ORIGINAL ARTICLE

Risk Factors Leading to ST Elevation Myocardial Infarction in Young Patients Presenting to a Tertiary Care Hospital, Islamabad Pakistan

MUHAMMAD SAID NAWAZ[1], KALSOOM BIBI[2], SYED NASIR ALI SHAH[3], NOUMAN KHAN[4], MUHAMMAD ILYAS[5], ZARAK KHAN[6]
[1]PGR Cardiology PIMS Hospital, Islamabad
[2]House Officer, Sir Ganga Ram Hospital, Lahore
[3]Associate Professor Cardiology PIMS Hospital, Islamabad
[4,5,6]PGR Cardiology PIMS Hospital, Islamabad
Corresponding Author: Muhammad Said Nawaz, Email: Nawaz_222@yahoo.com

ABSTRACT

Objective: To determine the risk factors leading to ST Elevation Myocardial infarction in young patients presenting to a tertiary care hospital,Islamabad Pakistan

Methodology: Prospective observational study was conducted at Pakistan Institute of Medical Sciences, Cardiology department, Islamabad, Pakistan for duration of 10 months. Study was conducted on sample size of 164 selected through non-probability consecutive sampling technique. Study included participants with age less than or equals to 45 and participants from both genders.However, participants with Age more than 45and those having non ST myocardial infarction were excluded.

findings including Blood pressure, pulse, respiratory rate, cyanosis, S3, Killip class and JVP were noted. Data was entered and analyzed using statistical package for social sciences (SPSS). P value of < 0.05 was considered as significant.

Results: Mean age of participant was found to be 25.3±4.3, mean BMI was found to be 25.8 ±0.81. Mean HB level was found to be 12.8±0.8 and mean respiratory rate was found to be 18. Risk factor HTN in association with gender was found to have significant difference between two with p value of 0.01 **In** study analysis it was seen that risk factor HTN in association with age was found to have significant difference between two with p value of 0.05.Smoking in association with age was found to have shown significant difference between two with p value of 0.02Family history of MI in association with age was found to have shown significant difference between two with p value of 0.04.

Conclusion: Risk factors HTN ,Smoking and family history were found to be positively associated with ST elevation myocardial infarctionin young age.

INTRODUCTION

Onset of angina rapidly progresses to fully evolved myocardial infarction (MI) in young patients. The vast majority of young patients deny history of chest pain prior to MI.[1] Approximately one to two percent of the adult population in developed countries has Heart failure, with the prevalence of more than 10 percent among persons age less than or equal to seventy years of age. However, in younger individual it is also prevalent. It is clear that the incidence rate is going to increase. Early recognition and risk factor modification in this population sub-set is of key importance. These patients have different risk factor profile, presenting sign and symptoms and prognosis.[2] Different socio-economic and environmental conditions may predispose them to increased risk of Myocardial Infarction. Congenital coronary artery anomalies can present for the first time as MI in young adults. Rare condition causing acute coronary artery dissection is found to be prevalent in young adults. The chest pain is often atypical and women are at a higher risk during their peripartum period. Thrombotic occlusion of a coronary artery can result in acute MI[3]. ST-segment elevation MI also commonly known as STEMI is most frequently caused by acute rupture of atherosclerotic plaque and thrombosis of the involved coronary arteries. Diagnosis is made on basis of the ECG showing ST-segment elevation in two consecutive leads with of 0.1 mV or 1 mm.[4] STEMI is the most acute manifestation of coronary artery disease and is associated with great morbidity and mortality. A complete thrombotic occlusion developing from an atherosclerotic plaque in an epicardial coronary vessel is the cause of STEMI in the majority of cases.[5] Early diagnosis and immediate reperfusion are the most effective ways to limit myocardial ischemia and infarct size and thereby reduce the risk of post-STEMI complications and heart failure.[6] Less published literature in young immigrant population regarding ST elevation myocardial infarction in young patients is found. Better prognosis among young adults was achieved when the appropriate investigations and treatment was offered. This information provides guidance to physicians for better identifying and targeting primary and secondary preventative treatment options.

