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 a challenging problem for the patient and the treating cardiologist, as these patients have different clinical and angiographic features, 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 carried out at the cardiology departments of all the three main teaching hospitals in Peshawar from December 2009 to November 2010. All patients who presented with acute myocardial infarction under the age of 35 years, were subjected to percutaneous coronary angiography, and patterns of coronary arterial involvement were assessed.

Results: Out of a total of 101 patients who were angiographically assessed, 86 (78.18%) patients were men, and 15 (21.81%) were women. The mean age was 32.56 ± 3.76 years (22 to 35). Significant coronary artery stenosis (greater than 50 percent lumen loss 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 frequency of one, two and three vessel disease was 39(38.6%), 18(17.8%) and 19(18.8%) respectively, while 3(2.97%) patients were found to have left main coronary artery disease. 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 ostial to proximal segments, and were mostly severely to completely occlusive disease.

Conclusion: In our study, most of the patients with acute myocardial infarction were young 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

INTRODUCTION:

Coronary artery disease (CAD) is one of the most common cause of death in the westernworld.[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 male or female can also suffer MI. Young age itself offers a great protection against development of coronary artery disease, but this has been taken away by increasing prevalence of risk factors for CAD in the younger population such as obesity, smoking, 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] Various studies have been carried out in the past to find out the etiology, risk factor profile, clinical features, management and prognosis of coronary heart disease in the younger age group, yet many aspects need to be discovered[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 when compared 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. So, we don't know much about the angiographic profile and prognosis of young patients with acute myocardial infarction.

We, therefore, chose to delineate the pattern and distribution of coronary arterial lesion in the younger patients who sustain a myocardial infarction in Pakistani population.

MATERIAL AND METHODS:

All patients having age less than 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. Three patients excluded from the study who were initially included 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 analysis was done using SPSS software version 16 Mean and standard deviation has been calculated for continuous variable while categorical variables have been presented as frequency and percentage.

RESULTS:

About of 101 patients with acute MI underwent coronary angiography. Mean age of the patients was 32.56 ± 3.26 years (range 22 – 35 years). Out of 101, 86 (78.18%) patients were male, while 15 (21.81%) were female. 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. Angiographically normal coronaries were 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 evidenced by the coronary angiography, there were 25 (24.8%) patients with normal 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.

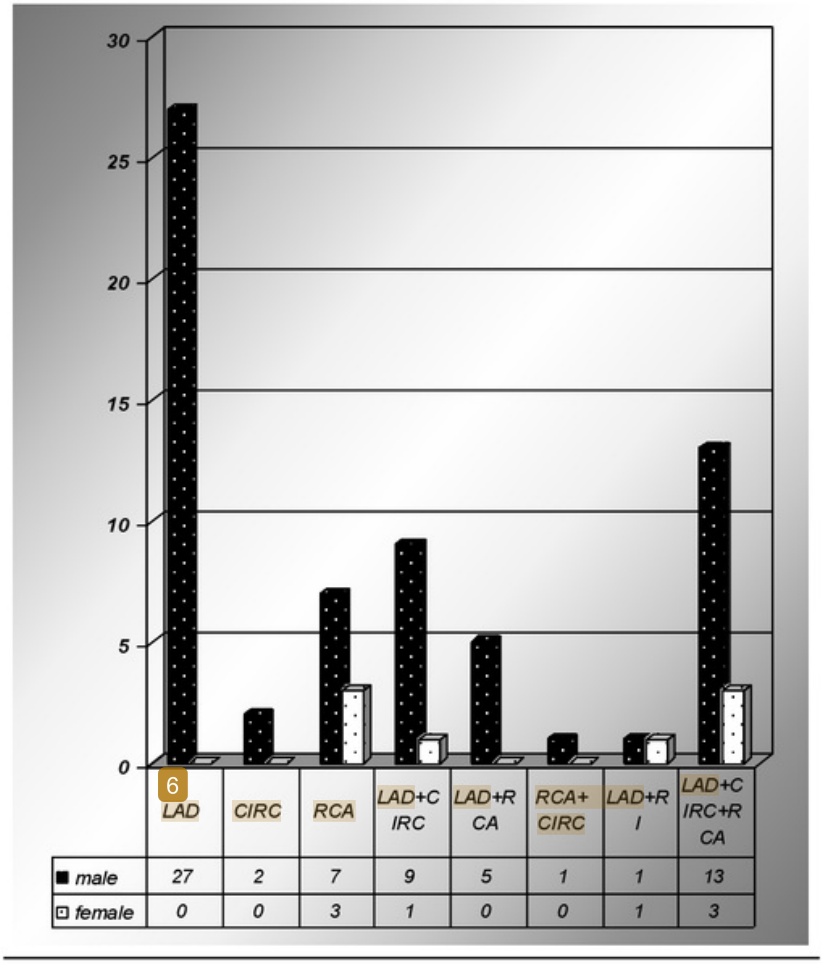
Fig. 1 shows the pattern of involvement of the major epicardial vessels. LAD was found to be the most frequently involved in all patterns of CAD, whether SVD, DVD or TVD. It is seen that in SVD, LAD (69.23%) is the most frequently diseased vessel followed by RCA (25.64%), while Circumflex artery is the 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).

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



	LAD	CIRC	RCA	LAD+CIRC	LAD+RCA	RCA+CIRC	LAD+RI	LAD+CIRC+RCA
male	27	2	7	9	5	1	1	13
female	0	0	3	1	0	0	1	3

LMS: left main stem coronary artery

LAD: left anterior descending coronary artery

CIRC: left circumflex coronary artery

RCA: right coronary artery

RI: ramus intermedius coronary artery

DISCUSSION:

We studied 101 patients with acute myocardial infarction which revealed that acute MI was more prevalent in young men (78%) as compared to young women (22%). Even this 22% is the highest percentage of females reported so far. Previously Al-Khadra[15] reported it be as low as 3% in Saudi Arabia and as high as 13% in Punjab by Ahmed[16]. This simply shows that a very high percentage of females sustain acute myocardial infarction in a younger age in Pakistani population. Khan et al[17] also reported same trends in 2006.

Our study revealed a high incidence of normal coronary arteries and single vessel disease. These findings are in accordance with the studies conducted previously on similar population group. Similarly, distribution of lesions in our patients, also agree with the research studies done in the past. Older patients with obstructive coronary artery disease tend to have more extensive atherosclerotic disease as compared to younger patients.[18]. We found that most of our patients had normal coronary vessels or single-vessel coronary artery disease. These findings are also in accordance with those from other studies [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 our study, most of the patients with acute myocardial infarction were young men, but a relatively higher frequency of younger females with MI has been encountered. A much higher incidence of normal coronaries is met with. LAD is the most commonly involved coronary artery with atherosclerotic disease in the proximal/ostial segment.

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