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Medical Faculty No 1
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APPROVED
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METHODOLOGICAL GUIDE FOR INDEPENDET APPLICANT'S WORK OF THE ELECTIVE COMPONENT

International Faculty, **6th year**
Educational discipline: **"EMERGENCY CONDITIONS IN CARDIOVASCULAR DISEASES: ALGORITHMS OF DIAGNOSIS AND TREATMENT, ANALYSIS OF CLINICAL SITUATIONS"**

Approved
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Topic 1: Key symptoms and syndromes in emergency cardiology (heart pain, dyspnoea, syncope)

Aims: to acquire knowledge and skills in the diagnosis and differential diagnosis of the main symptoms and syndromes in emergency cardiology at different stages of medical care for patients with cardiovascular diseases (CVD).

Part I. Heart pain

Main definitions:

1. Pain in the heart (cardiac pain, equivalent of angina pain (angina pectoris), probably cardiac pain, non-cardiac pain).
2. Risk factors for atherosclerotic CVD (ASCVD).
3. Factors to consider when assessing the situation during the first medical contact (FMC) with a patient with complaints of heart pain.
4. Algorithm of actions for cardiac pain / equivalents of agnosic pain (angina) at the stages of medical care.

1. Theoretical questions:

1.1. Etiology and pathogenetic mechanisms of anginal pain.

Questions for self-control:

1. Clinical characteristics of typical anginal pain (location, nature, duration of pain, its relationship with physical or psycho-emotional stress, as well as factors/actions that eliminate it.
2. Clinical characteristics of angina pain equivalents (angina pectoris)
3. The most common causes of chest pain and their differential diagnosis (cause, mechanism, localisation, nature of pain, factors that provoke, aggravate, relieve pain, possible concomitant symptoms)
4. Factors to be considered for assessing the severity of a patient with heart pain during the first medical contact (FMC) with a patient with complaints of heart pain.

The main tasks for studying the theoretical material:

1. Fill in the table 1.

Table 1: Clinical differential diagnosis of anginal and non-anginal pain

Type of pain syndrome	Features.
A typical angina attack	1) 2) 3)
Atypical angina pectoris	
Equivalents of angina pectoris	
Non-anginal pain	

2. Work out the main differential diagnostic characteristics of heart pain (Table 2)

Table 2: The most common causes of chest pain and their differential diagnosis

Disease (cause)	Mechanism	Localisation	Type of pain, duration	Factors that provoke, aggravate, and relieve pain
Angina pectoris	Myocardial ischaemia (imbalance between oxygen demand and delivery to the heart muscle) due to coronary blood flow disorders	Behind the sternum, to the left of the sternum, with possible radiation to the neck, lower jaw, shoulders, elbows, fingers, back, epigastric region	Pressing, burning, squeezing; 2-10 min, no more than 20 min	Physical exertion, emotional stress, cold air, large amounts of food consumed; disappears after cessation of physical activity or after taking nitroglycerin for 5-7-10 minutes
Acute coronary syndrome/ myocardial infarction	Prolonged myocardial ischaemia, myocardial necrosis due to complete or partial occlusion of the coronary artery (CA), persistent CA spasm, stent thrombosis, severe anaemia	As in angina pectoris	As for angina pectoris, but more intense, often there are concomitant symptoms (fear of death, shortness of breath, rhythm disturbance, loss of consciousness) duration of more than 20 minutes.	It does not resolve after the use of nitroglycerin and/or cessation of physical activity, or recurs rapidly.
Aortic dissection	Stretching and damage to the aortic wall	Anterior chest wall, may radiate to the intercostal region and/or lower back	Intense (unbearable) tearing, burning	High blood pressure, excessive physical activity, trauma
Pericarditis	Irritation of the pericardial lining or pleura adjacent to the pericardium due to inflammation, stretching (effusion)	Precardially on the left, behind the sternum, in the area of the apical impulse; may radiate to the neck and left shoulder, back	Sharp, stabbing, burning, with variable severity depending on breathing and body position, may be accompanied by an increase in body temperature (in	It increases with deep breathing, coughing, turning the torso, lying on the back; decreases in the sitting position with a forward bend