METHODOLOGY

Prospective observational study was conducted atPakistan Institute of Medical Sciences, Cardiology department, Islamabad, Pakistan for duration of 10 months. Study was conducted on sample size of 164 selected through non-probability consecutive sampling technique. Study included participants with age less than or equals to 45 and participants from both genders.However, participants with Age more than 45and those having non ST myocardial infarction were excluded. After the approval from Pakistan Institute of Medical Sciences, Cardiology department, Islamabad, Pakistan ethical committee, Consent was taken from patients having MI, diagnosed on basis of rise and/or fall of troponin, absolute change of 7 to 9 ng/l along with supportive evidence in the form of typical symptoms, shortness of breath, heart pain or palpitations and suggestive electrocardiographic (ECG) changes showingSTEMI .ECG showing ST-segment elevation of at least 0.1 mV (1 mm) in two consecutive leads.

Selected patients from department of Cardiology.Medical records were analyzed for the patient's MI risk factor profile i.e. history of diabetes, hypertension, hyperlipidemia, family history and smoking. BMI was also noted to check for obesity, history about lifestyle was also noted and type of MI was also assessed based on ST segment elevation to check if MI was ST segment elevation MI or non-ST segment elevation MI.

Details of the coronary angiogram, laboratory investigations, and cardiac biomarker including trop T, I and CK-MB werenoted. Fasting lipid profile was noted to check for level of lipids. Examination findings including Blood pressure, pulse, respiratory rate, cyanosis, S3, Killip class and JVP were noted.Data was entered and analyzed using statistical package for social sciences (SPSS) version 2.0 and different descriptive and analytical statistics was applied according to the type of data. Mean +- SD was calculated for the quantitative variable like age. Frequencies and percentages were computed for categorical variables like gender. P value of < 0.05 was considered as significant.

RESULTS

In study analysis it was found that out of total 164 participants, study included 155 males (94.5%) and 9 females

(5.5%). out of which 70 (42.7%) were hypertensive and 44 (26.8%) were found to be having diabetes. Participant included in study who used to smoke were 156 (95.1%), patients having dyslipidemia were found to be 130 (79.3%) and 108 (65.9%) were obese. Out of all patients 46 (28%) were found to be having a family history of MI, while all 164 (100%) participants were found to have High density lipids raised on fasting lipid profile. Out of all participants 95 (57.9%) were found that having an active lifestyle and 69 (42.1%) were found to have a sedentary life style.

Mean age of participant was found to be 25.3±4.3, mean BMI was found to be 25.8 ±0.81. Mean HB level was found to be 12.8±0.8 and mean respiratory rate was found to be 18.

Out of 164 participants 103 (62.8%) were well off, 57 (34.8%) were middle class and 4 (2.4%) lower middle class. Uric acid was found to be prevalent in 51 (31.1%), cyanosis was prevalent in 130 (19.3%), JVP was raised with serum biomarker levels raised in all patients. Killip class I was found in 130 (70.9%), Killip II was found in 34 (20.7%).

In study analysis it was seen that risk factor HTN in association with gender was found to have significant difference between two with p value of 0.01 showing that 70 males were having HTN Risk factor DM in association with gender was found to have shown non-significant difference between two with p value of 1.0 showing that DM was found in 42 males and 2 females. Risk factor dyslipidemia in association with gender was found to have shown non-significant difference between two with p value of 0.68 showing that dyslipidemia was found in 122 males and 8 females. Risk factor smoking in association with gender was found to have shown non-significant difference between two with p value of 0.04 showing that smoking was found in 147 males and 9 females. Risk factor obesity in association with gender was found to have shown significant difference between two with p value of 0.06 showing that smoking was found in 105 males and 3 females. Risk factor family history of having MI in association with gender was found to have shown non-significant difference between two with p value of 0.7 showing that family history of MI was found in 43 males and 3 females.

In study analysis it was seen that risk factor HTN in association with age was found to have significant difference between two with p value of 0.05 showing that 70 individuals with age between 20- 27 were having HTN while 27- 35 year aged 23 individuals were having HTN. Risk factor DM in association with age was found to have shown non-significant difference between two with p value of 0.7 showing that DM was found in 28 individuals aged between 20 to 27 years and 16 individuals aged between 28-35 years Risk factor dyslipidemia in association with age was found to have shown non-significant difference between two with p value of 0.8 showing that dyslipidemia was found in 87 individuals aged between 20 to 27 years and 43 individuals aged between 28-35 years. Smoking in association with age was found to have shown significant difference between two with p value of 0.02 showing that smoking was found in 102 individuals aged between 20 to 27 years and 54 individuals aged between 28-35 years. Obesity in association with age was found to have shown non-significant difference between two with p value of 0.7 showing that obesity was found in 71 individuals aged between 20 to 27 years and 37 individuals aged between 28-35 years. Family history of MI in association with age was found to have shown significant difference between two with p value of 0.04 showing that family history of MI was found in 62 individuals aged between 20 to 27 years and 33 individuals aged between 28-35 years.

