SIGNIFICANT CORONARY ARTERY DISEASE ON CORONARY ANGIOGRAPHY IN PATIENTS WHO SUSTAIN MYOCARDIAL INFARCTION UNDER AGE 35 YEARS

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FILE	17588-68533-1-RV.DOCX (46.77K)		
TIME SUBMITTED	11-APR-2017 06:23PM	WORD COUNT	2361
SUBMISSION ID	797797428	CHARACTER COUNT	13212

SIGNIFICANT CORONARY ARTERY DISEASE ON CORONARY ANGIOGRAPHY IN PATIENTS WHO SUSTAIN MYOCARDIAL INFARCTION UNDER AGE 35 YEARS

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ABSTRACT

Background: Acute myocardial infarction (AMI) among young is not very uncommon. But, it is an important problem for the patient and the treating physician, as these patients have different risk factors, clinical and angiographic profiles, and prognosis than the older patients.

Objectives: This study was carried out to determine the pattern of significant coronary artery disease by means of coronary angiography in patients who sustain an acute myocardial infarction under the age of 35 years.

Material and Methods: A prospective study was conducted at the cardiology departments of the three tertiary care hospitals in Peshawar from December 2009 to November 2011. All patients who presented with acute myocardial infarction under the age of 35 years, were subjected to percutaneous coronary angiography, and the individual lesions were characterized.

Results: Out of a total of 101 patients who were angiographically assessed, 86 (78.18%) patients were men, and 15 (21.81%) women. The mean age was 32.56 ± 3.26 years (22 to 35). Significant CAD (greater than 50 percent diameter narrowing of at least one major coronary artery) was found in 71(70.29%) patients, 21 (20.79%) had normal coronary arteries, 1(0.99%) patients had coronary artery ectasia, 2(1.98%) patients had a myocardial bridge over left anterior descending artery and 1(0.99%) patient had anomalous origins of the right and left coronary arteries. The prevalence rate of one, two and three vessel disease was 39(38.6%), 18(17.8%) and 19(18.8%) respectively, while left main coronary artery was diseased in 3(2.97%) patients. In patients with single vessel disease, LAD artery was involved most frequently in 27(69.23%) patients, followed by RCA in 10(25.64%) and left circumflex in 2(5.13%). The lesions were located mostly in the proximal to proximal segments, and were mostly severely to completely occlusive disease.

Conclusion: In the younger age group, myocardial infarction is mostly a disease of men, but a relatively higher frequency of younger females with MI has been encountered. A much higher incidence of normal coronaries is met with. Single vessel disease predominates with LAD involvement.

Key Words: Myocardial infarction, Angiography, coronary artery disease

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INTRODUCTION:

Coronary heart disease (CHD) represents one of the most common cause of death in adults in the western world.[1-2] Acute myocardial infarction (AMI) is the most serious presentation of coronary heart disease and can even result in sudden death. Although myocardial infarction occurs mainly in older population, younger men or women can also suffer MI. The disease carries a significant morbidity, psychological effects, and financial constraints for the person and the family when it occurs at a young age. The protection offered by young age has been slowly taken away by the increased prevalence of risk factors for CHD in adolescents such as smoking, obesity, and lack of physical activity.[3]

The origin of MI lies in the interaction between genetic predisposition and environmental influences. In young individuals, MI appears to be the result of simultaneous presence of both atherogenic and thrombogenic risk factors.[4] Numerous studies have been carried out in the past aiming to discover the etiopathogenesis, clinical profile, management and prognosis of coronary artery disease in the younger population, yet many aspects are undiscovered[5-10].

The etiology of CAD in young subjects is mainly due to coronary atherosclerosis in 80% of cases, but a number of differences exist regarding both the risk factor profile and clinical and angiographic characteristics in comparison to older patients.[11] Literature review indicates that young patients with myocardial infarction are usually male overweight smokers with abnormal lipid profile and often having family history for premature CAD. Coronary angiography shows normal coronary arteries in most of the cases, prompting for a search for non-atherosclerotic etiology such as coronary spasm, vasculitis, embolism, or hypercoagulability. Destructive lifestyle factors have also been implicated, including exaggerated ambitions, competition, use of psychoactive substances including cocaine, marijuana, and anabolic steroids.[12-14] Myocardial infarction in young adults, being an uncommon event, not many studies are available in this regard particularly in Pakistan. It is, therefore, still undetermined whether the development of MI in a young age represents a form of coronary artery disease with an adverse prognosis.

