

Clinical Significance of Electrocardiogram ST-Segment Resolution Rate in Reperfusion Therapy for Acute Myocardial Infarction

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Abstract: **Objective:** To analyze the clinical significance of electrocardiogram (ECG) ST-segment resolution rate in reperfusion therapy for acute myocardial infarction (AMI). **Methods:** A retrospective study was conducted on 60 AMI patients who underwent reperfusion therapy in our hospital from January to December 2024. Patients were divided into two groups based on ST-segment resolution rate: the control group (38 cases) with ST-segment resolution $\geq 50\%$, and the observation group (22 cases) with ST-segment resolution $< 50\%$. The treatment outcomes of the two groups were compared. **Results:** The cardiac function level in the observation group was lower than that in the control group ($P < 0.05$). The incidence of adverse events in the observation group was higher than that in the control group ($P < 0.05$). **Conclusion:** In reperfusion therapy for AMI, the ST-segment resolution rate can guide the evaluation of cardiac function improvement and adverse event risk. Lower resolution rates are associated with poorer cardiac function recovery and a higher probability of adverse events.

Keywords: Electrocardiogram ST-Segment Resolution Rate; Acute Myocardial Infarction; Reperfusion Therapy

1. Introduction

A total of 60 AMI patients who underwent Acute myocardial infarction (AMI) is the most common clinical disease with high incidence, which has a certain risk. If patients are not treated effectively in time, it may even endanger the life safety of patients. In the process of reperfusion treatment, it is necessary to timely evaluate the patient's condition changes, so as to timely adjust the treatment plan, help the

patient's condition quickly stabilize, and promote the recovery of the patient's damaged cardiac function^[1-2]. Combined with the observation of ECG ST segment fall, it can more intuitively reflect the changes of patients' condition, and provide guidance for clinical evaluation of patients' condition. This study mainly analyzes the specific clinical value of ECG ST segment fall rate in the treatment of acute myocardial infarction reperfusion.

2. Materials and Methods

2.1 General Information

A total of 60 AMI patients who underwent reperfusion therapy in our hospital from January to December 2024 were retrospectively analyzed. Patients were grouped according to ST-segment resolution rate: the control group (38 cases) with ST-segment resolution $\geq 50\%$, and the observation group (22 cases) with ST-segment resolution $< 50\%$. The control group included 20 males and 18 females, aged 55-77 years (mean: 61.23 ± 1.83 years), with a body mass index (BMI) of 21-25 kg/m² (mean: 22.34 ± 1.03 kg/m²). The observation group included 12 males and 10 females, aged 54-76 years (mean: 61.85 ± 1.65 years), with a BMI of 21-25 kg/m² (mean: 22.26 ± 1.15 kg/m²). There was no significant difference in baseline data between the two groups ($P > 0.05$).

2.2 Methods

All patients received reperfusion therapy, with specific treatment protocols and medications administered according to medical orders. After treatment, dynamic ECG monitoring was performed to record ST-segment resolution, and patients were grouped based on their ST-segment resolution level.

2.3 Observation Indicators

(1) Cardiac function assessment: Cardiac function changes before and after treatment were evaluated using echocardiography, including left ventricular end-systolic diameter (LVESD) and left ventricular end-diastolic diameter (LVEDD).
(2) Adverse event statistics: The incidence of cardiovascular adverse events during treatment was recorded, including arrhythmia, recurrent angina, and heart failure.

2.4 Statistical Methods

Data were analyzed using SPSS 25.0.

Measurement data (e.g., cardiac function indices) were expressed as mean \pm standard deviation ($\bar{x} \pm s$) and tested by t-test. Count data were expressed as percentages and tested by chi-square test. $P < 0.05$ indicated that the difference was statistically significant.

3. Result

3.1 Comparison of Cardiac Function Levels

After treatment, the Kubota Water Drinking Test score of the observation group was higher than that of the control group ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of Cardiac Function Levels ($\bar{x} \pm s$)

Group	Number of Cases	LVESD (mm)		LVEDD (mm)	
		Before Treatment	After Treatment	Before Treatment	After Treatment
Observation Group	22	53.56 ± 2.15	48.45 ± 2.35	51.05 ± 2.35	48.45 ± 2.12
Control Group	38	53.61 ± 2.18	42.15 ± 2.15	51.11 ± 2.18	43.61 ± 2.35
<i>t</i>	-	0.101	10.045	0.140	22.452
<i>p</i>	-	0.920	<0.001	0.889	<0.001

3.2 Statistical Analysis of Adverse Events

The incidence of adverse events in the

observation group was significantly higher than that in the control group ($P < 0.05$), as shown in Table 2.

Table 2. Statistical Analysis of Adverse Events [n, (%)]

Group	Number of Cases	Arrhythmia	Recurrent Angina	Heart Failure	Incidence
Observation Group	22	53.56 ± 2.15	48.45 ± 2.35	51.05 ± 2.35	48.45 ± 2.12
Control Group	38	53.61 ± 2.18	42.15 ± 2.15	51.11 ± 2.18	43.61 ± 2.35
<i>t</i>	-	0.101	10.045	0.140	22.452
<i>p</i>	-	0.920	<0.001	0.889	<0.001

4. Discussion

Acute myocardial infarction is the most common and high-risk type of cardiovascular disease, which mainly occurs in the middle-aged and elderly groups. The disease has a high risk. If patients are not treated effectively in time, it will endanger the life safety of patients in time. And most patients have the risk of microcirculation reperfusion after interventional therapy, which is not conducive to the recovery of patients, so reperfusion therapy should be carried out in time^[3-4]. During the reperfusion treatment of acute myocardial infarction, it is necessary to accurately evaluate the changes of patients' condition, so as to adjust the treatment plan in time.

The ST-segment resolution on ECG directly reflects myocardial reperfusion status and can predict treatment outcomes. Inadequate microcirculatory reperfusion, such as vasospasm or embolism — leads to insufficient endocardial

perfusion, affecting ST-segment resolution. In this study, patients with ST-segment resolution more than 50% showed significantly better cardiac function recovery and lower adverse event rates than those with <50% resolution, indicating superior myocardial repair. ECG offers advantages of simplicity, low cost, and rapid results, making it widely applicable in clinical settings^[5-6].

In conclusion, the ST-segment resolution rate during AMI reperfusion therapy serves as a key indicator for evaluating cardiac function recovery and adverse event risk. Lower resolution rates are closely associated with poorer prognosis, emphasizing the importance of routine ECG monitoring to guide personalized treatment.

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