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RESEARCH ARTICLE

CORRELATION BETWEEN ELECTROCARDIOGRAM AND CORONARY ANGIOGRAPHY FINDINGS IN PATIENTS WITH ST SEGMENT ELEVATION ACUTE CORONARY SYNDROMES

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Abstract

The objective of this study was to evaluate the correlation between electrocardiogram (ECG) findings and coronary angiography results in patients presenting with ST-segment elevation acute coronary syndrome (STEMI). We retrospectively analyzed data from 60 patients who underwent emergency coronary angiography for STEMI. The results demonstrated a significant correlation between ECG abnormalities and coronary lesions identified by angiography, with patients exhibiting more severe ECG abnormalities tending to have more severe coronary lesions. This study reinforces the crucial role of ECG in the diagnosis and management of patients with STEMI.

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Introduction.

ST-segment elevation myocardial infarction (STEMI) is a medical emergency requiring prompt and effective management. The electrocardiogram (ECG) is a critical tool for the early diagnosis and management of ST-segment elevation acute coronary syndromes. It enables the localization of ischemic territories and facilitates prognostic assessment based on the extent of injury [1,2]. The correlation between ST-segment elevation patterns on the 12-lead ECG and the culprit coronary artery territory is well established in patients with STEMI, particularly for anterior (LAD occlusion) and inferior (RCA/LCx involvement) presentations [2]. While this correlation is strong in STEMI, the relationship between ischemic ECG changes and the affected coronary territory in patients with non-ST-segment elevation myocardial infarction (NSTEMI) has not been as extensively studied [2]. This study aimed to assess the correlation between ischemic ECG changes and the affected coronary territory in patients with STEMI.

Methods.

We conducted a retrospective, single-center study on 60 consecutive patients who underwent emergency coronary angiography for STEMI. ECG and angiographic data were analyzed and compared to evaluate the relationship between ECG abnormalities and coronary lesions.

Results.

This study included 60 patients diagnosed with myocardial infarction (MI). The mean age was 62 years, and the male-to-female ratio was 3:1. Smoking was identified as the predominant risk factor, present in 51% of patients. A history of coronary artery disease was noted in 15% of cases, and angina was reported in 75% of patients. Eight percent of cases were complicated by Killip class II heart failure, and 17% of patients had a left ventricular ejection fraction (LVEF) \leq 35%.

Anterior MIs accounted for 68% of all cases (Figure 1), with the left anterior descending artery (LAD) identified as the culprit vessel in 57% (Figure 2). Inferior MIs represented 27% of all cases. The right coronary artery was responsible for infarction in 60% of these cases, while the circumflex artery was implicated in 20%. Overall, heart failure was observed as a complication in 33% of patients.

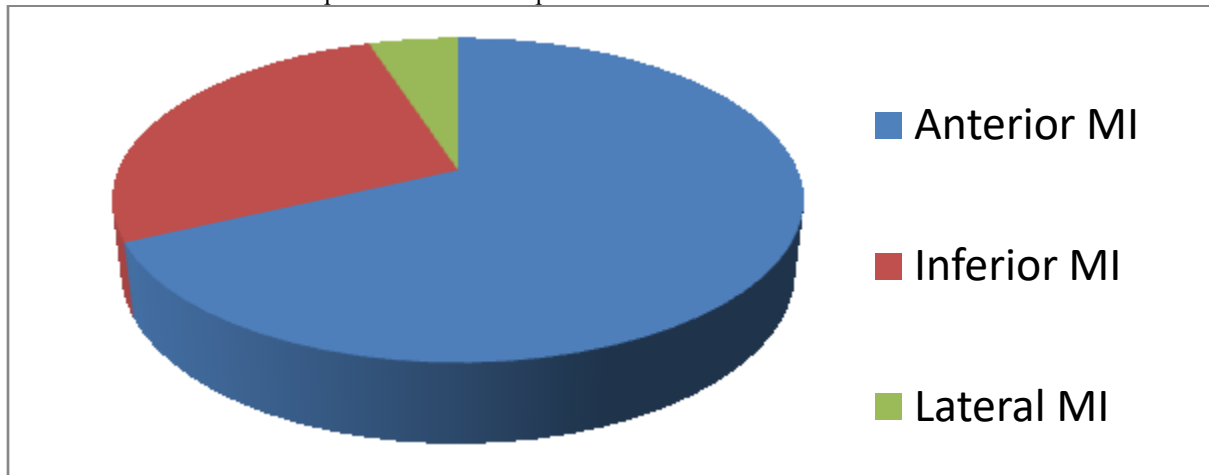


Figure 1. Topographic distribution of MI on ECG.