			case of inflammation), a decrease in blood pressure and swelling of the jugular veins, paradoxical pulse (in case of cardiac tamponade)	
Bone and joint and neurological pain	Inflammatory and/or degenerative process in the sternocostal and sternoclavicular joints, trauma and recent unusual physical exertion, Neuritis (e.g. shingles), nerve compression caused by changes in the spine	Local, anterior chest wall, Unilateral in herpes zoster, may be bilateral in case of changes in the spine	Sharp, stabbing, pressing	Chest movements, cough, Worsens during palpation along the nerve, sometimes with light touch (allodynia)
Gastroenterolo-gical (gastroesophageal reflux disease, esophageal pathology, peptic ulcer,	Esophagitis, damage to the oesophageal wall,	Behind the sternum, may radiate to the back Epigastric region, sometimes in the lower chest	Burning or pressing Dull, rarely sharp or burning	Large amounts of food consumed, bending over, lying down, vomiting Eating (stomach ulcer) or on an empty stomach; eating reduces complaints of duodenal ulcer.
Gallstone disease)	damage to the mucous membrane stretching and overflow of the gallbladder	Right hypochondrium or epigastric region, may radiate to the right shoulder	Severe, increasing, then constant, slowly disappearing; lasts from several minutes to several hours	Eating fatty foods; decreases when lying down without moving
Pain of neurotic origin	Unidentified	Precordial	Changes the characteristics	Emotional stress, panic disorders, decreases when taking sedatives

3. Analysing clinical cases

Clinical case 1: A 50-year-old male patient woke up at night with intense burning pain behind the sternum, accompanied by a feeling of shortness of breath, terror, could not find his place, walked around the room, and the pain was increasing. The patient called an ambulance 15 minutes after the onset of the attack. The doctor arrived in 15 minutes. The pain persisted, relieved after taking nitroglycerin. Objectively: the skin is moist, the heart rhythm is irregular, the tones are muffled, the heart rate is 100 per minute, blood pressure is 110/80 mm Hg, breathing is vesicular in the lungs, the abdomen is soft, painless. ECG: ventricular extrasystoles, ST-segment elevation in V1-V5.

1. Describe the characteristics of pain that correspond to its coronary origin.
2. Evaluate and justify your opinion on the patient's condition: stable or unstable
3. Determine the preliminary diagnosis.

Clinical case 2: The patient is 28 years old. Complaints: pain, burning and pressing in the heart area, almost constant for 2 weeks, aggravated by walking, shortness of breath with slight physical exertion and palpitations. He fell ill 3 weeks ago, after ARVI. Objectively: acrocyanosis, blood pressure - 90/75 mm Hg, pulse - 108 beats per minute. The heart borders are percussively mixed to the left and right. The heart sounds are deaf, the third tone is heard. In the lungs, breathing is vesicular, the liver is not enlarged, swelling of the legs. ECG: sinus rhythm, left bundle branch block.

1. Describe the type of pain in the patient, justify your suggestion: cardiac, non-cardiac.
2. Determine the etiology of pain.
3. Formulate a preliminary diagnosis.
4. Work through Table 3.

Table 3. Methods for diagnosing the causes of heart pain

Methods		
Laboratory:	Purpose: to identify risk factors for atherosclerosis and conditions that provoke the development of myocardial ischaemia/necrosis	
Lipid profile	Indicators	Value
	Total cholesterol (TC), LDL CHOLESTEROL, HDL CHOLESTEROL, triglycerides	Dyslipidemia
Assessment of glycaemia	Fasting glucose Glycated haemoglobin	Hyper-/hypoglycaemia

