial excitation** - inverted P wave before QRS (retrograde impulse conduction back into atria)
2. **atria and ventricles are excited synchronously**
   - without P wave, it is buried within QRS complex
3. **with prior ventricular excitation** - inverted P wave after QRS (because of retrograde atrial activation)

**Ventricular Rhythm** - incomplete AV block
1. Heart rate is less than 40 beats per minute
2. wide and deformed (abnormal) QRS complex
3. P wave may be seen but it has no relation to QRS complex
Premature Complexes (Extrasystolic Arrhythmia)

Classification

Rate of occurrence
1. rare (<6 per minute)
2. frequent (>6 per minute)
3. single
4. couplet - couplet of two ventricular premature contractions (VPCs) (uniform or multiform)
5. triplet - three VPCs in row (three and more ventricle tachycardia)
6. group VPCs- group of three and more VPCs

If extrasystoles have certain order for their occurrence

Allorhythmias
1. bigeminy (1N+1E)
2. trigeminy (2N+1E)
3. quadrigeminy (3N+1E)

Configuration
1. uniform VPCs (unifocal VPCs) - they have the same site of their occurrence so in the same lead they have equal configuration.
2. multiform VPCs (multifocal VPCs) from different sites so they have different shapes in the same lead

R- on T phenomenon – VPC occurs on or near the peak of previous T wave

Interpolated premature ventricular contraction occurring between two normal beats without compensatory pause.

Lawn’s classification
1Grade - 1-30 VPC per hour
2Grade >30 VPC per hour
3Grade - multifocal VPCs
4A Grade - couplet of VPCs
4B Grade - group VPCs
5Grade - R on T phenomenon

Paroxysmal Tachycardia
This is sudden acceleration of the cardiac rhythm (from 180 to 240 beats per minute). This impulses arise from ectopic focus because its high activity inhibits the activity of sinoatrial node.

Paroxysmal atrial tachycardia
1. Sudden acceleration of the heart rate 140 to 220 beats per minute
2. Change P wave-negative or biphasic P wave
3. QRS complex configuration is normal
4. Regular rhythm.
**Paroxysmal AV tachycardia**
1. Sudden acceleration of heart rate
2. P wave is absent or negative after QRS
3. QRS complexes are normal
4. Regular rhythm

**Ventricular tachycardia**
1. Abrupt starts and stops of the heart rate acceleration 140-220 bpm
2. Deformation of QRS complexes (> 0.12s) with opposite to the main QRS deflection ST segment and T waves.
3. AV dissociation (independent arterial and ventricular rhythm)
4. Regular rhythm usually

**Atrial Flutter**
May result from rapid series of impulses from single ectopic focus or from multiple ectopic atrial foci. The atrial rate is usually between 240 to 350 (400) beats per minute.
1. Presence of rapid (200 to 400 beats per minute) regular uniform atrial F waves (saw tooth view) which are best seen in lead II, III, AVF and V1.
2. Regular ventricular rhythm with equal R-R interval
3. QRS complexes are usually normal in configuration
4. The conduction of the ventricle is 2:1, 3:1, 4:1.

If atrial flutter is changing (4:1, 3:1, 2:1) irregular ventricular rhythm develops

**Atrial Fibrillation:**
1. P waves are absent
2. Instead P waves irregular undulations of varying shape and amplitude (f waves), which are best seen in leads II, III AVF, V1.
3. The QRS have relatively normal configuration
4. Irregular ventricular rhythm
*Types according to heart rate*
1. Normosystolic form
2. Bradysystolic form
3. Tachysystolic form

*According to clinical types*
1. Paroxysmal
2. Persistent
3. Permanent

**Ventricular Flutter**
It is characterized by regular equal oscillating waves of large amplitude with no isoelectric interval and rate between 200 to 300 cycles per minute.

**Ventricular fibrillation**
It is the irregular waves of varying amplitude and shape occurring 250 to 500 times per minute. Clinical cardiac arrest is present, there is no cardiac output.

**Revision Questions**

**Q1.** Choose correct item:
A. Sinus rhythm with normal heart rate  
B. Sinus rhythm with high heart rate (sinus tachycardia)  
C. Sinus rhythm with low heart rate (sinus bradycardia)  
D. Sinus rhythm with arrhythmia (sinus arrhythmia)  
E. It is sinus rhythm

![ECG Example](image_url)

**Q2.** Choose correct item:
A. Sinus rhythm with normal heart rate  
B. Sinus rhythm with high heart rate (sinus tachycardia)  
C. Sinus rhythm with low heart rate (sinus bradycardia)  
D. Sinus rhythm with arrhythmia (sinus arrhythmia)  
E. Non sinus rhythm

![ECG Example](image_url)

**Q3.** Choose correct item:
A. Sinus rhythm with normal heart rate  
B. Sinus rhythm with high heart rate (sinus tachycardia)  
C. Sinus rhythm with low heart rate (sinus bradycardia)  
D. Sinus rhythm with arrhythmia (sinus arrhythmia)  
E. It is sinus rhythm

![ECG Example](image_url)

**Q4.** The following changes of the ECG can be fined:
A. Posterior Q-wave-MI, acute stage  
B. Posterior Q-wave-MI, subacute stage  
C. Posterior Q-wave-MI, stage of the cicatrisation  
D. Ischemia of the anterior wall  
E. Ischemic lesion of the anterior wall
Q5. The following changes of the ECG can be fine:
A. Ischemia of the anterior wall
B. Ischemia of the lateral wall
C. Anterior non-Q-wave-MI
D. Lateral wall Q-wave-MI
E. Lateral wall non-Q-wave-MI

Q6. The following changes of the ECG can be fine:
A. Anterior Q-wave-MI, acute stage
B. Lateral wall non-Q-wave-MI, acute stage
C. Anterior non-Q-wave-MI, subacute stage
D. Lateral wall Q-wave-MI, subacute stage
E. Anterior Q-wave-MI, stage of the cicatrisation

Q7. Characterize the following ECG:
A. Atrial premature beat (extrasystole)
B. Ventricular premature beat (extrasystole)
C. AV-nodal premature beat (extrasystole) with preceding depolarization of the atria
D. AV-nodal beat (extrasystole) with preceding depolarization of the ventricles
E. Atrial flutter

Q8. Characterize the following ECG:
A. Atrial premature beats (extrasystoles)
B. Ventricular premature beats (extrasystoles)  
C. Atrial fibrillation  
D. Atrial flutter  
E. Supraventricular tachycardia

Q9. What is it the disorder of conduction?  
A. first-degree AV block  
B. sino-atrial block  
C. second-degree, Mobitz type I  
D. second-degree, Mobitz type II  
E. third-degree, complete AV block

Q10. Degree of the AV block:  
A. first-degree  
B. second-degree, Mobitz type I  
C. second-degree, Mobitz type II  
D. third-degree, complete AV block  
E. left posterior hemiblock

Key answers: Q1-D, Q2-E, Q3-B, Q4-A, Q5-E, Q6-E, Q7-C, Q8-D, Q9-B, Q10-B

SUMMARY OF PROCEDURES

The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out. After that the instructor gives students out variants of normal ECG and students analyze them under the instructor’s supervision for 20-25 minutes determining the following: rhythm, its regularity, heart rate, position of electric cardiac axis and configuration of the waves and intervals of ECG. Later each student gets an individual task in clinical electrocardiography. Then students with teacter discuss ECG signs in different cardiac pathology (premature contractions, paroxysmal tachycardia, atrial , ventricular flutter and fibrillation, myocardial infarction) their diagnostic value. Teacher gives students different ECG for revelation the changes in these ECG and discusses cardiac disorders which may cause these signs and changes of mucous membrane of the mouth in cardiovascular pathology.

Then students are invited to the room for ECG recording where the
instructor will demonstrate to the students technique of ECG recording and
discuss revealed data.
At the end of the practice teacher makes short general conclusion concerning
obtained findings and students do final tests.

**Final tests**

**Q1.** Choose the item which corresponds to the stage of the cicatrisation of the
myocardial infarction:

![ECG Image]

Q2. The following changes of the ECG can be fined:
A. Posterior Q-wave-MI, acute stage
B. Posterior Q-wave-MI, subacute stage
C. Posterior Q-wave-MI, stage of the cicatrisation
D. Ischemia of the anterior wall
E. Ischemic lesion of the anterior wall

![ECG Image]

Q3. The following changes of the ECG can be fined:
A. Ischemia of the anterior wall
B. Ischemia of the lateral wall
C. Anterior non-Q-wave-MI
D. Lateral wall Q-wave-MI
E. Lateral wall non-Q-wave-MI

![ECG Image]

Q4. The following changes of the ECG can be fined:
A. Anterior Q-wave-MI, acute stage
B. Lateral wall non-Q-wave-MI, acute stage
C. Anterior non-Q-wave-MI, subacute stage
D. Lateral wall Q-wave-MI, subacute stage
E. Anterior Q-wave-MI, stage of the cicatrisation

Q5. Characterize the following ECG:
A. Sinus rhythm with normal heart rate.
B. Sinus rhythm with tachycardia (sinus tachycardia).
C. Sinus rhythm bradycardia (sinus bradycardia).
D. Sinus arrhythmia.
E. The heart rhythm does not correspond to the sinus rhythm criterion.

Q6. Characterize the following ECG:
A. Sinus rhythm.
B. AV-nodal rhythm with simultaneous depolarization of the atria and ventricles.
C. AV-nodal rhythm with preceding depolarization of the ventricles.
D. AV-nodal rhythm with preceding depolarization of the atria.
E. Idioventricular rhythm.

Q7. Characterize the following ECG:
A. Atrial premature beat (extrasystole).
B. Ventricular premature beat (extrasystole).
C. AV-nodal premature beat (extrasystole) with preceding depolarization of the atria.
D. AV-nodal premature beat (extrasystole) with preceding depolarization of the ventricles.
E. Atrial flutter.

Q8. Characterize the following ECG:
A. Atrial premature beats (extrasystoles).
B. Ventricular premature beats (extrasystoles).
C. Atrial fibrillation.
D. Atrial flutter.
E. Supraventricular tachycardia
Q9. Characterize the following ECG:
A. Atrial premature beats (extrasystoles).
B. Ventricular tachycardia
C. Atrial fibrillation.
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Q10. Degree of the AV block:
A. first-degree
B. second-degree, Mobitz type I
C. second-degree, Mobitz type II
D. third-degree, complete AV block
E. sino-atrial block
STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>The main methods of examination of patient and the main symptoms and syndromes on internal diseases course</td>
</tr>
<tr>
<td>Topic 5 Module</td>
<td>Methods of examination and interpretation data of laboratory investigation in endocrine pathology, blood disorders, musculoskeletal disorders.</td>
</tr>
</tbody>
</table>

| Course | 2 |
| Faculty | Dentistry |

Donetsk 2011
**Importance of the Subject:** Ability to interpret a clinical blood analysis and reveal clinical signs and syndromes of blood system disorders is necessary for the doctor of any speciality because changes in peripheral blood are both specific for haematological pathology and for disorders of other organs and systems.

**Key Objective:** To be able to estimate the blood analysis, make inquiries about haematological pathology, carry out physical examination of patients with blood disorders and reveal the main syndromes, symptoms and laboratory criterions of blood pathology.

