

Coronary Artery Disease in Young: A Study of Risk Factors and Angiographic Characterization in the Valley of Kashmir

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Abstract- Ischemic heart disease is uncommon in young adults and may have some characteristics that are different from those in older patients. This study examined the risk factors for coronary artery disease and angiographic characterization in young adults. In current study 45 patients (90%) were men and only 5(10%) women. 10% of this population were obese and 78% were overweight. Risk factor analysis revealed smoking to be present in 78% of population. Family history was present in 52% of population. As compared to Diabetes Mellitus 12%, hypertension was present in 40% of patients and hyperlipidemia was seen in 48% of patients. Angiographically the percentage of coronaries involved was 84% (n=42). Nevertheless single vessel disease was the most common angiographic finding in the study group, 67% of patients had single vessel disease and 28% had double vessel while as about 5% patients had triple vessel disease. The left anterior descending artery was the most common artery involved followed by right coronary artery and circumflex artery. From these results we conclude that Myocardial infarction before age 45 is a disease of men. A sizeable proportion of patients will have normal coronary arteries. Coronary arteriography should be considered for patients who sustain a myocardial infarction before age 45 for purposes of diagnosis, management and prognosis.

Index Terms- ischemic heart disease, risk factors, angiography.

I. INTRODUCTION

Ischemic heart disease although relatively uncommon in young adults constitutes an important problem for such patients because of its devastating effect on their more active lifestyle. When the afflicted individual is under the age of 40, the tragic consequences for family, friends, and occupation are particularly catastrophic and unexpected. In addition these patients may have different risk factor and angiographic profiles, clinical presentations and prognosis compared to older patients¹. There are several risk factors for IHD in young adults, most of whom have coronary atherosclerosis. As the number of atherosclerosis risk factors increases so does the severity of coronary atherosclerosis in young adults. However IHD in the absence of atherosclerosis, although uncommon in older patients accounts for approximately 20% of cases in patients under age 45²⁻⁴. Young patients with IHD have a greater prevalence of anatomically normal epicardial coronary arteries than do older

patients with IHD. However approximately half have single vessel atherosclerotic disease. The remainder have multi-vessel disease. The prevalence of left main coronary artery stenosis is approximately 5%. Multi-vessel disease is more likely in patients with multiple risk factors and diabetes. All young patients presenting with symptoms suggestive of IHD should be questioned of cocaine use⁵. Younger patients with IHD who undergo diagnostic catheterization are much more likely to have a major change in management than are older patients. Cigarette smoking appears to be the most common risk factor in young patients. The extent of smoking appears to be inversely related to the age at which IHD occurs⁶. The other significant risk factors in this age group include deranged lipid profile, positive family history, obesity, hypercoagulable states, coronary anomalies, diabetes mellitus, and oral contraceptive use in young woman. Other unusual causes include hypertension, vasulitic disorders, coronary aneurysms, mediastinal irradiations, valvular abnormalities, infective endocarditis⁷⁻⁹. A particular challenge remains for the clinician in the management of the young patients with coronary disease who might anticipate a life expectancy measured in decades rather than years. It must be noted, however, that those patients who come to medical attention owing to symptomatic disease may well represent the "tip of the iceberg" when considering manifest and subclinical disease together.

India topped the world with 1531534 cardiovascular disease-related deaths in 2002. Median age of first heart attack in Indians is 53 years. Incidence of CAD in young Indians is about 12%–16%, which is higher than any other ethnic group. About 5%–10% of heart attacks occur in Indian men and women younger than 40 years¹⁰.

II. MATERIAL AND METHODS

The study was conducted in Department Of Cardiology at Sheri-Kashmir Institute of Medical Sciences (SKIMS) tertiary care hospital rendering services of type of primary PCI to a large population in Srinagar, India. The patients in this study were recorded over a period of two years after a proper consent was taken from them. In this study angiographic profile was studied in young patients who presented mainly as one of the variants of IHD which includes stable angina, unstable angina, and acute MI (both ST elevation and non ST elevation.) The study included patients under age 45 years which has been internationally

accepted as age bar for young adults. The study includes risk factor screening with parameters like BMI, history of smoking, diabetic history, and include some invasive and non invasive investigations like cardiac enzymes, lipid profile, electrocardiography, echocardiography and stress ECG.

An important objective was to study the Angiographic profile in patients younger than 45 years of age. As we have found that incidence of patients with IHD is increasing, so the study laid more importance on the pattern of involvement of coronary arteries, No. of coronary arteries involved, type of lesions, whether coronaries are involved or they are normal and whether there was an association of vasospastic angina.

III. STATISTICAL ANALYSIS

Data was described as mean \pm SD and percentage. Chi square analysis was used for inter group comparison and variance was checked at 95% confidence interval. SPSS software was used for data analysis.