We, therefore, chose to delineate the pattern of coronary arterial involvement in the younger patients who sustain a myocardial infarction under the age of 35 years in our population.

MATERIAL AND METHODS:

All patients, under the age of 35 years, of both genders, presenting to Hayatabad Medical Complex(Peshawar), Lady Reading Hospital(Peshawar), and Khyber Teaching Hospital(Peshawar) with the first episode of acute myocardial infarction, from December 01st, 2009 to November 30th, 2010, were enrolled prospectively in this study by consecutive sampling. Patients who either did not consent for coronary angiography or were lost to follow-up, were excluded from the study. Demographic data like name, age, gender, address, contact numbers, occupation, date of admission and admission number was recorded. A total of 132 patients with acute myocardial infarction were initially enrolled. 3 patients excluded who were initially treated as acute MI but later proved otherwise (1 acute pericarditis, 2 Brugada syndrome). Among the remaining 129 patients, 5 patients did not consent for coronary angiography, and 23 were lost to follow-up; these were excluded from the study. 101 patients underwent coronary angiography. The angiographic findings, agreed upon by mutual consensus of the two observers, were recorded on the proforma annexed. Data so obtained was entered into and analyzed using SPSS version 16 software. The data has been presented as mean with standard deviation for the continuous variable i.e. age. Frequency and percentages were calculated for the categorical data such as the gender and the number of vessels showing significant coronary artery disease; luminal narrowing of ≥ 70% was defined as significant.

RESULTS:

A total of 101 patients with acute myocardial infarction underwent coronary angiography. Mean age of the patients was 32.56 ± 3.26 years (range 22 – 35 years). Eighty-six patients (78.18%) were male, while 15 (21.81%) were female. Mean age of male patients was 32.44 ± 3.3, while that of female was 33.26 ± 3.01. There were 4 patients (all male) in the age group below 25 years, 23 patients (20 male, 3 female) between 26 and 30 years, and 74 patients (86 male, 15 female) 31 years and older. Non-atherosclerotic disease was found in 25 (24.8%) patients on the whole (Table 1). Amongst these, 18 were male, while 7 were female, constituting 20.9% and 46.66% of the total patients of their respective gender (Table 1).As revealed by the coronary angiography, there were 25 (24.8%) patients with non-atherosclerotic coronary arteries, 39 (38.6%) with single vessel disease, 18 patients (17.8%) had double vessel disease, and 19

patients (18.8%) had triple vessel disease (Fig. 1). Of the total, 3 patients (2.97%) had disease in the left main stem.

Fig. 1 shows the pattern of involvement of the major epicardial vessels. LAD was found to be the most frequently involved in all patterns of CAD, whether SVD, DVD or TVD. It is seen that in SVD, LAD (69.23%) is the most frequently diseased vessel followed by RCA (25.64%), while Circumflex artery is the least diseased vessel (5.12%). Left Main Stem (LMS) was found to be diseased in 5 patients. Of these, it was insignificant (approximately 30%) in 2 patients, while in the other 3 patients it was significantly diseased (>70%). Two of these 3 patients, both male, had associated TVD, while one (male patient) had concomitant DVD (LAD and Circumflex involvement).

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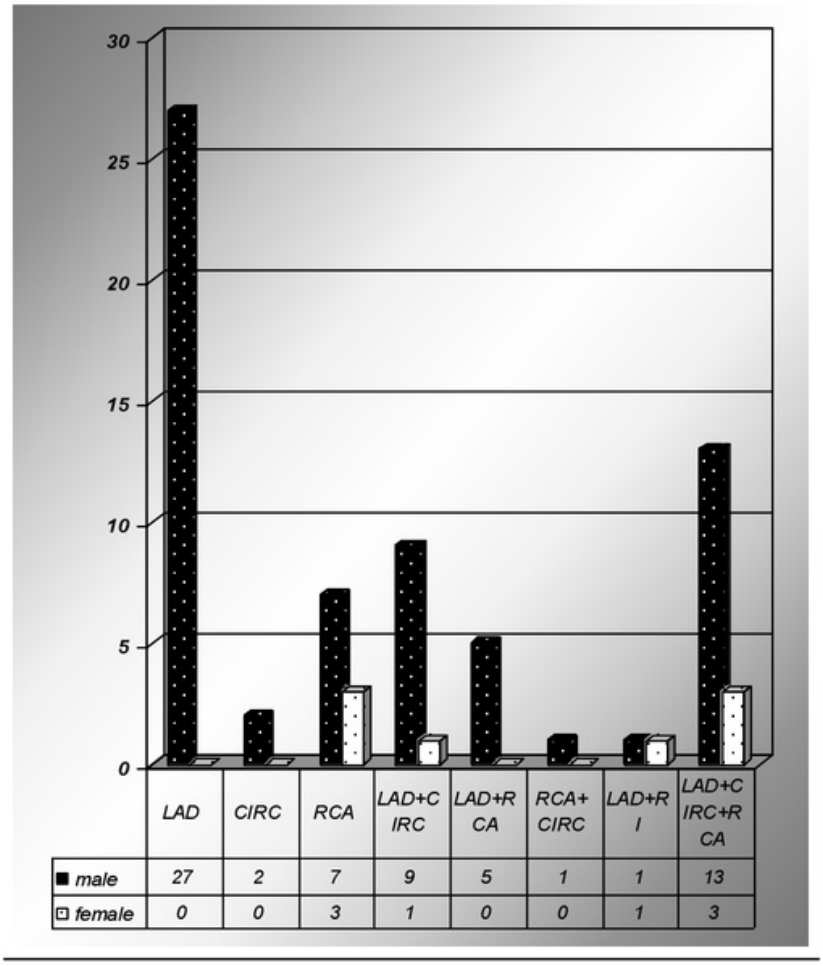
Table 1 - Distribution of coronary artery disease age- and gender-wise in young patients

