1. Algorithm for evaluating the results of the "general blood test" in patients with anemia.

Indicator	**Iron deficiency anemia**	**B12 - folate deficiency anemia**
Hemoglobin	lowered	promoted
Color index	<0,85	>1,15
Reticulocytes	raised	reduced
ESR	magnified	---
Serum iron level	lowered	---
B12 / folic acid level	---	decline
Note	microcytosis, anisocytosis, poikilocytosis	macrocytosis, megalocytosis

2. Urinalysis and urine sediment evaluation algorithm Urinalysis

Parameter	**Reference values**
Color	Pale yellow to yellow
Transparency	Transparent
Density	1.003 – 1.040
pH	5.5 – 7.0
Chemical properties	
Protein	Negative
Glucose	Negative
Ketones	Negative
Urobilinogen	Negative
Nitrites	Negative
Bilirubin	Negative
Microscopy	
Flat epithelium	Negative
Transient epithelium	Negative
Renal epithelium	Negative
WBC	0 - 5
RBC	0 - 2
Hyaline cylinders	Negative
Granular cylinders	Negative
Erythoricyte-based cylinders	Negative
Amorphous phosphates	Negative
Uric acid crystals	Negative
Oxalates	Negative
Amorphous urates	Negative
Fungi	Negative

Mucus	Small amount
Bacteria	Negative

3. Blood chemistry evaluation

Basic parameters	**Normal range**
Glucose	3.05 – 6.38 mmol/l
Glycilated hemoglobin	4.8 – 5.9 %
Total protein	66 – 87g/l
Albumin	35 – 50g/l
Alanine aminotransferase (ALT)	0.1 – 0.68 mmol/h·l
Aspartate aminotransferase	0.1 – 0.45 mmol/h·l
Alkaline phosphatase	50 – 130 mmol/h·l
Amylase	200 - 800 U/l
Total bilirubin	3.4 – 20.5 mcmol/l
Direct bilirubin	5.1 mcmol/l
Indirect bilirubin	8.6 mcmol/l
Creatinine	M. 40 – 115 mcmol/l,
Urea	M. 3.8 – 7.3 mmol/l,
Uric acid	M. 180 – 420 mcmol/l,
Fibrinogen	2.5 – 4.0 g/l
Iron	M. 5.5 – 25.8 mcmol/l,
Cholesterol	2.58 – 5.85 mmol/l
Triglycerides	0.11 – 5.65 mmol/l
Total thyroxine	65 – 160nmol/l
Unbound thyroxine	9 – 25 pmol/l
Total triodinethyronine	1.17 – 2.5 nmol/l
Free triodinethyronine	4 – 8pmol/l
Creatine phosphokinase	0 – 150 U/l
MB - CPK	0 – 12 U/l
Cardiac troponine	0.01 – 0.1ng/ml

4. Thyroid gland palpation method.

The examiner should be positioned in front of the patient. Thyroid gland area should be examined prior to palpation in order to detect the enlargement.Thyroid gland isthmus is palpated first: place the right thumb over the isthmus location and move it gently downwards. Then check the lateral lobes reaching beyond the inner margins of sternoclavicular muscles. Ask the patient to make a swallowing movement – it makes the palpation easier.

The palpation can be also performed with flexed fingers of both hands (2 and 3 fingers); reach beyond the internal margins of sternoclavicular muscles towards the posterior-lateral surfaces of thyroid gland lateral lobes. If this method is used, the examiner should be positioned behind the patient.

Thefollowingparametersareestablishedbypalpation:

- gland position,
- gland size (thyroid gland enlargement stage),
- presence or absence of nodes,
- pain,
- mobility.

Normally thyroid gland is not enlarged, elastic, painless and mobile.

Diffuse thyroid gland enlargement: flat surface, soft structure of thyroid gland are detected. Nodular goiter: dense nodes are detected in the thyroid gland region. Acute and subacute thyroiditis: thyroid gland is elastic and enlarged; palpation is associated with pain. Malignancies: dense structure, possible loss o thyroid gland mobility.

Thyroid gland enlargement stages:

I – isthmus enlarged; isthmus can be palpated and becomes visible during the swallowing movements.

