

Strategy and interpretation of paraclinical investigations in cardiovascular diseases

1. BP measurement in the cabinet:

- use of an authorized tensiometer, calibrated annually, with a cuff corresponding to the thickness of the arm (standard 12-13 cm / 35 cm; wider in obese).
- the determination of BP should be done after 5 minutes of rest, after the consumption of coffee, cigarettes, adrenergic drugs prior to the determination.
- at least two determinations are made every 1-2 minutes, BP is measured on both arms; In the case of young people with high values of BP, BP will be measured also in the legs (aortic coarctation).
- BP measurement is performed in sitting, in clinostatism and in orthostatism (at 1 and 5 minutes, especially in the elderly and diabetics) to detect orthostatic hypotension.

2. The measurement of BP at home has the advantage that

- avoids the effect of "white robe",
- bring additional information to the doctor to adjust the treatment,
- ensures the patient's compliance with the treatment,
- but at the same time it can generate:
 - anxiety by too frequent BP measurements
 - and risk of self-medication and drug dose adjustment.

3. Automatic ambulatory monitoring of 24-hour blood pressure is indicated:

- if there are large variations in the BP values or a large discrepancy between the values determined at the cabinet and those at home,
- for investigating a treatment-resistant hypertension,
- for exploring dipper-nondipper status,
- for highlighting nighttime BP growth or BP variability,
- as unfavorable prognostic factors of evolution (Table 1).

4. Measurement of BP in children and adolescents - is done with a tensiometer having a cuff corresponding to the size of the arm, after 5 minutes of rest.

- Normal and pathological values of blood pressure (BP) are expressed in percentiles, being different depending on age, sex and height.
- The classification of BP values is done as follows:
 - Hypertension is systolic and / or diastolic BP greater than or equal to the 95th percentile for age, sex, and height at ~ 3 determinations.
- It comprises 2 stages:
 - stage I HTA- BP values between the 95th and 99th percentiles plus 5 mmHg
 - stage II HTA - BP values greater than the 99th percentile plus 5 mmHg.

5. Determination of the ankle-arm index (AAI) is considered the first non-invasive method for screening and diagnosing peripheral arterial disease.

- The necessary equipment consists of a tensiometer and an arterial Doppler - calculating the ratio of systolic BP at the ankle (sound signal at the posterior tibial artery or pedicular artery) and systolic BP at the arm level, taking into account the highest value of BP between the two arms.

- The ankle-arm index is calculated for each lower limb as the ratio of the highest BP value of the posterior tibial artery or pedicle to the highest value of the BP between the two arms.
- $IAA = \text{highest BP of posterior tibial or arteriovenous artery} / \text{highest value of BP between the two arms.}$

6. Electrocardiogram - Graphical recording of variations of electrical potential that arise at the surface of the body, due to cardiac activity

Indications:

- Symptoms of palpitations, retrosternal pain
- Screening and diagnosis for heart rhythm disorders (tachyarrhythmias, bradycardia, extrasystoles, atrial fibrillation, atrial flutter), ischemic heart disease,

By overlapping the 12 derivatives commonly used in practice, two exploratory plans are created, thus

- DII, DIII, and aVF lower derivatives
- DI and aVL, VS, V6 are lateral derivatives
- aVR the left atrium
- V1, V2 interventricular septum
- V3, V4 anterior wall of left ventricle

ECG interpretation:

- waves- P, QRS, T- are analyzed in terms of shape, meaning, duration, amplitude
- segments- PQ (R), ST- are analyzed from the point of view of position and duration
- intervals - the sum of a wave and a segment - are analyzed in terms of duration
- the interpretation of an electrocardiogram gives us data about the ventricular allure, the axis of the QRS complex, the presence of the sinus rhythm

Criteria for appreciation of the sinus rhythm:

- There is the P wave in all the cardiac revolutions and in all the recorded derivations
- P waves are located in front of the QRS complex
- P waves have normal duration, amplitude and orientation (positive in 01, 02, positive, negative or phasic in D3, amplitude below 2.5 mm, duration below 0.10 sec)
- P-waves constant as form in the same derivation
- PQ interval constant and within normal limits
- PP intervals = RR intervals, constant
- AV 84 / min, QRS axis = 50 °, sinus rhythm

7. Effort electrocardiogram - functional test, representing the ECG pathway that follows the recording of the electrical activity of the heart during

- standardized physical effort,
- progressively increasing,

- performed under close monitoring
 - of the symptoms (precordial pain, dyspnoea, dizziness),
 - of the electrocardiogram,
 - as well as the main hemodynamic variables (blood pressure, pulse, oxygen saturation of the blood).
- It is an accessible, non-invasive method.

Indications

- for the detection and assessment of the severity of ischemic heart disease
- suspected ischemic heart disease
- screening of the patient with multiple cardiovascular risk factors

Preparing the patient:

- fasting 2 hours
- light clothing and footwear
- explaining the patient about the test stages (resting ECG, effort period and recovery period)

Criteria for evaluating an effort test as positive:

- horizontal or descending sub-leveling of the ST segment > 1 mm, lasting more than 0.08 sec,
- the onset of angina pain