

Subject 2 Evaluation of the patient state: inquiry and general inspection. Assessment of the general state of patient; estimation of the patient position. Assessment of the skin and mucous membranes. Thermometry. Caring for the patients with the fever.

The clinical study of disease is founded on two essential processes, the history of the patient's disability (inquiry), and the physical examination. The doctor's first task is to listen and observe, not only to obtain information about the current problem but also to understand the patient as a person and that individual's life situation. In order to make a correct diagnosis it is necessary to be able to identify the signs and symptoms of the disease, and to reveal the appropriate changes in the patient. Various methods are used to reveal and study the numerous symptoms of the disease. These methods include questioning the patient, measuring his body temperature, and complicated techniques of examination (microscopy of the formed elements of the blood, chemical studies of the bodily fluids, X-ray examination of the patient, etc.).

It is necessary to distinguish symptoms and signs of disease. A *symptom* is an indication of a disease or disorder noticed by the patient himself. A sign is an indication of a particular disorder that is observed by a physician but is not apparent to the patient.

It is almost impossible to diagnose a disease by only one sign. A correct diagnosis can only be sign established by investigating several signs and symptoms. Most incorrect diagnoses are the result of signs an insufficient examination. The main requirement is therefore a thorough and systematic examination of the patient. A correct diagnosis can be established if the physician follows a definite plan in his examinations.

The examination begins with an *interview*. The patient tells his complaints which often are of no less importance than a thorough objective examination of the patient. Some diseases are diagnosed almost exclusively by the patient's complaints. A detailed questioning of the patient concerning the time of the onset of the disease, its early symptoms (until the time of medical examination) is even more important in establishing a correct diagnosis. All this information is usually called anamnesis morbi, i.e. remembering the present disease by the patient, as distinct from anamnesis vitae which is the history of previous diseases of the patient. Stages of development of the present disease are traced back while collecting an anamnesis from the history of the disease as given by the patient himself and also from the information supplied by his relatives.

Another stage of examination is *objective examination* of the patient's condition at the present time (status praesens). This examination includes various diagnostic procedures (inspection, measuring temperature, percussion, auscultation, palpation, laboratory tests, X-ray examination, etc.) and reveals changes in the patient's body

and deviations from normal structure and function of various organs that could not be sensed by the patient himself.

Inquiry

It is first necessary to clarify the patient's account to ensure that all the symptoms have been elicited and to evaluate them. The art of interrogation is one which develops with practice, provided certain principles are observed. Questions should be formulated simply and clearly. When a satisfactory answer has been obtained, the same question should not be repeated later. This usually results from inattention and gives a justifiably poor impression of the carefulness of the examiner.

Many individuals are very open to suggestion and unintentionally provide erroneous information if a certain answer would appear to be expected. Biased and premature questions in conjunction with a perplexed patient open to suggestion and anxious to help the doctor, may result in a very distorted history. It is therefore important, particularly while the basic facts are being elicited, not to ask leading questions which may act as guides to the answers desired by the doctor. Later in the proceedings, however, use may be made of such questions to elucidate the patient's account provided that the potential fallacies involved are kept in mind. It is good policy to indicate in the case notes any uncorroborated information obtained by asking leading questions.

The principal symptoms must be thoroughly analyzed. Basically the doctor must be satisfied that accurate information has been obtained regarding the time and mode of onset of any important symptom, the circumstances in which it occurred, its duration and the existence of any ameliorating or aggravating factors. The relationship to other symptoms must be defined and a chronological account obtained of the development of the illness from the first symptom to the date of interview. If possible, exact dates should be recorded rather than vague statements such as 'last Saturday' or 'a few weeks ago'. It may be helpful to reproduce the symptoms and observe what happens; for example the patient who complains of breathlessness on exertion may be studied ascending stairs. If there is difficulty in describing a recurrent symptom of varying severity, the position may be clarified by asking for an account of the first or of the most severe attack. It is often useful to record negative findings, e.g. cough but no sputum, or breathlessness but no cough.

Elderly or ill patients easily tire during the initial history taking which should then be curtailed and completed later.

Systemic Enquiry. When a clear record has been obtained of the current complaint specific enquiries should be made about the presence or absence of cardinal symptoms suggestive of involvement of various systems. The student should compile a list of standard questions about the cardiovascular, respiratory, urogenital, alimentary, locomotor, endocrine and central nervous systems. In the cardiovascular system, for example, enquiry should be made about swelling of the ankles, palpitations, breathlessness when lying flat (orthopnoea), attacks of nocturnal dyspnoea, and chest pain and its relation to exercise. If a positive response is elicited then further questions will need to be asked, e.g. radiation of pain, and its severity,

duration, frequency and relief with medication. Such questions can be asked very quickly and enable a comprehensive systemic history to be taken and often reveal crucial information necessary for making a diagnosis or point to the presence of pathology unrelated to the presenting complaint.

RESPIRATORY SYSTEM

Cough, dyspnoea (breathlessness), sputum, bloody expectorations (haemoptysis), and chest pain are the principal manifestations of respiratory disease.

Cough

This is the most frequent symptom of respiratory disease. *Cough* is a complicated reflex act which is actually a defence reaction aimed at clearing the larynx, trachea, or bronchi from mucus or foreign material. It may be caused by stimuli arising in the mucosa of any part of the respiratory tract from the pharynx to the smaller bronchi. Stimuli arising in the parietal pleura may, on rare occasions, also produce cough, for example during the aspiration of a pleural effusion. The frequency, severity and character of cough are dependent on several factors including (a) the situation and nature of the lesion responsible for the cough, (b) the presence or absence of sputum and (c) coexisting abnormalities such as vocal cord paralysis, impairment of ventilatory function and pleural pain.

Types of Cough.

1. Cough produced by stimuli arising in the *pharyngeal mucosa* occurs in pharyngitis or may be caused by secretions trickling down the posterior pharyngeal wall from the nasal sinuses. It is typically a persistent cough, but may be paroxysmal.

2. Cough arising in the *larynx* has a harsh, barking quality and may be painful, especially in acute laryngitis. If a vocal cord is paralysed, a cough, whatever its site of origin, will lose its normal explosive force and will cease to be as effective in clearing the respiratory tract of secretion. Whooping-cough is characterised by prolonged severe paroxysms culminating in a long, stridulous, inspiratory whoop produced by laryngeal spasm.

3. Cough arising in the *trachea* is usually caused by tracheitis, in which it is harsh, dry and painful at first, becoming loose, productive and painless later. Cough caused by a malignant tumour partially obstructing the trachea is associated with stridor, persistent and at times severe and suffocating. Such patients may become deeply cyanosed and even unconscious during paroxysms of coughing.

4. Cough of several different types may be produced by stimulation of nerve endings in the *bronchial mucosa*.

Cough in *acute bronchitis* is often preceded or accompanied by transient wheeze and a feeling of diffuse tightness in the chest. In the early stages it sounds dry; later it becomes loose and productive usually of purulent sputum.

Cough in *chronic bronchitis* tends to occur in prolonged paroxysms, which usually culminate in the production of sputum. Bouts of coughing in these patients often produce severe dyspnoea, frequently accompanied by wheezing, and may be very distressing. When the sputum is very tenacious, however, or if there is serious

impairment of ventilatory function, the patient, exhausted by the effort of coughing, may abandon the attempt to clear the bronchi of secretions and the coughing comes to an indecisive stop. Cough in chronic bronchitis has other typical features. It is particularly frequent and severe when the patient retires to bed at night and, even more so, on getting up in the morning, because of sudden changes in posture and in the temperature and humidity of the inspired air. Sleep is seldom disturbed by coughing, but most patients with chronic bronchitis waken in the morning with a wheeze and a sensation of tightness in the chest. These symptoms do not improve until sputum is brought up by violent bouts of coughing which may continue for prolonged periods. Cough in chronic bronchitis is stimulated not only by changes in atmospheric temperature and humidity but also by bronchial irritants such as smoke, fumes or dust, and by the sudden increase in the depth of ventilation which occurs with exertion and laughter. Some patients may experience cough syncope during bouts of prolonged and violent coughing. When patients with chronic bronchitis develop Type II respiratory failure, cough becomes progressively more feeble and ineffective, and eventually the accumulation of secretions in the larynx and trachea gives rise to a so-called death rattle.

Prolonged paroxysms of coughing may also occur in patients with *chronic asthma*. The cough, which invariably aggravates the dyspnoea and wheeze, is less directly related to atmospheric conditions than the cough of chronic bronchitis and often wakens the patient in the middle of the night. Associated dyspnoea and wheeze may be wrongly attributed to left ventricular failure (p. 146).