II – thyroid gland lobes are clearly palpated and clearly visible during the swallowing movements.

III –thyroid gland occupies the anterior neck surface and makes the neck look shorter.

IV – changes of neck shape; enlarged thyroid gland protrudes and looks like a tumor.

V–huge size of thyroid gland.

5. The algorithm for percussion of the lungs.

Comparative percussion of the lungs in front:

a) the position of the patient - hands are lowered;

b) the position of the doctor - in front and to the right of the patient;

c) percussion in front starts from the tops. To do this, install the finger-plessimeter in the supraclavicular fossa parallel to the clavicle, the midclavicular line should cross the middle of the middle phalanx of the plessimeter. With a finger-hammer, medium-strength strokes are applied to the plessimeter finger. After that, the finger-plessimeter is installed in the symmetrical supraclavicular fossa in the same position and strikes of the same force. Percussion sound is

evaluated at each percussion point, and sounds at symmetrical points are compared;

d) then carry out percussion on the collarbone, which in this case are natural plessimeters (with a hammer-finger strike moderate force blows in the middle of the clavicle);

e) at the next stage, percussion is performed in the subclavian region along three intercostal spaces (I, II, III). In this case, the finger-plessimeter is installed in the intercostal space parallel to the ribs so that the middle of the middle phalanx is crossed by the midclavicular line.

Comparative percussion of the lungs in the lateral regions:

a) the position of the patient - hands down;

b) the position of the doctor - in front of a patient facing him;

c) a finger-plessimeter is installed on the chest in the axilla (along the intercostal space) parallel to the ribs so that the middle of the middle phalanx is crossed by the mid-axillary line. Percussion of symmetric lateral sections of the chest along the intercostal spaces is carried out up to and including VII.

Comparative lung percussion at the back:

a) the position of the patient - arms crossed on his chest. At the same time, the shoulder blades diverge, expanding the interscapular space;

b) the position of the doctor - on the left hand of the patient;

c) first, percussion is performed in the suprascapular region. The finger-plessimeter is installed horizontally above the spine of the scapula parallel to the ribs;

d) then proceed to percussion in the interscapular region. A finger-plessimeter is installed vertically parallel to the spine. After each percussion strike, the plessimeter is gradually moved down to the blade angle to the left and right;

e) after that, comparative percussion is carried out in the subscapular region along the VII, VIII, IX intercostal spaces. The finger-plessimeter is laid horizontally along the intercostal space so that the middle of the middle phalanx is crossed by the scapular line.

6. Algorithm for auscultation of the lungs.

1. The room should be quiet and warm.

2. The lungs are listened to in the upright position of the patient (standing or sitting), only if the patient is in a serious condition, it is possible to listen to them in the supine position.

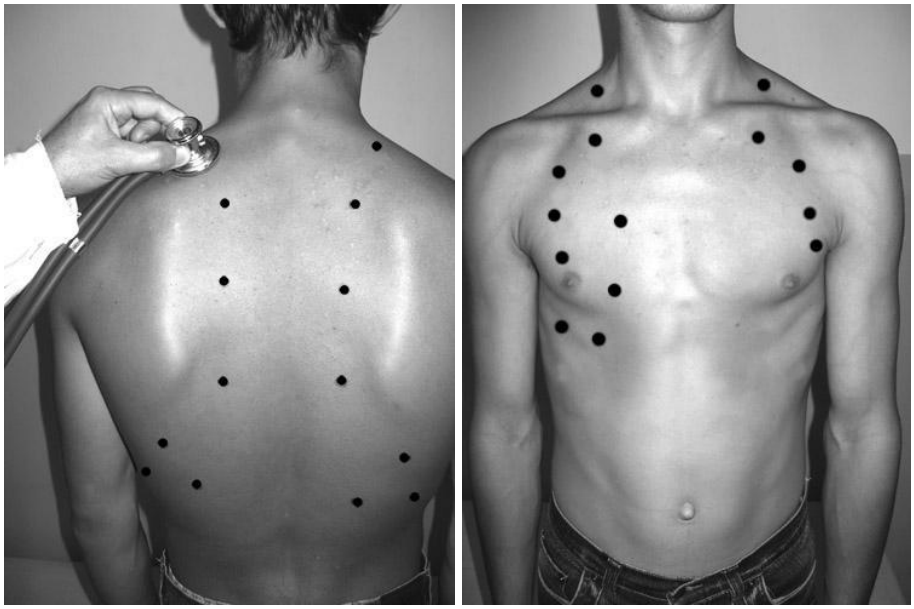
3. Auscultation of the lungs, as well as percussion should be comparative.

