

Benign Early Repolarization on Electrocardiogram

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ABSTRACT

Aim: To find the frequency of benign early repolarization in ST segment elevation with non-acute myocardial infarction.

Design: Cross sectional descriptive study.

Setting: Medical emergency of Akhtar Saeed Trust Hospital Lahore from 1st May to 30th November 2014.

Methods: A total of 200 patients were included after taking brief history and clinical examination. ECG was done in the emergency ward and interpreted by the emergency doctor and medical specialist. Cardiac enzyme was done if necessary to exclude acute myocardial infarction.

Result: Benign early repolarization was found in 40 patients out of 200. 65% male and 35% were female with 13 patients having age group 21-30 and 2 patients age group 61-70 years.

Conclusion: It was concluded that benign early repolarization is third important ST segment elevation non-myocardial infarction cause on ECG in emergency ward.

Keywords: Benign early repolarization, Electrocardiogram

INTRODUCTION

Electrocardiography is usually initial investigation done in the emergency ward for patients presented with chest pain. Correct interpretation of ST-segment elevation on electrocardiogram is a difficult task for emergency physician because ST segment elevation is not only found in acute myocardial infarction but also in left ventricular hypertrophy, left bundle branch block, right bundle branch block, benign early repolarization, left ventricular aneurysm, hyperkalemia and Pericarditis. Benign Early Repolarization is an important entity frequently encountered in emergency department and easily confused with Myocardial Infarction. In one study ECG interpretation of these two entities by Emergency Physician and Cardiologist was done in which Cardiologist correctly interpreted 99% of ECGs and Emergency Physician 81% of ECGs¹.

Often misdiagnosed as myocardial infarction, Pericarditis or other diseases that involve ST segment elevation, benign early repolarization was considered as not having any clinical implication, until several clinical population studies "cast a spell" on its innocence. Experimental studies, case reports and clinical studies have shown benign early repolarization potential arrhythmogenic effect. In 2000, based on preclinical experimental work,

Antzelevitch suggested that benign early repolarization should not be considered as normal or benign ECG abnormality, unless otherwise proven, as under certain conditions known to predispose to ST-segment elevation, patients with benign early repolarization may be at higher arrhythmogenic risk².

This idiopathic syndrome is defined as: J point elevation manifested either as QRS slurring (transition from the QRS segment to the ST segment) or notching (positive deflection on terminal S wave), upper concavity ST segment elevation for more than 0.1mV and prominent T waves in at least 2 contiguous leads^{3,4}. Other accompanying features are vertical axis, shorter and depressed PR interval, abrupt transition, counterclockwise rotation, presence of U waves, and sinus bradycardia⁴.

Considering the importance of benign early repolarization this study is designed to see the frequency of it in patients with ST segment elevation in non acute myocardial infarction.

MATERIAL AND METHODS

It was cross-sectional descriptive study carried out by the Emergency Department of Medicine, Akhtar Saeed Trust Hospital Lahore from 1st May to 30th November 2014. A total of 200 patients were selected through convenience sampling. All male or female patients of more than 14 years of age with ST segment elevation in two contiguous ECG leads were selected. The purpose of study was explained to the patients and consent obtained. After taking brief history and clinical examination twelve leads electrocardiogram was recorded on a paper at a speed of 25 mm/s and amplification of 10 mm/mv.

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ECG was interpreted by emergency doctor and medical specialist. Cardiac enzyme CK-MB was done in emergency ward to exclude the diagnosis of acute myocardial infarction. If needed, echocardiography was performed in cardiology department. On a specially designed Performa data were collected and data was analysed on SPSS version 11. The main variables in data were consisting of causes of ST elevation on ECG in non-acute myocardial infarction and data was mostly in percentages of those variables. Significance of their relative frequencies being qualitative in nature was compared by Chi square test and P value of < 0.005 was taken as significant.

RESULTS

A total of 200 cases were included in this study presented in emergency department with chest pain having ST segment elevation non-acute myocardial infarction. Among the causes left ventricular hypertrophy was most frequent followed by left bundle branch block and benign early repolarization (Table 1). Among the 40 patients of benign early repolarization their age distribution is as in graph 1 and their sex distribution in graph 2.

