Risk Factors Angiographic Characterization and Prognosis in Young Adults presented with Acute Coronary syndrome at a tertiary care center in North India

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ABSTRACT

Background and objective- It is predicted that more than half the worldwide cardiovascular disease risk burden will be borne by Indian subcontinent in the next decade according to a recent epidemiological studies. The association of smoking, dyslipidaemia hypertension, diabetes, central obesity and a positive family history with CAD is well established, risk factors with premature CAD. Newer risk factor like higher levels of lipoprotein (a), homocystein and hsCRP are associated with premature coronary artery disease with weak supportive evidence.

Material and Methods- An observational study was done at SMS Medical College & Hospital Jaipur, Rajasthan from July 2009 to Dec 2010. Patients with Acute Coronary Syndrome were included in this study. Acute Coronary Syndrome defined as Acute MI (STEMI and NONSTEMI) or unstable angina. Total 111 patients with aged 40 years or less included in the study out of which 107 were males and only 4 were females.

Conclusion- Young patients have a different risk factor profile in comparison with older patients. Smoking is a strong and quite common coronary risk factor in the young ACS patients who are 40 years or less. Young patients with a myocardial infarction have a favorable short term prognosis and longer follow up is required to detect any adverse long term outcome and its correlation with coronary angiography findings at presentation.

KEYWORDS: Acute Coronary syndrome

INTRODUCTION

It is predicted that more than half the worldwide cardiovascular disease risk burden will be borne by Indian subcontinent in the next decade according to a recent epidemiological studies.[1] CAD in the Indian subcontinent has been reported to manifest almost a decade earlier than in the West.[2] Moreover, deaths related to CAD occur 5–10 years earlier in the Indian subcontinent than in Western countries.[3] The incidence of CAD in the young has been reported to be 12%–16% in Indians.[4][5]

The association of smoking, dyslipidaemia hypertension, diabetes, central obesity and a positive family history with CAD is well established, risk factors with premature CAD. Newer risk factor like higher levels of lipoprotein (a), homocystein and hsCRP are associated with premature coronary artery disease with weak supportive evidence.[9][10]
Small studies comparing younger and older patients with MI show that young patients are discharged with higher ejection fractions (EF), have fewer co-morbidities, and are more likely to return to work. Also, short-term mortality studies indicate that these patients have a more favorable outcome.[11][13]

METHODS

An observational study was done at SMS Medical College & Hospital Jaipur, Rajasthan from July 2009 to Dec 2010. Patients with Acute Coronary Syndrome were included in this study. Acute Coronary Syndrome defined as Acute MI (STEMI and NONSTEMI) or unstable angina. Total 111 patients with aged 40 years or less included in the study out of which 107 were males and only 4 were females. All patients were evaluated for conventional coronary risk factors like smoking, DM, hypertension, dyslipidaemia, gender, family history and prior coronary events, heart failure, NYHA class and newer risk factors like lipoprotein (a), homocystein and hsCRP were also evaluated. All patients underwent standard ACS protocol management, evaluated for LVEF and undergone coronary angiography. Subsequently follow up was done by telephonically, by OPD visits or by hospitalization in case of event.

RESULTS

Total of 111 patients included in this study with age less than 40 years. The mean age at presentation was 34.46 year for men and 35 years for women, 40.54% patients belonged to 36-40 years group, 42.35 % patients belonged to 30-35 years group and 17.11 % patients were under 30 years. Out of this 96.4 % patients were male and 3.6 % patients were female.

Out of 111 patients 17.11% presented to this hospital as UA, 0.9% presented as Non Q MI, 82.80% present as STEMI. Of the STEMI patients Acute Anterior MI was present in 13.51%, Acute Anteroseptal MI 41.44%, Acute Inferior MI 23.42%, Acute Infero-posterior-lat MI in 3.6%. Regarding coronary risk factors smoking was the most common in young patients. Overall 83.78% patients were smoker but among male patients 85.04 % were smoker and two out of four female patients were smoker. Dyslipidaemia was present among 37.83 % patients, 12.6 % were hypertensive, 8.1% were diabetic, and family history of IHD was present in 13.5% patients. Sixty patients were evaluated for non-conventional risk factors and raised level of Homocystein, Lp(a), & hsCRP was found in 16%, 12%, and 24% respectively. Left ventricular dysfunction was present in 92.5% of the patients. Out of which it was severe in 32.8%, moderate in 30%, mild in 22.8% with rest of the patients having normal left ventricular function.