4. Listening to the lungs, unlike percussion, is carried out not according to topographic lines, but in areas starting from the supraclavicular regions (the region of the apexes of the lungs), then the region of the pectoralis major muscles and the lower lateral parts of the anterior surface of the chest. When listening to the axillary areas of the patient is asked to lay his hands behind his head, then listen to the lateral surfaces of the chest. On the posterior surface, auscultation of the lungs begins with the supraspinate regions (projection of the apices of the lungs from the back), then the interscapular region is heard, for this the patient should cross his arms on his chest. Next, the areas below the angles of the shoulder blades and the lower lateral departments are heard.

5. In each area, auscultation is performed by the "nesting method", i.e. the tube is placed at least at 2-3 points, since it is impossible to evaluate the auscultatory picture at one point, then auscultation is performed in the same way on a symmetrical section of the opposite side.

6. At the beginning, the main respiratory sounds are analyzed, while the patient's breathing should be even through the nose and medium depth.

7. Then they ask the patient to breathe deeply and through the mouth, while side respiratory sounds are better detected. For the same purpose, if necessary, they ask the patient to cough, quickly and abruptly exhale.



Auscultation points of the lungs front and back.

7. The algorithm for determining the margins of the heart by percussion.

Allocate the right, upper and left borders of the heart.

When determining the relative dullness of the heart, the right border is first determined, having previously determined the lower border of the right lung by the

mid-clavicular line. Then they rise one intercostal space above (IV) and percussion from the mid-clavicular line towards the heart until the clear pulmonary sound becomes dulled, while the finger plessimeter is located vertically. Normally, the right border is located on the right edge of the sternum or 1 cm outward from it in the 4th intercostal space.

The left border of the relative dullness of the heart is determined in the intercostal space where the apical impulse is previously palpated. In this case, the finger-plessimeter is positioned vertically outwards from the apical impulse and is moved inwards. If the apical impulse is not palpable, percussion is carried out in the 5th intercostal space from the front axillary line to the right. Normally, the border of relative dullness of the heart is located in the 5th intercostal space 1-1.5 cm inwards from the mid-clavicular line.

When determining the upper boundary of the relative dullness of the heart, percussion is carried out to the left of the clavicle down between the sternal and parasternal lines, the finger plessimeter is parallel to the desired boundary. Normally, the upper boundary is located on the III rib.

Having determined the margins of the relative dullness of the heart, measure its transverse size. For this, a ruler measures the distance from the extreme points of the relative dullness of the heart to the anterior midline. Normally, the distance from the right border of relative dullness (4th intercostal space) to the anterior midline is 3-4 cm, from the left (5th intercostal space) is 8-9 cm, the sum of these values is the transverse size of the heart (11-13 cm).

Heart margins	**relative dullness**	**absolute dullness**
Right	4 intercostal space on the right edge of the sternum	4 intercostal space on the left edge of the sternum
Upper	3 rib on the left	4 rib on the right
Left	5th intercostal space 1-1.5 cm inwards from the midclavicular line	5th intercostal space 1-1.5 cm inwards from the margins of relative dullness or coincides with it

Defining the margins of absolute dullness of the heart

The right border of absolute dullness is determined by placing a finger-plessimeter vertically in the 4th intercostal space outside the border of relative dullness and moving it to the left until a dull sound appears (use quietest percussion). Normally, it is located on the left edge of the sternum.

The left border of absolute dullness is determined by the V intercostal space. A finger-plessimeter is set somewhat outward from the left border of relative

dullness, move it inside until a dull sound appears. Normally, the left border of absolute dullness is located 1-1.5 cm inward from the border of relative dullness or coincides with it.