**Specific Goals:**
1. To learn how to enquire patients with haematological pathologies about their most disturbing complaints
2. To interpretate clinical blood analysis in the norm and pathology
3. To develop skills in carrying out the inspection and palpation of lymph nodes, inspection, palpation and percussion of the bones, percussion and palpation of the spleen
4. To be able to reveal changes of tunica mucosa of mouth in blood pathology
5. To develop skills in revealing the main symptoms and syndromes of blood pathology (anaemia, haemorrhagic syndrome, disseminated intravascular clotting syndrome, syndrome of enlarged lymph nodes, syndrome of leukemia)

**Level of Knowledge and Skills before the Practice:**
1. To have knowledge of anatomical details and projection of the lymph nodes and spleen (Described in the Human Anatomy course)
2. To distinguish the cellular elements of blood on their morphological properties (Described in the Histology course)
3. To carry out clinical analysis of the blood – blood taking, preparation of smears (for microscopic examination), cell count, ESR determination (Described in the Physiology course)
4. To have knowledge of the links of the haemopoiesis, coagulation cascade (Described in the Histology course)

**Questions for Self-Assessment of the Pre-Practice Knowledge**

**Q1.** A patient with tissue trauma was taken a blood sample for the determination of blood clotting parameters. Specify the right sequence of extrinsic pathway activation.

A. III – VIII: TF – Xa  
B. III – VIIa – Xa  
C. III – IV – Xa  
D. IV – VIII: TF – Xa  
E. IV – VIIa – Xa
Q2. A couple came for medical genetic counseling. The man has hemophilia, the woman is healthy and there were no cases of hemophilia in her family. What is the risk of having a sick child in this family?
A. 25%
B. 0
C. 100%
D. 75%
E. 50%

Q3. In the blood smear, stained according to Romanovsky-Giemsa method, there are 20% big (20 mcm in diameter), rounded cells with pale-basophilic cytoplasm and bean-shaped nucleus. How is this condition characterised clinically?
A. Neutrophilosis
B. Leukopenia
C. Monocytosis
D. Lymphocytosis
E. Reticulocytosis

Q4. Blood sampling for bulk analysis is recommended to be performed on an empty stomach and in the morning. What changes in blood composition can occur if to perform blood sampling after food intake?
A. Reduced contents of erythrocytes
B. Increased contents of erythrocytes
C. Increased contents of leukocytes
D. Increased plasma proteins
E. Reduced contents of thrombocytes

Q5. Which of the following are the last precursors of red blood cells?
A. Platelets
B. Normocytes
C. Monocytes
D. Reticulocytes
E. Erythroblasts

Answer Keys: B, B, C, C, D

The following printed materials can be of help to improve your pre-practice knowledge and skills:
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

Contents of Practice
Topics of Theory:
1. The main complaints of patients with different blood pathology.
3. Changes of tunica mucosa of mouth in blood pathology.
4. The main clinical and laboratory features of anaemia (iron deficiency anaemia, vitamin B12 and folate deficiency anaemia, congenital and acquired haemolytic anaemia)
5. Haemorrhagic syndrome in thrombocytopenia, coagulopathy, hemorrhagic vasculatis.
6. Laboratory investigations of haemorrhagic syndrome, coagulation tests
7. Clinical and laboratory signs and of disseminated intravascular clotting
8. Main clinical symptoms and laboratory signs in leukemia

**Practical skills:**
Students should be able to demonstrate mastery of the following practical skills
1. To estimate clinical blood analysis
2. To enquire patients with haematological pathologies about their most disturbing complaints
3. To be able to reveal and interpretate changes of tunica mucosa of mouth in blood pathology
4. To carry out the inspection and palpation of lymph nodes, inspection, palpation and percussion of the bones, spleen
5. To reveal the main laboratory criterions, clinical symptoms and syndromes of blood pathology

<table>
<thead>
<tr>
<th>Required Glossary to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong></td>
</tr>
</tbody>
</table>
| Colour index | Haemoglobin content (haemoglobin saturation) of each erythrocyte, it compare with normal saturation= 1

\[
\text{Colour index} = \frac{3 \times \text{Hb}}{\text{RBC(first three figures)}}.
\] |
<p>| Reticulocyt | Immature red cells; last precursor of red cells. They have reticular formation. |
| Normoblasts | Immature nuclear (still containing nuclei) red cells. They delivered into the blood from bone marrow in its erythropoietic hypofunction. |
| Relative polycytemia | The concentration of the RBC becomes greater than normal (but total red cell mass is normal) in the circulating blood. This occurs as a result of loss blood plasma. (dehydration -low fluid intake, diarrhoea, vomiting, sweating) |
| Absolute polycytemia (erythrocytosis) | There is an increase in the total red cell mass. |</p>
<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary polycythemia</strong>&lt;br&gt;(erythremia, polycythemia vera, primary proliferative polycythemia, Vakeza disease)</td>
<td>It is one of the chronic myelopolyferative disorders. It is characterized by increased production of all cell, however the disease is generally dominated by an elevated RBC, haemoglobin concentration.</td>
</tr>
<tr>
<td><strong>Anemia</strong></td>
<td>A pathological condition characterized by decreased number of erythrocytes and the blood haemoglobin level is below the normal range in blood unit volume for the patient’s age, sex.</td>
</tr>
<tr>
<td><strong>Normochromia</strong></td>
<td>Colour index 0.85-1.05 (normochromic anemia)</td>
</tr>
<tr>
<td><strong>Hyperchromia</strong></td>
<td>Colour index more than 1.05 – the volume of erythrocyte is higher than normal. It occurs in hyperchromic anemia - vitamin B-12 deficiency anemia.</td>
</tr>
<tr>
<td><strong>Microcytosis (microtic red cells)</strong></td>
<td>Decrease in diameter of RBC less than &lt; 7 μm; it occurs in iron deficiency anemia.</td>
</tr>
<tr>
<td><strong>Macrocytosis (macrocytic red cells)</strong></td>
<td>Increase in diameter of RBC more &gt;9 to 11 μm; it develops in vitamin B12 folate deficiency anaemia; haemopoietic dysfunction of the liver disease.</td>
</tr>
<tr>
<td><strong>Anisocytosis</strong></td>
<td>Excessive variation in the size of RBC. It occurs in different anaemias.</td>
</tr>
<tr>
<td><strong>Poikilocytosis</strong></td>
<td>The changes in the shape of RBC in severe anaemia. Specific poikilocytosis - micropherocytic haemolytic anaemia (microcytic, spherocytic shape).</td>
</tr>
<tr>
<td><strong>Polychromasia</strong></td>
<td>Presence in peripheral blood the polychromatophilic, immature erythrocytes which have different colour because they are stained acid and alkaline stains.</td>
</tr>
<tr>
<td><strong>Erythrocytosis (polycythemia)</strong></td>
<td>Increased number of erythrocytes in the circulating blood. The increase may or may not be associated with an elevation in the total quantity of RBC in the body.</td>
</tr>
<tr>
<td><strong>Hydraemia</strong></td>
<td>Is abnormally watery blood, due to dilution of blood in renal, cardiac and other oedema without absolute reduction of erythrocytes (relative erythrocytopenia).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Myeloplastic syndrome (panmyelophthisis)</td>
<td>Is a large group of conditions of various aetiology and pathogenesis whose main clinical syndroms are determined by the inhibition of blood formation in the bone marrow</td>
</tr>
<tr>
<td>Hypoplastic and aplastic condition</td>
<td>Incomplete or complete inhibition of bone marrow</td>
</tr>
<tr>
<td>Panmyelophthisis</td>
<td>In which the regeneration function of bone marrow is inhibited in all directions</td>
</tr>
<tr>
<td>Haemorrhagic syndrome</td>
<td>There are hemorrhagic diseases in which bleeding disorders are main leading symptomes (bleeding into skin, mucous membranes, muscles, joints, bleeding from wounds, easy bruising) in haemophilia, thrombocytopenic purpura</td>
</tr>
<tr>
<td>Immune idiopathic thrombocytopenic purpura (Werlhof’s disease)</td>
<td>Increased destruction of platelets due to production anti-thrombocytic antibodies which fix on surface of platelets and damage them</td>
</tr>
<tr>
<td>Haemophilia</td>
<td>Is X – linked recessive genetic disorders of coagulation. It results from reduction of coagulation factors (haemophilia A - VIII factor, haemophilia B - IX factor, haemophilia C - X factor)</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>Is characterized by a failure of cell maturation (differentiation), proliferation of immature cells which fill up the bone marrow so replacement (metaplasia) of these pathological cells for normal cells of the haemopoietic organs develops</td>
</tr>
<tr>
<td>Hiatus leukaemicus</td>
<td>Is typical for acute leukaemia. Presence blasts, mature forms in leucocyte formule in peripheral blood and absence intermediate forms</td>
</tr>
</tbody>
</table>
**Flow chart 1**

### Syndrome of Anaemia

#### Anaemia

#### Clinical Signs

- **Complaints:** weakness, dizziness, fainting, fast fatigue, dyspnoea, ear noise, palpitation, decreased appetite.

- **Inspection:** pallor of skin and mucous membrane, trophic changes of skin and mucous membrane.

- **Pica, dyspeptic complaints, dysphagia.**

- **Burning sensation of the tongue, skin paraesthesia, changed gait, deranged sleep, irritability.**

- **Painlike painness**

- **Pain with lemon like tinge, smooth and glossy tongue.**

- **Painness with golden yellow tinge**

- **Increase in spleen and liver.**

#### Laboratory investigation

- **Blood analysis**
  - Haemoglobin and RBC are reduced, anisocytosis, poikilocytosis, increased ESR.
  - Hypochromia, microcytosis, frequently thrombocytopenias, eosinopenia
  - Hyperchromia, macro- and megalocytosis, Jolly boddies, Cabot rings, neutropenia, eosinopenia, relative lymphocytosis, thrombocytopenia.
  - Normochromia, microspherocytosis, sicle cells.
  - Absence of reticulotes, thrombocytopenia., relative monocytosis and lymphocytosis.

- **Other investigations**
  - Decrease in plasma iron
  - Insignificant increase in unconjugated bilirubin
  - Increase in unconjugated bilirubin in the blood, increase in stercobilin, decrease in osmotic resistance of RBC.
  - Bone marrow study: Hypocellular and acellular marrow.

