# Acute Coronary Syndrome in the Young - Risk Factors and Angiographic Pattern

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## Abstract:

**Background***: Coronary artery disease (CAD) is a worldwide health epidemic. Acute coronary syndrome is a potentially life-threatening condition and patient may die or become disabled in the prime of life. There is documented evidence that South Asian people develop CAD at a higher rate and also at an early age. If the affected individual is 40 yrs old or below, the tragic consequences are catastrophic.*

**Methods:** *It was a retrospective observational study to find out the pattern of acute coronary syndrome in the young (40 years old or less) in a military hospital (CMH Dhaka) from July 2007 to July 2008 and to analyze the risk factors and the angiographic characteristics of coronary vessels. Consecutive 64 young patients including both male and female admitted into this hospital were the study subjects. Out of these patients 53 were males and 11 were females. Among these patients coronary risk factors and angiographic pattern were studied. 64 older patients with Acute coronary syndrome (age more than 40 years) were also studied.*

**Results:** *Out of 64 young patients 15.6% patients presented to this hospital as UA, 9.37% presented as Non-Q MI, 28.12% Acute Anterior MI, 14.06% Acute Anteroseptal MI, 26.56% Acute Inferior MI, 6.25% Acute Infero-posterior MI. Smoking was the most common risk factor among these young patients. 64.06 % patients were smoker. Dyslipidaemia was present among 50 % patients, 37.55 % were hypertensive, 15.62% were diabetic, and 15.62 % were obese. SVCAD was the most common lesion and it was 53.12 %. 26.56% patients had DVCAD and TVCAD was present among 20.31 % patients. In the older group (more than 40 years) most common risk factor was dyslipidaemia (71.88%) and smoking was present among 48.43% patients.*

**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. Risk factor identification and control is very crucial in the primary and secondary prevention in young patients with CAD.*

## Introduction:

Acute coronary syndrome is a devastating disease because an otherwise healthy person may die or become disabled without warning. Cerebrovascular diseases (CVD) are no longer confined by geographical area or by age, sex, or socioeconomic boundaries. Heart disease has already reached epidemic proportions in poorer countries also. If the affected individual is 40 yrs old or below, the tragic consequences are catastrophic. But the incidence of myocardial infarction (MI) and symptomatic CAD in the young is less. Most studies show that only about 3% of all CAD cases occur in this age range.[1]

Cardiovascular disease is posing a major public health hazard and clinical problem in South Asia (India, Pakistan, Bangladesh, and Nepal). Estimates from the Global burden of Disease Study suggest that by the year 2020 this part of world will have more individuals with atherosclerotic cardiovascular disease than any other region.[2] There is documented evidence that South Asian people develop CAD at a higher rate and also at an early age. This higher incidence of CAD and excess mortality rates in this population can not be fully explained on the basis of conventional risk factors.[3]

The incidence of CAD in the young has been reported to be 12%–16% in Indians. Half of the CVD-related deaths (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.[4] Patients who come to medical

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attention owing to symptomatic disease may represent the "tip of the iceberg" when considering manifest and subclinical disease together. Because young, asymptomatic patients usually do not undergo medical investigations leading to the discovery of CAD, the true prevalence of the disease has been grossly underestimated. Indeed, when a intravascular ultrasound-based investigation was undertaken in a cohort of recently transplanted hearts (mean donor age 33.4 ± 13.2 years) by Tuzcu et al. the prevalence of disease was >50%, with one in six teenagers manifesting coronary lesions.[5]

## Materials and Methods:

An observational study was carried out in CMH Dhaka from July 2007 to July 2008. Patients with Acute coronary syndrome were included in this study. Acute coronary syndrome was defined as Acute MI (STEMI and Non-STEMI) or unstable angina. Patients aged 40 yrs or less was included in this study. Consecutive 64 patients including both male and female admitted into this hospital were the study subjects. Out of these patients 53 were males and 11 were females. Among these patients coronary risk factors like smoking, DM, hypertension, dyslipidaemia, gender, family history and also prior MI, heart failure, angina class, NYHA class, EF and angiographic pattern were studied. In two patients conventional risk factors were not found and they were screened for hyperhomocysteinemia and test was positive for them. Patients who did not undergo CAG and patients without objective evidence of ACS were excluded from the study. 64 older patients with Acute coronary syndrome (more than 40 years old) were also studied.