Table 1: Association between STEMI and co morbid wit gender stratification

	Male (n)	Female (n)	P value
Co morbid HTN	70	0	0.01
Co morbid DM	42	2	1.0
Dyslipidemia	122	8	0.68
Smoking	147	9	0.04
obesity	105	3	0.06
Family history	43	3	0.7

Table 2: Association between STEMI and co morbid with ager stratification

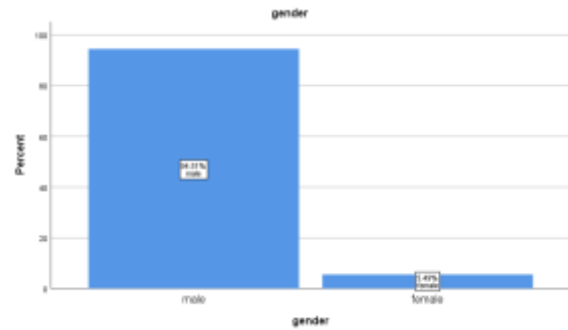|	Age (20-27) (n)	Age(28-35) (n)	P value
Co morbid HTN	47	23	0.05
Co morbid DM	28	16	0.7
Dyslipidemia	87	43	0.8
Smoking	102	54	0.02
obesity	71	37	0.8
Family history	29	17	0.04
Life style	62	33	0.7

Figure 1 Gender description

DISCUSSION

In study analysis it was seen that risk factorHTN ,male gender, DM, smoking and family history of ischemic heart disease were found to have positively associated with ST elevation MI in young patients.Result of study are supported by previous study which showed that individuals having HTN were found to be associated with STEMI. [7,8,9]Those having HTN were significantly associated with developing STEMI In another study Risk factors for STEMI included male gender , smoking and family history of early STEMI. In another as study it was seen that male gender was at more risk of developing STEMI and male gender was considered to be important risk factor for STEMI in young patients.[10]

Risk factor dyslipidemia in association with age was found to have shown non-significant difference, smoking in association with age was found to have shown significant difference, obesity in association with age was found to have shown non-significant difference, Family history of MI in association with age was found to have shown significant difference. Also proven from previous study showing that STEMI is associated with HTN, Family history and obesity in young adults specially in males it is found to be prevalent.[11,12,13] American heart association also showed that young adults having Higher blood pressure were more prone to develop Myocardial infarction with higher ST segment elevation. STEMI also found to be associated with obesity and male gender and younger individuals al these results are in accordance with results of this study.[14,15]

Risk factors are studied in this study on younger individuals of single tertiary care center in Islamabad, for better generalizability study can be conducted in multiple study settings across the country or regions and on a larger sample size. Study concluded that more male young adults were found to be having a STEMI, this could be because more male ratio of patients. Equal number of male and female patients can be included and studied for eliminating risk of biasness.

CONCLUSION

Risk factor HTN, obesity, male gender,Smoking and family history was found to be positively associated with ST elevation myocardial infarction in young age.

REFERENCES

1. De Matteis G, Covino M, Burzo ML, Della Polla DA, Franceschi F, Mebazaa A, Gambassi G. Clinical Characteristics and Predictors of

In-Hospital Mortality among Older Patients with Acute Heart Failure. Journal of Clinical Medicine. 2022 Jan;11(2):439.

2. Trullàs JC, Aguiló O, Mirò Ó, Díez-Manglano J, Carrera-Izquierdo M, Quesada-Simón MA, Álvarez-Rocha P, Llorens P, González-Franco Á, Montero-Pérez-Barquero M. Prevalence and impact on prognosis of right-bundle branch block in patients with acute heart failure: Findings from the RICA registry. RevistaClínica Española (English Edition). 2022 Mar 7.