- **Posthaemorrhagic**
  - Acute and chronic

- **Based on the cause of anemia**
  - Due to inadequate production of red cells
    - Iron deficiency
    - B12 and folate deficiency
    - Hypoplastic and aplastic

- **Haemolytic**
Flow chart 2

Enlargement of Lymph Nodes

Local
- Local infections
- Features
  - 1- size
  - 2- presence or absence of tenderness
  - 3- consistensy
  - 4- mobility
  - 5- fusing with skin
  - 6- fusing between each other
  - 7- changes of skin over lymph nodes

Tumours

Generalized
- Systemic connective tissue disease
- Immune process
- Granulomatous process
- Tumours
- Lymphoproliferative syndrome
- Hereditary process
Flow chart 3

Reasons Of Enlargement Of The Lymph Nodes

<table>
<thead>
<tr>
<th>Enlarged lymph nodes</th>
<th>Common reasons of enlargement of lymph nodes</th>
</tr>
</thead>
</table>
| Cervical lymph nodes           | Tonsillitis  
Pharyngitis  
Scarlatina (scarlet fever)  
Diptheria  
Lymphangioma  
Tumour of thyroid gland       |
| Submandibular lymph nodes      | Caries  
Gingivitis  
Tumour of larynx  
Carcinoma of lips            |
| Supraclavicular lymph nodes    | Tumour of mammary gland  
Tumour of stomach (Virchow's metastasis)                                                |
| Subclavicular lymph nodes      | Tumour of thyroid gland  
Tumour of the lung                                                              |
| Axillary lymph nodes           | Furunculosis  
Paronychia  
Pararitium (felon, whitlow)  
Tumour of mammary gland  
Tumour of lung                                                              |
| Inguinal lymph nodes           | Paronychia, paraitium  
Blister foot  
Syphilis  
Gonorrhea  
Bartholinitis                                                            |
| General enlargement of lymph nodes | Tbs  
Sarcoidosis  
Syphilis  
Mononucleosis  
Lymphoid leukaemia  
Lymphogranulomatosis  
Lymphosarcoma  
Systemic connective tissue diseases  
HIV                                                                                 |
Flow chart 4

Leukaemia

The main clinical syndrome

Myeloproliferative syndrome

- Splenomegaly
- Hepatomegaly
- Pain in the bones

Lymphoproliferative syndrome

- Enlargement of lymph nodes
- Splenomegaly
- Skin damages

Added syndromes

- Proliferative
- Anaemic
- Haemorrhagic
- Immunodeficiency
- Hematologic

Sings

- Proliferation of immature cells
- Failure of cell maturation (differentiation)
- Replacement (metaplasia) of the bone marrow
- Development of pathological foci (leukaemic infiltrations)
Suggested Reading List

1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 1986
3. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
4. Lecture: Functional investigation of the blood
5. Methodical guideline for students
6. Flow charts for Practice
7. Website of department: www.cardiology.dsmu.edu.ua

Additional Reading

2. History and Physical Examination . Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006

Clinical Study of the Blood

Includes:
   Quantitative and Qualitative Determination:
   ↓
   Cell count
   - erythrocyte count
   - level of haemoglobin
   - reticulocyte count
   - platelet count
   - leucocyte count
   Leucocyte formula: cellular changes of the size, shape (morphology of the cells)

Red Blood study

- Red blood cells (erythrocytes)
- Haemoglobin
- Colour index
- Hemotocrit
- Reticulocyte count
The main function of “Red” blood is taking part in gas exchange.
**Haemoglobin**

There are three main methods for determining Haemoglobin.

1) colorimetric (widely used in practical medicine - Sali’s method)
2) Gasometric
3) Determination by the iron contained in the haemoglobin molecule.

The most accurate technique – cyanmethaemoglobin method.

*Concentration of haemoglobin in healthy people varies from:

- 120-260 g/l in women
- 130-170 g/l in men

**Neutrophils are classified into:**

1) juvenile (metamylocytes) neutrophils (0%) - in peripheral blood
2) stab (band) neutrophils 2-7%
3) segmented neutrophils (50-70%) - mature neutrophils

Granules of neutrophilic leucocytes are small, stained brown-violet colour.

Segmented neutrophils have nuclei which consist of 2 to 5 segments of various size and shape connected by thready bridges

The main function of the neutrophils is phagocytining.

**PLATELETS (Thrombocytes)** are derived from marrow megakaryocytes; normal life span is about 7-10 days; blue or puple non-nucleated discs, with granular centre.

Their normal number is 180,0 - 320*10^9/l per microlitre per 1L (180,000-320,000 per 1 ML) of blood. The main function of platelets is formation of mechanical plug during the haemostatic response to vascular injury.

- adhesion
- aggregation
- platelet release reaction (vasoconstriction – tromboxane A2, heparin neutralizing factor, fibrinogen, serotonin).

IF the number of thrombocytes decreases significantly – thrombocytopenia a tendency to haemorrhages develops. Critical figure at which haemorrhage occurs is believed to 30-50*10^9/L.

**THROMBOCYTOPENIA**

- immune (idiopathic) thrombocytopenic purpura - Vergolf’s disease (antiplatelet antibodies) due to virus and bacterial infections (including HIV infections), drugs (aspirin, indomethacin, penicillins, heparin)
- marrow aplasia (idiopathic, drugs)
  - aplastic condition
- marrow infiltrations (leukaemia, myeloma).
- SLE, Vasculatis, DIC (dissminated intravascular coagulation)
- uraemia
- sepsis
- hypersplenism (portal hypertension, lymphomas, myeloproliferative disorders).
-B12, folate deficiency anaemia

**THROBOCYTOSIS**

Increase in risk of clots. Occurs after haemorrhages, operations.
- polycytemia
- splenectomy
- malignant tumours

**NEUTROPENIA**

It is a kind of leucopenia (decrease in neutrophils). Due to disturbed or inhibited leukopoiesis. It is observed in action of various toxic substances
1) The poisoning with benzelen, arsenic, sulphonamides.
2) ionising radiation
3) some drugs (sulpha drugs, aspirinamidobutrin, lutostic.
Actions some infections
4) typhoid fever, brucellosis, virus infections- influenza, measles, German measles, chicken pox, infectious hepatitis.
Sometimes leukopenia is manifested in the form of *agranulocytes* which is characterized by strong decrease or even absence of neutrophils and other granulocytes in blood, when the number of granulocytes is below $0.75 \times 10^9/L$ or total number of leukocytes is below $1 \times 10^9/L$.

**NEUTROPHILIA:**

1) bacterial infections, pyogenic processes
2) different in toxications (uraemia, diabetes, acidosis, lead poisoning, digitalis, mercury)
3) necrosis, damage of the tissues - myocardial infaction, burn, operations.
4) malignancies (carcionomas, sarcomas).
5) systemic diseases of the connective tissue

**ACCELERATION OF ESR**

Develops due to changes ratio between proteins in blood (globulins, albumin, fibrinogen) and increased content of high dispersed protiens (globulins, fibrinogen) these protiens absorbed on negative changed RBC and thus promote their agglutination and sedimentation- infections and inflammatory processes
1) bacterial infections (non - viral infections)
2) tbs
3) immune connective tissue diseases.
4) miocardial infarction
5) malignant tumours
6) liver diseases
7) multiple myeloma
8) amilodosis
9) nephrotic syndrome
10) anaemia – decreased number RBC accelerates ERS due to agglutination arises more easier
11) pregnancy, vaccination

**DECREASE IN ESR**
1) polycythemia vera- Vakeza’s disease.
2) typhoid fever.
3) viral infections
4) obstructive jaundice with significant cholemia.

**ANAEMIA** - is pathological condition characterized by decreased number of red blood cells and blood haemoglobin level is below the normal range in blood unit volume for the patient’s age, sex.

**CLASSIFICATION:** Based on the cause of anaemia.
There are three main groups.

1) **DUE TO BLOOD LOSS**-Posthaemorrhagic anaemia.
   a) *Acute posthaemorrhagic anaemia* - acute blood loss (trauma, postpartum bleeding)-large volume over short period.
   b) *Chronic posthaemorrhagic anaemia* - chronic blood loss small volume over long period. it may considered as iron deficiency anaemia.(bleeding peptic ulcer, haemorrhoids, excessive menstrual loss, look worms).

2) **DUE TO INADEQUATE PRODUCTION OF RED CELLS:**(disordered haemopoiesis).
   a) *Iron deficiency anaemia* due to iron deficiency -
      -increased demand - physiological – pregnancy, lactation, adolescent growth, menstruation.
      -iron loss due to bleeding - hook worm infestation, menorrhagic postpartum haemorrhage, peptic ulcer, piles, neoplastic diseases, erosion from in inflammatory drugs.
      -malabsorption - inflammatory bowel disease a tropic gastritis.
      -in adequate diet - postgastectomy.
   b) *Vitamin B12, folate deficiency anaemia*.due to vitamin B12 and folate deficiency
      - malabsorption syndrome, postgastrectomy, atropic gastritis (lack of intrinsic factor), gastric cancer, entritis, intestineotomy, helminthic infestation, inadequate nutrition (alcoholics, purevegetarians), hepatitis, liver cancer, cirrhosis.
   c) Influence of toxic factors - chronic inflammatory and infective disease, renal failure, hepatic failure
   d) *Marrow failure* - hypoplastic, aplastic anaemia (condition)
      - endogenous or exogenous toxicosis (inhibition of the bone marrow), radiation; drugs (cytotoxic drugs, antibacterial drugs, tranquillizers, antirheumatic drugs), chemicals (benzene, arsenic, mercury), viral and bacterial infections (viral hepatitis, mononucleosis, HIV, parvovirus; tbs).
e) *Metaplastic anaemia* due to marrow invasion
- red bone marrow is replaced by other tissue (leukaemias, multiple mieloma, fibrosis, metastasis).

### 3) DUE TO EXCESSIVE DESTRUCTION OF RED CELLS (HAEMOLYTIC ANAEMIAS)

1) *Congenital genetic defects*
   a) Red cell membrane defects
      - **Spherocytosis** - *Microspherocytosis anaemia Minkovskiy – Shoffar’s anaemia* (hereditary spherocytosis)
      - **Elliptocytosis**
   b) Haemoglobin defects: sickle cell anaemia - results from an abnormal haemoglobin known as Hb –S or sickle cell Hb. The molecular lesion in Hbs is the substitution of valine for glutamic acid at the beta chain.
      Thalassemia- reduction or absence synthesis of one of globulin chains – alpha or beta thalassaemia it depends on which chains are affected.
   c) Enzyme defects – G6PD (glulose 6-phosphate dehydrogenase) deficiency, pyruvate kinase deficiency.

2) *Acquired* - influence of extra-erythrocytic factors:
   - Infections (malaria, sepsis, influenza)
   - Haemolytic disease of new borns.
   - Bruns
   - Mushroom poisoning
   - Incompatible blood transfusion
   - Drugs (aspirin, sulphaamides, nitrofurtrition, L-Dopa)
   - Autoimmune process- antibodies against RBC.
   - Proxysmal cold haemoglobinuria - attack of acute haemolysis on exposure to cold.

