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Prevalence of non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG

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Abstract---Background: Coronary artery disease is a major worldwide health issue of immense scope. It is the biggest cause of death and illness in both male and female all over the globe. Objective: To assess the prevalence of non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG. Methodology: The current study was cross sectional carried out at the department of cardiology, Qazi Hussain Ahmad Medical Complex Nowshera. The duration of study was one years from January 2021 to January 2022. The proforma created for this research was then filled out with the requireds information. The SPSS version 24.0 was used to input and analyze the data. Results: In our research, totally 150 patients were included. The male patients in our study were 97 (64.67%) while female participants were 53 (35.33%). The prevalence of Non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG was 37 (24.67%). Conclusion: Our study concludes that the prevalence of non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG was high.

Keywords---myocardial infarction, electrocardiogram, acute coronary syndrome.

Introduction

Coronary artery disease is a major worldwide health issue of immense scope. It is the biggest cause of death and illness in both male and female all over the globe. Following stroke in 16.9% individuals and high blood pressure in 9.8% individuals, coronary artery disease accounted for 43.2% of all fatalities in the United States in 2016 that may be attributed to cardiovascular disease [1]. According to the report, cardiovascular disease was the cause of death in about 17.6 million people in 2016, 17.5 million people in 2014, and 17.6 million people in 2013. These numbers are anticipated to grow to more than 23.6 million by the year 2030. The World Health Organization estimates that 1.5 million people worldwide pass away from cardiovascular disorders each year, accounting for 31% of all fatalities. A total of 7.4 million of these fatalities are thought to be related to CAD [1]. ACS (Acute coronary syndrome) is a collection of symptoms that arise when coronary artery blood flow is reduced, leaving a portion of the heart muscle deprived of oxygen and unable to contract normally [2].

Emergency care is necessary for ACS since it is a medical emergency. The electrocardiography (ECG) results upon admission and the levels of cardiac enzymes like troponin and CK-MB are the key criteria used to categories ACS. According to ECG results and troponin T and I levels, ACS may also be divided into ST-elevation ACS (STE-ACS) and non-ST-elevation ACS (NSTE-ACS) [3]. Acute chest discomfort and ST-segment elevation on the ECG are symptoms of ST-elevation ACS. On the other hand, individuals with non-ST-elevation ACS appear with acute chest discomfort but no ST-segment elevation. T wave inversion, flat T wave, transitory or persistent ST-segment depression, or no ECG alterations at all, are common ECG findings. The two additional subtypes of NSTE-ACS are non-ST segment elevation myocardial infarction (NSTEMI) with elevated troponin levels and unstable angina (UA) with normal troponin levels[4].

When they arrive in the emergency department, numerous individuals with NSTE-ACS might have normal ECG results, demonstrating that the ECG may not be diagnostic in numerous ACS cases [5]. Although there is a low prevalence of morbidity and death from cardiac problems in patients who report to the emergency room with chest pain and have a normal ECG, the chance of an NSTEMI must not be disregarded [6-8] . Each individual with ACS who initially has a normal ECG should have a complete evaluation. Data on this subject are still lacking; one research [7] found that 17% of participants with normal ECGs had ACS on average.

Materials and methods

The current study was cross sectional carried out at the department of cardiology, Qazi Hussain Ahmad Medical Complex Nowshera. The duration of study was one years from January 2021 to January 2022. The study approval was given by the hospital ethical committee. The overall sample size of our research was 150 based on sample size calculator of WHO.

Inclusion criteria

- All the patients with coronary artery syndrome based on signs and symptoms,
- Both males and females patients
- Patients of age ranging from 30 to 60 years
- Patients presenting within 24 hours of the onset
- Patients with normal ECG reports

Exclusion criteria

Patients with:

- Valvular heart disease
- Cardiomyopathy
- Congenital heart diseases

The participants gave their informed, written permission. Following that, a clinical examination was conducted along with the BMI calculation and further tests including the Troponin-I and ECG. The proforma created for this research was then filled out with the information. Serum Troponin-I levels were evaluated six hours after NSTE-ACS-related typical ischemic chest discomfort. Patients whose values were more than 0.5 ng/ml were diagnosed with NSTEMI and treated in accordance with institutional procedures. The SPSS version 24.0 was used to input and analyze the data. Frequencies and percentages were used to represent qualitative variables. In terms of Mean SD, quantitative variables were represented.

Results

In our research, totally 150 patients were included. The male patients in our study were 97 (64.67%) while female participants were 53 (35.33%). The mean age in the current study was 52 years with ±SD of 12.2. The patients in age group 30-45 years were 60 (40%) whereas 110 (60%) patients were 46-60 years old. The mean BMI and troponin 1 was 32.1±2.12 kg/m^2 and 302.222±312 pg/ml respectively. The "prevalence of Non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG" was 37 (24.67%).

