Methodological recommendations for the training of bicycle ergometry techniques (using the execution algorithm)

Specialty: General Medicine
Discipline: Fundamentals of general medical practice
Course: 5
Department: "General Practitioner – 1"
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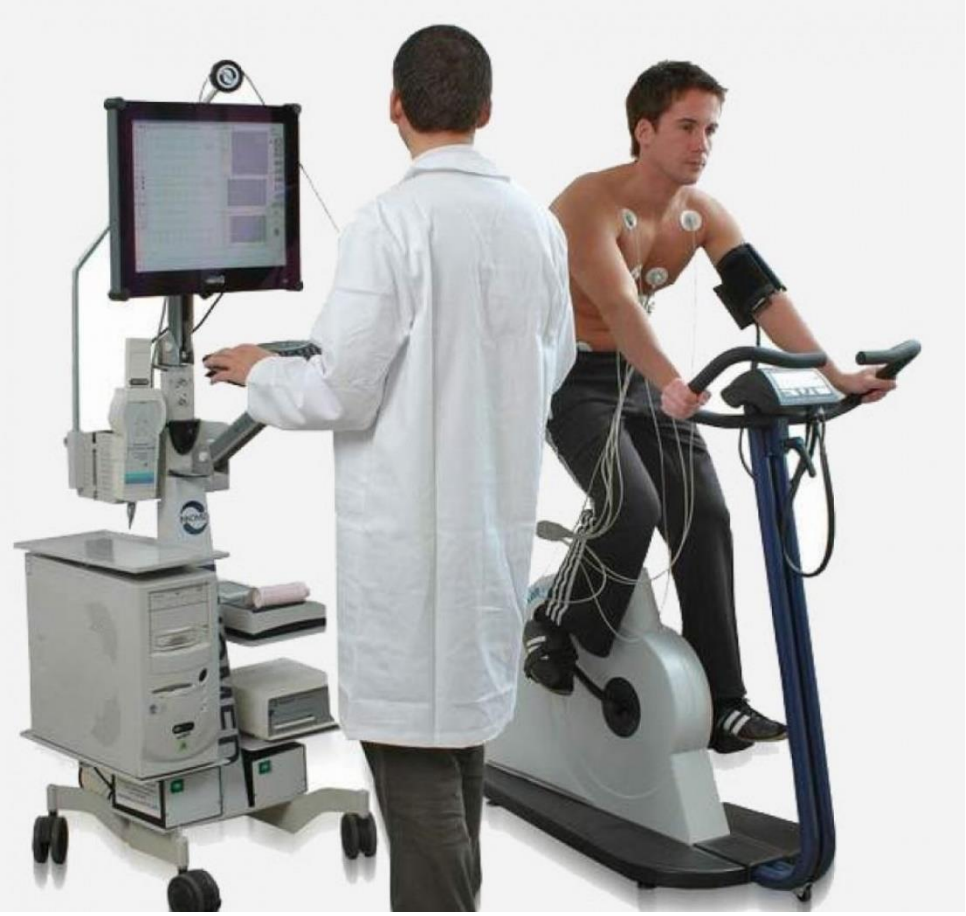

Shymkent 2022

Department: "General practitioner - 1"	044/61
Methodological recommendations for teaching clinical skills in the CPS (using the execution algorithm)	

Reviewed and discussed at the meeting of the department
Protocol No. 4 of 5. 11 2022
Head of the Department _____ Datkaeva G.M.