	(Hb A1c, %)	
Complete blood count	Haemoglobin Leukocytosis ESR	Anaemia Inflammation, leukaemia in the acute period of MI
Biomarkers of myocardial necrosis/injury	Cardiac troponins, if possible, highly sensitive, at 3-hour intervals	Marker of myocardial necrosis/injury, prognostic marker
A biomarker for heart failure	Sodium pro-brain uretic peptide (NT-proBNP)	HF diagnostic, prognostic marker
Instrumental	To confirm / exclude coronary causes of heart pain	
ECG at rest	**NB!** It is performed on all patients with heart pain within 10 minutes of the first medical contact	
	Assessment: - heart rhythm - QRS complex (pathological Q wave), acute block of the left bundle branch block) - repolarisation phases (elevations, ST-segment depression, changes in amplitude, shape of the T wave, its inversion)	For the diagnosis and differential diagnosis of acute coronary syndrome (ACS), MI, unstable angina: ACS with ST-segment elevation, ACS without ST-segment elevation, unstable angina), to diagnose complications of ACS (rhythm and conduction disorders).
Holter monitoring of the ECG	It is performed in case of arrhythmia or suspected vasospastic angina (Prinzmetal) after excluding an emergency condition.	Detects "silent" myocardial ischaemia, total ischaemia time
Echocardiography (Echocardiography) at rest	Assessment of segmental (hypo- and akinesis zones) and total myocardial contractility, left ventricular ejection fraction (LVEF)	Confirmation of ischaemia, risk stratification
Coronarography	Complete, incomplete occlusion of the CA, intact coronary arteries	A basic study to assess the anatomy of the coronary artery, prognosis and possibilities of invasive treatment.

5. Make an algorithm of actions for cardiac pain / equivalent of agnosic pain (angina pectoris) at the stages of medical care in accordance with current standards:

- actions of the family doctor:

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- actions of an emergency physician:

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- actions of a cardiologist in a specialised hospital:

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Part 2. Shortness of breath in CVD

2.1. Theoretical questions:

2.1.1. Etiology and pathogenetic mechanisms of dyspnoea in CVD.

1. Clinical manifestations and characteristics of dyspnoea in CVD.
2. The main indicators for assessing the severity and monitoring of the patient's condition with dyspnoea.
3. Indications for transporting a patient with dyspnoea to the intensive care unit.
4. Syncopal state, definition.
5. Etiology and pathogenetic mechanisms of syncopal states in CVD.
6. Diagnostic criteria for syncopal state.
7. Differential diagnosis of syncope and conditions other than syncope.
8. Risk stratification in patients with probable syncope.

Topic 2 : Acute coronary syndromes (ACSs)

Aims: to acquire knowledge and skills in the diagnosis and differential diagnosis of ACS at different stages of medical care; to master modern algorithms for providing medical care to patients with ACS.

Main definitions:

1. ACS with stable elevation of the ST segment

2. ACS without stable elevation of the ST segment
3. Unstable angina pectoris
4. Biomarkers of necrosis and myocardial damage
5. ECG criteria for ACS
6. Optimal time of diagnostic and therapeutic procedures in patients with different types of ACS
7. Antiplatelet drugs
8. Anticoagulants
9. Thrombolysis
10. High-dose statin therapy

Plan.

1. Theoretical questions:

1.1. Basic concepts and definitions of GCS

1.2. Universal definition of myocardial infarction (MI). Types of MI

1.3. Pathogenesis of ACS

1.4. Clinical manifestations of ACS

1.5. ECG criteria for different types of ACS

1.6. laboratory criteria for ACS

1.7. Principles of medical triage of patients with suspected ACS

Questions for self-control:

The main tasks for studying the theoretical material:

1. To study the etiology, pathogenesis and main risk factors and provoking factors of ACS.
2. Describe the main clinical manifestations of ACS.
3. Learn the classification of ACS and the 4th universal definition of acute myocardial infarction (MI).
4. To know the modern principles of diagnosis of ACS at different stages of medical care.
5. To give a list of the main methods of diagnosing ACS and to assess their diagnostic significance.
6. Principles of risk stratification in patients with ACS. The GRACE risk scale.
5. Principles of treatment of various forms of ACS.

2. Practical work (tasks) to be performed:

Create an algorithm for the provision of medical care and treatment of a patient with ST-segment elevation acute coronary syndrome at the prehospital and hospital stages.

1. To create an algorithm for the provision of medical care and treatment of a patient with NSTEMI without persistent ST-segment elevation at the prehospital and hospital stages.

2. Principles of differential diagnosis of cardiac (ischaemic) and non-cardiac heart pain. Create and fill in the table of differential diagnosis of acute heart pain.