In *bronchial carcinoma* cough may be an early and persistent symptom. At first it is a frequent short dry cough, but later may become more severe and distressing. If the bronchus is not completely occluded, pus may be coughed up.

Cough in *bronchiectasis*, uncomplicated by chronic bronchitis or asthma, is characteristically loose and readily productive of sputum. It may be brought on by changes in posture, e.g. by stooping if the bronchiectasis affects the lower lobes. Patients with severe unilateral bronchiectasis prefer to sleep on the affected side in order to prevent cough being stimulated by the dislodgement of sputum. Cough in *pneumonia* is dry and irritant at first, later becoming loose and productive. When pleural pain is present, cough is typically short and partially suppressed. Cough in *acute pulmonary oedema* secondary to left heart failure is generally short, persistent and exhausting. A similar type of cough may occur in *allergic* and *fibrosing alveolitis*.

Sputum

When a patient has sputum, information should be obtained as to amount, character, viscosity and taste or odour.

AMOUNT. This can seldom be accurately estimated by the patient although statements that it is very large (e.g. a teacupful per day) or very small (one or two spits per day) are usually reliable. If it is important to obtain precise information about the amount of sputum, the patient should be given a graduated container and a 24-hour collection measured. Some patients deny cough while admitting to the presence of sputum, saying that they bring it up merely by clearing the throat. A specific enquiry about sputum should, therefore, be made in every case. Most

children swallow their sputum, even when it is being produced in large amounts. The sound of the cough, if it is loose or moist, will, however, indicate that sputum is present.

CHARACTER. This is seldom described accurately by the patient and, wherever possible, a specimen should be inspected by the doctor. Apart from haemoptysis, there are four types of sputum — serous, mucoid, purulent and mucopurulent. *Serous* sputum, which is usually described by patients as clear and/or frothy, is seen in acute pulmonary oedema, in which it may acquire a pink colour through admixture with red blood cells, and in the rare condition of alveolar-cell carcinoma. *Mucoid* sputum, which is a characteristic feature of chronic bronchitis, is usually described by patients as grey, white, clear or sometimes black (when it contains soot particles). *Purulent* and *mucopurulent* sputum is usually described as yellow or green, but occasionally white sputum proves on inspection to be purulent. The term 'dirty spit' used by many patients is misleading as it may refer either to purulent sputum or to mucoid sputum containing soot particles. Mucoid sputum may be copious and frothy in some cases of chronic bronchitis and asthma. Hysterical patients may spit out large amounts of saliva which they claim to be sputum.

VISCOSITY. Mucoid sputum is often more viscous than purulent sputum and for that reason is often more difficult to cough up. Sputum is particularly viscous in the early stages of pneumococcal pneumonia and in severe asthma. Serous sputum is watery with a low viscosity.

TASTE OR ODOUR. When this is described as 'nasty' the patient may merely be referring to the normal taste of purulent sputum. Only when terms such as offensive, nauseating or putrid are used can it be assumed that the sputum is fetid (as in bronchiectasis or lung abscess with anaerobic bacterial infection). The observer's own sense of smell should be used to assess odour.

Haemoptysis

This occurs in many respiratory diseases (e.g. bronchial carcinoma and adenoma, pulmonary tuberculosis, bronchiectasis, pulmonary infarction), in certain cardiovascular diseases (e.g. mitral stenosis) and where there is a coagulation disorder or the patient is receiving anticoagulants. Occasionally no cause can be found for an episode of haemoptysis. The blood is bright red at first but may later become dark red. It is often frothy and may be mixed with sputum. Although most patients realise whether blood has been coughed up or vomited, haemoptysis is occasionally confused with haematemesis.

Whenever a history of haemoptysis is obtained, questions must be asked about its type, degree, frequency and duration. In some cases the events preceding it may be of importance in diagnosis, e.g. deep venous thrombosis in a lower limb or a respiratory infection.

TYPE AND DEGREE OF HAEMOPTYSIS. 1. *Frank haemoptysis*, in which the material coughed up consists wholly of blood, occurs most commonly in bronchiectasis, pulmonary infarction and tuberculosis. A rough estimate should be made of the amount of blood lost, bearing in mind that most patients tend to overestimate this.

2. *Blood-stained sputum*, in which the blood and sputum are intimately mixed in

various proportions, occurs in bronchial infections, suppurative pneumonia and bronchial carcinoma.

3. *Blood-streaked sputum*, in which streaks or specks of blood are present in mucoid or purulent sputum, is a fairly frequent symptom in bronchial carcinoma and chronic bronchitis.

4. *Rusty sputum*, in which degradation products of haemoglobin give the sputum a colour varying between rust and golden-yellow, is a common feature of pneumococcal pneumonia and occurs in few other conditions.

FREQUENCY AND DURATION OF HAEMOPTYSIS. With frank haemoptysis it is usual for the blood in the sputum to become progressively darker for 24 to 48 hours at least after the bleeding ceases. When, however, small amounts of fresh blood are coughed up frequently, either as frank haemoptysis or blood-stained sputum, for example daily for a week, the symptom strongly suggests a diagnosis of bronchial carcinoma. Regular blood-streaking of mucoid sputum, sometimes only in the mornings, should always raise the suspicion of bronchial carcinoma. Recurrent episodes of haemoptysis over many years, usually associated with purulent sputum, are a feature of bronchiectasis.

Dyspnoea

Dyspnoea (breathlessness), in its manifestation can be subjective, objective, or subjective and objective simultaneously. By subjective dyspnoea is understood the subjective feeling of difficult or laboured breathing. Objective dyspnoea is determined by objective examination and is characterized by changes in the respiration rate, depth, or rhythm, and also the duration of the inspiration or expiration. Diseases of the respiratory system are often accompanied by mixed (i.e. subjective and objective) dyspnoea. It is often associated with rapid breathing (tachypnoea). These symptoms occur in pneumonia, bronchogenic cancer, and in tuberculosis. Cases with purely subjective dyspnoea (in hysteria, thoracic radiculitis) or purely objective dyspnoea (in pulmonary emphysema or pleural obliteration) occur less frequently. Dyspnoea is possible with both normal and slow rate of breathing (bradypnoea). Three types of dyspnoea are differentiated by the prevalent breathing phase: inspiratory dyspnoea, expiratory dyspnoea and mixed dyspnoea when both expiration and inspiration become difficult.

Dyspnoea may be physiological (caused by heavy exercise) and pathological (associated with pathology of the respiratory organs, diseases of the cardiovascular and haemopoietic systems, and poisoning).

Dyspnoea associated with respiratory pathology may be of various aetiology. It can be caused by obstruction of the respiratory ducts, contraction of the respiratory surface of the lungs due to their compression by liquid or air accumulated in the pleural cavity, decreased pneumatization of the lung in pneumonia, atelectasis, infarction or decreased elasticity of the lungs. These conditions are associated with decreased total (vital) lung capacity and ventilation, which causes increased carbon dioxide content of blood, and acidosis of tissues due to accumulation in them of incompletely oxidized metabolites (lactic acid, etc.). The so-called alveolar-capillary block is also possible in some cases. This is associated with exudative and

proliferative inflammation of the interstitial tissue in interstitial pneumonia or lung oedema.

A mechanical obstruction in the upper respiratory ducts (larynx trachea) complicates and slows down passage of the air into the alveoli and causes inspiratory dyspnoea. When the trachea and a large bronchus are sharply contracted, both inspiration and expiration become difficult and noisy (stridulous respiration). Narrowed lumen in the fine bronchi and bronchioles due to inflammatory oedema and swelling of their mucosa, or else in spasms in the smooth muscles (bronchial asthma), interferes with normal air passage from the alveoli and the expiration becomes difficult. Expiratory dyspnoea thus develops. Pathological conditions caused by a significant decrease in the respiratory surface of the lungs are accompanied by mixed dyspnoea (transient or permanent). Respiration becomes superficial and painful in inflammation of the pleura. Pronounced mixed dyspnoea, often painful, with deep inspiration and expiration occurs in embolism or thrombosis of the pulmonary artery. The patient has to assume a forced, sometimes sitting posture (orthopnoea) to remove the discomfort. Heavy dyspnoea, often followed by asphyxia, is called suffocation. It occurs also in acute oedema of the lungs, bronchiolitis in children, and in fibrinous bronchitis. Asphyxia arising as a sudden attack is asthma. Bronchial asthma, in which an attack of dyspnoea occurs as a result of spasms of smaller bronchi and is accompanied by difficult, lengthy and noisy expiration, is differentiated from cardiac asthma which is secondary to left heart failure and is often accompanied by lung oedema with very difficult expiration.