### Normal blood values

- **Haemoglobin (males)** – 130 -170g/l
- **Haemoglobin (females)**- 120-160g/l
- **Red blood cells (m)**- 4·10¹²/l -5,5·10¹²/l
- **Red blood cells (f)**- 3,5·10¹²/l -5,0·10¹²/l
- **Colour index** - 0,85- 1,05
- **Diameter of RBC** -7-9µm
- **Haematocrit (m)** – 40-55%
- **Haematocrit (f)** – 35-42%
- **Reticulocytes** – 0, 2 -1,2% (2-12‰)
- **White blood cells (m)**- 4,5 ·10⁹/l -8,0 ·10⁹/l
- **White blood cells (f)**- 3,5 ·10⁹/l -7,0 ·10⁹/l
- **Average white blood cell count** - 4 ·10⁹/l - 9 ·10⁹/l
- **Eosinophils** -0,5 – 3%
- **Basophiles** -0-1%
- **Stab neutrophils** -2-7%
Segmented neutrophils - 50-70%
Lymphocytes – 20- 35%
Monocytes – 5-10%
Myelocytes - 0%
Metamyelocytes - 0%
Platelets – 190 ·10⁹/l - 320·10⁹/l
ESR(m) – 3-12mm/l
ESR(f) – 5- 20mm/l

Osmotic resistance of red blood cells (osmotic fragility test )
Minimal – 0,42 -0,46%NaCl
Maximum – 0,30 -0,36%NaCl

Haemopoiesis

Pluripotent stem cell

Erythropoiesis
↓
Erythroblast
↓
Pronormocyte
↓
Basofile normocyte
↓
Polychromatofile normocyte
↓
Oxyfile normocyte
↓
Reticulocyte
↓
RBC (life span 120days)

Thrombopoiesis
↓
Megacaryoblast
↓
Promegacaryoblast
↓
Megacaryocyte
↓
Platelet (tb) - life span 7-10days

Myelopoiesis
↓
Myeloblast
↓
Promyelocyte
↓
Myelocyte
↓
Metamyelocyte (juvenile)
↓
Stab neutrophils ______ appear in peripheral blood
↓
Segmented neutrophils (basophils, eosinophils, neutrophils)

Lymphopoiesis
↓
Lymphoblast
↓
Prolymphocyte
↓
Lymphocyte

T-cell

B-cell
↓
Plasma cells
**Monopoiesis**

\[
\begin{align*}
\text{Monopoiesis} & \quad \downarrow \\
\text{Monoblast} & \quad \downarrow \\
\text{Promonocyte} & \quad \downarrow \\
\text{Monocyte} & \quad \downarrow \\
\text{Macrophage (in tissue)} & \quad \downarrow
\end{align*}
\]

**HAEMORRHAGIC SYNDROME**

There haemorrhagic diseases in which bleeding disorders are the main leading symptoms. In some diseases the haemorrhagic syndrome is secondary one (liver diseases; leukemia, aplastic, hypoplastic anaemias).

**Clinic:**

1) Bleeding into skin - purpura, petechia, echymoses
2) Bleeding into mucous membranous-epistaxis, haemorrhagic bullae in oral mucosa; genitourinary, gastrointestinal bleeding
3) Bleeding into viscera, muscles, joints
4) Easy brusing
5) Prolonged bleeding from wounds
6) Intracranial haemorrhage

**Coagulation Tests**

1. Whole blood clotting time (blood coagulation time - Lee and White method).

Venous blood specimen is placed in a test tube and kept at 37deg.C°. In the norm blood coagulation is 5-10 minutes.

*Less than 5min. – Hypercoagulation.
*More than 10min. – Hypocoagulation (deficiency of factors- haemophilia A, B; administration of heparin).
*Vasopathy, Thrombocytopenia- N.

2. Bleeding time (By Duke’s method) - finger tip in punctured by blood lancet to depth 3mm then touch to skin with special paper every 15sec, until all bleeding ceases. Normal time is 2-4min. It estimates adherence and fusing (aggregation) features of Tb.

*Increase in time- in thrombocytopenia, thrombopathy, N- in haemophilia.

3. Retraction of blood clot (clot retraction): Also depends on number and activity of Tb, retrozyne which realizes by Tbs and causes retraction.

Norm- 0,3 – 0,5 :
*decrease in the thrombocytopenia, thrombocytopathy.

4. Platelet count (decrease in thrombocytopenia, leukaemia, hypoplastic conditions).

5. Activated partial thromboplastin time (APTT).
6. Thrombin time.
7. Prothrombin time.
8. Prothrombin index:- prothrombin time of donor’s plasma / prothrombin time of the patient’s plasma= N- 80-10%
9. Fibrinogen level
10. Fibrin degradation products.(FDPs).
11. INR (International Normalized Ratio)
12. Capillary permeability tests (capillary resistance tests):
   a) Konchalovskysky-Rumpel-Leede sign (tourniquet test –Hess test):- A tourniquet is applied to the forearm and changes occurring in the skin are assessed. If petechiae appear on the skin below the tourniquet, the test is positive.
   b) Cupping glass test.
   c) Pinch test.
   d) Mallet symptom- ecchymosis develops on the skin after tapping percussion mallet.
   * These tests estimate vascular component and they are positive in vessel wall abnormalities – vasopathy sometimes in thrombocytopenia, thrombocytopenia.

**Immune (Idiopathic) Thrombocytopenic Purpura (ITP) (Werlhof’s disease)**

Anti-thrombocytic antibodies of IgG type are produced and fixed on surface of TB to damage them.

*Reasons:* Viral and bacterial infections, drugs, vaccination.

*Clinic:* Multiple haemorrhages into skin- petechiae, echymoses (large spots), purpura and mucous membrane.
- Prolonged bleeding from superficial cuts.
- Bleeding immediately after surgery, trauma.

Local pressure effective.

History of drug intake especially non-steroidal anti-inflammatory drugs (like Aspirin), viral infections

*Investigation:*
- Decrease in Tbs.
- Prolonged bleeding time.
- Clot retraction is decreased.
- Blood coagulation time- N
- May be positive capillary resistance tests.

**Haemophilia**

Haemophilia is X-linked recessive genetic disorder of coagulation. It results from reduction of (VIII\(^{\text{th}}\) coagulation factor – Haemophilia A, IX\(^{\text{th}}\) B, X\(^{\text{th}}\) C).

*Clinic:*
- Bleeding into viscera, muscles
- Into joints (haemarthroses); bleeding wounds
- Bleeding starts several hours after surgery or trauma (delayed bleeding)
- Local pressure ineffective
- East bruising
- Life-long history, family history

**Investigation:**
- Bleeding time, prothrombin time and platelet count are normal
- Clot retraction is normal
- Blood coagulation time is prolonged (more than 10 min)
- Negative capillary resistance tests.
- Prolonged time of plasma recalcification factor. (norm is 60-70 sec)
- Activated partial thromboplastin time (APTT) is typically prolonged.
- Deficiency of specific coagulation factor (VIII, IX, X).

**Leukaemia**

Leukaemia is characterized by a failure of the maturation (differentiation), proliferation of immature cells which fill up the bone marrow; replacement (metaplasia) of these pathological cells for normal cells of the haemopoietic organs and development of pathological foci (leukaemic infiltrations) in other organs.

1) Acute - lymphoid (lymphoblastic)
   - myeloid (myelogenous)
2) Chronic – lymphoid (lymphocytic)
   - myeloid (myelocytic)

*It should be remembered that differentiation between chronic and acute leucosis first of all depends on the cytomorphological sign (the degree of cell mature) not on the clinical course of the disease. (its morphological diagnosis)

- Myeloproliferative syndrome
- Lymphoproliferative syndrome
- Added symptoms:
  - Anaemia- anaemic syndrome.
  - Granulocytopenia- infections at various sites (oral, pharyngeal ulcers, pneumonias, fever, septicaemia)
  - Thrombocytopenia – Haemorrhagic syndrome
  - Expanding cell mass in bone marrow (bone pains, sternal tenderness)
  - Leukaemic infiltration of tissues.

*Leukaemias can have the following three variants*
- Leukaemic form- with considerable increase in the quantity of pathological cells in the peripheral blood
- Subleukaemic form – with moderate increase in their number.
- Aleukaemic form – Normal or decreased number of leucocytes.

**Acute Leukaemia**

**Investigations**
- The most specific haematological sign is the presence of blast cells in the peripheral blood. Only the youngest and the most mature cells can be
revealed in the blood of most patients with acute leukaemia. While intermediate forms are absent (hiatus leucaemicus). Prevelence of certain blast forms is determined by the haematological variant (acute lymphoblastic leukaemia, acute myeloblastic leukaemia (myelogenous))

- Total leucocyte count depends on the form (leukaemic, subleukaemic, aleukaemic) usually marked raised.
- Normochromia, normocytic anaemia
- Decrease in platelet count.
- Bone marrow study: hypercellular with replacement of normal elements by leukaemic blast cells.

**Chronic leukaemia**

1) **Myeloid (myelocytic)**
- Total leucocyte count is markedly raised
- Full range of granulocyte precursors ranging from myeloblasts, myelocytes, promyelocytes, metamyelocytes, to mature neutrophils are seen, mature forms predominate. Myeloblast are less than 5-10% (during exacerbation increases blast cells - blast crisis phase).
- Increase in basophils and eosinophils
- ↓ RBC, ↓ Pl

* Bone marrow study:
  - Hypercellular bone marrow with marked proliferation of all granulocytic elements
  - Philadelphia chromosome (Ph) – is positive more than 95%

2) **Lymphoid (lymphocytic)**
- Lymphocytes make 80-95% are mostly mature
- Small amounts of prolymphocytes, lymphoblasts
- Specific Botkin – Gumprecht shadows (lymphocytes are very soft and easily destroyed when preparing smear)
- ↓ RBC, ↓ Pl

* Bone marrow study:
  - Marrow is hypercellular with infiltration of small and medium sized lymphocytes.

**Revision Questions**

Q1. Macrocytosis is characteristic for:
A. iron deficiency anaemia
B. aplastic anaemia
C. folate deficiency anaemia
D. severe anaemia
E. relative erythrocytosis

Q2. Define the color index, if level of hemoglobin is 138 g/l and red blood cell count is 4,4 · 10^{12}/l:
A. 0,74
B. 0,87
C. 0,94
D. 1,0
E. 1,2
Q3. Choose the parameter which is not included into the clinical study of the blood:
A. platelet count
B. reticulocyte count
C. level of haemoglobin
D. haematocrit
E. leucocyte formula

Q4. Choose the normal level of hemoglobin for men in the clinical investigation of the blood:
A. 100 g/l
B. 110 g/l
C. 150 g/l
D. 180 g/l
E. 200 g/l

Q5. High ESR is typical for:
A. multiple myeloma
B. influenza
C. cardiac failure
D. polycythaemia vera
E. all listed variants

Q6. Patient S. 57 years with malignant tumour of lung and metastasises of malignant tumour has enlargement of lymph nodes. Estimate features of lymph nodes after metastasis in them:
A. Movable
B. Formation of fistulae
C. Do not adhere to the skin
D. Fuse with skin
E. Smooth surface

Q7. Choose normal quantity of the myelocytes in the clinical investigation of the blood for women:
A. 0,5-1 %
B. 1-3 %
C. 3-5 %
D. 5-7 %
E. they must be absent

Q8. Patient A. 60 years has enlargement of cervical lymph node. Estimate features of lymph nodes which are characteristic for lymphadenitis:
A. Usual colour above damaged lymph node
B. Firm consistency
C. Fuse with each other
D. Painless
E. Elastic consistency

Q9. What lymph nodes may be palpated in the norm:
A. submandibular lymph nodes
B. axillary lymph nodes
C. inguinal lymph nodes
D. all listed groups of lymph nodes
E. without correct previous variants of answers

Q10. Patient D. 56 years with lymphogranulomatosis has enlargement of lymph nodes. Estimate features of lymph nodes which are characteristic for lymphogranulomatosis:
A. Painful
B. Do not fuse with each other
C. Fuse with skin
D. Elastic consistency
E. Firm consistency

Answer Keys: Q1C, Q2C, Q3D, Q4C, Q5A, Q6D, Q7E, Q8E, Q9D, Q10E.

SUMMARY OF PROCEDURES

The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out. Teacher gives to students blood analyses for revelation the changes in these analyses and discuss disorders which may cause these changes, features of tunica mucosa of mouth in blood pathology.