3. Ponikowski, P.; Voors, A.A.; Anker, S.D.; Bueno, H.; Cleland, J.G.; Coats, A.J.; Falk, V.; González-Juanatey, J.R.; Harjola, V.P.; Jankowska, E.A.; et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Eur. J. Heart Fail. 2016, 18, 891–975.

4. Conrad, N.; Judge, A.; Canoy, D.; Tran, J.; Pinho-Gomes, A.C.; Millett, E.R.C.; Salimi-Khorshidi, G.; Cleland, J.G.; McMurray, J.J.V.; Rahimi, K. Temporal trends and patterns in mortality after incident heart failure: A longitudinal analysis of 86,000 individuals. JAMA Cardiol. 2019, 4, 1102–1111.

5. Van Deursen, V.M.; Urso, R.; Laroche, C.; Damman, K.; Dahlström, U.; Tavazzi, L.; Maggioni, A.P.; Voors, A.A. Co-morbidities in patients with heart failure: An analysis of the European Heart Failure Pilot Survey. Eur. J. Heart Fail. 2014, 16, 103–111.

6. Sharma, A.; Zhao, X.; Hammill, B.G.; Hernandez, A.F.; Fonarow, G.C.; Felker, G.M.; Yancy, C.W.; Heidenreich, P.A.; Ezekowitz, J.A.; DeVore, A.D. Trends in noncardiovascular comorbidities among patients hospitalized for heart failure: Insights from the get with the guidelines-Heart Failure Registry. Circ. Heart Fail. 2018, 11, e004646.

7. Kaler GP, Mohan B, Gupta D, Kaler NK, Garg M, Wander GS. Precipitating factors for acute decompensated heart failure in patients with stable chronic left ventricular systolic dysfunction. J PractCardiovascSci 2018;4:21-8.

8. García Mena LM, Ramírez Gómez JI, Llanes Camacho MC, Jiménez Trujillo JA, Alegret Rodríguez M. Estudio de la cardiopatíaisquémica en pacientesmenores de 45 años. CorSalud [Internet]. 2009 [cited 10 Jun 2019];1(4).

9. Valdés Ramos ER, Rivera Chávez M, Bencosme Rodríguez N. Comportamiento del infartoagudo del miocardio en personas con diabetes mellitus de la provincia Granma. Rev Cuba Endocrinol [Internet]. 2012 [cited 9 Jun 2019];23(2):128-38.

10. Thygesen K, Alpert JS, Jaffe AS, Chaitman BR, Bax JJ, Morrow DA, et al. Fourth Universal Definition of Myocardial Infarction (2018). J Am CollCardiol. 2018;72(18):2231-64.

11. Santos M. Barreiro A, García RC, Barreiro AE. Factores de riesgo de mortalidadhospitalaria post infartoagudo de miocardio. Rev Cuban Cardiol [Internet]. 2017 [cited 10 Jun 2019];23(3).

12. Nwaedozie S, Rezkalla SH. ST Segment Elevation Myocardial Infarction in the COVID-19 Era: Appraisal of the Evidence. Clinical Medicine & Research. 2022 Jan 27:cmr-2021.

13. Han C, Xu K, Wang L, Zhang Y, Zhang R, Wei A, Dong L, Hu Y, Xu J, Li W, Li T. Impact of persistent subclinical hypothyroidism on clinical outcomes in non-ST-segment elevation acute coronary syndrome undergoing percutaneous coronary intervention. Clinical Endocrinology. 2022 Jan;96(1):70-81.

14. Zhang R, Fan Y, Xue Y, Feng Y, Dong C, Wang Y, Kou P, Li G, Ma A, Wang T. The LDL/HDL ratio predicts long-term risk of coronary revascularization in ST-segment elevation myocardial infarction patients undergoing percutaneous coronary intervention: a cohort study. Brazilian Journal of Medical and Biological Research. 2022 Feb 4;55.

15. Moledina SM, Rashid M, Nolan J, Nakao K, Sun LY, Velagapudi P, Wilton SB, Volgman AS, Gale CP, Mamas MA. Addressing disparities of care in non-ST-segment elevation myocardial infarction patients without standard modifiable risk factors: insights from a nationwide cohort study. European journal of preventive cardiology. 2022 May;29(7):1084-92.