To determine the upper boundary of absolute dullness, a finger-plessimeter is placed outward from the upper boundary of relative dullness, moving it down between the sternal and parasternal lines. Normally, it is located on the 4th rib.

8. Auscultation points of the heart.

The first point is the apex of the heart, i.e. the region of the apical impulse or, if it is not determined, then the left border of the heart at level V of the intercostal space (listening point of the mitral valve and the left atrioventricular opening); during auscultation over the apex of a woman, if necessary, she is first asked to raise the left mammary gland;

the second point is the II intercostal space directly at the right edge of the sternum (the point of listening to the aortic valve and the mouth of the aorta);

the third point - II intercostal space directly at the left edge of the sternum (the point of listening to the pulmonary valve and its mouth);

the second and third points are usually united by the concept of "base of the heart";

the fourth point is the base of the xiphoid process (the point of listening to the tricuspid valve and the right atrioventricular opening).

fifth point - Botkin-Erb’s point - III intercostal space at the left edge of the sternum (additional listening point of the aortic valve, corresponding to its anatomical projection).

9. Methodology for measuring blood pressure.

1. Blood pressure (BP) evaluation is conducted after 5 minutes rest, under quiet conditions.
2. Smoking or uptake of coffee is prohibited within 30 minutes prior to BP evaluation.
3. The cuff should cover 80% of shoulder circumference and 2/3 of its length. Use of short or narrow cuffs can result in elevated BP values; use of broad cuffs can result in lower BP values. Standard cuff(width12-13 cm, length 35 cm) is applicable in patients with normal or thin shoulders. In patients with heavy muscles or thick shoulders 42 cm cuffs are recommended; 12 cm cuffs are recommended in children younger than 5 years.

4. The cuff is placed in the middle shoulder on the level of heart so that its lower level is 2-2.5 cm over the elbow pit. The space between the cuff and the skin of shoulder should be enough to push a finger tip inside.

5. DuringthefirstBPevaluationsessionfirstestablishthesystolicpressure (sBP) by palpation. Find the pulse on radial artery and quickly pump the cuff up to 70 mm hg level. Then pump it with a 10 mm hg step up to the level when the pulse on radial artery disappears. After this the air is released from the cuff. The pressure level when the pulse on radial artery appears again corresponds to systolic BP. Thus method helps to avoid the bias associated with a so called auscultation pit, namely the disappearance of Korotkov's sounds shortly after their onset.

6. When the auscultation method is used, pump the cuff up to pressure level 20-30 mm hg higher than sBP as established by the palpation method.

7. Release the air slowly at 2 mm/sec rate and establish the phase I of Korotkov's sound (onset) and phaseV (disappearance) corresponding to sBP and diastolic blood pressure (dBP). If the Korotkov's sounds are heard up to the very low level or up to 0 end point, dBP is considered the BP level at the beginning of phase V. The nearest 2 mm mark is used for rounding of BP level.

8. At least 2 evaluations should be conducted with a 2-3 minutes interval. If the discrepancy is over 5 mm hg, repeat the evaluation within several minutes.

9. During the first test BP is evaluated on both hands as well as in sitting, standing and horizontal positions. Pay attention to higher values that correspond to internal arterial pressure.

10. In elderly patients, patients with diabetes mellitus and inpatients with manifested or suspected orthostatic hypotension BP should be evaluated at minutes 1 and 5 after taking the orthostasis position.

10. Determination of the margins of the liver (percussion according to Kurlov).

Percussion is carried out in the position of the patient lying on his back.

- Percussion is performed along the right midclavicular line from the navel to the lower border of the liver and from a clear pulmonary sound down the intercostal space to the appearance of hepatic dullness (it should be recalled that the border of the transition of a clear or tympanic sound into a dull is marked along the outer edge of the finger - a plessimeter, i.e. from a clear or tympanic sound). By connecting the two points, measure the first size of the liver according to Kurlov. Usually it is 9 cm. The upper limit of hepatic dullness is used to determine two other sizes.