BLOOD CIRCULATORY SYSTEM

Dyspnoea (breathlessness), chest pain, palpitation and oedema are the principal manifestations of heart disease.

Dyspnoea

Dyspnoea on effort is usually the first symptom of left heart failure. Exercise leads to increased venous return, and the relatively normal 'right side of the heart' (right atrium and ventricle and the tricuspid and pulmonary valves) transmits this increase through the pulmonary circulation. In the presence of left heart failure the result is pulmonary venous congestion. This stimulates fine nerve endings around the terminal alveoli, and causes a sensation of breathlessness. At the same time, pulmonary interstitial oedema begins to develop. When exercise is stopped, venous return diminishes, congestion subsides and dyspnoea is relieved. Very occasionally severe unaccustomed exercise in the presence of incipient left heart failure leads to progressive pulmonary oedema.

Paroxysmal nocturnal dyspnoea is a characteristic symptom of left heart failure. It is traditionally attributed to a rise in venous pressure as the patient slips down the pillows to a more recumbent position during the night's sleep. This may be an oversimplification. Paroxysmal nocturnal dyspnoea requires a special search for a cause of increased left ventricular work, such as hypertension or aortic stenosis. In the absence of such a cause it is usually an indicator of disease of the left ventricle. Paroxysmal nocturnal dyspnoea is a rare symptom in mitral stenosis, except during pregnancy or at the onset of atrial fibrillation. The drop in pulse rate during sleep

may help left heart function in mitral stenosis, and, in patients with chronic mitral valve disease, thickening of the alveolar walls and dilatation of the pulmonary lymphatics may protect against pulmonary oedema. Abrupt blockage of the mitral valve by left atrial thrombus or a left atrial myxoma may also cause paroxysmal nocturnal dyspnoea, but this is very rare.

Breathlessness demanding the upright position, *orthopnoea*, when due to heart disease, is a symptom of persistent pulmonary oedema and indicates that the heart disease is advanced. With improvements in therapy it is now much less commonly seen. In attacks of *acute pulmonary oedema* there is persistent severe breathlessness of sudden onset, accompanied usually by coughing and, generally, considerable alarm. Unless treatment is prompt and effective, the cough, initially repetitive and unproductive, may produce copious watery, frothy and often blood-tinged sputum.

Pain

Angina Pectoris. This term was originally used by Heberden in 1772 to describe a characteristic chest pain occurring on exertion which we now know to be the principal symptom of myocardial ischaemia. By extension, the term angina is also used for pain caused by myocardial ischaemia under other circumstances, for example during coronary artery spasm, but 'angina' without further qualification generally means angina of effort. Typical attacks of angina provoked by less and less exertion, and/or attacks of chest pain like angina occurring at rest with increasing frequency, constitute the syndrome of *crescendo angina*, which may precede myocardial infarction. Since angina is frequently the sole symptom, and often unaccompanied by abnormal physical signs, it must be evaluated precisely.

SITE. In describing the symptom the patient often places both hands on the chest with fingers meeting on the lower sternum, or presses the palm or a clenched fist there.

RADIATION. A feeling of heaviness or uselessness in one arm, usually the left, or both arms often accompanies the sensation in the chest. Aching in the wrists, or in the jaw or neck, and less often in the back of the chest may be volunteered or elicited. Any of these places of reference may be involved without discomfort in the chest, and the relationship to exertion is then the indication that the pain is probably of cardiac origin.

CHARACTER. The pain is characteristically like a tight band round the chest, or a feeling of constriction or heaviness. The description depends so much on the personality of the patient that other features are more reliable, such as the circumstances under which the symptom occurs and the gestures which the patient uses. The pain is often attributed wrongly to indigestion. The patient may describe the sensation as a discomfort rather than a pain or may regard it as a form of breathlessness.

SEVERITY AND DURATION. Cardiac pain produced by exertion usually begins at about the same place in the course of a regular walk. It generally demands a rest, or the adoption of a slower pace, so that the patient does not allow it to become severe. With rest the pain usually disappears in two or three minutes. Sometimes a 'second wind' effect occurs — for example a patient who develops mild angina during the

first hole of a game of golf may not have it subsequently despite encountering steeper hills.

AGGRAVATING FACTORS. Walking uphill, particularly in a cold wind, or exercise after meals is often noted as likely to result in angina pectoris, or to bring it on more easily. Angina pectoris is often produced by excitement, stress or fear. Boxing matches on television, sexual intercourse, or outbursts of rage may provoke it. In some patients angina occurs mainly at night, sometimes in association with vivid dreams (including those induced by beta-blocker therapy). Angina pectoris can be exacerbated by anaemia, obesity or hyperthyroidism; in some cases it may be a symptom of aortic stenosis, hypertrophic cardiomyopathy or syphilitic aortitis.

Patients with coronary artery disease and incipient left ventricular failure may get angina on lying flat — *decubitus angina*. Pain which is typical of angina in site and character, but not related to effort nor a symptom of acute myocardial infarction is often attributed to coronary artery spasm. Such pain is sometimes called *variant* or *Prinzmetal angina*. Coronary artery spasm is very difficult to confirm by any technique short of coronary angiography and is much more common in cigarette smokers.

RELIEVING FACTORS. Pain persisting significantly longer than about five minutes after the end of exercise is very unlikely to be angina pectoris. A sense of time, however, is not always reliable, especially in the presence of pain, and severe pain may seem to last for several minutes whereas its true duration is much shorter.

Oedema

Venous congestion in the greater circulation occurs in severe heart diseases. The patients would complain of oedema, which first develops only in the evening and resolves during the night sleep. Oedema occurs mostly in the malleolus region and on the dorsal side of the foot; shins are then affected. In graver cases when fluid is accumulated in the abdominal cavity (ascites) the patient would complain of heaviness in the abdomen and its enlargement. Heaviness most commonly develops in the right hypochondrium due to congestion and enlargement of the liver. In rapidly developing congestion, pain is felt in this region due to distention of the liver capsule. Patients may complain also of poor appetite, nausea, vomiting, and swelling of the abdomen. These symptoms are associated with disordered blood circulation in the abdominal organs. The renal function is upset for the same reason and diuresis decreases.

Patients with cardiovascular pathology often have dysfunction of the central nervous system, which is manifested by weakness, rapid fatigue, decreased work capacity, increased excitability, and deranged sleep. Complaints of headache, nausea, noise in the ears or the head are not infrequent in essential hypertension patients.

Some heart diseases (myocarditis, endocarditis, etc.) are attended by elevated (usually subfebrile) temperature; sometimes high fever may occur. The patient should be asked about the time of the day when the temperature usually rises, how long it persists and if this rise is accompanied by chills, profuse sweating, etc.

DIGESTIVE SYSTEM

Heartburn (eructation)

Heartburn is otherwise known as *belching*, i.e. burning pain in the retrosternal region. Heartburn arises in gastro-oesophageal reflux, mostly in the presence of gastric hyperacidity in various diseases of the alimentary tract (e.g. peptic ulcer or cholecystitis), hiatus hernia, and sometimes in pregnancy. Heartburn in healthy subjects can be due to hypersensitivity to some foods.

Nausea

Nausea, the reflectory act associated with irritation of the vagus nerve, is an indefinite feeling of sickness and sensation of compression in the epigastrium. Nausea is often attended by pallidness of the skin, general weakness, giddiness, sweating, salivation, fall in the arterial pressure, cold in the limbs, and sometimes semisyncopal state. Nausea often (but not necessarily) precedes vomiting. The mechanism of nausea is not known. Its frequent association with vomiting suggests that it might be the early sign of stimulation of the vomiting centre. The leading role in the development of nausea is given to the nervous system and also the tone of the stomach, the duodenum, and the small intestine. Nausea may develop without any connection with diseases of the stomach, e.g. in toxæmia of pregnancy, renal failure, deranged cerebral circulation, and sometimes in healthy people in the presence of foul odour (or in remembrance of something unpleasant). Some diseases of the stomach are attended by nausea, e.g. acute and chronic gastritis or cancer of the stomach. Nausea associated with gastric pathology usually occurs after meals, especially after taking some pungent food. Nausea often develops in secretory insufficiency of the stomach.