Angiographic pattern of the patients were studied. Single Vessel CAD was most common and it was 60 %. Double vessel & triple vessel disease is present in 14.5% & 10.22% respectively. Insignificant CAD was seen in only 5.6% of the patients, where as only two patients found to have left main disease. Among the single vessel disease group LAD involvement was the most common (78.33 %), whereas RCA involved in 11.67% and LCX in 10%.

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Based on overall assessment of the patients forty patients (36.06%) advise PTCA, four patients CABG (3.6%) and rest of the patients medical treatment (60.33%). Patients were followed for maximum of three and half years with average of duration of 2.9 years with maximum duration of three and half years and minimum of two years. Follow-up was done telephonically in 95% and rest of the patients has outdoor visits. At the end of the follow up 10.8% patients underwent PTCA, 3.6% CABG and remaining on medical treatment. Two patients died at follow up, one patient had anterior wall MI with severe LV dysfunction (20%) died because of heart failure (hospital death) and another patient who presented with unstable angina with normal LV function found to have triple vessel disease in angiography expired having sudden cardiac death. Rests of the patients are having no recurrent coronary event.

DISCUSSION

The incidence of CAD in the young has been reported to be 12%–16% in Indians[4][5]. Half of the CVD-related deaths (ie, 52% of CVDs) in India occur below the age of 50 years, and about 25% of acute myocardial infarction (MI) in India occurs under the age of 40 years.[14][15]

Prior literature emphasizes that cigarette smoking, diabetes, hypertension, dyslipidaemia and family history are prominent risk factors in the development of early atherosclerosis [16]. The prevalence of risk factors is on the rise in young adults and children. This will result in an increased disease burden in the near future[17]. Cigarette smoking has been strongly associated with CAD in the young adult. Smoking in Indians has been found to be prevalent in 20–39-year-old urban adults[8]. The INTERHEART study also observed that smoking was a greater risk factor in younger men than in women [19]. The risk of CAD increased incrementally with smoking. Other epidemiological studies from India also suggest a greater association of smoking with CAD in younger individuals [16].

Kaul et al [20] showed in their study of one hundred four patients (101 men, three women), under 40 years of age, with myocardial infarction (MI), underwent coronary angiography found to have smoking as coronary risk factors in 76.2%. Biswas et al [21] 1995 has found the Smoking rate of 56.4% in 124 patients of ischaemic heart disease under 40 years of age who underwent coronary angiogram. Some have identified current tobacco use as the most common risk factor in young MI patients. These studies reported that between 76% and 90% of young patients with MI are smokers compared with 40% of older patients with MI.[22] Similarly in our study 83.78% patients found to have smoking, representing the strongest risk factor for CAD.

Hyperlipidemia was found to be prevalent in young Indians with CAD in studies.[16] A greater role can be attributed to total cholesterol and LDL-C in atherogenesis in the younger Indian population (<40 years) with angiographically proven CAD.[16] The lower HDL-C and higher triglyceride levels in both younger and older cases appear to be a hallmark of the Indian population.23,24 Dyslipidaemia was present among 37.83 % patients in our study which was comparable to study done by Kaul et al20 (36.3%) Dyslipidemia in Biswas et al25 study was (30.6%) in 124 patients of ischaemic heart disease under 40 years. These studies indicate that abnormalities in lipid metabolism play an important role in development of CAD in young Indians.

Another important independent risk factor for CAD in younger cases emerging out of Indian studies is family history of CAD.[20][23] Family history of IHD was present in 13.5% patients in our study as compare to 28.7% in Kaul et al. The INTERHEART study showed family history of 14.8% in younger versus 10.45% in older patients.

DS Jaswal, et al [25] in the coronary artery disease population, found to have 76% cases had hyperhomocysteinemia, 11% abnormal CRP values, 23% abnormal lipoprotein (a) levels, and in control group 72% hyperhomocystinaemia and 19% cases had abnormal lipoprotein(a) levels and only 2% had abnormal C reactive protein values. Whereas in our study raised level of Homocystein, Lp(a), & hsCRP was found in 16%, 12%, and 24% respectively. Study done by Jaswal, et al25 has comparable levels of the homocystein in both control and study group which was very high as compare to our study. But ours is observational study and not having control group, so level in general population can’t be determined. Regarding the Lp(a) and C reactive protein values in our study, they are comparable with other study. In our study 12.6 % subjects were hypertensive and 8.1% were diabetic as compare to the study done by Kaul et al20 where as 32.5% subjects were hypertensive and 5% having diabetes mellitus.