IV. RESULTS

The study population consisted of 50 patients less than 45 years of age (mean age, 39.7 ± 5.0). There were 11 patients below 35 years of age, 14 patients between 36 to 40, and 25 patients between 41 and 45. The mean age of presentation among men was 39.4 years and it was 42.8 years among female population (Table 1). 45 patients (90%) belonged to male sex and only 5(10%) were female. 70% were from rural population. Risk factor analysis revealed smoking to be present in seventy eight percent of population. Family history was present in fifty two percent of population. As compared to diabetes mellitus (12%), hypertension was present in 40% of patients. Among five female participants only one had history of contraceptive use. In the non invasive investigations, hyperlipidemia was seen in twenty four patients (48%) patients. In thirty six percent patients's chest x ray showed cardiothoracic ratio of more than 0.5. Thirty-four percent patients had anterior wall involvement while as thirty six had inferior wall and sixteen had lateral wall involvement. Fourteen percent had normal electrocardiogram. Eighty-two percent patients had echo documented regional wall motion abnormality. Eighty-two percent patients had elevated cardiac troponin levels. Majority of patients had presented as myocardial infarction (82%), while as 7% percent had unstable angina and only 4% had stable angina (Table 2). Angiographically, the percentage of coronaries involved was eighty-four percent. (n=42). Nevertheless single vessel disease was the most common angiographic finding in the study group. Sixty-seven percent patients had single vessel disease & twenty eight percent had double vessel while as about five percent patients had triple vessel disease. The left anterior descending artery was the most common artery involved followed by right coronary artery and circumflex. No patient had involvement of left main coronary. The proximal and mid segments were most commonly involved. Type A lesion was the most common type of lesion. Among Myocardial infarction patients sixty-eight percent had LAD involvement and unstable angina patients had anatomically

normal arteries. Both stable angina patients had coronary involvement. One had SVD and other had DVD (Table 3).

Regarding relationship of risk factors and pattern of coronary involvement-it was seen that among 39 smokers only 6 had normal coronaries and 25 had predominantly SVD while as among 20 hypertensive's, only 2 had normal coronaries while as 10 had SVD.

Among DM patients out of six patients 3 had DVD & none had normal coronaries. Among hyperlipidemics, out of 24 patients 12 had SVD and 8 had DVD while as 2 had TVD and two patients had normal coronary anatomy (Table 4).

V. DISCUSSION

This study was conducted in a group of patients under age of 45 who were diagnosed as a case of ischemic heart disease viz stable angina pectoris, unstable angina or myocardial infarction. This study was conducted in dept. of cardiology at Sheri-Kashmir Institute Of Medical Sciences for a period of 2 years from Nov 2009.

A close association exists between traditional risk factors and risk of cardiovascular disease in young adults.

In our study 90% of patients belonged to male sex which is consistent with international studies conducted world over^{1,11}. More young patients were currently smoking cigarettes (78%) which is comparable to that seen by Zimmerman et al.in 1995 and other studies^{5,15-18}.

In our population 10 percent patients were obese (BMI > 30kg / m²) and 78 percent were overweight (BMI 25-29.9 kg/m²) suggesting that it again is a major risk factor. A positive family history, defined as premature incidence of overt CAD in a first degree relative has been widely reported. In our study, family history was present in fifty two percent of population. It has been determined that younger the patient is when the first MI occurs, the more common was CAD in relatives¹⁵⁻¹⁸. Although systemic hypertension and diabetes mellitus are also well established risk factors for atherosclerosis, they may not be as prevalent in younger age groups as in older ones. In our study it was found that 40 percent of patients were in hypertensive range and only 12 percent had diabetes^{5,15-18}. It is probable that not only the pressure levels but also the duration of the hypertensive disease are of importance in increasing the risk of acute MI. Hyperlipidemia was documented in 46 percent of study population. Other studies of young MI patients have reported the prevalence of hyperlipidemia in the range of 41 to 80%. The low incidence of MI in women (10%) limited our ability to investigate this entity adequately. Conventional risk factors associated with MI in men had similar implications in women, with oral contraceptives being an additional consideration. The present study focuses on the angiographic extent of the coronary lesions in young adults having IHD. Angiographically, the percentage of coronaries involved was eighty-four percent. Nevertheless single vessel disease was the most common angiographic finding in the study group. Sixty-seven percent patients had single vessel disease & twenty eight percent had double vessel disease while as about five percent patients had triple vessel disease¹⁵⁻¹⁸.

The left anterior descending artery was the most common artery involved followed by right coronary artery and circumflex artery. No patient had involvement of left main coronary.

The proximal and mid segments were most commonly involved. Type A lesion was the most common type of lesion. As described in the literature, young adults are characterized by a less extensive coronary disease, mainly as one vessel form.