Gender	Vessels	Age group			
		25 years and below	26-30 years	More than 30 years	Total pts
Male	NCA	1(0.99%)	4(3.96%)	13(12.87%)	18(17.82%)
	SVD	2(1.98%)	8(7.92%)	26(25.74%)	36(35.64%)
	DVD	1(0.99%)	5(4.95%)	10(9.9%)	16(15.84%)
	TVD	0	3(2.97%)	13(12.87%)	16(15.84%)
	Total	4(3.96%)	20(19.8%)	62(61.38%)	86(85.14%)
Female	NCA	0	2(1.98%)	5(4.95%)	7(6.93%)
	SVD	0	1(0.99%)	2(1.98%)	3(2.97%)
	DVD	0	0	2(1.98%)	2(1.98%)

	TVD	0	0	3(2.97%)	3(2.97%)
	Total	0	3(2.97%)	12(11.88%)	15(14.85%)

Fig 1. Pattern of involvement of major epicardial vessels



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LMS: left main stem artery

LAD: left anterior descending artery

CIRC: left circumflex artery

RCA: right coronary artery

RI: ramus intermedius artery

DISCUSSION:

The 101 patients we studied, revealed that acute myocardial infarction was predominant in young men (78%); women represented 22% our series. But this was surprisingly the highest percentage of females reported yet. Previously it has been reported as low as 3% by Al-Khadra[15] in Saudi Arabia and as high as 13% by Ahmed[16] in Punjab. This implies that in our population, a very high percentage of females sustain acute myocardial infarction in a younger age, as also previously reported by Khan et al[17] in the same population in 2006.

The distribution of lesions in our patients, with a high incidence of normal coronary arteries and single vessel disease, is in accordance with previous studies as is the paucity of patients with left main coronary artery disease. Young patients with significant coronary obstruction have less extensive disease than older patients[18]. We found that most of our patients had normal vessels or single-vessel disease. These findings agree with those from other series [19-20] where normal coronary arteries ranged from 10% to 20%, SVD from 36% to 62%, DVD from 17% to 36%, and TVD from 6% to 15%. The distribution of lesions in our patients is in accordance with these studies, where we found normal coronaries in 24.8%, SVD in 38.6%, DVD in 17.8% and TVD in 18.8%. LMS was found diseased in 2.2% of our patients, similar to a frequency of 2% and 2.8% LMS disease as reported by Fournier et al[19] and Wolfe et al[8].

When we compared our study results with the study conducted by Ahmed et al [16] in Lahore, Punjab, we come across a much higher frequency of normal coronary arteries (24.8%) in our population compared to 10% by Ahmed[16]. SVD was however, more predominant (62%) in the study by Ahmed et al[4] while TVD was less frequent (6%) in contrary to our study where SVD and DVD are found in 38.6% and 24.8% respectively. Similarly, Ahmed et al[16] came across no LMS disease, while 2.2% of our patients had significant LMS disease. This implies that our population is more prone to TVD with more LMS involvement, but far more normal coronary arteries are encountered in our patients with acute MI in a young age.

