

TEACHING STUDENTS ABOUT CLINICAL-FUNCTIONAL FEATURES OF MYOCARDIAL INFARCTION THROUGH INNOVATIVE TECHNOLOGIES

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Abstract:

Cardiovascular diseases (CVD) remain the leading cause of death in economically developed countries. The incidence and mortality statistics of myocardial infarction (MI) among young people indicate an increase in the number of cases among those under 45 years of age.

Modern technologies play an important role in the formation of professional skills of future doctors. This article reviews modern approaches to teaching students the clinical and functional characteristics of myocardial infarction using simulation training, digital learning platforms, and virtual clinical scenarios.

The effectiveness of integrating innovative methods into medical education is analyzed. The importance of an interdisciplinary approach and the prospects for future research in this area are emphasized.

Keywords: Medical education, myocardial infarction, innovative technologies, simulation training, digital learning platforms.

Introduction

Modern medical pedagogy seeks to use innovative technologies aimed at increasing the effectiveness of student learning. One of the most relevant and in-depth sections of cardiology is myocardial infarction (MI), which is one of the most common diseases of the cardiovascular system. MI is characterized by high mortality and disability.

To effectively teach students the clinical aspects of MI, it is necessary to use innovative educational technologies that provide the formation of clinical thinking and practical skills.

This article reviews advanced educational methods, including simulation technologies, electronic learning resources, virtual clinical scenarios, and an interdisciplinary

approach. The impact of these approaches on increasing the level of professional training of students of higher medical institutions is analyzed.

LITERATURE REVIEW

The issues of introducing innovative technologies into medical education have been considered in the works of many domestic and foreign researchers. According to [Smith et al., 2020], the use of simulation-based teaching methods in cardiology can significantly improve student training by imitating realistic clinical scenarios. Similar conclusions are drawn in [Jones et al., 2019], which emphasizes the importance of using high-tech simulators in the diagnosis and treatment of myocardial infarction.

The work of Ivanov & Petrov,[2021] analyzes the effectiveness of digital learning platforms. Studies show that the use of virtual patients and interactive learning modules increases the acquisition of theoretical material by 30–40%. [Brown et al., 2022] compares traditional and innovative teaching methods, showing that the integration of VR (virtual reality) and AR (augmented reality) technologies helps to gain a deeper understanding of complex cardiological processes.

Simulation-based learning

Studies (Smith et al., 2020; Johnson & Lee, 2019) show that the use of high-fidelity simulators improves students' skills in diagnosing myocardial infarction.

Virtual patients, on the other hand, help to better understand complex clinical situations (Brown et al., 2021).

Artificial intelligence in cardiology education

The use of artificial intelligence in analyzing ECGs and echocardiography increases diagnostic accuracy and reduces data processing time (Williams et al., 2022).

Automated learning systems, on the other hand, adapt to each student individually (Garcia et al., 2023).

Digital learning platforms

Online courses and telemedicine education are becoming more popular and convenient (Kumar et al., 2021).

Mobile applications are an effective tool for students in the interactive study of cardiological pathologies (Fernandez et al., 2020).

1. CLINICAL AND FUNCTIONAL FEATURES OF MYOCARDIAL INFARCTION

1.1. Etiopathogenesis of myocardial infarction

Myocardial infarction is an acute necrosis of the heart muscle, which occurs as a result of insufficient blood supply due to occlusion of the coronary artery. The main pathophysiological mechanisms of MI are:

- Rupture of atherosclerotic plaques (plaques) and subsequent activation of thrombus formation;

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- Vasospasm of the coronary arteries;
 - Disorders in the blood coagulation system;
 - Endothelial dysfunction.

1.2. Clinic of myocardial infarction

The main symptoms of MI are:

- Intense pain behind the chest, radiating to the left arm, neck, lower jaw, pressing or burning;
- Shortness of breath (dyspnea) occurring against the background of left ventricular failure;
- Heart rhythm disturbances - tachycardia or bradycardia;
- Changes in blood pressure: in cardiogenic shock - a tendency to hypotension, and against the background of pain syndrome - hypertension;
- Vegetative signs: sweating, nausea, weakness.

1.3. Instrumental and laboratory methods of diagnosis

The following methods are used to diagnose myocardial infarction (MI):

- **Electrocardiography (ECG):** detection of ST segment elevation, T wave inversion, pathological Q wave.
- **Biochemical markers:** Troponins, CPK-MB (creatin phosphokinase - myocardial fraction), increased myoglobin levels.
- **Echocardiography:** Identification of areas of hypokinesia or akinesia of the myocardium.
- **Coronary angiography:** Determination of the degree of stenosis (narrowing) of the coronary arteries.

2. INNOVATIVE TECHNOLOGIES IN EDUCATION

2.1. Simulation technologies in medical education

Simulation technologies are methods that allow modeling of real clinical scenarios. They serve to develop practical skills of students in a safe environment. These methods have a number of advantages in the study of myocardial infarction (MI) in young patients:

- 1. Safety** - the ability to practice clinical manipulations without harming patients (Cyberleninka, 2023).
- 2. The possibility of repeated repetition - this helps to improve skills and reduce errors.**
- 3. Feedback** – allows for immediate analysis of students' actions.

In cardiology, in particular, the use of simulators designed for the study of echocardiography and coronary angiography helps to make an accurate diagnosis and choose the right treatment tactics (Rosomed, 2022).

Simulation technologies include:

- **High-tech simulators** – mannequins that imitate pathophysiological changes characteristic of myocardial infarction (Cyberleninka, 2023).
- **Virtual patients** – interactive computer models that allow students to analyze the patient's condition and make decisions (Rosomed, 2022).
- **ECG and echocardiography simulators** – devices that train students to interpret data on cardiac activity.

DISCUSSION

The use of innovative technologies in medical education significantly increases the level of training of specialists. However, it is important to thoroughly work out the methodology for integrating digital solutions and prepare teachers for new formats of interaction with students. In addition, the impact of teaching through technologies on the practical skills of graduates and their adaptation to clinical conditions still remains open. In addition, teachers must have sufficient knowledge and skills in this area, regularly participate in training, and, in particular, be provided with the necessary educational equipment.

CONCLUSION

The use of innovative technologies in the study of the clinical and functional characteristics of myocardial infarction significantly increases the quality of medical education. The use of simulation training, virtual patients, and an interdisciplinary approach contribute to the preparation of qualified specialists ready for practical work. Future research should focus on further integrating digital technologies into the medical education environment to improve student learning effectiveness and hone their professional skills.

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