Graph 1:

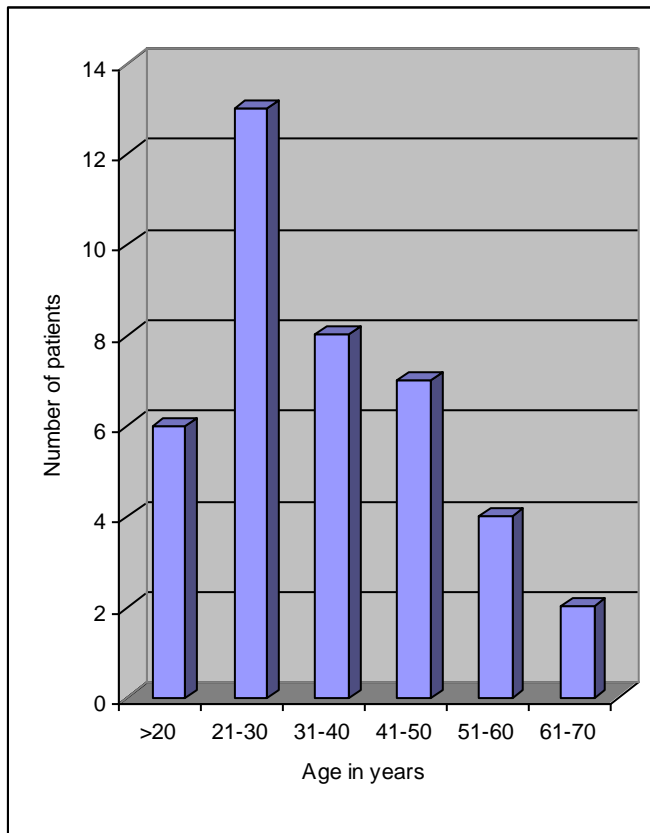
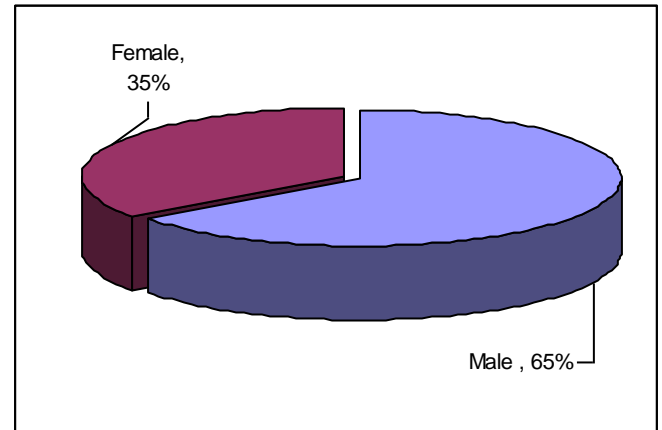


Table 1: Distribution of Causes among 200 Patients

Causes	%age	P- value
Left Ventricular Hypertrophy	39	0.02
Left Bundle Branch Block	35	0.003
Benign Early Repolarization	20	0.001
Right Bundle Branch Block	01	<0.001
Left Ventricular Aneurysm	01	<0.001
Pericarditis	02	0.001
Cerebrovascular Accident	01	0.001
Hyperkalemia	01	0.001

Graph 2



DISCUSSION

ST segment elevation is not a sensitive marker of acute myocardial infarction⁵. In fact, numerous other non-infarction syndromes that occur in the chest pain patient will manifest electrocardiographic ST segment elevation. From the perspective of benign early repolarization, it is encountered not infrequently in chest pain patients. For example, one pre-hospital study demonstrated that benign early repolarization accounted for many of these ST segment abnormalities⁶. Among adult emergency department chest pain patients with ST elevation on ECG, benign early repolarization was encountered almost as often as acute myocardial infarction⁷. In my study benign early repolarization is third important cause of non-infarction ST segment elevation. Sharkey et al found 30% of cases benign early repolarization in his study⁸. Brady found 48% of patients seen in emergency department with chest pain and labeled it as benign variant of the normal electrocardiogram⁹. So its diagnosis is very important by the emergency physician whose frequency is 20% in my study.

Benign early repolarization has been reported in men and women of all age groups in people of varying ethnic backgrounds, with men manifesting the pattern more often than women¹⁰. One to two percent of young military recruits demonstrate benign early repolarization¹¹. In a large population-based

study of benign early repolarization, the mean age of patients with benign early repolarization was 39 years with a range of 16 to 80. The syndrome was seen predominantly; however, in patients under age 50 and rarely encountered in those over age 70 (3.5%)^{10,12}. In my study on benign early repolarization most of the patients were young and were in age group 20-30 and 65% were male and 35% were female. Epidemiology data shows higher prevalence in young adults, especially males, darker skinned persons and athletes¹³. Enhanced parasympathetic activity and increased cardiovascular fitness are the most common explanation for these ECG alterations^{14,15,16}.

CONCLUSION

As recent studies are highlighting potential dangerous aspects of benign early repolarization especially in young adult male patients^{17,18} whose frequency is also high in my study in same age and sex group, emergency physician should not ignore it by labeling it as a benign condition.

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