- In the midline of the abdomen percussion up until the appearance of hepatic dullness. The upper border in the midline is difficult to determine due to the location under the skin of a dense sternum that extinguishes percussion sounds, therefore, for the top point of this size, a point lying at the same level with the upper border of the first size of hepatic dullness is conventionally taken (through this point, draw a horizontal line to the intersection with middle line). By connecting these points, measure the second size of the liver according to Kurlov, usually 8 cm.

- The third size of the liver according to Kurlov is determined during percussion near the left costal arch parallel to it, starting percussion from approximately the front axillary line. The upper point corresponds to the upper point of the second liver size according to Kurlov. The third size is usually 7 cm. If the liver is enlarged, then the first large size is indicated by a fraction, in the numerator of which is the total size along the right midclavicular line, and in the denominator is its part corresponding to the size that extends down the edge of the arch.

11. Algorithm for palpation of the spleen.

The patient is located on the right side with a slightly bent left foot and the left hand laid forward. Palpation of the spleen is bimanual: the left hand is laid flat on the lower part of the chest on the left costal arch and gently squeezes this area to limit the movement of the chest to the side during inspiration and increase downward movement of the diaphragm and spleen. The terminal phalanges of 2-5 fingers of the right hand are parallel to the front edge of the spleen 3cm below its location found during percussion. The second and third moments of palpation are the formation of a skin fold and “pockets”: during exhalation, when the front abdominal wall relaxes, the fingertips of the palpating hand pull the skin towards the navel (skin fold formation), and then they are immersed into the abdomen towards the left hypochondrium (pocket formation). The fourth point is the feeling of the spleen: upon completion of the formation of a “pocket”, which is carried out at the end of exhalation, the patient is asked to take a deep breath. The left hand at this time slightly presses on the lower part of the chest and the left costal arch, and the fingers of the palpating hand are somewhat straightened and make a small onward movement towards the spleen. If the spleen is enlarged, then it falls into the pocket and gives a certain tactile sensation. In case of palpation of the spleen, its localization (in centimeters from the edge of the costal arch), consistency, shape and soreness are noted.

In a healthy person, the spleen is not accessible to palpation, since its front edge is 3-4 cm above the costal arch, but if the spleen is palpated even at the edge of the costal arch, it is already 1.5 times enlarged.

12. Methods of ECG recording (3-channel electrocardiograph).

Electrocardiography (ECG) is an imaging technique reflecting the difference of electric potentials that emerge during the electric activation wave distribution in the cardiac muscle; the potentials are being recorded on the surface of tissue or conducting medium that surrounds the heart. General regulations of ECG recording are applicable in order to obtain high quality results.

ECG is recorded in a special room that should be isolated from powerful sources of electric current, e.g., electric motors, physiotherapeutic or X-ray equipment, power supply nodes, etc. The ECG bed should be located within at least 1.5 – 2 meters from the power line. It is reasonable to isolate the bed with a blanket enforced by the grounded metal wire.

The study is conducted after 15-20 minutes of rest and within at least 30 minutes after meals. Clothes should be removed from the patient's chest. Patient's wrists and ankles should also be free from clothing. Usually ECG is being recorded in horizontal position so that the patient's muscles are relaxed.

-Apply plate electrodes or single use electrodes on lower third inner surface of patient's forearms and ankles using rubber bands. Place 1 or several (for multi-channel recording) vacuum chest electrodes or single use electrodes on patient's chest.

-In order to improve ECG quality and interference current suppression better contact of electrodes to skin is recommended. Remove skin fat on electrode application sites, apply the conducting gel on skin that decreases the resistance rate. Shaving of electrode application sites is recommended in some patients.

-Connect wires to all electrodes located on patient's extremities or chest. The ECG wires have respective colors: red (R) for right arm, yellow (L) for left arm, green for left leg (F) and black (N) for right leg. Chest electrodes have white wires. If 6 channels ECG is used, red wire is used to connect V1 electrode, yellow wire is used to connect V2 electrode, green wire is used to connect V3 electrode, brown wire is used to connect V4 electrode, black wire is used to connect V5 electrode and purple wire is used to connect V6 electrode. Chest leads were proposed by Wilson in 1934. Their location is as follows:

V1 - active electrode located in IV intercostal space near to right side of sternum;

V2 – active electrode located in IV intercostal space near to left side of sternum;

V3 – active electrode located between V2 and V4, approximately on the level of IV rib on the left parasternal line;

V4 – active electrode located in the V intercostal space on the left medio-clavicular line;

V5 – active electrode located on the same horizontal line as V4 on the left anterior armpit line;

V6 – active electrode located on the left medium armpit line on the same horizontal level as V4 and V5 electrodes.