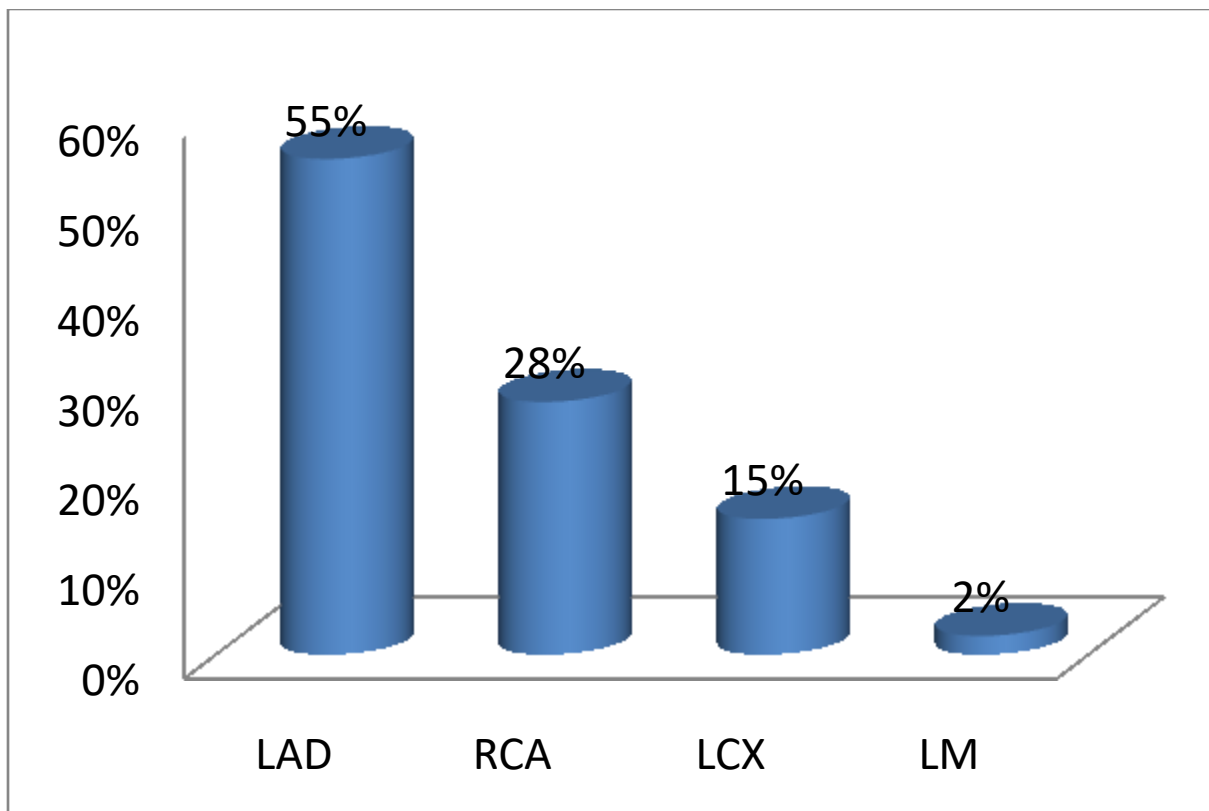


Figure 2. Culprit Coronary Artery Analysis in Myocardial Infarction

Discussion.

This study confirms a significant correlation between ECG abnormalities and coronary lesions identified by angiography in patients with STEMI. The findings suggest that ECG serves as a valuable tool for predicting the severity of coronary lesions and guiding patient management. This correlation aligns with prior research, demonstrating that ECG changes can reflect the extent of myocardial damage and predict outcomes in patients with STEMI [3,4].

The clinical implications of this study are notable. The ECG is a widely accessible, non-invasive, and cost-effective diagnostic tool that enables rapid assessment of patients with suspected STEMI. By identifying patients with more pronounced ECG abnormalities, clinicians can prioritize those who require urgent angiography and subsequent revascularization [5].

Furthermore, this study underscores the importance of integrating ECG findings with other diagnostic modalities, such as angiography, to optimize patient management. This comprehensive approach can facilitate a more thorough understanding of the patient's condition, leading to well-informed treatment decisions.

Limitations.

While this study provides valuable insights into the correlation between ECG abnormalities and coronary lesions, it is important to acknowledge its limitations. First, the study's retrospective design and single-center data collection may introduce bias. Second, the relatively small sample size may limit the generalizability of the findings, and larger studies are needed to validate these results. Finally, the study did not account for other factors that may influence the correlation between ECG abnormalities and coronary lesions, such as patient comorbidities, pre-existing medications, and the time elapsed between symptom onset and ECG acquisition.

Future Directions

Future research should focus on validating these findings in larger, multi-center studies with more diverse patient populations. Additionally, investigations should explore the development of more sophisticated ECG-based algorithms for predicting coronary lesions, assessing microvascular obstruction, and guiding patient management. Integrating ECG findings with other diagnostic modalities and clinical data will be crucial for developing more effective strategies for managing patients with STEMI and improving clinical outcomes.

Conclusion.

In conclusion, this study demonstrates a significant correlation between ECG abnormalities and coronary lesions identified by angiography in patients with STEMI. These findings reinforce the critical role of ECG in predicting the severity of coronary lesions and guiding patient management. By integrating ECG findings with other diagnostic modalities and clinical data, clinicians can develop more effective strategies for managing patients with STEMI.

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