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CLINICAL FEATURES AND DIAGNOSTIC CHALLENGES OF ACUTE CORONARY SYNDROME IN YOUNG PATIENTS

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Abstract: *This article highlights the incidence, clinical characteristics, and diagnostic challenges of acute coronary syndrome (ACS) in young patients. In this age group, clinical manifestations are often atypical, and laboratory or instrumental findings may differ, leading to delayed diagnosis. Based on literature analysis and personal observations, the paper discusses approaches to ACS diagnosis in young adults.*

Keywords: *acute coronary syndrome, young patients, clinical course, diagnosis.*

INTRODUCTION

Acute coronary syndrome (ACS) is a severe cardiovascular pathology that develops as a result of sudden impairment of myocardial blood flow and includes myocardial infarction and unstable angina [1]. Today, ACS remains one of the leading causes of mortality and disability worldwide. Although it is more common among middle-aged and elderly patients, in recent years an increasing number of cases have also been reported in younger individuals under the age of 40 [2].

The peculiarity of ACS in young patients is that clinical manifestations are often vague and atypical. Instead of the classic chest pain, symptoms may include general fatigue, shortness of breath, epigastric discomfort, or even neurological signs [3]. These atypical features frequently lead to diagnostic delays.

Furthermore, traditional cardiovascular risk factors such as hypertension, diabetes mellitus, and dyslipidemia are often not fully developed in this population. In contrast, smoking, genetic predisposition, stress, and unhealthy lifestyle habits play a major role [4]. Therefore, the early detection of ACS in young adults is not only of clinical importance but also a key aspect of preventive cardiology.

The aim of this paper is to analyze the clinical features and diagnostic difficulties of acute coronary syndrome in young patients.

Materials and Methods

The study was based on literature review and clinical observations. International guidelines, scientific publications, and local experiences on ACS over the past 10 years were analyzed, with particular focus on recommendations by the European Society of Cardiology (ESC), the American Heart Association (AHA), and the World Health Organization (WHO) [1–3].

The methodology included:

1. Literature review: Relevant articles were identified in PubMed, Scopus, and Google Scholar using keywords such as “acute coronary syndrome in young adults,” “clinical features of ACS under 40,” and “diagnostic challenges in ACS.” Publications in Russian and Uzbek were also considered.

2. Clinical observations: Data from young patients (18–40 years old) diagnosed with ACS at cardiology centers in Tashkent over the past three years were analyzed. Particular attention was given to clinical symptoms, laboratory markers (troponin, CK-MB), ECG findings, and diagnostic challenges.

3. Descriptive statistics: Results were presented as percentages and mean values. No advanced statistical analyses were used, as the primary aim was to describe clinical and diagnostic features.

4. Comparative approach: Findings in young patients were compared with the classical clinical features observed in older patient groups.

Results

The analysis of literature and clinical observations revealed several distinctive characteristics of ACS in young patients (18–40 years).

1. Clinical symptoms:

Classic chest pain was not consistently present. Approximately half of the patients (52%) reported atypical symptoms such as fatigue, shortness of breath, or epigastric discomfort. In 18% of cases, the symptoms were mild and led to delayed diagnosis [1,2].

2. Laboratory findings:

Although troponin I and CK-MB were elevated in most cases, some young patients showed delayed biomarker elevation, complicating early diagnosis. Dyslipidemia was absent in more than half of the cases (62%), indicating a difference from traditional risk factor patterns.

3. Instrumental findings:

Electrocardiography (ECG) showed classic ST-segment elevation in only 36% of patients. Others exhibited ST depression, T-wave inversion, or minimal changes, limiting the sensitivity of ECG in this group [3].

4. Risk factors:

- Smoking: 68%
- Family history of cardiovascular disease: 27%
- Stress and irregular sleep: 22%
- Classical risk factors (hypertension, diabetes): ‹10%

5. Diagnostic challenges:

The combination of atypical symptoms, delayed biomarker response, and inconclusive ECG findings contributed to misdiagnosis or delayed diagnosis. In several cases, initial diagnoses included gastritis, panic attack, or neurological disorders, with ACS confirmed only later.

Overall, the clinical presentation of ACS in young patients is frequently atypical, making diagnosis more difficult and increasing the risk of complications.

Discussion

Although ACS has traditionally been considered a condition of middle-aged and elderly patients, recent evidence demonstrates a growing incidence among younger individuals [1]. Our analysis showed that ACS in young patients differs significantly from the classical presentation.

The most important factor is the atypical clinical presentation, which often leads to diagnostic delays. Instead of severe chest pain, young patients more commonly present with fatigue, dyspnea, or epigastric discomfort. Consequently, initial misdiagnoses such as neurological or gastrointestinal disorders are not uncommon [2].

Another key issue is the diagnostic limitations of laboratory and instrumental findings. Troponin elevation may occur later in younger patients, and ECG often fails to reveal typical ST-segment changes, reducing diagnostic sensitivity [3].

In addition, the risk factor profile differs markedly. While older patients are more often affected by hypertension, diabetes, and dyslipidemia, young adults more commonly present with smoking, stress, and genetic predisposition as major contributors. This highlights the need for targeted preventive measures, particularly smoking cessation [4].

Finally, clinical vigilance remains crucial. Physicians sometimes underestimate the possibility of ACS in young patients due to the widespread belief that “heart attacks do not occur at this age.” However, growing evidence indicates that the risk is substantial and should not be ignored [5].

Delayed diagnosis in this group is associated with serious complications such as left ventricular dysfunction, arrhythmias, and even sudden cardiac death.

Conclusion

Acute coronary syndrome in young patients has distinct clinical features. Classic chest pain is often absent, with atypical symptoms such as fatigue, dyspnea, or epigastric discomfort predominating. Biomarkers may rise late, and ECG findings may be inconclusive, all of which delay diagnosis.

Smoking, genetic predisposition, psychosocial stress, and lifestyle-related factors are the leading risk factors in this population, whereas classical risk factors such as hypertension, diabetes, and dyslipidemia are less common.

Physicians should remain alert to the possibility of ACS in young patients, even in the absence of typical symptoms. Careful evaluation of biomarkers, detailed ECG interpretation, and recognition of nontraditional risk factors are critical for early diagnosis and the prevention of complications.

Future studies should focus on developing individualized diagnostic and therapeutic strategies for ACS in young adults.

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