-Before ECG recording set the same electric signal amplification for all channels. An ECG apparatus has an option of calibration voltage setting for the halvanometer, usually 1 mV voltage is used. Usually the amplification for each channel is set so that the 1 mV voltage results in halvanometer response and recording of a 10 mm wave. In order to do so, adjust the ECG amplification at 0 position of the lead switch and record the millivoltage calibration waves. The amplification can be adjusted: it can be decreased for large amplitude ECG waves (1 mV = 5 mm) or increased for low amplitude (1 mV = 15 or 20 mm).

-Adjust the ECG recording speed by pressing the speed button in order to choose the appropriate one (25 mm/sec).

-Check the electrode pads application quality by controlling the ECG screen for leads I and II. Switch the leads with arrow buttons. If large muscular oscillations are recorded, switch the muscle filter on with a filter button.

-ECG is recorded under normal respiratory rate. If the three channel ECG is used, standard leads (I, II and III) are recorded first followed by the enforced leads from extremities (aVR, aVL and aVF) and chest leads. At least 5 PQRST heart cycles are recorded for each lead.

-After completion of ECG recording patient's name, age and study date and time are recorded on the paper ECG strip.

13. Analysis of the results of the electrocardiogram.

First steps

-Pacemaker establishment (sinus/non-sinus rhythm);

-Rhythm of cardiac complexes (regular/irregular rhythm);

-HR establishment;

-Electric heart axis establishment;

-Calculate the duration and amplitude of waves and duration of cardiac cycle intervals;

-Check the presence of:

-Atrial or ventricular hypertrophy;

-Automatic function disorder, activation or conduction disorders;

-Coronary failure manifestations control.

Sinus rhythm criteria

-Presence of P wave before each QRS complex;

-Positive P wave in II standard lead;

-Similar polarity, amplitude, shape and duration of P waves for all heart cycles of particular lead;

-Similar P-Q interval for each ventricular complex; normal P-Q duration (0.12 – 0.18 seconds).

HR calculation for ECG

-Calculate the R-R distance (in millimeters) in 4-5 consequent cycles;

-Calculate the average for this distance in millimeters;

-Calculate the duration of average R-R interval by multiplication of average distance (in mm) by 0.02 (duration of 1 mm distance at mean stripe movement speed 50 mm/sec) or by 0.04 (duration of 1 mm distance at mean stripe movement speed 25 mm/sec);

-Calculate the HR using the following formula: HR = 60/R-R.

Parameters of waves and intervals

P wave reflects the electric activity of atria (depolarization process distribution). Amplitude: 0.5 – 2.5 mm, duration: 0.06 – 0.08 seconds.

Q wave reflects the activation of left side of the inter-ventricular septum. Duration: less than 0.03 seconds; amplitude – less than ¼ of the following R wave amplitude for the same lead.

R wave reflects the activation of ventricles. It is a positive wave for all leads. R wave amplitude in different leads depends on electric axis position. For normal electric axis position the maximum amplitude is recorded in II standard lead; for chest lead consequent increase of R wave amplitude is reported for V1-V4 followed by the decrease in the left chest leads. R wave duration is 0.05 – 0.08 seconds.

S wave reflects the terminal activation of the left ventricle. It is not a permanent wave. S wave is always negative. The deepest S waves are recorded in chest leads V1 and V2.

QRS complex reflects the complete depolarization of ventricles. QRS complex duration is 0.06 – 0.08 seconds (up to 0.1 seconds).

T wave reflects repolarization of ventricles. T wave amplitude: 3-8 millimeters. T wave duration: 0.10 – 0.25 seconds.