1. Name of the clinical skill: Bicycle ergometry technique

2. The purpose of the training:

- teach the rules and techniques of using a bicycle ergometer
- master the theoretical material on the rules and techniques of using a bicycle ergometer
- work out the method of using a bicycle ergometer by each intern doctor
- determine the indications for the use of a bicycle ergometer
- teach safety precautions when working with the device
- development of clinical skills to perfection, taking into account the application in real clinical practice

3. The time required for preliminary instruction and demonstration of the skill on a mannequin: 7 minutes

4. Time required for self-mastery of the skill: 15 minutes

5. The necessary theoretical knowledge to master the clinical skill:

- cardiopulmonary resuscitation
- the reaction of blood pressure to the load
- the pathogenesis of coronary heart disease
- dosed physical activity
- reading the ECG

6. The list of simulators, simulators, dummies, models required for clinical skill development:

- exercise bike with stepwise increasing load
- electrocardiograph to monitor the patient's heart rhythm

7. List of medical devices and equipment:

- blood pressure measuring device
- bed
- defibrillator
- first aid kit
- oxygen cushion

8. Execution algorithm:

	Steps	Algorithm of action
1	Disinfects hands	He treated his hands in accordance with the *European standard* EN-1500 and put on sterile gloves.
2	Conducts an examination of the patient	• anamnesis collection (well-being, sleep, medications, etc.) • physical examination with blood pressure measurement • calculation of heart rate (HR)
3	Applies standard electrodes	• the chest electrodes are imposed in the standard position • the electrodes are transferred from the legs to the lumbar region

		• from the hands under the angles of the shoulder blades or on the shoulder belt
4	Performs blood pressure measurement	• a tonometer cuff is placed on the shoulder
5	Assess clinical symptoms during exercise	• shortness of breath • fatigue • reduced physical activity • lack of air • the appearance of edema
6	The doctor at each stage conducts	• recording of 5 ECG complexes • the ECG shows the level of load and its duration
7	Measurement of blood pressure	• at load peak • at the end of the load • during the recovery period, every 2 minutes
8	Evaluation of the results of the load test	• complaints • appearance • psychological load tolerance • heart rate indicators • ECG data • test results should be recorded in the study protocol

9. Task:

- Determine the indications for conducting bicycle ergometry
- Process the data obtained after the bicycle ergometry

10. Skill execution algorithm:

- before the start of the study, the intern doctor takes ECG, blood pressure and pulse readings at restпациент
- sit on the simulator, pedal and describe his condition under various loads
- every 3 minutes, the intern doctor increases the load
- the intern must carefully monitor the patient and his performance
- at the same time, all changes in heart rate, blood pressure, pulse are recorded in the protocol

11. Materials for self-assessment on the topic of the lesson:

1. Select items without which the stress testing room cannot function without a high risk of complications for the patient:

A. Humidifier
B. Defibrillator
C. Air conditioning
D. Automatic blood pressure monitor
E. First aid kit with medicines

2. Before the stress test, the patient had a blood pressure of 165/90 mm Hg. What antihypertensive drug is the most appropriate to prescribe?
A. Corinfar.
B. Captopril.
C. Lasix.
D. Atenolol.
E. Klofelin.
3. The patient before the test with physical activity on the ECG at rest for the first time revealed a complete blockade of the right leg of the bundle of His. What is your tactic in this case?
A. Perform a study to exclude coronary artery disease by submaximal.
B. Protocol.
C. Perform a test according to a sparing protocol.
D. Hospitalize the patient.
E. Perform the test after careful pre-examination and observation.
F. Postpone the test indefinitely.
4. A 68-year-old patient who is afraid of a stress test is tested according to the protocol. After two minutes, the patient urgently demands to stop the study, but cannot explain the reason. Your next steps:
A. Reduce the speed and incline of the treadmill and continue the test.
B. Continue the test in the same mode until the patient clearly articulates the reason for his concerns or there is a significant change in the ECG.
C. Continue the test as before, call the attending physician.
D. Stop testing immediately.
5. A 30-year-old patient underwent exercise testing to determine exercise tolerance. During the test at the last stage, there was a slight shortness of breath, negative T waves were recorded on the ECG in several leads. Your next strategy:
A. Continue testing until submaximal heart rate is reached.
B. Stop the test while sitting on the bike, monitor the ECG.
C. The next day, test with hyperventilation.
D. Recommend a stress test the next day while taking nitroglycerin.
6. A 57-year-old patient with recurrent pain in the heart area arising from physical activity is undergoing a stress test according to the protocol. After 5 minutes, unpleasant sensations appeared in the region of the heart, without ECG changes. Your tactics:
A. Stop testing, regard the sample as doubtful, recommend further additional examination (Stress EchoCG, CAG).
B. Continue testing in the same mode until submaximal heart rate is reached.
C. Continue testing until submaximal heart rate is reached, but with manual decrease in incline and treadmill speed.
7. The patient developed hypotension up to 90/50 mm Hg during the stress test (EMT). Art., presyncope state. What to do?
A. Stop the test while sitting on a bicycle, control blood pressure, ECG.
B. Stop the test, lay the patient with raised legs, control blood pressure, ECG.
C. Reduce the speed of the bicycle, continue the load under the control of blood pressure.
D. Maintain the achieved load level until a clear ECG dynamics appears on the monitor screen in order to exclude coronary artery disease.