Vomiting

Vomiting (emesis) occurs due to stimulation of the vomiting centre. This is a complicated reflex through the oesophagus, larynx and the mouth (sometimes through the nose as well). Vomiting may be caused by ingestion of spoiled food, by seasickness, or irritation arising inside the body (diseases of the gastro-intestinal tract, liver, kidneys, etc.). In most cases vomiting is preceded by nausea and sometimes hypersalivation. Factors causing the vomiting reflex are quite varied. This can be explained by the numerous connections that exist between the vomiting centre (located in the medulla oblongata, in the inferior part of the floor of the 4th ventricle) and all bodily systems. Depending on a particular causative factor, the following can be differentiated: (1) nervous (central) vomiting; (2) vomiting of visceral aetiology (peripheral or reflex); (3) haematogenic and toxic vomiting.

Vomiting is an important symptom of many diseases of the stomach, but it can be regarded as the symptom of a particular disease only in the presence of other signs characteristic of this disease. Vomiting of gastric aetiology is caused by stimulation of receptors in the gastric mucosa by inflammatory processes (acute or chronic gastritis), in ingestion of strong acids or alkalis, or food acting on the gastric receptors by chemical (spoiled food) or physical (overeating or excessively cold food) routes. Vomiting can also be caused by difficult evacuation of the stomach due to spasms or stenosed pylorus.

If the patient complains of vomiting, the physician should inquire about the time when the vomiting occurred, possible connections with meals, association with pain,

the amount and character of the vomited material. Morning vomiting (on a fasting stomach) with expulsion of much mucus is characteristic of chronic gastritis, especially in alcoholics. Hyperacid vomiting in the morning indicates nocturnal hypersecretion of the stomach. Vomiting occurring 10—15 minutes after meals suggests ulcer or cancer of the cardial part of the stomach, or acute gastritis. If vomiting occurs 2—3 hours after meals (during intense digestion) it may indicate ulcer or cancer of the stomach body. In the presence of ulcer of the pylorus or duodenum, vomiting occurs 4—6 hours after meals. Expulsion of food taken a day or two before is characteristic of pyloric stenosis. Patients with peptic ulcer often vomit at the height of pain thus removing it, which is typical of the disease. The odour of the vomit is usually acid, but it can often be fetid (putrefactive processes in the stomach); the odour may be even faecal (in the presence of a faecal fistula between the stomach and the transverse colon).

The vomited material may have acid reaction (due to the presence of hydrochloric acid, in hyperchlorhydria), neutral (in achylia), or alkaline (in the presence of ammonia compounds, in pyloric stenosis, hypofunction of renal function, and also in regurgitation of the duodenal contents into the stomach). Vomitus may contain materials of great diagnostic importance, e.g. blood, mucus (in chronic gastritis), ample bile (narrowing of the duodenum, gastric achylia), and faecal matter. Vomiting may attend acute gastritis, exacerbation of chronic gastritis, gastric neurosis, peptic ulcer, spasm and organic stenosis of the pylorus, and cancer of the stomach.

Pain

Pain is the leading symptom in diseases of the stomach. Epigastric pain is not obligatory connected with diseases of the stomach. It should be remembered that the epigastrium is the "site of encounter" of all kinds of pain. Epigastric pain may be due to diseases of the liver, pancreas, and due to hernia of the linea alba. Epigastric pain may develop in diseases of other abdominal organs (sometimes of organs located outside the abdomen) by the viscerovisceral reflex (acute appendicitis, myocardial infarction, affection of the diaphragmatic pleura, etc.). In order to locate correctly the source of pain, the physician should ask the patient (1) to show exactly the site of pain; (2) to characterize the pain which may be periodical or paroxysmal (at certain time of the day); permanent or seasonal (in spring or autumn); (3) to describe the connection (if any) between pain and meals, the quality of food and its consistency; (4) to indicate possible radiation of pain (into the back, shoulder blade, behind the sternum, left hypochondrium); (5) to describe conditions under which pain lessens (after vomiting, after taking food or baking soda, after applying hot-water bottle or taking spasmolytics); (6) to describe possible connections between pain and physical strain (weight lifting, traffic jolting, etc.), or strong emotions. Intensity and character of pain are also important diagnostically. The pain may be dull, stabbing, cutting, etc. Pain in hollow organs with smooth muscles (e.g. stomach) is provoked by spasms (spastic pain), distension of the organ (distensional pain), and by its motor dysfunction.

Paroxysmal, periodical epigastric pain is due to the spasm of the pyloric muscles. It arises under the influence of strong impulses arriving from the vagus nerve centre

in cerebral cortex dysfunction. The spasm of the pylorus is stimulated by the hyperacidity of gastric juice due to hyperstimulation of the vagus. Depending on the time of paroxysmal pain (after meals), it may be early (occurring 30-40 min after meals), late (90-120 min after meals), nocturnal, and hunger pain (which is abated after taking food). If pain occurs after meals stimulating secretion of gastric juice (bitter, pungent, spicy or smoked foods), this indicates the leading role of hypersecretion in its aetiology. The pain then localizes in the epigastrium, radiates to the back, and is rather intense; it is abated after vomiting and taking alkali or foods that decrease acidity of gastric juice, and also after taking antispastic preparations and applying hot-water bottle (which removes spasms).

A seasonal character of pain, i.e. development of periodic pain during spring and autumn, is characteristic of peptic ulcer, especially if the process is localized in the peripyloric region. Permanent boring pain is usually caused by stimulation of the nerve elements in the mucous and submucous layer of the stomach; the pain is usually intensified after meals and is characteristic of exacerbation of chronic gastritis or cancer of the stomach.

Pain. If the patient complains of pain in the abdomen, the following should be established: location of pain, its radiation, intensity, character, duration, and means by which it is lessened. The general signs by which intestinal pain may be differentiated from gastric one are: (1) absence of regular dependence of pain on food taking; the only exception is inflammation in the transverse colon (transversitis): pain develops immediately after meals; the pathogenesis of this pain is connected with reflex peristaltic contractions of the transverse colon when food enters the stomach; (2) close association of pain with defaecation: pain occurs before, during, and (rarely) after defaecation; (3) pain relief after defaecation or passage of gas.

Pain may be boring and spasmodic (intestinal colic). Colicky pain is characterized by short repeated attacks which arise and disappear quite of a sudden. Pain may very quickly change its location, the main site being round the navel. Sometimes pain may arise in other areas of the abdomen. Boring pain is sometimes permanent; it intensifies during cough, especially if the mesenterium or peritoneum are involved. Pain is characteristic of inflammatory diseases of the intestine. As inflammation extends onto the peritoneum, pain is attended by a pronounced muscular defence.

Exact location of the source of pain is very important. Pain in the right iliac region occurs in appendicitis, tuberculosis, cancer, or inflammation of the caecum (typhlitis). Acute pain in the left lower abdomen occurs in intestinal obstruction and inflammation of the sigmoid (sigmoiditis). Pain in the umbilical region occurs in inflammation of small intestine (enteritis) and inflammation or cancer of the colon. Pain in the perineal region, and especially during defaecation (with the presence of blood in faeces), is characteristic of the rectum diseases (proctitis, cancer). Pain in intestinal pathology may radiate into the chest; pain associated with affection of the spleen angle of the descending large intestine radiates into the left side of the chest (it is sometimes mistaken for pain attacks of angina pectoris); colics of appendicitic origin radiate into the right leg.

In acute affection of the left portions of the large intestine (dysentery), pain radiates into the sacral area. Thermal procedures, spasmolytics, passage of gas, and emptying of the bowels can relieve pain or remove it completely.

Intestinal pain is caused by obstruction of intestinal patency and upset motor function. Intestinal pain is mostly caused by spasms (spasmodic contraction of smooth muscles; hence spastic pain), or by distension of the intestine by gases. Both mechanisms often become involved.

Spastic pain can be due to various causes. Individual predisposition to spastic contractions in general (vegetoneurosis) may be as important as irritation originating in the intestine proper, e.g. in enteritis, colitis, intestinal tumour, poisoning with arsenic or lead, and also in diseases of the central nervous system (posterior spinal sclerosis).

Pain arising due to intestinal distension by gases, and associated with tension and irritation of the mesentery, differs from spastic pain (1) by the absence of periodicity; it is long-standing and gradually lessens in prolonged inflation; and (2) by exact localization. In intestinal obstruction (complete or partial) colicky pain is combined with almost permanent pain in the abdomen. It is characterized by exact and permanent location (the umbilical region and large intestine). The pain intensifies with intestinal peristalsis.