P-Q interval is the time interval from P wave start to Q wave starting point (R). It reflects the time required for the impulse to pass through the atria, atrio-ventricular node, Hisses bundle and pedicles and Purkinje's fibers up to contractile myocardium. Normal P-Q interval duration: 0.12 – 0.18 seconds.

S-T segment is an interval from QRS complex end to T wave. It reflects the complete activation of both ventricles. Normally it is located on the iso-electric line; however, it can be horizontally elevated over the iso-electric line by 0.5 mm or located within 0.5-1 mm below the iso-electric line. It can also be oblique elevated over the iso-electric line in right chest leads.

R-R intervals reflect the total duration of heart cycle. Normally all R-R intervals are regular; the difference should be less than 0.15 seconds (or 10%). If the difference of heart cycles duration (R-R) is higher, the rhythm is considered irregular.

ECG evaluation in patients with acute Q myocardium infarction located in the posterior wall of the left ventricle

Q wave present. ST elevation in II, III and aVF leads.

Specific laboratory parameters reflecting the myocardium infarction:

-Troponine levels;

MB fraction of creatine phosphokinase/

Basic medications for treatment of acute myocardium infarction

-Nitrates;

-Morphine (narcotic analgesic drugs);

-ACE inhibitors;

-Anti-aggregation drugs;

-Direct anti-coagulants;

-Coronary arteries angiography followed by stunt introduction.

14. Analysis of the results of echocardiography.

Parameters	**Normal values**
Left ventricle	
- terminal diastolic diameter	37 – 55, mm
- terminal systolic diameter	26 – 37, mm
- diastolic volume	55 – 149, mm
- systolic volume	18 – 40, mm
- ejection fraction	55 – 65 %
- posterior wall thickness	9 – 11, mm
Inter-ventricular wall thickness	9 – 10, mm
Right ventricle	
- diameter	7 – 26, mm

- wall thickness	2 – 4, mm
Left atrium	20 – 36 (4), mm
Aorta radix	20 – 38, mm
Aortavalves opening amplitude	17 – 25, mm
Pulmonary artery isthmus	11 – 22, mm
Maximum flow rate as measured by Doppler sonic test, m/sec	
Trans-mitral flow	0.6 – 1.3
Trans tricuspidal flow	0.3 – 0.7

15. Pulse oximetry. (determination of oxygen saturation).

Insert one of the fingers into the clamp of the device. Before examination, you should make sure that the finger is not dirty. After turning on the device, the numbers appear on the display:

- heart rate (norm 60 - 90 contractions);
- level of blood oxygen saturation (norm 95 - 100%).

16. Analysis of the results of pneumotachometry.

Preparation for the study: the study is carried out on an empty stomach or 2 hours after a meal. The patient is asked not to smoke 24 hours before spirography, not to drink alcohol. 30 minutes before the study, it is necessary to exclude active physical exercises, sit in a calm environment. Clothing on the subject should be comfortable and free so as not to hamper the movements of the chest. Cancel short-acting bronchodilators 4 hours before the study after consultation with the attending physician. If the patient uses an inhaler, you should take it with you. Carry a handkerchief.

Procedure: the patient sits right in the chair, hands are located on the armrests. The study is performed using a spirometer, which is designed both for spirography and pneumotachometry. A disposable mouthpiece is put on the spirometer for each patient, and a nose clip is placed on the patient's nose. After several calm breathing cycles (inhale-exhale), the patient performs a forced breath and immediately, without holding his breath, forced expiration. If a cough occurs, the study is stopped and continued after a few minutes. The appearance of hemoptysis or chest pain requires the cessation of pneumotachometry. The procedure is repeated several times to obtain several results. Then the doctor evaluates the graphic image, the obtained indicators and formulates a conclusion.

17. The algorithm for interpreting the results of pneumotachometry.

- Forced vital capacity of the lungs (FVC): 70 - 80%.

- Volume of forced expiration in the first second (FEV1): not less than 70% FVC.

- Tiffnaud index: at least 70-75%.

- The maximum volumetric air velocity at the exhalation level of 25% FVC (MEF25): not less than 60%.

- The maximum volumetric air velocity at the exhalation level of 50% FVC (MEF50): not less than 60%.