8. Stress testing is performed on a patient after stenting of the right coronary artery a month ago. The chest pain does not recur. A treadmill test is carried out according to the BRUCE protocol. In which leads should we expect dynamics with restenosestent:
A. Leads II, III, aVF.
B. Lead V1.
C. Leads V4, V5.
D. In any of the leads.
9. A patient has an early ventricular repolarization syndrome with 1.5 mm ST segment elevation in the chest leads before the ECG test. Upon reaching submaximal heart rate, a decrease in the ST segment to the isoline was revealed. There are no complaints. BP - 170/90 mm Hg. Art. Your actions:
A. Continue the test to the maximum allowable heart rate.
B. Stop the test, consider the result as positive - the dynamics of the 79 ST segment is more than 1 mm.
C. Stop the test, describe it as doubtful, order a stress echocardiogram.
D. Stop the test, recognize it as negative, since no signs of transient ischemia have been identified.
10. In a 53-year-old patient with complaints of pressing pain behind the sternum when walking, the load test was qualified as doubtful. Menopause came 3 years ago. Your next strategy:
A. Start antianginal therapy, statins and aspirin without further investigation.
B. Conduct stress echocardiography, MSCT, and, depending on the results, decide on the need for CAG.
C. Carry out CAG in a planned manner for verification of coronary artery disease.
D. Do not conduct further instrumental examinations, because you suspect a false positive test result.

12. Evaluating criteria for the performance of a skill

	Steps	Algorithm of action	Performance evaluation	
			Yes	No
1	Disinfects hands	He treated his hands in accordance with the *European standard* EN-1500 and put on sterile gloves.		
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3	Applies standard electrodes	• the chest electrodes are imposed in the standard position • the electrodes are transferred from the legs to the lumbar region from the hands under the angles of the shoulder blades or on the shoulder belt		
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5	Assess clinical symptoms during exercise	• shortness of breath		

		• fatigue • reduced physical activity • lack of air • the appearance of edema		
6	The doctor at each stage conducts	• recording of 5 ECG complexes the ECG shows the level of load and its duration		
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8	Evaluation of the results of the load test	• complaints • appearance • psychological load tolerance • heart rate indicators • ECG data • test results should be recorded in the study protocol		

13. References:

Main:

1. Heart disease: A guide for doctors / ed. R.G. Oganova, I.G. Fomina. – M.: Litterra, 2006. – 1328 p.
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Additional:

8. Domnitskaya T.M., Gracheva O.A., Batenkova O.A. The use of exercise tests in cardiology. Guidelines edited by prof. B.A. Sidorenko. - M. 2001. - 30 p.
9. Skvirskaya G.P., Kuzin V.F. Diagnostic service in healthcare institutions. Endoscopy, functional and radiation diagnostics / Regulatory documents. Comment - M .: Knizhny Mir, 1998. - 200 p.
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14. Samples of correct answers for the assessment material:

question number	answer
1	B, F
2	B
3	D
4	D
5	A, C
6	C
7	B
8	D
9	A, D
10	B, C