Most studies have shown the left anterior descending coronary artery to be the vessel most commonly involved[8,9,18], in agreement with our study showing the predilection for LAD followed by RCA. The left circumflex was the artery less commonly involved. In our study, we observed that there was a dominance of normal coronaries and SVD, but complex angiographic stenosis morphologic features were also more frequently found.

CONCLUSION:

In the younger age group, myocardial infarction is mostly a disease of men, but a relatively higher frequency of younger females with MI has been encountered. A much higher incidence of normal coronaries is met with. Single vessel disease predominates with LAD involvement mostly in the proximal/ostial segments.

REFERENCES:

1. Department of Health. National Service Framework for Coronary Heart Disease, 2000. http://www.doh.gov.uk/publications.
2. Office of National Statistics. Indicators of the nation's health—ischemic heart disease: male and female death rates by special causes, 2002. http://www.statistics.gov.uk/mortality.
3. Sinha R. Fisch G, Teague B, et al. Prevalence of impaired glucose tolerance among children and adolescents with marked obesity. N Engl J Med 2002;346:802–10.
4. Gupta M, Singh N, Verma S. South Asians and cardiovascular risk: what clinicians should know. Circulation 2006;113:924–9.
5. Al-Khadra AH. Clinical profile of young patients with acute myocardial infarction in Saudi Arabia. Int J Cardiol. 2003 Sep;91(1):9-13.
6. Cole JH, Miller JI 3rd, Sperling LS, Weintraub WS. Long-term follow-up of coronary artery disease presenting in young adults. J Am Coll Cardiol 2003;41(4):521-8.
7. Doughty M, Mehta R, Bruckman D, Das S, Karavite D, Tsai T, Eagle K. Acute myocardial infarction in the young. The University of Michigan experience. Am Heart J 2002; 143(1):56-62.

8. Wolfe MW, Vacek JL. Myocardial infarction in the young. Angiographic features and risk factor analysis of patients with myocardial infarction at or before the age of 35 years. Chest 1988;94(5):926-30.
9. Davia JE, Hallal FJ, Cheitlin MD, Gregoratos G, McCarty R, Foote W. Coronary artery disease in young patients: Arteriographic and clinical review of 40 cases aged 35 and under. Am Heart J 1974;87(6):689-96
10. Johannson S, Vadin A, Wilhelmsson C. Myocardial infarction in women. Epidemiologic Reviews 1983;5:67-95
11. Rubin JB, Borden WB. Coronary heart disease in young adults. Curr Atheroscler Rep, 2012; 14: 140–149. doi: 10.1007/s11883-012- 0226-3.
12. Arzamendi D, Benito B, Tizon-Marcos H et al. Increase in sudden death from coronary artery disease in young adults. Am Heart J,2011; 161: 574–580. doi: 10.1016/j.ahj.2010.10.040.
13. Poloński L, Gąsior M, Gierlotka M et al. Ogólnopolski Rejestr Ostrych Zespołów Wieńcowych (PL-ACS). Charakterystyka kliniczna, leczenie, rokowanie chorych z ostrymi zespołami wieńcowymi w Polsce. Kardiol Pol, 2007; 65: 861–872.
14. Egred M, Viswanathan G, Davis GK. Myocardial infarction in young adults. Postgrad Med J, 2005; 81: 741–745. doi:10.1136/pgmj.2004.027532.
15. Al-Khadra AH. Clinical profile of young patients with acute myocardial infarction in Saudi Arabia. Int J Cardiol. 2003 Sep;91(1):9-13.
16. Ahmad I, Shafique Q. Myocardial infarction under age 40: risk factors and coronary arteriographic findings. Ann King Edward Med Coll 2004;9:262-5.
17. Khan MA, Hassan MU, Hafizullah M. Coronary artery disease, is it more frequently affecting younger age group and women? Pakistan Heart Journal 2006;39:17-21.
18. Zimmerman FH, Cameron A, Fisher LD, Ng G. Myocardial infarction in young adults: Angiographic characterization, risk factors and prognosis (Coronary Artery Surgery Registery). J Am Coll Cardiol 1995;26(3):654-61.
19. Fournier JA, Sanchez A, Quero J, Fernandez-Cortacero JA, Gonzalez-Barrero A. Myocardial infarction in men aged 40 years or less; a prospective clinical-angiographic study. Clinical Cardiology 1996;19:631-6

20. Negus BH, Willard JE, Glamann B, Landau C, Snyder RW, Hillis D, et al. Coronary anatomy and prognosis of young asymptomatic survivors of myocardial infarction. Am J Med l994; 96:354-358

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