Students with teacher discuss signs of blood investigations for diagnostics of different pathology and their diagnostic value. Then the signs characteristic of syndromes of blood pathology, the methods of their determination (clinical, laboratory) are discussed. After that students examine patients with blood pathology in the ward and interpretate blood analysis independently.

At the end of the practice teacher makes short general conclusion concerning obtained findings and students do final tests.

Final Tests

Q1. Choose changes of tunica mucosa of mouth in thrombocytopenia:
A. pigmentation of mucous membrane
B. haemorrhages of mucous membrane
C. aphthae
D. enanthema
E. they must be absent

Q2. Decreased level of the haematocrit is occurred in:
A. increased quantity of red blood cells in the peripheral blood
B. increased quantity of white blood cells in the peripheral blood
C. increased quantity of platelets in the peripheral blood
D. hypovolemia (decreased plasma volume)
E. massive hemorrhage

Q3. Define character of the anemia if in the peripheral blood: red blood cell count is 2,8 · 10^{12}/l, hemoglobin is 64 g/l, reticulocyte count is 4 %:
A. hypochomic aregenerative
B. hypochimic regenerative
C. normochimic hyporegenerative
D. normochimic regenerative
E. hyperchimic aregenerative

Q4. High ESR is typical for:
A. multiple myeloma
B. myocardium infarction
C. nephrotic syndrome
D. tuberculosis
E. all listed variants

Q5. Poikilocytosis is characteristic for:
A. iron deficiency anaemia
B. vitamin B12 anaemia
C. aplastic anaemia
D. severe anaemia
E. relative erythrocytosis

Q6. Expressed hepatosplenomegaly is characteristic for:
A. anemic syndrome
B. hemorrhagic syndrome
C. myeloproliferative syndrome
D. lymphoproliferative syndrome
E. all listed syndromes

Q7. Immunodeficiency is characteristic for:
A. anemic syndrome
B. hemorrhagic syndrome
C. total myeloaplastic syndrome
D. all listed variants
E. without correct previous variants of answers

Q8. Patient M. 55 years has enlargement of axillary lymph node. Estimate features which are characteristic for lymphadenitis of axillary node:
A. Usual colour above damaged lymph node
B. Fuse with each other
C. Firm consistency
D. Painless
E. Hyperemic colour above damaged lymph node

Q9. The thrombocytopenia is characteristic for:
A. malignant tumours
B. polycythaemia vera
C. radioactive irradiation
D. splenectomy
E. all listed

Q10. Patient V. 56 years with malignant tumour of intestines and metastasises of malignant tumour has enlargement of lymph nodes. Estimate features of lymph nodes after metastasis in them:
A. Smooth surface
B. Rough surface
C. Formation of fistulae
D. Elastic consistency
E. Do not adhere to the skin
STUDENT’S SELF-STUDY GUIDELINES FOR
PRACTICE ACTIVITIES

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<td>The main methods of examination of patient and the main symptoms and syndromes on internal diseases course</td>
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<tr>
<td>Topic 5 Module</td>
<td>Methods of examination and interpretation data of laboratory investigation in endocrine pathology, blood disorders, musculoskeletal disorders.</td>
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<tr>
<td>Practice</td>
<td>Examination of the endocrine system. Enquiry, objective examination of patients with pathology of endocrine system. Added methods of investigation in the endocrinology. The main syndromes in the endocrinology. Changes of tunica mucosa of mouth in endocrine pathology.</td>
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Course 2
Faculty Dentistry

Donetsk 2011
**Importance of the Subject:** Early diagnostics of endocrine pathology is important for doctors of any specialities, it allows to render the first aid in emergency situations, provide the patient with necessary treatment and prevent development of complications increasing life-span of patients.

**Key Objective:** To be able to make inquiries about endocrine pathology, determine the main syndromes and symptoms in endocrine pathology, estimate results of laboratory and instrumental investigations.

**Specific Goals:**
6. To learn how to enquire patients with endocrine pathologies about their most disturbing complaints
7. To develop skills in carrying out physical examination of patient with endocrine pathology
8. To estimate results of added methods in patients with endocrine pathology
9. To determine the main syndromes and symptoms of endocrine pathology
10. To reveal changes of mucous membrane of the mouth in respiratory pathology

**Level of Knowledge and Skills before the Practice:**
1. To have knowledge of anatomical details and projection of the organs of endocrine system (Described in the Human Anatomy course)
2. To know the morphological properties of endocrine system (Described in the Histology course)
3. To know physiology of endocrine system (Described in the Physiology course)

**Questions for Self-Assessment of the Pre-Practice Knowledge**

**Q1.** A 70-year old patient L. has level glucose of blood - 5,4 mmol/l. Which of the following refer to normal glucose level of the blood?
A. 2,2 -2,3 mmol/l
B. 3,3-4,4 mmol/l
C. 4,4-6,6 mmol/l
D. 6,6-8,8 mmol/l
E. 8,8-9,9 mmol/l

**Q2.** How does insulin influence on a carbohydrate metabolism?
A. Increases in glucose level
B. Decreases in glucose level
C. Increases in catalase level
D. Stimulates thyroid gland.
E. No any influence on a carbohydrate metabolism.
Q3. How changes level of blood cholesterol in hypothyroidism?
A. Decrease
B. Increase
C. Without any influence
D. Increase only during physical activity
E. Decrease only at rest

Q4. Endocrine function of the pancreas?
A. Calcium metabolism.
B. Output of thyroid hormones.
C. Output of growth hormone.
D. Output of cortisol.
E. Influence on carbohydrate metabolism.

Q5. Diabetes mellitus happens in affection of
A. Liver
B. Heart
C. Pancreas
D. Thyroid gland
E. Stomach

Answer Keys: C, B, B, E, C

The following printed materials can be of help to improve your pre-practice knowledge and skills:
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

Contents of Practice

Topics of Theory
1. The main complaints of patients with endocrine pathologies
2. Method and technique of inspection of the skin, mucous membranes, inspection and palpation of thyroid gland, palpation and percussion liver and pancreas
3. Diagnostic value of data of physical examination for endocrine system
4. Laboratory and instrumental investigations in patients with endocrine pathology
5. The main syndromes and symptoms of endocrine pathology
6. Diagnostics of emergency situations in endocrine pathology
7. Caring for the patients with endocrine pathology
8. Changes of mucous membrane of the mouth in respiratory pathology

Practical skills:
Students should be able to demonstrate mastery of the following practical skills

6. To enquire patients with endocrine pathologies about their most disturbing complaints
7. To be able to reveal and interpretate changes of tunica mucosa of mouth in
endocrine pathology
8. To carry out the inspection and palpation of thyroid gland, palpation and percussion liver and pancreas
9. Interpretation of laboratory and instrumental investigations in endocrine pathology

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<td><strong>Conn’s syndrome (primary hyperaldosteronism)</strong></td>
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<td><strong>Coma</strong></td>
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Flow chart 1

Diabetes mellitus

Main Syndromes

Hyperglycaemia, hyperlipidemia and dislipidemia
Thirst, polyuria, skin itching
Microangiopathy
Macroangiopathy
Osteopathy

Added methods of investigation

Clinical

EXo

Biochemical

Ultrasonic of intern organs
Ultrasonic of vessels
ECG
Capillaroscopy
Biopsy of kidney
Ophtalmologist’s examination
Flow chart 2
Odematous syndrome
1. Heart failure. 2. Glomerulonephritis. 3. Allergy. 4. Hydropectic syndrome
5. Hypothyroidism

1. Heart failure
   Yes
   Odema, swollen of jugular veins, liver enlargement, dyspnoe
   no

2. Glomerulonephritis
   Yes
   Odema, urinary syndrome (proteinuria, hematuria, casturia), frequent arterial hypertension
   no
   2,3,4,5

3. Allergy
   Yes
   Temporal odema, mostly on face, connection of appearance with allergen
   no
   3,4,5

4. Hydropectic syndrome
   Yes
   General odema, oligouria, high relative density of urine
   no
   4,5

5. Hypothyroidism
   Yes
   Dense odema without pit on pressure, bradicardia, cold intolerance.
   Added methods: Thyroid gland hormones, TSH, I-131 absorption by thyroid gland
   no
   5
Flow chart 3

Hyperglycaemic syndrome

4. Hemachromatosis. 5. Diffuse toxic goitre. 6. Diabetes mellitus

1. Steroid diabetes
   - History of hormone intake
     - Yes
     - No
       2, 3, 4, 5, 6

2. Cushing’s syndrome (disease)
   - Yes
   - No
     3, 4, 5, 6

3. Acromegaly
   - Yes
     Acromegalic face, increase in fingers of hands and feet
   - No
     4, 5, 6

4. Hemachromatosis
   - Yes
     Polychromia of skin, шкіри (dirty-grey colour), liver cirrhosis
   - No
     5, 6

5. Diffuse toxic goitre
   - Yes
     Goitre, tachycardia, decreased weight
   - No
**Suggested Reading List**

**Required Reading**
1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination, Edited by Jonh Macleod, Jonh Munro, Churchill Livingsone, 2000
4. Caring for the sick by British Red Cross Society
5. First aid manual by British Red Cross Society
6. Davidson’s Medicine, Edited by Nicholas A. Boon, Nicki R. Colledge, Davidson, 2008
7. Manual for the Case Record, Edited by Ignatenko G.A., Department of Propaedeutics of Internal Medicine, Donetsk, 2009
8. Lecture: Examination of the endocrine system
9. Methodical guideline for students
10. Flow charts for Practice
11. Website of department: www.cardiology.dsmu.edu.ua

**Additional Reading**
2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
## Diabetes Mellitus

<table>
<thead>
<tr>
<th>Types of coma</th>
<th>Hyperglycemic (diabetic) coma</th>
<th>Hyperglycemic hyperosmolar coma</th>
<th>Hyperlactactic acedotic coma</th>
<th>Hypoglycemic coma</th>
</tr>
</thead>
<tbody>
<tr>
<td>causes</td>
<td>Disorders of diet, lack of insulin, stress, infections</td>
<td>Severe dehydration (vomiting or diarrhea) in diabetes</td>
<td>Hypoxia-pneumonia, severe anaemia, congenital heart disease</td>
<td>excess of insulin, no food after insulin</td>
</tr>
<tr>
<td>precoma</td>
<td>passive</td>
<td>passive</td>
<td>passive</td>
<td>excitement</td>
</tr>
<tr>
<td>onset</td>
<td>gradual</td>
<td>gradual</td>
<td>fast</td>
<td>fast</td>
</tr>
<tr>
<td>breathing</td>
<td>Kussmaul's shallow and frequent breathing</td>
<td>Kussmaul's normal breathing</td>
<td>normal</td>
<td></td>
</tr>
<tr>
<td>pulse rate</td>
<td>frequent</td>
<td>frequent</td>
<td>frequent</td>
<td>frequent</td>
</tr>
<tr>
<td>blood pressure</td>
<td>↓↓</td>
<td>↓↓↓</td>
<td>↓↓↓</td>
<td>N</td>
</tr>
<tr>
<td>Eye, muscular tonus</td>
<td>↓</td>
<td>↓</td>
<td>↑</td>
<td>N</td>
</tr>
<tr>
<td>body temperature</td>
<td>N</td>
<td>↑</td>
<td>↓</td>
<td>N</td>
</tr>
<tr>
<td>skin</td>
<td>dry</td>
<td>dry</td>
<td>dry</td>
<td>moist</td>
</tr>
<tr>
<td>pupils</td>
<td>miosis</td>
<td>N</td>
<td>N</td>
<td>mydriasis</td>
</tr>
<tr>
<td>glucose level in blood</td>
<td>↑↑</td>
<td>↑↑↑</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>clinical study of the blood</td>
<td>Leukocytosis, high ESR</td>
<td>Blood clotting, erythrocytosis, high ESR</td>
<td>Leukocytosis, high ESR</td>
<td>N</td>
</tr>
<tr>
<td>sodium level in blood</td>
<td>N</td>
<td>↑</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>potassium level in blood</td>
<td>↓</td>
<td>↓</td>
<td>↑</td>
<td>N</td>
</tr>
<tr>
<td>nitrogen level in blood</td>
<td>N</td>
<td>↑</td>
<td>↑</td>
<td>N</td>
</tr>
<tr>
<td>pH</td>
<td>acidosis</td>
<td>N</td>
<td>acidosis</td>
<td>N</td>
</tr>
<tr>
<td>ketone bodies level in urine</td>
<td>+++ (smell of rot apple )</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
</tr>
<tr>
<td>ketone bodies level in blood</td>
<td>↑↑↑</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>
Hyperthyroid coma(crisis)

**Causes:** after thyroidectomy, inadequately treated hyperthyroidism, severe infections, rapid withdrawal of antithyroid therapy, use of iodine or contrast agents, trauma, stress, physical exertion.

