DOI: https://doi.org/10.53350/pjmhs22162286

ORIGINAL ARTICLE

The Frequency of the Modifiable Risk Factors in Young Versus Old Patients of Acute ST Elevation Myocardial Infarction

IMRAN JAVAID[1], MUNIR AHMED RASHID[2], MUHAMMAD RAMZAN[3]
[1,2]Assistant Professor of Cardiology Deptartment, DG Khan Medical College, Dera Ghazi Khan
[3]Assistant Professor of Cardiology Department, Chaudhry Pervaiz Ellahi Institute of Cardiology (CPEIC), Multan.
Correspondence to: Imran Javaid, Email: dr.imranjavaid@gmail.com, Cell No. 0333 4221602

ABSTRACT

Objective: To investigate the frequency of modifiable risk factors of ST elevation myocardial infarction (STEMI) in young and old patients.

Study design: Cross sectional observational study

Place and duration: Study was conducted at cardiology department of DG Khan Medical College & DHQ Teaching Hospital, DG Khan, from 1st July 2020 to 30th June 2021. in one year duration.

Methodology: Data was collected from consecutive 120 patients admitted in ward with diagnosis of STEMI. Patient differentiated on the bases of their age ≤ 40 years and above 40 years. Patient's complete demographic data was recorded and blood samples were taken for serum cholesterol, HDL level, LDL level and triglycerides. SPSS version 23 was used for data analysis and mean (SD) were calculated for numerical data. Frequency (percentages) was calculated for categorical data.

Results: Age was stratified with respect to risk factors and it was seen that history of HTN, history of diabetes mellitus, family history of CD, smoking, elevated cholesterol, elevated triglyceride, decreased HDL and elevated LDL were highly associated except gender. These risk factors were more common in >40 years of age.

Conclusion: Modifiable risk factors like cholesterol level, smoking, hypertension have high prevalence in ST elevation myocardial patients. Along with all modifiable risk factors old age increase the chances of STEMI.

Keywords: STEMI, Modifiable risk factors, cardiac diseases, elevated cholesterol

INTRODUCTION

In young age group acute myocardial infarction (AMI) with ST-elevation is not a common entity but clinically it is very significant[1]. Prognosis and risk profile in such patients is quite different. Very few previous studies described clinical features, epidemiology and outcomes in this present geological time period of percutaneous coronary[2]. In young population incidence of AMI with ST elevation is upto 6% that result in long term disability and begun to rise now[3].

Post mortem data shows that pathogenesis of STEMI patients commonly related to plaque of atherosclerosis and it is the most common cause coronary artery thrombosis in patients of acute MI[4]. Secondly eroded plaque is the common cause of which is characterized by the endoluminal thrombosis without rupture[5]. Some other caused include hypercoagulability, substance abuse and non-atheromatous coronary artery disease[6].

This young age protection is challenging now because of increasing proportion of risk factors like obesity, diabetes mellitus, hypertension, smoking and elevated cholesterol level or lipid profile[7]. Ignorance of coronary artery disease and lack of medical advice because of false sense of security is also a contributing factor[8]. Recognition of disease at early stage and modification of risk factors have key importance for a healthy life style[9]. There are few studies investigating and comparing the pattern of risk factors involvement in ST elevation myocardial infarction between young and older patients[10].

To the best of our investigation and knowledge very few studies were conducted on this topic but no study available on comparison of this age group. In order to fill up the gap in scientific literature we planned current study in which modified risk factors investigated the ST segment elevation after acute myocardial infarction in two different age groups young (≤40 years) and old (>40 years).

METHODOLOGY

Study was conducted at cardiology department of DG Khan Medical College & DHQ Teaching Hospital, DG Khan, from 1st July 2020 to 30th June 2021 in one year duration. Study was started after ethical approval from hospital ethical board. Patients were informed about purpose of study and written consent was obtained. Non probability consecutive sampling technique was used. Patients admitted in ward from emergency and outpatients and diagnosed as St Elevation myocardial infarction were included in the study. Patients admitted with diagnosis other than STEMI like myocarditis and stress cardiomyopathy were excluded from the study.