List of recommended literature

Basic:

1. ISH 2020: оновлені клінічні рекомендації, нова класифікація артеріальної гіпертензії та спрощена класифікація кардіоваскулярного ризику. *УКР. МЕД. ЧАСОПИС*, 2020, 16 червня [Електронна публікація: WWW.UMJ.COM.UA].
2. Рекомендації Європейського товариства кардіологів (European Society of Cardiology) і Європейського товариства з гіпертензії) з лікування артеріальної гіпертензії 2018 р. *Аретріальна гіпертензія*, 2018; 5 (61): 58-172.
3. Наказ МОЗ України № 441 від 09.03.2022 р. Про затвердження порядків надання домедичної допомоги особам при невідкладних станах, https://zakon.rada.gov.ua/laws/show/z0356-22#Text.
4. Наказ МОЗ України від 14 вересня 2021 р. №1936 УНІФІКОВАНИЙ КЛІНІЧНИЙ ПРОТОКОЛ ЕКСТРЕНОЇ, ПЕРВИННОЇ, ВТОРИННОЇ (СПЕЦІАЛІЗОВАНОЇ), ТРЕТИННОЇ (ВИСОКОСПЕЦІАЛІЗОВАНОЇ) МЕДИЧНОЇ ДОПОМОГИ ТА КАРДІОРЕАБІЛІТАЦІЇ «ГОСТРИЙ КОРОНАРНИЙ СИНДРОМ З ЕЛЕВАЦІЄЮ СЕГМЕНТА ST», https://www.dec.gov.ua/wp-content/uploads/2021/09/2021_1936_ykpmd_gkszelev.pdf.
5. Наказ Міністерства охорони здоров'я України від 15 вересня 2021 р. №1957 УНІФІКОВАНИЙ КЛІНІЧНИЙ ПРОТОКОЛ ЕКСТРЕНОЇ, ПЕРВИННОЇ, ВТОРИННОЇ (СПЕЦІАЛІЗОВАНОЇ), ТРЕТИННОЇ (ВИСОКОСПЕЦІАЛІЗОВАНОЇ) МЕДИЧНОЇ ДОПОМОГИ ТА КАРДІОРЕАБІЛІТАЦІЇ «ГОСТРИЙ КОРОНАРНИЙ СИНДРОМ БЕЗ ЕЛЕВАЦІЇ СЕГМЕНТА ST» .
6. Наказ МОЗ України від 15 січня 2014 р. №34 «Про затвердження та впровадження медико-технологічних документів зі стандартизації екстреної медичної допомоги «Гіпертонічний криз», «Раптова серцева смерть», «Гостра дихальна недостатність», «Гіповолемічний шок», «Гострі отруєння», «Тромбоемболія легеневої артерії».
7. Невідкладні стани при серцево-судинних захворюваннях: алгоритми діагностики та лікування. Адаптовано за матеріалами Асоціації з невідкладної серцево-судинної допомоги Європейського товариства кардіологів, Українська асоціація з невідкладної кардіології, Ассоціація кардіологів України,
   2023 /За редак. члена-кор. НАМН України проф. О.М. Пархоменка,
   Видання третє, - 153 с.
8. Серцево-судинні захворювання. Класифікація, стандарти діагностики та лікування / за ред. В. М. Коваленка, М. І. Лутая, Ю. М. Сіренка, О. С. Сичова. – К.: МОРІОН, 2021. – 192 с.
9. Електрокардіографічна діагностика і лікування в невідкладній кардіології. 2-е видання, доповнене. Скибчик В.А., Скибчик Я.В.. - Л: Простір – М, 2020. - 164.

Additional:

1. Невідкладні стани в кардіології: навчально-методичний посібник для здобувачів ступеня доктора філософії за третім освітньо-науковим рівнем в галузі знань 22 "Охорона здоров'я" спеціальності 222 "Медицина" навчальна дисципліна "Сучасна кардіологія" / В.Д. Сиволап, С.М. Кисельов, Д.А. Лашкул. – Запоріжжя : ЗДМУ, 2020. – 137 с.

Electronic information resources.

1. State Expert Centre of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

2. Resource on drug interactions http://medicine.iupui.edu/flockart/
3. Oxford Medical Education http://www.oxfordmedicaleducation.com/

Information support:

Electronic library of ONMedU: methodological recommendations.