Gastric bleeding

Gastric bleeding is a very important symptom. It can be manifested by vomiting of blood (haematemesis) or by black tarry stools (melaena). Gastric haemorrhage is usually manifested by the presence of blood in the vomitus. The colour of the vomitus depends on the time during which the blood is present in the stomach. If the blood was in the stomach for a long time, the blood reacts with hydrochloric acid of the gastric juice to form haematin hydrochloride. The vomitus looks like coffee grounds. If haemorrhage is profuse (damage to a large vessel) the vomitus contains much scarlet (unaltered) blood. Haematemesis occurs in peptic ulcer, cancer, and polyps, in erosive gastritis, rarely in sarcoma, tuberculosis and syphilis of the stomach, and in varicosity of the oesophageal veins. Tarry stools are not an obligatory sign of gastric haemorrhage.

The main complaints with intestinal diseases are pain, meteorism (inflation of the abdomen), motor dysfunction of the intestine (constipation and diarrhoea), and intestinal haemorrhage.

Flatulence

Flatulence. The patient feels flatulence, inflation, and boring distension of the abdomen. The causes of meteorism are (1) excessive gas formation in the intestine due to ingestion of vegetable cellular tissue and easily fermented food (peas, beans, cabbage, etc.); (2) intestinal motor dysfunction due to decreased tone of the intestinal wall or intestinal obstruction; (3) lowered absorbability of gases by the intestinal wall, the process of gas formation being normal; (4) aerophagia, i.e. excess swallowing of air, with its subsequent propulsion to the stomach and the intestine; (5) hysterical meteorism: the abdomen is rapidly inflated to the size of the abdomen of a pregnant woman at her last weeks; this nervous mechanism is very complicated.

When inquiring the patient, the physician should ask about the character of his nutrition and the site of abdomen inflation (the entire abdomen or only its limited part may be inflated). If inflation is local, it is necessary to ask the patient whether or not inflation occurs always at one and the same area. In intestinal obstruction, the patient feels rumbling sounds inside the abdomen, feels movement of liquid in the intestine, and intense peristaltic movements above the point of obstruction.

Diarrhoea

Diarrhoea. Frequent and liquid stools is a common sign of intestinal pathology. Diarrhoea occurs in acute and chronic intestinal infections (enteritis, enterocolitis, sigmoiditis, proctitis), in various exogenous intoxications (poisoning with arsenic or mercury), endogenous intoxications (uraemia, diabetes, gout), in endocrine disorders (adrenal dysfunction, thyrotoxicosis), and in hypersensitivity to some foods (allergy).

The mechanism of diarrhoea is very complicated. Different pathogenic factors may prevail in various pathological conditions. Accelerated movement of the liquefied food in the intestine due to peristalsis is among them. Almost undigested food can thus be evacuated. Another factor is disordered absorptive function of the intestine. Affection of the intestinal wall, disordered mechanisms regulating absorption, purgatives and upset water metabolism produce a marked change in the absorption process and are the cause of diarrhoea.

The third cause of liquid stools is inflammation of the intestine. Large quantities of inflammatory secretion stimulating the intestinal receptors are released into the lumen of the intestine to intensify its peristalsis and to impair its absorptive function.

Paradoxical diarrhoea occurs in prolonged constipation due to mechanical irritation of the intestinal wall by hard faecal masses.

Upset equilibrium between the fermentative and putrefactive flora of the intestine is another important factor in the aetiology of diarrhoea. If fermentative flora prevails, *fermentative dyspepsia* occurs which is characterized by flatulence of the abdomen and semiliquid acid faeces (2—3 stools a day); the faeces contain numerous gas bubbles, numerous starch grains, vegetable cellular tissue, and iodophilic microbes. Fermentative dyspepsia develops in connection with deranged digestion of carbohydrates, if they are ingested in excess.

Putrid dyspepsia more often occurs in secretory hypofunction of the stomach. The absence of bactericidal action of gastric juice is connected with the absence of hydrochloric acid; rapid passage of insufficiently digested food from the stomach to the intestine has a negative effect in the first instance on digestion of proteins. This in turn provokes putrid dyspepsia. It is characterized by liquid dark excrements containing clots of undigested food; the faeces react alkaline and have a foul putrid smell. Microscopy of faeces reveals much fats, muscular fibres with vivid transverse and longitudinal striation and even ends (creatorrhoea). The content of organic compounds in the faeces is increased. The iodophilic flora is absent.

Diarrhoea occurring in organic affections of the large intestine is mostly of the inflammatory character. It is not copious, nor does it produce strong negative effect

on the patient's general condition (as compared with affections of the small intestine which is attended by profuse diarrhoea associated with deranged motor and absorption function of the intestine). The pronounced disorder in digestion causes some metabolic disorders in the patient (impaired absorption of proteins, iron, vitamins, and electrolytes).

Constipation.

Constipation occurs when faeces are long retained in the intestine (for more than 48 hours). But the duration of constipation is only relative, because in many cases it is not the result of pathology but of the living conditions and nutrition. If vegetable food dominates in the diet, the subject may defaecate two or three times a day. Stools become rarer if the diet is rich in meat. A radical change in nutrition can remove constipation. Limited mobility of the subject, hunger, and irregular defaecations (during the day) may prolong pauses between defaecation. The main factor determining defaecation is the condition of intestinal motor function. Bowel contents are retained in the large intestine and the rectum during constipation. Organic and functional constipation is differentiated. Organic constipation is usually associated with mechanical obstruction, such as narrowing of the intestinal lumen due to a tumour, scar, adhesion, and also abnormalities in the intestine (megacolon, dolichosigmoid, megasigmoid, diverticulosis).

Dyspepsia (Indigestion).

Dyspepsia includes decreased appetite, often bitter taste in the mouth, eructation, nausea, vomiting, flatulence, constipations or diarrhoea. These complaints are characteristic not only of diseases of the hepatobiliary system but also of other parts of the digestive system. Causes of these symptoms in diseases of the liver and bile ducts are explained by deranged secretion of bile (and hence impaired digestion of fats in the intestine) and derangement of the detoxicating function of the liver.

URINARY SYSTEM

Patients with diseases of the kidneys most commonly complain of pain in the lumbar region, disordered urination, oedema, headache, and dizziness. They may also complain of deranged vision, pain in the heart, dyspnoea, absence of appetite, nausea, vomiting, and elevated body temperature. But diseases of the kidneys may also proceed without any symptoms of renal or general clinical insufficiency.

If the patient complains of *pain*, its location should first of all be determined. Pain of renal origin often localizes in the lumbar region. If the ureters are affected, the pain is felt by their course. If the bladder is involved, pain is suprapubical. Radiation of pain into the perineal region is characteristic of an attack of nephrolithiasis.

The character of pain should then be determined. It is necessary to remember that the renal tissue is devoid of pain receptors. The pain is felt when the capsule or the pelvis is distended. Dull and boring pain in the lumbar region occurs in acute glomerulonephritis, abscess of the perirenal cellular tissue, in heart decompensation ("congestive kidney"), in chronic pyelonephritis (usually unilateral) and less frequently in chronic glomerulonephritis. Pain arises due to distension of the renal

capsule because of the inflammatory or congestive swelling of the renal tissue. Sharp and suddenly developing pain on one side of the loin can be due to the renal infarction. The pain persists for several hours or days and then subsides gradually. The pain is rather severe in acute pyelonephritis: inflammatory oedema of the ureter interferes with the normal urine outflow from the pelvis and thus causes its distension. The pain is usually permanent. Some patients complain of attacks of severe piercing pain in the lumbar region or by the course of the ureter. The pain increases periodically and then subsides, i.e. has the character of *renal colic*. Obstruction of the ureter by a calculus or its bending (movable kidney) is the most common cause of this pain, which is usually attended by spasmodic contraction of the ureter, retention of the urine in the pelvis, and hence its distension. The spasmodic contractions and distension of the pelvis account for the pain. Pain in renal colic is usually unilateral. It radiates into the corresponding hypochondrium and most frequently by the course of the ureter to the bladder and to the urethra. This radiation of pain is explained by the presence of nerve fibres (carrying the impulses from kidneys, ureters, sex organs and the corresponding skin zones) in the immediate vicinity of the relevant segments of the spinal cord (D_X - D_{XII} and L_r - L_n). This facilitates propagation of the excitation. Patients with renal colic (like those with colic of other aetiology) are restless; they toss in bed. Patients with severe pain of other aetiology would usually lie quiet in their beds (movements may intensify the pain).