**Pathogenesis:** Proteinlysis, lipolysis, impaired glucose tolerance, water-electrolytic disbalance, acid-base disbalance, dysfunction of central nervous system, hypothalamo-pituitary-adrenal gland dysfunction, sympathoadrenal system dysfunction

**Clinical features:** hyperemia, hyperhidrosis (excessive profuse sweating), pulse pressure increasing, cramps, hyperthermia, tachycardia, jaundice, muscular weakness, diarrhea, anuria delirium, apathy.

Hypothyroid (myxoedema) coma

**Causes:** severe infections, supercooling, trauma, operations, discontinue of antithyroid therapy, use of iodine or contrast agents, trauma, stress, physical exertion.

**Clinical features:** low blood pressure, bradycardia, bradypnoe, hypothermia, anuria

**Investigation:** decreased level of glucose, sodium, chlorine, increased level of potassium, increased level of urea, cholesterol, anemia, T3, T4-↓

Adrenal coma( acute adrenal insufficiency)

Low level of glucocorticoid and mineralocorticoid

Affection of adrenal glands – infections (tbc), adrenal infarction, hemorrhage(meningococcaemia-Waterhouse-Friderichen syndrome), operation on adrenal gland

**Mechanisms** – decrease in gluconeogenesis, excessive excretion of sodium and chloride with urine, lack excretion of potassium with urine, dehydration, decreased volume of circulating blood, decrease in renal circulation.

**Clinical features:** hyperpigmentated and pale skin, acrocyanosis, thready, weak pulse, low blood pressure, cold extremities

**Laboratory signs** – decrease in cortisol, sodium, glucose, increase in potassium, urea, creatinine, eosinophils, leucocytosis
Diabetes Mellitus
Type I
Type II

*Causes:* pancreatitis, receptor disorders, Itsenko-Cushing syndrome, thyrotoxicosis, remedies

*Clinical features:* thirst, polydipsia, polyuria, polyphagia, weight loss, muscular weakness, skin itch, pyogenic skin diseases, non-healing of wounds, paradontosis, microangiopathy.

Ketoacidosis: lose of appetite, vomiting, nausea.

**Hypoglycemia** – clinical features: headache, drowsiness, excitation, hyperhidrosis (excessive profuse sweating), starvation, palpitation, hand tremor, paresthesia, salivation.

*Causes:* excess of insulin, no food after insulin insuloma, liver diseases, gastrectomia, alimentary, alcohol intoxication, hard physical activity.

**Hyperthyroidism**

*Causes:* diffuse thyroid enlargement, multinodular goiter, solitary thyroid goiter, tbc, scarlet fever, encephalitis, somatotropin (acromegalia or giantism), typhus, pertussis, rheumatism, viral meningitis, Itsenko-Cushing syndrome.

*Clinical features:* tachycardia, exophthalmos, enlargement of thyroid gland (goiter), excitation, irritability, emotional lability, fine tremor, deranged sleep, hyperhidrosis (excessive profuse sweating), muscular weakness, palpititation (sinus tachycardia, atrial fibrillation), weight loss despite increased appetite, increased stool frequency, increasing blood pressure, eye signs

*Investigation*– ↑ T3, T4, TSH is low, thyroid stimulating immunoglobulins, hyperglycemia, hypocholesterolemia, increased basal metabolism, changes of ECG (sinus tachycardia, atrial fibrillation)

**Hypothyroidism**

*Primary* – affection of thyroid gland – resection of thyroid gland, Hashimoto's thyroiditis, lack of iodine.

*Secondary* - affection of adenohypophysis – tumor of brain, encephalitis, arachnoiditis, stroke, trauma

*Tertiary* - affection of hypothalamus – tumor of brain, trauma, encephalitis, arachnoiditis, stroke

*Clinical features:* oedema of face and extremities (myxoedema), pain in muscles, fast fatigue, drowsiness, cold intolerance, memory disorders, depression, hoarseness, constipation, dry, flaky, skin, alopecia, dyspnoea.

*Mechanisms* - decreasing of basal metabolism, decreasing of oxidative reaction, disorder of protein synthesis.
Investigation— $\downarrow$ T3,T4, TSH is low or high, anemia, high ESR, hypercholesterolemia, hypoglycemia, reduction of basal metabolism, changes of ECG(sinus bradycardia, low voltage QRS), accumulation of fluid in pericardial cavity.

Revision tests

Q1. Choose the most typical stomatological problems in patients with diabetes mellitus
   A. Caries
   B. Paradontosis
   C. Hypersalivation
   D. Gingivitis
   E. All listed variants

Q2. Early parameter which shows diabetic nephropathy
   A. Casturia
   B. Leucocyturia
   C. Hematuria
   D. Microalbuminuria
   E. Bacteriuria

Q3. The main symptoms in clinic of diabetes mellitus
   A. Dryness of mouth mucosa and tongue, polydipsia, furuncles, polyuria
   B. Thirst, oliguria, muscular weakness, increased appetite
   C. Fast fatigue, nausea, palpitation
   D. Odema, depression, constipation, sore throat
   E. Muscular weakness, tremor, thirst

Q4. Early signs of diabetes mellitus except for
   A. thirst
   B. polyuria
   C. general weakness
   D. skin itching
   E. proteinuria

Q5. Which sign better characterizes compensation of carbohydrate metabolism?
   A. Glucose level on empty stomach
   B. Glucose level of urine
   C. Glycosylated haemoglobin
   D. Haemoglobin level
   E. All listed variants

Q6. Patient 60 years old has sudden appearance of tremor, hunger, aggression, sweating. He doesn’t suffer from diabetes mellitus. Which diseases and conditions can cause hypoglycaemia except for diabetes mellitus
   A. Insulinoma.
   B. Tumour of thyroid gland
   C. Alcoholic intoxication
   D. Gastrectomy
E. Tumour of testicle

Q7. Which rhythm disorder happen more often in hyperthyrodisim
A. Sinus tachycardia
B. AV block 1 degree
C. AV block 3 degree
D. Myocardium infarction
E. Sinus bradycardia

Q8. Which ECG changes happen in hypothyrodisim
A. High voltage of waves
B. Shortening of all intervals
C. Low voltage of waves
D. Atrial flutter
E. Sinus tachycardia

Q9. Patient 22 years old is admitted to the hospital without consciousness. Breathing is noisy, deep, acetone smell from mouth. Skin is dry, decreased tone of skin, muscles and eye balls. According to relatives he had thirst, dryness of mouth, furuncles, increased appetite, decreased weight for last 4 months. What happens with patient?
A. Hypoglycaemic coma
B. Diabetic coma
C. Hyperlactic coma
D. Hyperthyroid crisis
E. Toxic coma

Q10. The main symptoms in clinic of ketoacidosis
A. Odema, depression, constipation, sore throat
B. Thirst, oliguria, muscular weakness, increased appetite
C. Fast fatigue, nausea, palpitation, increased weight
D. Nausea, vomiting, absence of appetite, thirst
E. Muscular weakness, tremor, thirst

Answer Keys: Q1: B; Q2: D; Q3: A; Q4: E, Q5: C; Q6: A; Q7: A; Q8: C, Q9: B; Q10: D.

SUMMARY OF PROCEDURES
The practice lesson shall begin in the study room, with the homework assignment checked and students’ testing carried out. Another part of the practice shall be conducted in the hospital wards. Instructor will demonstrate to the students how to make enquiring, physical examination of patients with endocrine pathology.

Diagnostic value of the revealed in examined patients shall be discussed outside of the ward. Instructor teaches to perceive the organism of man as single unit, underline connection oral cavity pathology and internal organs, to provide first aid to the patients before hospitalization and in urgent situations.

At the end of the practice teacher makes short general conclusion concerning obtained findings and students do final tests.
Final Tests

Q1. Ketoacidotic coma characterized by:
A. Sudden occurrence
B. Acetone smell from mouth
C. Cold sweating
D. Sudden hunger
E. Hypoglycaemia

Q2. Hyperfunction of thyroid gland has such signs as:
A. Serum T3 and T4 level are high
B. Only serum level T3 is high
C. Only serum level T4 is high
D. Serum T3 level and T4 are high
E. Serum T3 is high but T4 level is high

Q3. Hypothyrodism is characterized by:
A. Tachycardia
B. Increased stool frequency
C. Fine tremor
D. Vomitting
E. Bradycardia

Q4. Hyperthyrodism characterized by these signs except for:
A. High body temperature
B. Sensation of heating
C. Wet skin
D. Increased appetite
E. Increased weight

Q5. Absolute deficiency of insulin causes:
A. Azotemia
B. Cattlepsy
C. Hypolipidemia
D. Fat infiltration of liver
E. hyperglycaemia

Q6. Enlargement of liver in diabetes mellitus happens due to:
A. Fat hepatosis
B. Hepatitis
C. Cirrhosis
D. Diabetic retinopathy
E. Heart failure

Q7. During ketoacidotic coma the breathing is:
A. Rare
B. Frequent
C. Noisy, deep
D. With temporary apnoe
E. Superficial

Q8. What is rubeosis?
A. Increase in thyroid hormones in the blood
B. Increase in blood glucose level
C. Decrease in blood protein
D. Accumulation of acetone and ketone bodies
E. Decrease in thyroid hormones in the blood

Q9. What is action of insulin?
A. Increase in glycaemia
B. Decrease in glycaemia
C. Increase in catalase
D. Increase in lipase.
E. Without influence

Q10. Hyperthyrodism characterized by these sigs except for:
A. Tachycardia
B. Atrial fibrillation
C. Bradycardia
D. Increased loudness of heart sounds
E. Increase in cetone body
STUDENT’S SELF-STUDY GUIDELINES FOR PRACTICE ACTIVITIES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Propedeutics of the Internal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Methods of examination and basic symptoms and syndromes at the diseases of internals organs in the clinic of internal medicines.</td>
</tr>
<tr>
<td>Topic 1 Module</td>
<td>Introduction to the clinic of internal illnesses. Basic rules of inquiring and inspection of sick.</td>
</tr>
</tbody>
</table>

Course 2
Faculty Dentistry

Donetsk 2011
**Importance of the Subject:** Allergic diseases are one of the basic in the structure of morbidity of children, teenagers and young people. A lot of allergy signs appear in oral cavity or around it. That is why have this knowledge is necessary for dental specialists. Diseases of joints, especially rheumatoid arthritis and osteoarthritis are essential problem for the people of middle and old ages. Some time dentist first pay attention on changes on movement of his patient and may correctly and timely forward the patient to proper specialist. That is why abilities to inquire patients about all this pathology and correctly examine patient objectively are help for proper diagnose and early start treatment.