Angiographic pattern was analyzed in different studies. In our study single Vessel CAD was most common and it was 60 %. Double vessel & triple vessel disease is present in 14.5% & 10.22% respectively. Insignificant CAD was seen in only 5.6% of the patients, where as only two patients found to have left main disease. Among the single vessel disease group LAD involvement was the most common (78.33 %), whereas RCA involved in 11.67% and LCX in 10%. Biswas PK et al21 has shown in their study in Calcutta that there is preponderance of single vessel disease (48.41 %) and LAD being the commonly involved vessel (71.80 %). Similar findings were shown by Haque et al27 that single vessel disease was the most common and it was 53.12 %. DVCAD and TVCAD was present among 26.56% patients had 20.31 % patients respectively. The frequency of one-, two-, and three-vessel disease was 33.7%, 26.2%, and 40%, respectively in Kaul et al study 20, has shown much higher percentage of the triple vessel disease which in contrast to results of our study and study done by Biswas PK [25]and by Haque et al.[17]

Based on overall assessment of the patients forty patients (36.06%) advice PTCA, four patients CABG (3.6%) and rest of the patients medical treatment (60.33%). All three treatment groups had no in hospital mortality. Given the options available, treatment was appropriate by current recommendations. At the end of the follow up 10.8% out of 36.06% patients advice PTCA underwent PTCA, all undergone CABG to whom it was advice.

Patients were followed for maximum of three and half years with average of duration of 2.9 years with maximum duration of three and half years and minimum of two years.
Follow-up was done telephonically in 95% and rest of the patients has outdoor visits. Two patients died at follow up, one patient had anterior wall MI with severe LV dysfunction (20%) died because of heart failure (hospital death) and another patient who presented with unstable angina with normal LV function found to have triple vessel disease in angiography expired having sudden cardiac death. Rests of the patients are having no recurrent coronary event.

Also, mortality in earlier studies indicate that these patients have a more favorable outcome. In the Coronary Artery Surgery Study (CASS), there were 294 men age less than 35 years old. Coronary anatomy, baseline characteristics and prognosis were compared in younger and older patient. The survival rate at 7 years was improved for young men compared with that in older men (84% vs. 75%, p = 0.0094) and for young women compared with that in older women (90% vs. 77%, p = 0.0004).

Study comparing younger and older patients with MI show that young patients are discharged with higher ejection fractions (EF), have fewer co morbidities, and are more likely to return to work. Klein et al. theorized that two distinct populations exist. The more common subgroup is characterized by single-vessel, and often single-stenosis, disease, presumably related to acute plaque rupture, with an excellent three-year outcome. The favorable prognosis was believed to be related to preserved left ventricular function without multi vessel involvement. The less common group has extensive three vessel CAD with “galloping” progression unrestrained by coronary artery bypass graft surgery (CABG) and preventive measures. Similarly in our study the event rates are low, with only two patients died at the end of three and half years.

Cole et al. report on the 15-year follow-up of 843 patients who had angiographically documented CAD under age 40. Both in terms of length of follow-up and sample size, this is one of the largest observational series published. The investigators found diabetes and smoking to be predictive of mortality, along with prior MI and heart failure. The investigators show that, contrary to previous studies, the 15-year outcome is not favorable—a 30% mortality overall is found. The fact that number of vessels diseased at index catheterization was not predictive of long-term outcome is inconclusive, for it is the speed of disease progression over this long time frame, rather than initial findings, which would be the most crucial variable. This hypothesis cannot be tested in our study as the follow up of three and half has done. More number of patients and longer follow up is required to confirm the adverse long term outcome.

In conclusion the Young patients have a different risk factor profile in comparison with older patients. Smoking is a strong and quite common coronary risk factor in the young ACS patients who are 40 years or less. Young patients with a myocardial infarction have a favorable short term prognosis and longer follow up is required to detect any adverse long term outcome and its correlation with coronary angiography findings at presentation.

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