The conditions promoting pain should be established. For example, pain in nephrolithiasis can be provoked by taking much liquid, jolting motion, or the like; pain is provoked by urination in cystitis. Difficult and painful urination is observed in stranguria. Patients with urethritis feel a burning pain in the urethra during or after urination.

It is necessary also to establish the agent that lessens or removes the pain. For example, atropine sulphate, hot water-bottle or warm bath help in renal colic. Since these remedies only help in spasmodic pain by removing spasms of the smooth muscles, their efficacy in renal colic confirms the leading role of the ureter contraction in the pathogenesis of this pain. Pain of the renal colic-type in patients with movable kidney may lessen with changing posture: urine outflow improves with displacement of the kidney. Pain slightly lessens in patients with acute paranephritis if a bag with ice is placed on the lumbar region and if the patient is given amidopyrine or other analgesics.

Many renal diseases are attended by deranged micturition: changes in the daily volume of excreted urine and in the circadian rhythm of urination.

Secretion of urine during a certain period of time is called *diuresis*. Diuresis can be positive (the amount of urine excreted exceeds the volume of liquid taken) or negative (the reverse ratio). Negative diuresis is observed in cases of liquid retention in the body or its excess excretion through the skin, by the lungs (e.g. in dry and hot weather). Positive diuresis occurs in resolution of oedema, after administration of diuretics, and in some other cases. Deranged excretion of urine is called *disuria*.

Increased amount of excreted urine (over 2 liters a day) is called polyuria. It can be of renal and extrarenal aetiology. Polyuria is observed in persons who take much liquid, during resolution of oedema (cardiac or renal), and after taking diuretics.

Long-standing polyuria with a high relative density of urine is characteristic of diabetes mellitus. In this case polyuria arises due to a deranged resorption of water in renal tubules because of increased osmotic pressure of the urine rich in glucose. Polyuria occurs in diabetes insipidus because of insufficient supply of antidiuretic hormone secreted into blood by the posterior pituitary. Polyuria also occurs in the absence of sensitivity of the tubules to the ADH, in affected interstice of the renal medulla of various nature, in hypokalaemia, and hypo- and hypercalcaemia.

Persistent polyuria with low specific gravity of urine (hyposthenuria) is usually a symptom of a severe renal disease, e.g. chronic nephritis, chronic pyelonephritis, renal arteriosclerosis, etc. Polyuria in such cases indicates the presence of a neglected disease with renal insufficiency and decreased reabsorption in renal tubules.

Decreased amount of excreted urine (less than 500 ml a day) is called *oliguria*. It can be not connected directly with renal affections (extrarenal oliguria). For example, it can be due to limited intake of liquid, during staying in a hot and dry room, in excessive sweating, intense vomiting, profuse diarrhoea, and during decompensation in cardiac patients. But in certain cases oliguria is the result of diseases of the kidneys and the urinary ducts (renal oliguria), such as acute nephritis, acute dystrophy of the kidneys in poisoning with corrosive sublimate, etc.

A complete absence of urine secretion and excretion is called *anuria*. Anuria persisting for several days threatens with possible development of uraemia and fatal outcome. Anuria may be caused by the deranged secretion of urine by the kidneys (secretory anuria) which occurs in severe form of acute nephritis, nephronecrosis (poisoning with sublimate or other nephrotoxic substances), transfusion of incompatible blood, and also some general diseases and conditions such as severe heart failure, shock, or profuse blood loss.

In certain cases the secretion of urine is normal but its excretion is obstructed mechanically (obstruction of the ureters or the urethra by a calculus, inflammatory oedema of the mucosa, proliferation of a malignant tumour). This is called excretory anuria. It is usually attended by strong pain in the loin and the ureters due to distension of the renal pelvis and the ureters. Excretory anuria is often attended by renal colic.

Renal (secretory) anuria can be of reflex origin, e.g. in severe pain (contusion, fractures of the extremities, etc). Anuria should be differentiated from *ischuria*, when the urine is retained in the bladder and the patient is unable to evacuate it. This occurs in compression or other affection of the spinal cord, and in loss of consciousness.

Pollakiuria (frequent micturition) is observed in certain cases. A healthy person urinates from 4 to 7 times a day. The amount of excreted urine during one micturition is from 200 to 300 ml (1000-2000 ml a day). But frequency of micturition may vary within wider range under certain conditions: it may decrease in limited intake of liquid, after eating much salted food, in excessive sweating, in fever, and the like, or the frequency may increase (polyuria) if the person takes much liquid, in getting cold, and the like circumstances. Frequent desire to urinate with excretion of meagre quantity of urine is the sign of cystitis. A healthy person urinates 4-7 times during the day time; a desire to urinate during night sleep does not arise more than once. In the

presence of pollakiuria the patient feels the desire to urinate during both day and night. In the presence of chronic renal insufficiency and if the kidneys are unable to control the amount and concentration of excreted urine in accordance with the amount of liquid taken, physical exertion, the ambient temperature, or other factors important for the liquid balance in the body, the patient urinates at about equal intervals with evacuation of about equal portions of urine. This condition is called *isuria*.

Under certain pathological conditions, the frequency of urination is normal during the day time but increases during night. The amount of urine excreted during night often exceeds the amount of daily urine (*nycturia*). Nocturnal enuresis (*nycturia*) and oliguria during day time occur in cardiac decompensation and are explained by a better renal function at night, i.e. at rest (*cardiac nycturia*). *Nycturia* may concur with polyuria in renal dysfunction, at the final stage of chronic glomerulonephritis, chronic pyelitis, vascular nephrosclerosis, and other chronic renal diseases (*renal nycturia*). In the presence of *isuria* and *nycturia* of renal origin, which arise due to the loss by the kidneys of their concentrating ability, the specific gravity of the urine is monotonous. The condition is known as *isosthenuria*. The specific gravity of urine is usually decreased (*hyposthenuria*). The specific gravity of urine varies from 1.009 to 1.011, i.e. approaches the specific gravity of primary urine (plasma ultrafiltrate) in patients with pronounced nephrosclerosis, which is the final stage of many chronic renal diseases.

Some diseases of the bladder and the urethra are attended by difficult and painful urination. The patient would complain of change in the colour of the urine, its cloudiness, and traces of blood.

Oedema is observed in acute and chronic diffuse glomerulonephritis, nephrotic syndrome, amyloidosis, and acute renal excretory dysfunction (*anuria*). It is important to ask the patient about the site that was the first to be attacked by oedema, the sequence of oedema spreading, and the rate of intensification of this phenomenon.

General Inspection

Despite the many instrumental and laboratory tests available at the present time, general inspection of the patient (*inspectio*) has remained an important diagnostic procedure for any medical specialist. The patient's condition on the whole can be assessed and a correct diagnosis can sometimes be made at "first sight" (*acromegaly*, *toxic goitre*, etc.). Pathological signs revealed during inspection of the patient are of great help in collecting an anamnesis and in further studies. In order to make the best possible inspection, the following special rules should be followed, which concern illumination during inspection, its technique and plan.

Illumination. The patient should be examined in the daytime, because electric light will mask any yellow colouring of the skin and the sclera. In addition to direct light, which outlines the entire body and its separate parts, side light will also be useful to reveal pulsation on the surface of the body (the apex beat), respiratory movements of the chest, peristalsis of the stomach and the intestine.

Inspection technique. The body should be inspected by successively uncovering the patient and examining him in direct and side light. The trunk and the chest are better examined when the patient is in a vertical posture. When the abdomen is examined, the patient may be either in the erect (upright) or supine (dorsal) position. The examination should be carried out according to a special plan, since the physician can miss important signs that otherwise could give a clue for the diagnosis (e.g. liver palm or spider angiomas which are characteristic of cirrhosis of the liver).

The entire body is first inspected in order to reveal general symptoms. Next, separate parts of the body should be examined: the head, face, neck, trunk, limbs, skin, bones, joints, mucosa, and the hair cover. The general condition of the patient is characterized by the following signs: consciousness and the psyche, posture and body-built.

Consciousness. It can be clear or deranged. Depending on the degree of disorder, the following psychic states are differentiated.

1. Stupor. The patient cannot orient himself to the surroundings, he gives delayed answers. The state is characteristic of contusion and in some cases poisoning.