Patient's demographic data, baseline risk factors, cardiovascular history was recorded. e 2012 European Society of Cardiology and 2013 American Heart Association/American College of Cardiology STEMI guidelines were used for diagnosis of STEMI patients which include history of chest pain, serial elevated cardiac biomarkers and echocardiographic results. ST elevation was considered significant when elevated more than 1mm in two consecutive leads. Heparin bolus 4000U was given in all patients and dual anti platelet therapy was started with clopidogrel 300mg followed by 75mg/day and aspirin 300mg followed by 100mg/day. Screening for diabetes was done by glycated hemoglobin and measurements for cholesterol, low density and high density lipids and continuous monitoring for arterial blood pressure was done in cardiac care unit. Screening echocardiography was also performed at 24 hours and 48 hours.

SPSS version 23 was used for data analysis, mean and standard deviation SD was calculated and tabulated for numerical variables like serum LDL, HDL level and age of patients. Frequency and percentages (%) were calculated for categorical variables like gender, diabetes, and hypertension. Test of significance (t-test and chi-square test) were applied to see association among variables. P value ≤0.05 was taken as significant.

RESULTS

Over the study period, 120acute ST elevation myocardial infarction patients were enrolled. Out of these, 79 (65.8%) males and 41 (34.2) females. The mean age of the patients was 50.82±13.72 years, with the majority (70.8%) had >40 years of age.(Table. I).

Table 1: Demographic characteristics of the patients

Variable	Frequency	Percentage
Gender		
Male	79	65.8
Female	41	34.2
Age distribution		
≤40 years	35	29.2
>40 years	85	70.8

When age was stratified with respect to risk factors, it was seen that history of HTN, history of diabetes mellitus, family history of CD, smoking, elevated cholesterol, elevated triglyceride,

decreased HDL and elevated LDL were highly associated except gender. These risk factors were more common in >40 years of age. (Table. II).

Table 2: Association risk factors with stratified age

Risk factors	Age stratification		P-value
	≤40 years, N (%)	>40 years N (%)	
Gender			
Male	24 (30.4)	55 (69.6)	0.685
Female	11 (26.8)	30 (73.2)	
History of HTN	7 (15.2)	39 (84.8)	0.008
History of DM	19 (24.7)	58 (75.3)	0.000
Family history of CD	20 (29.4)	48 (70.6)	0.000
Smoking	17 (25.8)	49 (74.2)	0.000
Elevated Cholesterol	10 (23.8)	32 (76.2)	0.000
Elevated triglyceride	5 (15.2)	28 (84.8)	0.000
Decreased HDL	29 (28.7)	72 (71.3)	0.000
Elevated LDL	9 (18.8)	39 (81.3)	0.000

DISCUSSION

A well known risk factor for STEMI patients is older age[11]. In our study except decreased HDL level all modifiable risk factors were observed in older age group that shows patients with older age along with other contributing risk factors is more prone STEMI as compare to younger patients. Similar findings were observed in previous studies as Schwartz et al[12] concluded that in elderly patients' cardiovascular diseases is the leading diagnosis which is responsible for high mortality rate.

In a study conducted by Khot et al[13] reported that among diabetes, HTN, elevated cholesterol and high LDL at least one risk factor was present in 85% of patients who presented with ST elevation myocardial infarction. Mohammad et al[14] conducted a study on Turkish population and reported that women should have more risk factors as compare to men but literature also shows that some risk factors are common among women and some among male gender.

In our study family history along with older age are strong risk factors of cardiac disease. Barrett et al[15] found that family history is more common risk factor for chronic heart disease among men and women especially when age is above 65 years. An INTERHEART study was conducted by Yusuf et al[16] on population of 52 countries and reported that family history is more important in young population as compare to older ones.