Despite the involvement of only one vessel, the extent of left ventricular dysfunction (ECHO documented regional wall motion abnormality) appeared to be as great as in those patients with more extensive CAD.

This suggests that MI in the young occurs secondary to rapid occlusion of the coronary artery, without time for establishment of collateral pathways.

VI. CONCLUSION

- Myocardial infarction before age 45 is a disease of men.

- Most important risk factor is smoking and often patients have a family history of premature coronary artery disease.
- Most common pattern of involvement is SVD.
- A sizeable proportion of patients will have normal coronary arteries.
- Coronary arteriography should be considered for patients who sustain a myocardial infarction before age 45 for purposes of diagnosis, management and prognosis.

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TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE STUDIED SUBJECTS.

| | | N | % |
|-----------------------------------------|-------------|-------------------------|------|
| AGE (YR) | ≤ 30 | 4 | 8.0 |
| | 31 TO 35 | 7 | 14.0 |
| | 36 TO 40 | 14 | 28.0 |
| | 41 TO 45 | 25 | 50.0 |
| | MEAN ± SD | 39.7 ± 5.0 (21, 45) | |
| GENDER | MALE | 45 | 90.0 |
| | FEMALE | 5 | 10.0 |
| DWELLING | RURAL | 35 | 70.0 |
| | URBAN | 15 | 30.0 |
| BODY MASS INDEX (KG/M ²) | NORMAL | 6 | 12.0 |
| | OVER WEIGHT | 39 | 78.0 |
| | OBESE | 5 | 10.0 |
| | MEAN ± SD | 27.5 ± 2.0 (23.9, 33.2) | |

TABLE 2: NON INVASIVE INVESTIGATIONS OF THE STUDIED SUBJECTS.

| | | N | % |
|------------------------------------------|------------------------|----|----|
| INCREASE IN LIPIDS | CHOLESTEROL | 23 | 46 |
| | TRIGLYCERIDES | 6 | 12 |
| | LDL | 8 | 16 |
| INCREASED CXR (CARDIOMEGALY) | CT R > 0.5 | 18 | 36 |
| ECG | ANTERIOR | 17 | 34 |
| | INFERIOR | 18 | 36 |
| | LATERAL | 2 | 4 |
| | ANTERO-LATERAL | 6 | 12 |
| | NORMAL | 7 | 14 |
| REGIONAL WALL MOTION ABNORMALITY ON ECHO | | 41 | 82 |
| ELEVATED TROPONIN T LEVELS | | 41 | 82 |
| CLINICAL DIAGNOSIS | STABLE ANGINA PECTORIS | 2 | 4 |
| | UNSTABLE ANGINA | 7 | 14 |
| | MYOCARDIAL INFARCTION | 41 | 82 |

TABLE 3: DIAGNOSIS ACROSS CORONARIES INVOLVED.

| | | STABLE ANGINA PECTORIS | | UNSTABLE ANGINA | | MYOCARDIAL INFARCTION | |
|------------------------|-----|------------------------|-------|-----------------|-------|-----------------------|------|
| | | N | % | N | % | N | % |
| | | CORONARIES INVOLVED | YES | 2 | 100.0 | 0 | 0.0 |
| NO | 0 | | 0.0 | 7 | 100.0 | 1 | 2.4 |
| PATTERN OF INVOLVEMENT | SVD | 1 | 50.0 | 0 | 0.0 | 27 | 67.5 |
| | DVD | 1 | 50.0 | 0 | 0.0 | 11 | 27.5 |
| | TVD | 0 | 0.0 | 0 | 0.0 | 2 | 5.0 |
| LAD VESSEL | NO | 0 | 0.0 | 7 | 100.0 | 13 | 31.7 |
| | YES | 2 | 100.0 | 0 | 0.0 | 28 | 68.3 |
| LCX VESSEL | NO | 2 | 100.0 | 7 | 100.0 | 29 | 70.7 |
| | YES | 0 | 0.0 | 0 | 0.0 | 12 | 29.3 |
| RCA VESSEL | NO | 1 | 50.0 | 7 | 100.0 | 25 | 61.0 |
| | YES | 1 | 50.0 | 0 | 0.0 | 16 | 39.0 |

TABLE 4: RELATIONSHIP B/W RISK FACTOR AND PATTERN OF INVOLVEMENT

| | N | NORMAL | SVD | DVD | TVD | | |
|-------------------|----|--------|-----|-----|-----|--|--|
| SMOKING | 39 | 6 | 25 | 7 | 1 | | |
| HYPERTENSION | 20 | 2 | 10 | 6 | 2 | | |
| DIABETES MELLITUS | 6 | 0 | 2 | 3 | 1 | | |
| HYPERLIPIDEMIA | 24 | 2 | 12 | 8 | 2 | | |

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