2. Sopor. This is an unusually deep sleep from which the patient recovers only for short periods of time when called loudly, or roused by an external stimulus. The reflexes are preserved. The state can be observed in some infectious diseases and at the initial stage of acute uraemia.

3. Coma. The comatose state is the full loss of consciousness with complete absence of response to external stimuli, with the absence of reflexes, and deranged vital functions. The causes of coma are quite varied but the loss of consciousness in a coma of any aetiology is connected with the cerebral cortex dysfunction caused by some factors, among which the most important are disordered cerebral circulation and anoxia. Oedema of the brain and its membranes, increased intracranial pressure, effect of toxic substances on the brain tissue, metabolic and hormone disorders, and also upset acid-base equilibrium are also very important for the onset of coma. Coma may occur suddenly or develop gradually, through various stages of consciousness disorders. The period that precedes the onset of a complete coma is called the precomatose state. The following forms of coma are most common.

Alcoholic coma. The face is cyanotic, the pupils are dilated, the respiration shallow, the pulse low and accelerated, the arterial pressure is low; the patient has alcohol on his breath.

Apopleptic coma (due to cerebral haemorrhage). The face is red, breathing is slow, deep, noisy, the pulse is full and rare.

Hypoglycaemic coma can develop during insulin therapy for diabetes.

Diabetic (hyperglycaemic) coma occurs in non-treated diabetes mellitus.

Hepatic coma develops in acute and subacute dystrophy and necrosis of the liver parenchyma, and at the final stage of liver cirrhosis.

Uraemic coma develops in acute toxic and terminal stages of various chronic diseases of the kidneys.

Epileptic coma. The face is cyanotic, there are clonic and tonic convulsions, the tongue is bitten. Uncontrolled urination and defaecation. The pulse is frequent, the eye-balls are moved aside, the pupils are dilated, breathing is hoarse.

4. Irritative disorders of consciousness may also develop. These are characterized by excitation of the central nervous system in the form of hallucinations, delirium (delirium furibundum due to alcoholism; in pneumonia, especially in alcoholics; quiet delirium in typhus, etc.).

General inspection can also give information on other psychic disorders that may occur in the patient (depression, apathy).

Posture of the patient. (*patient position abed*). It can be active, passive, or forced.

The patient is *active* if the disease is relatively mild or at the initial stage of a grave disease. The patient readily changes his posture depending on circumstances. But it should be remembered that excessively sensitive or alert patients would often lie in bed without prescription of the physician.

Passive posture is observed with unconscious patients or, in rare cases, with extreme asthenia. The patient is motionless, his head and the limbs hang down by gravity, the body slips down from the pillows to the foot end of the bed.

Forced posture is often assumed by the patient to relieve or remove pain, cough, dyspnoea. For example, the sitting position relieves orthopnoea: dyspnoea becomes less aggravating in cases with circulatory insufficiency. The relief that the patient feels is associated with the decreased volume of circulating blood in the sitting position (some blood remains in the lower limbs and the cerebral circulation is thus improved). Patients with dry pleurisy, lung abscess, or bronchiectasis prefer to lie on the affected side. Pain relief in dry pleurisy can be explained by the limited movement of the pleural layers when the patient lies on the affected side. If a patient with lung abscess or bronchiectasis lies on the healthy side, coughing intensifies because the intracavitary contents penetrate the bronchial tree. And quite the reverse, the patient cannot lie on the affected side if the ribs are fractured because pain intensifies if the affected side is pressed against the bed. The patient with cerebrospinal meningitis would usually lie on his side with his head thrown back and the thighs and legs flexed on the abdomen. Patients with angina pectoris and intermittent claudication prefer to stand upright. The patient is also erect (standing or sitting) during attacks of bronchial asthma. He would lean against the edge of the table or the chair back, with the upper part of the body slightly inclined forward. Auxiliary respiratory muscles are more active in this posture. The supine posture is characteristic of strong pain in the abdomen (acute appendicitis, perforated ulcer of the stomach or duodenum). The prone position (lying with the face down) is characteristic of patients with tumours of the pancreas and gastric ulcer (if the posterior wall of the stomach is affected). Pressure of the pancreas on the solar plexus is lessened in this posture.

Habitus. The concept of habitus includes the body-build, i.e. constitution, height, and body weight.

Constitution (L *constituero* to set up) is the combination of functional and morphological bodily features that are based on the inherited and acquired properties, and that account for the body response to endo- and exogenic factors. The classification adopted in the Soviet Union (M. Chernorutsky) differentiates between

the following three main constitutional types: asthenic, hypersthenic, and normosthenic.

The *asthenic* constitution is characterized by a considerable predominance of the longitudinal over the transverse dimensions of the body by the dominance of the limbs over the trunk, of the chest over the abdomen. The heart and the parenchymatous organs are relatively small, the lungs are elongated, the intestine is short, the mesenterium long, and the diaphragm is low. Arterial pressure is lower than in hypersthenics; the vital capacity of the lungs is greater, the secretion and peristalsis of the

stomach, and also the absorptive power of the stomach and intestine are decreased; the haemoglobin and red blood cells counts, the level of cholesterol, calcium, uric acid, and sugar in the blood are also decreased. Adrenal and sexual functions are often decreased along with thyroid and pituitary hyperfunction.

The *hypersthenic constitution* is characterized by the relative predominance of the transverse over the longitudinal dimensions of the body (compared with the normosthenic constitution). The trunk is relatively long, the limbs are short, the abdomen is large, the diaphragm stands high. All internal organs except the lungs are larger than those in asthenics. The intestine is longer, the walls are thicker, and the capacity of the intestine is larger. The arterial pressure is higher; haemoglobin and red blood cell count and the content of cholesterol are also higher; hypermobility and hypersecretion of the stomach are more normal. The secretory and the absorptive function of the intestine are high. Thyroid hypofunction is common, while the function of the sex and adrenal glands is slightly increased.

Normosthenic constitution is characterized by a well proportioned make-up of the body and is intermediate between the asthenic and hypersthenic constitutions.

The *posture* or attitude of the patient is often indicative of his general tone, the degree of muscle development, and sometimes of his occupation and habits. Most patients with grave diseases or with psychic depression are often stooped. Erect posture, easy gait, and free and unconstrained movements indicate the normal condition of the body. Some gaits are specific for certain diseases of the nervous system (hemiplegia, sciatica, etc.). Surgical diseases of the bones and joints, rheumatism, or deranged blood circulation in the lower extremities change the gait and make walking difficult. The so-called waddling gait is characteristic of osteomalacia or congenital dislocation of the femur.

Red colour of the skin can be transient in fever or excess exposure to heat; persistent redness of the skin can occur in subjects who are permanently exposed to high temperatures, and also in erythraemia. Cyanotic skin can be due to hypoxia in circulatory insufficiency, in chronic pulmonary diseases, etc. Yellowish colour of the skin and mucosa can be due to upset secretion of bilirubin by the liver or due to increased haemolysis. Dark red or brown skin is characteristic of adrenal insufficiency. Hyperpigmentation of the breast nipples and the areola in women, pigmented patches on the face and the white line on the abdomen are signs of pregnancy. When silver preparations are taken for a long time, the skin becomes grey on the open parts of the body (argyria). Foci of depigmentation of the skin (vitiligo) also occur.

The skin can be wrinkled due to the loss of elasticity in old age, in prolonged debilitating diseases and in excessive loss of water.

Elasticity and turgor of the skin can be determined by pressing a fold of skin (usually on the abdomen or the extensor surface of the arm) between fingers. Cirrhosis of the liver is often manifested by development of specific vascular stellae (telangiectasia). This is a positive sign of this disease.

Abnormal growth of hair is usually due to endocrine diseases. Abnormally excessive growth of hair (hirsutism, hypertrichosis) can be congenital, but more frequently it occurs in adrenal tumours (Itsenko-Cushing syndrome) and tumours of the sex glands. Deficient hair growth is characteristic of myxoedema, liver cirrhosis, eunuchoidism, and infantilism. Hair is also affected in some skin diseases.

Nails become excessively brittle in myxoedema, anaemia and hypovitaminosis, and can also be found in some fungal diseases of the skin. Flattened and thickened nails are a symptom of acromegaly. Nails become rounded and look like watch glass in bronchiectasis, congenital heart diseases and some other affections.

