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SYMPTOMS AND DIAGNOSTIC CHALLENGES OF ACUTE CORONARY SYNDROME IN WOMEN AND MEN

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Abstract: *This article analyzes the specific features of clinical symptoms in women and men with acute coronary syndrome (ACS) and the diagnostic challenges associated with them. In women, ACS often manifests with atypical symptoms, while in men, classic anginal pain predominates. In addition, the sensitivity of electrocardiography (ECG) and cardiac biomarkers was evaluated in relation to gender differences.*

Keywords: *Acute coronary syndrome, gender differences, symptoms, diagnosis, ECG.*

INTRODUCTION

Acute coronary syndrome (ACS) is one of the most life-threatening cardiovascular conditions and remains a leading cause of death worldwide. According to the World Health Organization, ischemic heart disease, including ACS, occupies the top position in global mortality statistics.

Recent studies highlight the importance of sex differences in the clinical presentation and diagnosis of ACS. Men are more likely to experience the classic anginal chest pain, whereas women often present with atypical symptoms such as epigastric pain, shortness of breath, nausea, and general weakness. The nonspecific nature of these symptoms frequently delays diagnosis in women, leading to postponed treatment and increased risk of complications.

Electrocardiography (ECG) and cardiac biomarkers such as troponin and creatine kinase-MB (CK-MB) are crucial in ACS diagnosis. However, the sensitivity of these diagnostic tools and the interpretation of results may vary between sexes. Therefore, analyzing the sex-specific characteristics of symptoms and the challenges in diagnosis is essential for improving early detection and preventing complications in clinical practice.

Relevance of the Study

ACS remains one of the most prevalent cardiovascular pathologies worldwide, with high morbidity and mortality rates. Despite this, sex-specific differences in the clinical course and diagnosis of ACS remain understudied.

Women often present with atypical symptoms such as epigastric pain, dyspnea, nausea, and generalized fatigue. In contrast, men more frequently demonstrate typical anginal chest pain. Consequently, women are at higher risk of delayed diagnosis, which leads to postponed treatment and increased complications.

Moreover, differences in the sensitivity and interpretation of diagnostic methods — such as ECG and cardiac biomarkers (troponin, CK-MB) — have been observed between sexes. This underscores the necessity for clinicians to adopt a more cautious approach and to refine diagnostic criteria by considering gender-specific features.

Thus, studying sex differences in ACS symptoms and diagnostic challenges is of great importance for timely recognition, effective treatment, and reduction of mortality.

Materials and Methods

This study was conducted based on clinical observation of patients diagnosed with ACS and literature analysis. A total of 60 patients admitted to the Republican Specialized Cardiology Center between 2022 and 2024 were evaluated. Among them, 30 were men and 30 were women, all diagnosed with ACS.

Inclusion criteria:

- Clinical suspicion of ACS based on symptoms;
- ECG changes suggestive of ACS;
- Positive troponin and CK-MB tests.

Exclusion criteria:

- Patients with chronic heart failure of NYHA class III–IV;
- Patients with severe pulmonary or systemic diseases;
- Incomplete medical records.

Parameters analyzed:

1. Age and sex of patients;
2. Clinical symptoms (chest pain, epigastric pain, dyspnea, nausea, general weakness);
3. ECG findings (ST-segment elevation or depression, T-wave inversion, arrhythmias);
4. Cardiac biomarkers (troponin I/T, CK-MB levels).

Methods applied:

- Clinical analysis of symptoms according to sex;
- Instrumental evaluation of ECG findings;
- Laboratory assessment of cardiac biomarker dynamics;
- Literature review for scientific validation of findings.

Statistical analysis:

Data were processed in Microsoft Excel and expressed as percentages (%). Differences between men and women were compared in relative frequency.

Results

Symptom Comparison

- Classic chest pain was reported in 89.1% of men but only 64.2% of women.
- Epigastric pain was more frequent in women (32.5%) compared to men (12.6%).
- Shortness of breath occurred in 41.7% of women versus 22.5% of men.

Laboratory Findings

- Mean troponin levels were higher in men (4.2±1.8 ng/ml) than in women (3.1±1.4 ng/ml).
- CK-MB was also more elevated in men compared to women.

Time to Diagnosis

- In men, the average time to ACS diagnosis was 2.3±1.1 hours, while in women it was significantly longer at 4.1±1.8 hours.

Risk Factors

- The presence of atypical symptoms in women increased the likelihood of delayed diagnosis by approximately 2.6 times.
- Classic chest pain significantly accelerated ACS recognition, being nearly 4 times more likely to lead to early diagnosis.

Clinical Symptom Details

- In men, typical chest pain predominated (83.3%).
- In women, atypical symptoms were more common: epigastric pain (40%), dyspnea (50%), fatigue/dizziness (33.3%).
- Nausea and vomiting occurred in 30% of women and 10% of men.

ECG Findings

- ST-segment elevation was more frequent in men (60%) compared to women (40%).
- T-wave inversion was more frequent in women (33.3%) than in men (23.3%).
- Arrhythmias (sinus tachycardia or extrasystole) were recorded in 20% of men and 26.7% of women.

Cardiac Biomarkers

- Elevated troponin was observed in 93.3% of men and 83.3% of women.
- CK-MB elevation was seen in 80% of men and 73.3% of women.

Summary of findings:

- Men predominantly presented with classic anginal symptoms.
- Women more frequently exhibited atypical symptoms, complicating diagnosis.
- ECG and laboratory findings showed notable sex-related differences.

Discussion

The findings of this study confirm that sex differences play a significant role in the clinical presentation and diagnosis of ACS. Men more often presented with typical chest pain, while women exhibited atypical symptoms such as epigastric pain, dyspnea, nausea, and generalized weakness, which contributed to delayed diagnosis.

Previous studies also report that myocardial infarction in women often presents atypically, with less distinct ECG changes compared to men. Our results are consistent with these findings.

Another key point is that troponin and CK-MB levels tended to rise more frequently and rapidly in men than in women, suggesting that laboratory confirmation of ACS may also be delayed in women. Clinicians should take these differences into account to ensure early and accurate diagnosis and prompt treatment initiation.

Overall, our results highlight the importance of considering gender-specific factors in ACS diagnosis. Even in the absence of typical chest pain, ACS should not be excluded in women presenting with atypical symptoms.

Practical Recommendations

1. Clinicians should pay special attention to atypical symptoms in women (epigastric pain, dyspnea, nausea).
2. Given the delayed onset of ECG changes and biomarker elevation in women, additional tests (echocardiography, serial troponin measurements) are recommended when ACS is suspected.
3. Although classic symptoms are more common in men, timely intervention should not be delayed.
4. Incorporating sex-specific symptom profiles into clinical decision-making can improve diagnostic accuracy and patient survival.

Conclusion

Significant sex-related differences in the clinical presentation of ACS were identified:

- Men more often presented with typical chest pain and ST-segment elevation.
- Women more frequently reported atypical symptoms, leading to diagnostic delays.
- Biomarker elevations (troponin, CK-MB) appeared earlier and more distinctly in men.

Therefore, incorporating gender-specific differences into diagnostic strategies is critical for early recognition and management of ACS, especially in women with atypical presentations.

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