- The maximum volumetric air velocity at the exhalation level of 75% FVC (MEF75): not less than 60%.

- The average volumetric rate of forced expiration, calculated in the measurement interval from 25 to 75% FVC (FEF25-75).

- PEF - peak forced expiratory flow rate: 0.5 - 15 l / s.

With the occurrence and progression of chronic obstructive pulmonary disease, a gradual decrease in volume-velocity indicators occurs. First, small bronchi (distal) are affected, which is manifested by a decrease in MEF50, MEF75 and FEF25-75. A decrease in MEF25 indicates progression of obstruction and damage to the proximal airways. Progressive bronchial obstruction is manifested by a decrease in FEV1 and FVC. With severe bronchial obstruction, VC also decreases.

18. Evaluation of the results of radiography of the lungs.

1. Determination of the shape of the chest: - normal; - in the form of a bell - barrel-shaped, etc.

2. Assessment of lung volume: - not changed; - lung or its part is increased; - reduced.

3. Establishment of the state of the pulmonary fields: - transparent; - dimming; - enlightenment.

4. Analysis of the pulmonary pattern: - not changed; - reinforced; - weakened; - deformed.

5. Analysis of the roots of the lungs: - structural; - width; location; - increased lymph nodes; diameter of blood vessels.

6. Identification and description of pathological symptoms:

-Shadow picture: • dimming; • enlightenment.

- Localization: • by shares; • by segments.

- Dimensions in centimeters (at least two sizes are indicated).

- Shape: • rounded; • oval; • wrong; triangular, etc.

- Contours: • smooth or uneven; • clear or fuzzy.

- Intensity: • weak; • average; • high; • chalk density; • metal density. - The structure of the shadow: • homogeneous; • heterogeneous due to decay or calcareous inclusions, etc.

- Correlation of pathological changes with surrounding tissues: • increased pulmonary pattern in surrounding tissues; • rim of enlightenment around a round shadow due to the displacement of neighboring tissues; • pushing or pushing apart the bronchi or blood vessels, etc. • centers of elimination, etc.

19. Evaluation of the results of joint radiography.

General characteristic of the radiograph.

• Definition of the study area (knee joint, bones of the lower leg and ankle joint, skull, pelvic bones, etc.).

• Definition of a projection by a radiograph (straight, lateral, tangent, axial).

I. Bone study:

- the position of the bones (not displaced, displaced);

- bone shape (corresponds to the anatomical, deformation, additional bone growths, lack of bone, etc.);

- bone size (normal, lengthening, shortening, atrophy, thickening);

- bone contours (flat, bloating, local absence, unevenness, etc.);

- bone structure (not changed, osteoporosis, osteosclerosis, destruction, sequestration);

- periosteal reaction (no or is in the form of one of the periostitis forms).

II. Joint study:

- the ratio of the articular surfaces (not broken, dislocation, subluxation);

- the state of the x-ray joint gap (not changed, uniform or uneven narrowing, expansion, disappearance);

- the state of the end plates of the apophyses (not broken, thinning, compaction, destruction);

III. The study of soft tissues (no change, increase, decrease, additional shadows or enlightenment).

IV. Conclusion on the nature of pathological changes.

20. Algorithm for determining body mass index using the formula: the ratio of height and weight.

Measurement of body weight is carried out on a medical scale with an accuracy of 100 g. The scale plane is set horizontally to the floor. The patient should stand in the middle of the plane of the balance and not move during the

measurement. Height is measured with a stadiometer. The subject should stand on its plane with his back to the rack with a scale, touching it with three points: heels, buttocks and spine at the level of the line connecting the lower angle of the shoulder blades. The head should be slightly tilted so that the outer edge of the external auditory canal and the lower edge of the orbit are on the same line parallel to the floor. The person who takes the measurement stands on the side of the subject and lowers the tablet on his head, which moves on a centimeter scale. The counting is carried out along the bottom edge of the tablet.

Body mass index is determined by the formula:

²,

where: m - body weight in kilograms, h - height in meters, and measured in kg / m².

The body mass index was developed by the Belgian sociologist and statistician Adolphe Ketele.