**Key Objective:** able to determine the syndromes of allergy and joint syndrome, using skills of gathering of complaints and anamnesis, allergist anamnesis, objective examination (inspection, percussion, palpation and auscultation) and additional methods of examination (scratch test, skin test, provocative allergist tests, laboratory methods of diagnostics of allergy, immunological tests, X-Ray research of organs of thorax and joints, sonography of joints).

**Specific Goals:**

1. To know a concept about an allergy.
2. To know types of allergic reactions.
3. To master inquiring of patients with allergy.
4. To know basic complaints: itch of skin, fever, edema, rashes, blisters, difficulty in breathing, hacking cough, attacks of dispnoea, weakness, filling of fear, head pain, nausea, fever.
5. To be able to collect allergy anamnesis.
6. Determination of presence of asthma.
7. To can conduct inspection of patients with allergy.
8. To know changes of skin as erythema, urticaria (nettle rush), local edema, husky voice, difficulty and hoarse breathing, tachypnea.
9. To know places of rash, feature, types of blisters, their color, limits, consistency.
10. To know other sings of allergy as fever, oedema of lips, eyelids, cheeks, genitals, tongue, pharynx, larynx, violation of breathing and swallowing, increase of lymphatic nods.
11. To know changes of mucus membranes of nose, eyes - rhinitis, conjunctivitis. Epidermolysis.
12. To know variants of clinic in the case of development of anaphylactic shock.
13. To be able to help patients with allergy with violation of consciousness, collapse, skin rash, cramps, pain in heart, stomach, syndrome (pseudo) “acute abdomen”.
14. To know an allergy on stomatological materials and medicines.

16. To know signs of allergy and immune violations from the side of mucus membranes of oral cavity and teeth and jaw system. Features of care for patients.

17. Rendering first aid at anaphylactic shock, asphyxias at the edema of larynx.

18. Diagnose of inflammatory and degenerative diseases of locomotorium system.

19. To master inquiring of the system of musculoskeletal apparatus.

20. To be able to conduct objective examination (inspection, percussion, auscultation, palpation) and additional (instrumental, X-Ray, laboratory, morphological) methods of diagnostics of illnesses of peripheral joints, spine, mussels and periarticular tissues.

21. To know about examination of synovial liquid.

22. To know about joint syndromes (arthritic, osteoarthritic).

23. To know about mussels syndrome.

24. To know about features of care for patients.

**Level of Knowledge and Skills before the Practice:**

1. To know the structure of the immune system and joints. «Faculty of Anatomy».

2. To estimate the features of function of the immune system and joints. «Normal physiology».

3. To determine the basic mechanisms of development of anaphylactic reactions, to the attack bronchial asthma and asthmatic status, osteoarthritis and rheumatoid arthritis. «Pathophysiology».

**Questions for Self-Assessment of the Pre-Practice Knowledge (correct answers gone after last task).**

**Q1.** Activated mast cells and basophils undergo a process called degranulation, during which they release inflammatory chemical mediators from their granules into the surrounding tissue causing several systemic effects. Which mediators do you know?

A. histamine
B. prostaglandins
C. leukotrienes
D. interleukins and cytokines
E. all listed above

**Q2.** What antibodies overproduce at bronchial asthma?

A. IgA
B. IgM
C. IgG
D. IgE
E. IgM

**Q3.** Determine disease with anaphylactic allergy:
A. COPD
B. bronchial asthma
C. rheumatic fever
D. erysipelas
E. essential hypertension

**Q4.** Find immune organ:
A. liver
B. kidney
C. thymus
D. heart
E. thyroid gland

**Q5.** What kind of allergens do you know?
A. animal products
B. food
C. drugs
D. insect sings
E. all listed above

**Q6.** What can induce seasonal allergies?
A. food
B. insect sings
C. drugs
D. pollens
E. all listed above

**Q7.** What is atopy?
A. bronchial asthma exacerbation
B. seasonal allergy
C. polyvalent allergy
D. hereditary predisposition for allergy
E. all listed above

**Key answers:** 1-E, 2-D, 3-B, 4-C, 5-E, 6-D, 7-D.

**The following printed materials can be of help to improve your pre-practice knowledge and skills:**
3. M. Prives, N. Lysenkov, V. Bushovich; Human Anatomy

Contents of Practice

Topics of Theory:
1. Concept about an allergy.
2. Types of allergic reactions.
3. Inquiring of patients with allergy.
4. Basic complaints: itch of skin, fever, oedema, rashes, blisters, difficulty in breathing, hacking cough, attacks of dyspnoea, weakness, filling of fear, head pain, nausea, fever.
5. Allergy anamnesis.
6. Bronchial asthma.
7. Inspection of patients with allergy.
8. Changes of skin as erythema, urticaria (nettle rush), local oedema, husky voice, difficulty and hoarse breathing, tachypnea.
10. Fever, oedema of lips, eyelids, cheeks, genitals, tongue, pharynx, larynx, violation of breathing and swallowing, increase of lymphatic nods.
11. Changes of mucus membranes of nose, eyes - rhinitis, conjunctivitis.
   Epidermolysis.
13. Help patients with allergy with violation of consciousness, collapse, skin rash, cramps, pain in heart, stomach, syndrome (pseudo) “acute abdomen”.
14. Allergy on stomatological materials and medicines.
   Elimination tests - stopping of contact with allergen.
16. Signs of allergy and immune violations from the side of mucus membranes of oral cavity and teeth and jaw system. Features of care for patients.
17. Rendering first aid at anaphylactic shock, asphyxias at the oedema of larynx.
18. Diagnose of inflammatory and degenerative diseases of locomotorium system.
19. Inquiring of the system of musculoskeletal apparatus.
20. Objective examination (inspection, percussion, auscultation, palpation) and additional (instrumental, X-Ray, laboratory, morphological) methods of diagnostics of illnesses of peripheral joints, spine, mussels and periarticular tissues.
21. Examination of synovial liquid.
22. Joint syndromes (arthritic, osteoarthritis).
23. Mussels syndrome.
24. Features of care for patients.
Practical skills:
Students should be able to demonstrate mastery of the following practical skills able to determine the syndromes of allergy and joint syndrome, using skills of gathering of complaints and anamnesis, allergist anamnesis, objective examination (inspection, percussion, palpation and auscultation) and additional methods of examination (scratch test, skin test, provocative allergist tests, laboratory methods of diagnostics of allergy, immunological tests, X-Ray research of organs of thorax and joints, sonography of joints).

20. To gathering of complaints and anamnesis at patients with allergy reaction.
21. To gathering of complaints and anamnesis at patients with joint syndrome.
22. To perform inspection of the patient with allergy reaction.
23. To perform inspection of the patient with joint syndrome.
24. To determine of the general state of patient with allergy reaction.
25. To determine posture of the patient in a bed with joint syndrome.
26. To determine presence of oedema.
27. To examine mucous membranes and skin with allergy reaction and joint syndrome.
28. To examine muscles and joints at patients with rheumatoid arthritis and osteoarthritis.
29. To find proper clinical syndromes.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>allergy</td>
<td>is a disorder of the immune system which is a form of hypersensitivity</td>
</tr>
<tr>
<td>allergen</td>
<td>is a nonparasitic antigen capable of stimulating a type-I hypersensitivity reaction in atopic individuals</td>
</tr>
<tr>
<td>urticaria</td>
<td>a skin condition characterized by the formation of itchy red or whitish raised patches, usually caused by an allergy</td>
</tr>
<tr>
<td>eosinophilia</td>
<td>the presence of abnormally large numbers of eosinophils in the blood, occurring in various diseases and in response to certain drugs</td>
</tr>
<tr>
<td>stridor</td>
<td>is a high pitched sound resulting from turbulent air flow in the upper airway</td>
</tr>
<tr>
<td>rheumatoid arthritis</td>
<td>is a chronic, systemic inflammatory disorder that may affect many tissues and organs, but principally attacks synovial joints</td>
</tr>
<tr>
<td>osteoarthritis</td>
<td>also known as degenerative arthritis or degenerative joint disease, is a group of mechanical abnormalities involving degradation of joints, including articular cartilage and subchondral bone</td>
</tr>
<tr>
<td>contracture</td>
<td>constant limitation of mobility of the damaged joint</td>
</tr>
<tr>
<td>ankylosis</td>
<td>abnormal adhesion or immobility of the bones in a joint, as by a direct joining of the bones, a fibrous growth of tissues within the joint, or surgery</td>
</tr>
<tr>
<td>myalgia</td>
<td>pain in a muscle or a group of muscles</td>
</tr>
<tr>
<td>joint deformation</td>
<td>is a major difference in the shape of body part or joint compared to the average shape of that part</td>
</tr>
<tr>
<td>joint defiguration</td>
<td>change of form of joint because of oedema of periarticular tissue, increase of amount of synovia</td>
</tr>
</tbody>
</table>
Flow Chart 1

«Rheumatoid arthritis»

Main syndromes

Joint syndrome

Visceral syndrome

Additional methods of examination

Laboratory

- General blood
- ESR
- CRP
- Immune analysis

Instrumental

- Sonography внутрих
- Gastroscopy
- ECG
- ECHO

X-Ray

- Joint X-Ray
- Thorax X-Ray

Differential diagnosis

Final diagnosis

Treatment

- Drug
  - Anti-inflammatory
  - Disease-modifying antirheumatic drugs
  - Pain relief

- Non-drug
  - Surgery treatment
  - Orthopedic surgery
  - Extracorporeal treatment
  - Physiotherapy

Rehabilitation

- Prognosis
- working capacity
- Prophylaxis
Flow Chart 2

«Osteoarthritis»

Osteoarthritis

Main syndromes

Small joint affection

Big joint affection

Vertebra column affection

Initial diagnosis

Additional methods of examination

Laboratory

- General blood analysis
- Synovial fluid analysis

Instrumental

- Joint X-Ray
- Sonography
- Arthroscopy

Final diagnosis
### Differential diagnosis of rheumatoid arthritis and osteoarthritis