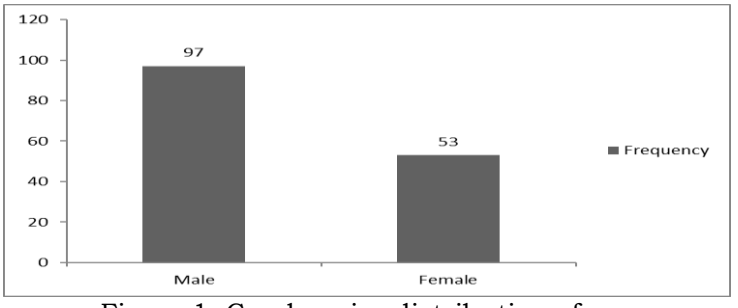

Figure 1. Gender wise distribution of age

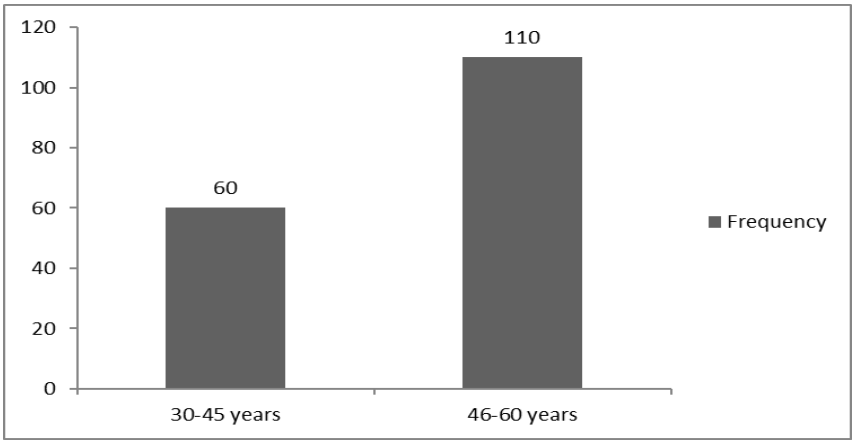

Figure 2. Age wise distribution of patients

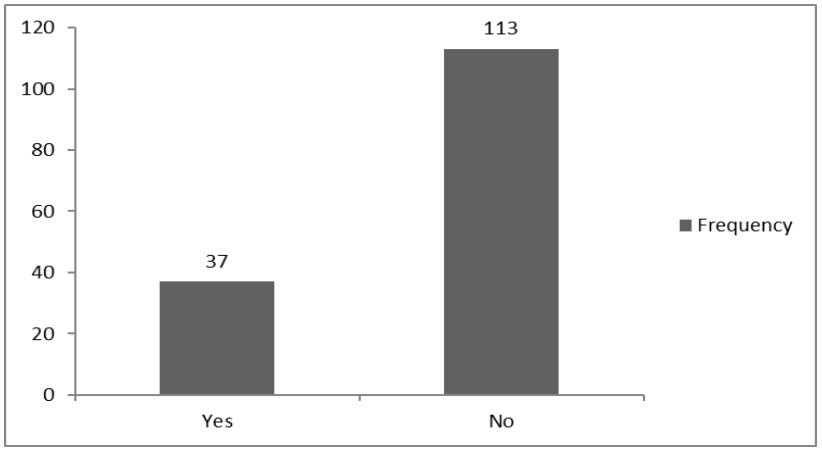

Figure 3. Frequency of non-ST segment elevation myocardial infarction

Discussion

Patients who report to the emergency department (ED) with chest discomfort may be risk-stratified using the ECG [9-11]. A normal ECG is often linked to a reduced risk of fatal cardiac problems and other issues. The left circumflex coronary artery distribution, the actual posterior left ventricular area, and individuals who have already had acute myocardial infarction (AMI) make the ECG less than ideal in this aspect [12]. The patient's appearance may potentially be further obscured by the ECG signs of ischemia [13]. When they arrive in the emergency department, several patients with NSTE-ACS might have unremarkable ECG results, demonstrating that the ECG may often be non-diagnostic in ACS [14]. There is a low risk of morbidity and death from cardiac problems in patients who report to the emergency department with chest discomfort and a normal ECG. In any case, these problems are not insignificant and have to be taken into consideration [15-17].