Subcutaneous fat can be normal or to various degrees excessive or deficient. The fat can be distributed uniformly or deposited in only certain parts of the body. Its thickness is assessed by palpation. Excessive accumulation of subcutaneous fat (adiposis) can be due to either exogenic (overfeeding, hypodynamia, alcoholism, etc.) or endogenic factors (dysfunction of sex glands, the thyroid, or pituitary gland). Insufficient accumulation of subcutaneous fat may result from constitutional factors (asthenic type), malnutrition, or alimentary dysfunction. Excessive wasting is referred to as cachexia, and may occur in prolonged intoxication, chronic infections (tuberculosis), malignant newgrowths, diseases of the pituitary, thyroid and pancreas, and in some psychological disorders as well. Weighing the patient gives additional information about his diet and is an objective means in following up on the patient's weight changes during the treatment of obesity or cachexia.

Oedema can be caused by penetration of fluid through the capillary walls and its accumulation in tissues. Accumulated fluid may be congestive (transudation) or inflammatory (exudation). Local oedema is a result of some local disorders in the blood or lymph circulation; it is usually associated with thrombosis of the veins, that is, compression of the veins by tumours or enlarged lymph nodes. General oedema associated with diseases of the heart, kidneys or other organs is characterized by general distribution of oedema throughout the entire body (anasarca) or by symmetrical localization in limited regions of the body. These phenomena can be due to the patient lying on one side. If oedema is generalized and considerable, transudate may accumulate in the body's cavities: in the abdomen (ascites), pleural cavity (hydrothorax) and in the pericardium (hydropericardium). Examination reveals swollen glossy skin. The specific relief features of the oedema-affected parts of the body disappear due to the levelling of all irregularities on the body surface. Stretched and tense skin appears transparent in oedema, and is especially apparent on loose subcutaneous tissues (the eyelids, the scrotum, etc.). In addition to observation, oedema can also be revealed by palpation. When pressed by the finger, the

oedematous skin overlying bones (external surface of the leg, malleolus, loin, etc.) remains depressed for 1-2 minutes after the pressure is released.

Thermometry

Body temperature is measured in each patient. It helps to reveal fever and is very important diagnostically. Fever is usually caused by infection and products of tissue decomposition. Fever is a normal reaction of the body to infection. Sometimes an infectious disease can develop without fever or it can temporarily proceed without elevation of temperature (tuberculosis, syphilis). The degree to which the body temperature rises depends on the patient's condition: the same infection can cause different fever in various persons. For example, in the young the temperature in pneumonia rises to 40 °C and over, while in old or asthenic patients with the same disease the temperature rises insignificantly or it may remain at normal level.

Elevation of temperature unconnected with infection is sometimes observed in malignant tumours or tissues necrosis (e.g. in myocardial infarction), tissue haemorrhages, rapid decomposition of red blood cells in the blood, etc. Fever occurs less frequently in diseases of the central nervous system and also in diseases of reflex aetiology. Non-infectious fever does not strongly affect the patient's condition and is usually transient.

The temperature is measured by a thermometer graded in 0.1 ° (C or F). Electric thermometers are also used in medical research. The sensitive element in such thermometers is a thermocouple. An electric thermometer quickly responds to variations in temperature. It can be used to measure and compare temperature of various areas of the skin. Some electric thermometers (including multi-channel) are provided with a device that automatically records variations in temperature on a graph paper (electrothermographs).

When temperature is measured, the thermometer is kept in the armpit for about ten minutes. The thermometer should come in tight contact with the patient's skin; the forearm should be tightly pressed against the chest to close the armpit. When temperature is measured in asthenic patients or in children, assistance is required to keep their forearm pressed to the chest. Sometimes temperature is measured in the rectum for which purpose the thermometer coated with oil is inserted in the rectum; the patient should lie on his side. 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.). Thermometer readings should be registered on a special chart for several days where the morning and the evening temperature is designated by dots. The dots are then interconnected to give a curve which is characteristic for many specific diseases. Normal temperature of the body (as measured in the armpit) is 36.2-36.8 °C. The temperature undergoes circadian variations. The minimal 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.

Fever is characterized not only by elevated temperature but also by the upset function of the entire body. The rise in temperature is a very important (but not always decisive) sign for assessing severity of fever. It is accompanied by accelerated pulse and respiration rate; arterial pressure often drops; the patient complains of being hot, exhausted, of headache, dryness and the unpleasant feeling in the mouth, thirst, and the absence of appetite; the tongue is coated and often dry; the amount of excreted urine decreases. Fever intensifies metabolic processes. And since the patient would often refuse food, his weight often decreases significantly.

A quick and intense rise in temperature (e.g. in malaria or pneumonia) is often attended by chills, which can last from a few minutes to an hour, and in rare cases for longer periods. The skin blood vessels strongly contract in chills, the skin becomes pallid, goose-flesh (*cutis anserina*) appears, the nailbeds become cyanotic; the patient feels intense cold, he shivers, the teeth begin chattering. If the temperature rises gradually, the chills are only slight. At high temperature the skin reddens and becomes warm; the patient feels hot. A sudden drop in temperature is accompanied by heavy perspiration. The temperature of the patient with fever is higher in the evening than in the morning. Its rise over 37 °C suggests a disease.

Elevated temperatures are characterized as follows: temperatures from 37° to 38 °C are called subfebrile, from 38° to 39 °C moderately high, from 39° to 40 °C high, and over 40 °C very high. Temperatures over 41° and 42 °C are called hyperpyretic and are dangerous to the patient's life.

Not only elevated temperature itself but also its circadian variations are very important for diagnosing the diseases. Variations of temperature during the day determine the *type of fever*. The following main six types of fever are differentiated.

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.

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. *Inverse fever (typhus inversus)*. The morning temperature is higher

than in the evening; it sometimes occurs in sepsis, tuberculosis, and brucellosis.

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

According to the *temperature curve* 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. The *course of fever* is characterized by a *period of elevation of temperature (stadium incrementi)*, which is followed by the *period of high temperature* and 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).

Measuring temperature inside some hollow organs (stomach, large intestine, etc.) by special radio devices is of great diagnostic significance.

Revision tests:

Q1. Inspection is usually used to determine the following:

- A. pain radiation;
- B. resistance of the apex beat;
- C. negative cardiac beat;
- D. systolic vibration of the chest wall;
- E. any of the answer variants offered above (all listed above)

Q2. Heart diseases are characterized by dyspnoea at which respiratory frequency is:

- A. not changed;
- B. considerably increased (up to 30-35 per minute);
- C. decreased to 8-12 per minute;
- D. not changed but periods of apnea arise;
- E. any of the variants offered.

Q3. Examination of patients with renal diseases reveals the following typical sign:

- A. oedema only on the legs
- B. ascites which caused by portal hypertension
- C. pallor skin
- D. skin cyanosis
- E. changes of distal phalanx of clubbing fingers

Q4. Spastic pains in abdomen can be caused by:

- A. stretch of hollow organs wall
- B. tension of the hollow organs ligamentous apparatus
- C. strong contraction of intestines smooth muscle
- D. inflammation of parietal peritoneum
- E. blood supply disturbance

Q5. Peritoneal pain in abdomen can be caused by:

- A. tension of walls of hollow organs
- B. tension of the hollow organs ligamentous apparatus
- C. strong contraction of intestine smooth muscles
- D. inflammation of parietal peritoneum
- E. blood supply disturbance

Q6. The pain in lumbar region (or abdomen) is the most typical for:

- A. pronounced proteinuria
- B. inflammation of renal pelvis
- C. gross hematuria
- D. moderate proteinuria
- E. microhematuria

Q7. Inspection is used, as a rule, to determine the following:

- A. pulsation of the carotid arteries;
- B. systolic vibration of the chest wall;
- C. resistance of the apex beat;
- D. duration of the pain syndrome;
- E. any of the variants offered.

Q8. Choose reason of the spastic pain in abdomen area:

- A. meteorism
- B. peritonitis at inflammation of appendix
- C. perforation of gastric ulcer
- D. hepatic colic
- E. thrombosis of mesenterial vessels

Q9. Choose complaints, which are the most typical for patients with bronchial asthma diseases:

- A. cough with great amount of purulent sputum and expiratory dyspnoea
- B. cough with small amount of sputum with blood and inspiratory dyspnoea
- C. cough with small amount of viscous mucous sputum and expiratory dyspnoea
- D. cough without sputum and inspiratory dyspnoea
- E. cough with small amount of purulent sputum without dyspnoea

Q10. Choose source of distensional pains in abdominal area:

- A. stomach
- B. small intestine
- C. large intestine
- D. none of previous variants
- E. all listed variants

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

The appendix 1

A model of the subject matter