<table>
<thead>
<tr>
<th></th>
<th>Rheumatoid arthritis</th>
<th>Osteoarthritis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of origin</strong></td>
<td>More young</td>
<td>Old</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>More women</td>
<td>Equal</td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td>Antigen-induced</td>
<td>Dystrophy</td>
</tr>
<tr>
<td></td>
<td>inflammation</td>
<td></td>
</tr>
<tr>
<td><strong>Joints started</strong></td>
<td>Small joints of feet and hands</td>
<td>Big joints</td>
</tr>
<tr>
<td><strong>Number of affected joints</strong></td>
<td>Polyarthritis, symmetrical</td>
<td>Initially oligoarthritis</td>
</tr>
<tr>
<td><strong>Number of affected joints</strong></td>
<td>3 and more</td>
<td>1 or oligoarthritis</td>
</tr>
<tr>
<td><strong>Severe pain in morning</strong></td>
<td>During first hour at morning</td>
<td>During first 10 min at morning</td>
</tr>
<tr>
<td><strong>All day pain</strong></td>
<td>Continuously pain all day with some relief</td>
<td>Started pain (first several seconds at movement or all movement) but it goes out at rest</td>
</tr>
<tr>
<td><strong>Limitation in the range of motions, active and passive</strong></td>
<td>Presents and progressive at all affected joints</td>
<td>May be present</td>
</tr>
<tr>
<td><strong>Anchylosis</strong></td>
<td>As rule develop</td>
<td>Never develop</td>
</tr>
<tr>
<td><strong>Deformation</strong></td>
<td>Present</td>
<td>Present and pronounced</td>
</tr>
<tr>
<td><strong>Articular crepitus</strong></td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td><strong>Hyperemia of skin</strong></td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td><strong>Changes in blood analysis</strong></td>
<td>High ESR, leucositosis</td>
<td>Absent</td>
</tr>
</tbody>
</table>

### Common symptoms of allergy

<table>
<thead>
<tr>
<th>Affected organ</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nose</td>
<td>Swelling of the nasal mucosa (allergic rhinitis)</td>
</tr>
<tr>
<td>Sinuses</td>
<td>Allergic sinusitis</td>
</tr>
<tr>
<td>Eyes</td>
<td>Redness and itching of the conjunctiva (allergic conjunctivitis)</td>
</tr>
<tr>
<td>Airways</td>
<td>Sneezing, coughing, bronchoconstriction, wheezing and dyspnea, sometimes outright attacks of asthma, in severe cases the airway constricts due to swelling known as laryngeal oedema</td>
</tr>
<tr>
<td>Ears</td>
<td>Feeling of fullness, possibly pain, and impaired hearing due to the lack of eustachian tube drainage.</td>
</tr>
<tr>
<td>Skin</td>
<td>Rashes, such as eczema and hives (urticaria)</td>
</tr>
<tr>
<td>Gastrointestinal tract</td>
<td>Abdominal pain, bloating, vomiting, diarrhea</td>
</tr>
</tbody>
</table>
Suggested Reading List

Required Reading

1. Internal Diseases, an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
2. Clinical Examination. Edited by Jonh Macleod, Jonh Munro, Churchill Livingstone, 1986
3. A system of case recording and clinical examination of patients on propaedeutic of internal diseases.
4. Medicine, Edited by K. George Mathew, Praveen Aggarwal, Elsevier, 2004
5. Methodical guideline for students
7. Website of department: www.cardiology.dsmu.edu.ua
8. Flow charts for Practice

Additional Reading

2. History and Physical Examination. Current Clinical Strategies, Edited Paul P. Chan, Peter, J. Winkle, 2005
3. Davidson’s Medicine, Nicholas A. Boon, Nicki R. Colledge, Davidson, 2006
Sequence of Actions in the enquiry of the patient

**Revision Questions**

**Q1.** What is main mechanism of bronchial asthma?
A. Beta-adrenal receptor blockade  
B. Increase of intrathoracic pressure  
C. Bronchospasm and swelling of bronchial mucus membranes  
D. Decrease of cardiac output  
E. Inflammation of alveoli

**Q2.** How to diagnose bronchial asthma?
A. X-ray of thorax  
B. Spirography  
C. Sonography of lung  
D. Bronchoscopy  
E. Blood analysis

**Q3.** Patient X, 45 years old, has several attacks of dyspnoea at night during last month. What type of dyspnoea trouble patient with bronchial asthma?
A. Inspiratory  
B. Expiratory  
C. Mix  
D. Inspiratory than expiratory
Q4. What kind of forced position at patient with bronchial asthma?
A. Lying
B. Sitting with legs down
C. Standing with bending forward
D. Sitting or standing with the fixing of the shoulder gird
E. Any one

Q5. Which joint usually more often affected with osteoarthritis?
A. Knee
B. Metacarpophalangeal
C. Proximal interphalangeal
D. Acromeoclavicular
E. Anyone

Q6. Which joint usually more often affected at rheumatoid arthritis?
A. Knee
B. Metacarpophalangeal
C. Hip
D. Acromeoclavicular
E. Anyone

Q7. Patient has angioneurotic (Quincke's) edema. What sings of this?
A. Tissues around the mouth, and the mucosa of the mouth and/or throat swelling up over the period of minutes to several hours
B. Swelling can also occur elsewhere, typically in the hands
C. In severe cases, stridor of the airway occurs
D. May be slightly decreased sensation in the affected areas due to compression of the nerves
E. All listed above

Q8. What is irreversible?
A. Dupuytren's contracture
B. Ankylosis
C. Kyphoscoliosis
D. Deformation
E. Any of them

Q9. Which parameter is main for assessing of bronchial conduction at bronchial asthma?
A. Vital capacity
B. Residual volume
C. FEV1
D. Tidal volume
E. PEF
Q10. Patient 65 years old has severe pain, especially in the morning, in both knee and hip joints, deformation and defiguration of both knee joint, restriction in movement of them because of pain, crepitus in right knee. Disease started one year ago. Analysis of blood reveal no pathology. What diagnosis may be first of all?
A. Rheumatism
B. Gout
C. Rheumatoid arthritis
D. Osteoarthritis
E. It is variant of norm

Key answers: 1-C, 2-B, 3-B, 4-D, 5-A, 6-B, 7-E, 8-E, 9-C, 10-D.

SUMMARY OF PROCEDURES

The practice lesson shall be begun in the study room. Checking of the homework, the test control is carried out. Then at the study room patient is invited. Demonstration of methodic of general assessment and examination of the patients with allergy reaction and affection of the joints. Then lesson is transferred to ward: the teacher of students group perform examination of patients, showing a different signs of pathology for this topics, inviting in turn of each students on a fragment of research. After students formulate syndromes and diagnosis if possible.

At the end of lesson in an educational room diagnostic value of available symptoms is discussed.

Final tests

Q1. Patient at time of penicillin injection blackout. No dyspnoea revealed. Vesicular breathing above lung. Blood pressure impossible to detect. Pulse is filiformis with rate about 120 bpm. What happened with patient?
A. Anaphylactic shock
B. Stroke
C. Myocardial infarction
D. Hypertonic crisis
E. Cardiac arrest

Q2. Patient 60 years old has severe pain, especially in the morning, in both knee joints, deformation and defiguration their, restriction in movement of them because of pain, crepitus. Disease started five years ago. Analysis of blood reveal no pathology. What first of all point on osteoarthritis rather than on rheumatoid arthritis?
A. Crepitus
B. Defiguration
Q3. Patient 39 years old has severe cough at night and after going out of home and inspiring of cold air. Now he has attack of cough. His eyes are red because of distraction of vessels in sclera because of cough. Severe expiratory dyspnoea is observed. Which syndrome main at him?
A. Intoxication
B. Heart failure
C. Respiratory failure
D. Anaemic
E. Hemorrhagic

Q4. What should be done for patient with bronchial asthma as a first aid?
A. Unbutton the collar
B. Add fresh air
C. To help patient set in forced position
D. Give inhaler
E. All listed above

Q5. 15 min after washing with new soap the oedema of face is developed. What is it?
A. Angioneurotic Quincke's oedema
B. Nephrotic syndrome
C. Chronic heart failure
D. Acute heart failure
E. Acute chemical burn of skin

Q6. What sign of home-dust allergy reaction?
A. Allergy reaction arise at spring and fall
B. Allergy reaction arise after clearing at home
C. Allergy reaction arise after work in garden
D. Allergy reaction not developed on dust
E. Allergy reaction developed after eating

Q7. Which parameter is main for assessing of bronchial conduction at bronchial asthma?
A. Total lung capacity
B. Residual volume
C. Tidal volume
D. FEV1
E. any of them

Q8. What is sign of aspirin asthma?
A. Attack of asthma and aspirin intolerance
B. Attack of asthma at physical exertion
C. Attack of asthma at emotional exertion
D. Attack of asthma and ulcer disease
E. Attack of asthma at going out of home and inspiring of cold air

Q9. Which parameter allows to determine activity of rheumatoid arthritis?
A. ESR
B. ASLO level
C. Monocytes level
D. Eosinophil level
E. RBC

Q10. What sign of food allergy reaction?
A. Allergy reaction arise at spring and fall
B. Allergy reaction arise after clearing at home
C. Allergy reaction arise after work in garden
D. Allergy reaction not developed on dust
E. Allergy reaction developed after eating
Checklist of Practical Skills
1. Scheme of case recording. Main parts of anamnesis
2. General inspection
3. Palpation of lymph nodes and characteristic of received data
4. Inspection of head and neck
5. Inspection of trunk and limbs
6. Static inspection of the chest, diagnostic value of main symptoms
7. Dynamic inspection of the chest, diagnostic value of main symptoms
8. Inspection of heart region, diagnostic value of main symptoms
9. Inspection of abdomen, determination of main symptoms
10. Palpation of the vessels
11. Measurement of systolic and diastolic pressure and rules of its taking, pulse pressure
12. Palpation of the chest, sequence, clinical value of main symptoms
13. Palpation of the heart region, sequence, clinical value of main symptoms
14. Palpation of the mammary gland
15. Superficial palpation of abdomen, interpretation the received data
16. Rules and principles of deep sliding palpation according to Obraztsov's method
17. Palpation of sigmoid, caecum and terminal part of ileum, their normal features
18. Methods of determination of greater curvature of stomach
19. Palpation of transverse colon, main features
20. Palpation of liver, diagnostic value of main symptoms
21. Palpation of spleen
22. Comparative percussion of the lungs. Main percussion notes, their origin
23. Technique of topographic percussion. Topographic data of the lungs in the norm and pathology
24. Percussion of the heart-relative cardiac dullness, normal borders and their changes in the pathology
25. Percussion of the heart-absolute cardiac dullness, normal borders and their changes due to cardiac and extracardiac reasons
26. Percussion of the vascular bundle, diagnostic value
27. Percussion of liver, sequence, data in the norm and pathology
28. Percussion of spleen. Rules of determination, reasons of spleen enlargement
29. Auscultation of the lungs. Main breath sounds, their quantitative and qualitative changes
30. Auscultation of the lungs. Added breath sounds, classification, their origin
31. Determination of vocal resonance and its diagnostic value
32. Auscultation of the heart and vessels
33. Palpation of joints
34. Palpation of thyroid gland
35. Gastric lavage
36. Intestine irrigation: siphon enemas, cleansing enemas
LITERATURE

2. Internal Diseases an Introductory Course. Edited by V. Vasilenko and Grebenev, Mir Publishers, Moscow, 1990
4. Student’s self-study guidelines for Practice Activities on propedeutics of internal medicine for Second Year Students of International Medical Faculty (Dentistry) Module 1. Main methods of examination of patients with diseases of internal organs. Symptoms and Syndromes of Internal Diseases, Edited by Ignatenko G.A., Department of Propaedeutic and internal medicine, Donetsk, 2011
5. Introduction of the course of internal disease. Z.H. Semidotska, O.S. Biltchenko, Kharkiv, 2006
6. Davidso’s Principles and Practice of Medicine.
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