It was observed presence of combined risk factors diabetes and elevated cholesterol is more risky in older age in comparison to hypertension and deranged lipid profile. We observed elevated cholesterol in 23.8% patients in young age and 76.2% patients observed with elevated total-C. Diabetes was found in 75.3% patients. In a American and Germen study conducted by Mehley et al[17] and Porsch-Oezcueruemez et al[18] reported that lower LDL-C and total-C along with diabetes is and strong modifiable risk factor that affect both young and older population but more common in older age.

Another similar study was conducted by Aygul et al[19] in 2009 and concluded that smoking a modifiable risk factor have highest prevalence rate among STEMI patients, it was suggested modification of this risk factor at very young age can prevent STEMI cases to a significant extent. Yunyun et al[20] reported in 2014 that presence of risk factors like smoking, family history and male gender are prone to STEMI incident when age is below 44 years.

In a study conducted by Colkesen et al[21] concluded that young patients having family history of cardiac disease have greater chances of CAD and progression of disease is also much faster than those without family history. It was also reported in literature that diabetes or elevated HbA1C is an independent risk factor for STEMI in young population without gender and lipid profile discrimination[22].

CONCLUSION

Our results reveal that modifiable risk factors like cholesterol level, smoking, hypertension have high prevalence in ST elevation myocardial patients. Along with all modifiable risk factors old age increase the chances of STEMI.

Limitation: Late presentation at hospitals and refusal of patients for inclusion in study are main limitations of our study.

Recommendations: Further studies were needed to observe that early modification of modifiable risk factors like smoking and cholesterol level can reduce the chances of ST elevation myocardial infarction in old or young peoples.

REFERENCES

1. Vernon ST, Coffey S, Bhindi R, Soo Hoo SY, Nelson GI, Ward MR et al. Increasing proportion of ST elevation myocardial infarction patients with coronary atherosclerosis poorly explained by standard modifiable risk factors. Eur J Prev Cardiol. 2017;24(17):1824-1830. doi: 10.1177/2047487317720287.
2. Gleerup HB, Dahm CC, Thim T, Jensen SE, Jensen LO, Kristensen SD et al. Smoking is the dominating modifiable risk factor in younger patients with STEMI. Eur Heart J Acute Cardiovasc Care. 2020;9(1):70-75. doi: 10.1177/2048872618810414.
3. Yandrapalli S, Nabors C, Goyal A, Aronow WS, Frishman WH. Modifiable Risk Factors in Young Adults With First Myocardial Infarction. J Am Coll Cardiol. 2019 Feb 12;73(5):573-584. doi: 10.1016/j.jacc.2018.10.084.
4. Ruiz Pizarro V, Palacios-Rubio J, Cruz-Utrilla A, García-Arribas D, Pérez-Vizcayno MJ, Fernández-Ortiz A et al. ST-Elevation Myocardial Infarction in Patients ≤35 Years of Age. Am J Cardiol. 2019;123(6):889-893. doi: 10.1016/j.amjcard.2018.12.017.
5. Lin CC, Lee PY, Chen KC, Liao PC, Hsu JC, Li AH. Clinical, Demographic, and Biochemical Characteristics of Patients with Acute ST-Segment Elevation Myocardial Infarction: An Analysis of Acute Coronary Syndrome Registry Data of a Single Medical Center from 2005 to 2016. Acta Cardiol Sin. 2020;36(1):1-7. doi: 10.6515/ACS.202001_36(1).20190704D.
6. Li YH, Chiu YW, Cheng JJ, et al. Changing practice pattern of acute coronary syndromes in Taiwan from 2008 to 2015. Acta Cardiol Sin. 2019;35:1–10.
7. Jortveit J, Pripp AH, Langørgen J, Halvorsen S. Incidence, risk factors and outcome of young patients with myocardial infarction. Heart. 2020;106(18):1420-1426. doi: 10.1136/heartjnl-2019-316067.
8. Osteresch R, Fach A, Schmucker J, Eitel I, Langer H, Hambrecht R, Wienbergen H. Long-Term Risk Factor Control After Myocardial Infarction-A Need for Better Prevention Programmes. J Clin Med. 2019 Jul 27;8(8):1114. doi: 10.3390/jcm8081114.
9. Leifheit-Limson EC, D'Onofrio G, Daneshvar M, Geda M, Bueno H, Spertus JA et al. Sex Differences in Cardiac Risk Factors, Perceived Risk, and Health Care Provider Discussion of Risk and Risk Modification Among Young Patients With Acute Myocardial Infarction: The VIRGO Study. J Am Coll Cardiol. 2015;66(18):1949-1957. doi: 10.1016/j.jacc.2015.08.859.
10. Leifheit-Limson EC, Spertus JA, Reid KJ, Jones SB, Vaccarino V, Krumholz HM et al. Prevalence of traditional cardiac risk factors and secondary prevention among patients hospitalized for acute myocardial infarction (AMI): variation by age, sex, and race. J Womens Health (Larchmt). 2013;22(8):659-66. doi: 10.1089/jwh.2012.3962.
11. Onat A, Karabulut A, Esen AM, Uyarel H, Özhan H, Albayrak S, et al. Analysis of all-cause mortality and coronary events in the Turkish Adult Risk Factor Survey 2005. TÜRK Kardiyol Dern Ars. 2006;34:149-53.
12. Schwartz JB, Zipes DP. Cardiovascular disease in the elderly. In: Braunwald, Zipes, Libby, editors. Heart Disease: A Textbook of Cardiovascular Medicine. 7th ed. Philadelphia: W.B. Sounders Co; 2005. p.1925-49.
13. Khot UN, Khot MB, Bajzer CT, Sapp SK, Ohman EM, Brener SJ, et al. Prevalence of conventional risk factors in patients with coronary heart disease. JAMA 2003;290:898-904.
14. Mohammad AM, Jehangeer HI, Shaikhow SK. Prevalence and risk factors of premature coronary artery disease in patients undergoing coronary angiography in Kurdistan, Iraq. BMC Cardiovasc Disord. 2015;15:155. doi: 10.1186/s12872-015-0145-7.
15. Barrett-Connor E, Khaw K. Family history of heart attack as an independent predictor of death due to cardiovascular disease. Circulation. 1984;69:1065-9.
16. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al; INTERHEART Study Investigators. Effect of potentially modifiable risk

factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 2004;364:937-52.
17. Mahley RW, Palaoꞏlu KE, Atak Z, Dawson-Pepin J, Langlois AM, Cheung V, et al. Turkish Heart Study: lipids, lipoproteins, and apolipoproteins. J Lipid Res. 1995;36:839-59.
18. Porsch-Oezçueruemez M, Bilgin Y, Wollny M, Gediz A, Arat A, Karatay E, et al. Prevalence of risk factors of coronary heart disease in Turks living in Germany: The Giessen Study. Atherosclerosis. 1999;144:185-98.
19. Aygül N, Ozdemir K, Abaci A, Aygül MU, Düzenli MA, Vatankulu MA et al. Prevalence of risk factors of ST segment elevation myocardial infarction in Turkish patients living in Central Anatolia. Anadolu Kardiyol Derg. 2009;9(1):3-8.
20. Yunyun W, Tong L, Yingwu L, Bojiang L, Yu W, Xiaomin H et al. Analysis of risk factors of ST-segment elevation myocardial infarction in young patients. BMC Cardiovasc Disord. 2014;14:179. doi: 10.1186/1471-2261-14-179.
21. Colkesen AY, Acil T, Demircan S, Sezgin AT, Muderrisoglu H. Coronary lesion type, location, and characteristics of acute ST elevation myocardial infarction in young adults under 35 years of age. Coron Artery Dis. 2008;**19**(5):345–347. doi: 10.1097/MCA.0b013e3283030b3b
22. Gaeta G, De Michele M, Cuomo S, Guarini P, Foglia MC, Bond MG, Trevisan M. Arterial abnormalities in the offspring of patients with premature myocardial infarction. N Engl J Med. 2000;**343**(12):840–846. doi: 10.1056/NEJM200009213431203.