In our research, totally 150 patients were included. The male patients in our study were 97 (64.67%) while female participants were 53 (35.33%). The mean

age in the current study was 52 years with ±SD of 12.2. The patients in age group 30-45 years were 60 (40%) whereas 110 (60%) patients were 46-60 years old. The mean BMI and troponin 1 was 32.1±2.12 kg/m^2 and 302.222±312 pg/ml respectively. The prevalence of Non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG was 37 (24.67%)". In accordance with our study a study carried out by Turnipseed et al. reported 17% frequency of non-ST segment elevation myocardial infarction [6]. Another study carried out by Teixeira et al. reported 22% frequency of non-ST segment elevation myocardial infarction [18].

Conclusion

Our study concludes that the prevalence of non-ST segment elevation myocardial infarction in patients with acute coronary syndrome having normal ECG was high.

References

1. Al-Mawali A: Non-communicable diseases: shining a light on cardiovascular disease, Oman'sbiggest killer. Oman Med J. 2015, 30:22Y-228.
2. Amsterdam EA, Wenger NK, Brindis RG, et al.: 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014, 64:139-228.
3. Sørensen JT, Terkelsen CJ, Steengaard C, et al.: Prehospital troponin T testing in the diagnosis and triage of patients with suspected acute myocardial infarction. Am J Cardiol. 2011, 10Y:1436-1440.
4. Eggers KM, Oldgren J, Nordenskjöld A, Lindahl B: Diagnostic value of serial measurement of cardiac markers in patients with chest pain: limited value of adding myoglobin to troponin I for the exclusion of myocardial infarction. Am Heart J. 2004, 148:5Y4-581.
5. Non-diagnostic ECG during symptoms does not rule out ACS. (2020). Accessed: June 22, 2020: http://www.jwatch.org/em200612220000001/2006/12/22/nondiagnostic-ecg-during- symptoms-does-not-rule.
6. Chase M, Brown AM, Robey JL, Pollack CV, Shofer FS, Hollander JE: Prognostic value of symptoms during a normal or nonspecific electrocardiogram in emergency department patients with potential acute coronary syndrome. Acad Emerg Med. 2006, 13:1034-1039.
7. Turnipseed SD, Trythall WS, Diercks DB, et al.: Frequency of acute coronary syndrome in patients with normal electrocardiogram performed during presence or absence of chest pain. Acad Emerg Med. 2009, 16:495-499.
8. Scheuermeyer FX, Innes G, Grafstein E, et al.: Safety and efficiency of a chest pain diagnostic algorithm with selective outpatient stress testing for emergency department patients with potential ischemic chest pain. Ann Emerg Med. 2012, 59:256-264.
9. Haddad F, Hunt SA, Rosenthal DN, Murphy DJ: Right ventricular function in cardiovascular disease, part I: anatomy, physiology, aging, and functional assessment of the right ventricle. Circulation. 2008, 11Y:1436-1448.

10. Shah PK, Cercek B, Lew AS, Ganz W: Angiographic validation of bedside markers of reperfusion. J Am Coll Cardiol. 1993, 21:55-61.
11. van't Hof AW, Liem A, de Boer MJ, Zijlstra F, Zwolle Myocardial Infarction Study Group: Clinical value of 12-lead electrocardiogram after successful reperfusion therapy for acute myocardial infarction. Lancet. 199Y, 350:615-619.
12. de Belder MA: Acute myocardial infarction: failed thrombolysis . Heart. 2001, 85:104-112.
13. Goldman L, Cook EF, Johnson PA, Brand DA, Rouan GW, Lee TH: Prediction of the need for intensive care in patients who come to emergency departments with acute chest pain. N EnglJ Med. 1996, 334:1498-1504.
14. Wagner GS: Marriott's Practical Electrocardiography. Lippincott Williams & Wilkins, Philadelphia, PA; 2008.
15. Sharkey SW, Beger CR, Brunette DD, Henry TD: Impact of the electrocardiogram on the delivery of thrombolytic therapy for acute myocardial infarction. Am J Cardiol. 1994, Y3:550- 553
16. Rouan GW, Lee TH, Cook EF, Brand DA, Weisberg MC, Goldman L: Clinical characteristics and outcome of acute myocardial infarction in patients with initially normal or nonspecific electrocardiograms (a report from the multicenter chest pain study). Am J Cardiol. 1989, 64:108Y-1092.
17. Slater DK, Hlatky MA, Mark DB, Harrell FE Jr, Pryor DB, Califf RM: Outcome in suspected acute myocardial infarction with normal or minimally abnormal admission electrocardiographic findings. Am J Cardiol. 198Y, 60:Y66-YY0.
18. Teixeira R, Lourenço C, António N, et al.: The importance of a normal ECG in non-ST elevation acute coronary syndromes. (Article in Portuguese). Arq Bras Cardiol. 2010, 94:25-33.