## Results:

In our study all of the patients were 40 years old or less. 67.18% patients belonged to 36-40 years group, 25 % patients belonged to 30-35 years group and 7.82 % patients were under 30 years. 82.81 % patients were male and 17.18 % patients were female. Out of 64 patients 15.6% presented to this hospital as UA, 9.37% presented as Non Q MI, 28.12% Acute Anterior MI, 14.06% Acute Anteroseptal MI, 26.56% Acute Inferior MI, 6.25% Acute Infero-posterior MI. Coronary risk factors were studied in details. Smoking was the most common among these young patients. Overall

64.06 % patients were smoker but among male patients 77.35 % were smoker. Dyslipidaemia was present among 50 % patients, 37.55 % were hypertensive, 15.62% were diabetic, and 15.62 % were obese. Family history of IHD was present in 26.56% patients. No conventional risk factor was found in two cases and they were screened for hyperhomocysteinemia. 39-year-old Warrant officer and 34-year-Corporal (having history of two sudden deaths and three IHD cases in the family) were detected to have hyperhomocysteinemia. Heart failure was assessed among these patients. 31.25% patients had low EF on echocardiography and Left ventriculography on CAG revealed low EF in 34.37 % patients. Angiographic pattern of the patients were studied. SVCAD was most common and it was 53.12 %. 26.56% patients had DVCAD and TVCAD was present among 20.31 % patients. LAD involvement was the most common (62.62 %), LCX 43.75% and RCA involvement was 56.25%. Angiographic pattern in female patients was not similar as compared with male patients (TVCAD was more than DVCAD) and the prevalence of hypertension (27.27 % vs. 13.20 %) and DM (72.72 % vs. 30.18 %) was significantly higher in the female patients. None of the female patients was smoker. Among the smoker patients similar pattern was observed – LAD most common involved vessel and the next involved vessel was RCA. After angiography 23.43% was found to be suitable for angioplasty and 34.37% patients were recommended for CABG. In the older group (more than 40 years old) with ACS risk factor pattern was different. Dyslipidaemia was the commonest risk factor (71.88%) and smoking was present among 48.43% older patients. 62.50% were hypertensive and 34.38% were diabetic.
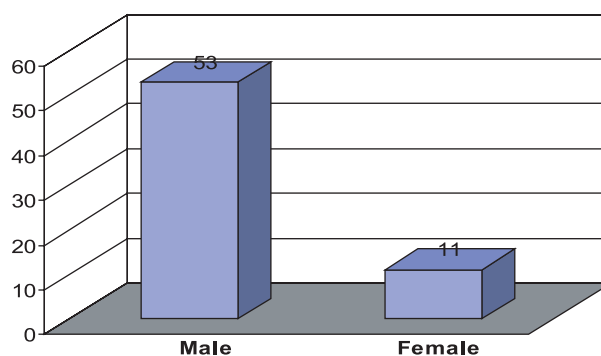

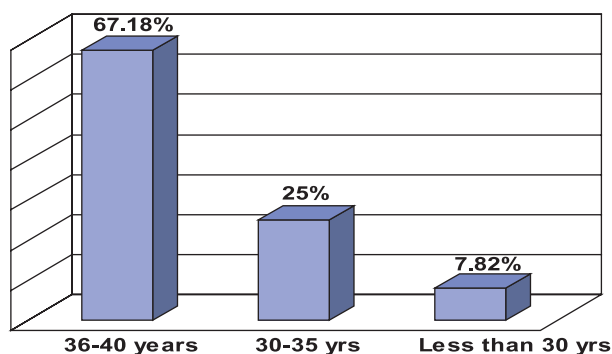
**Fig.-1:** *Sex distribution of study population.*

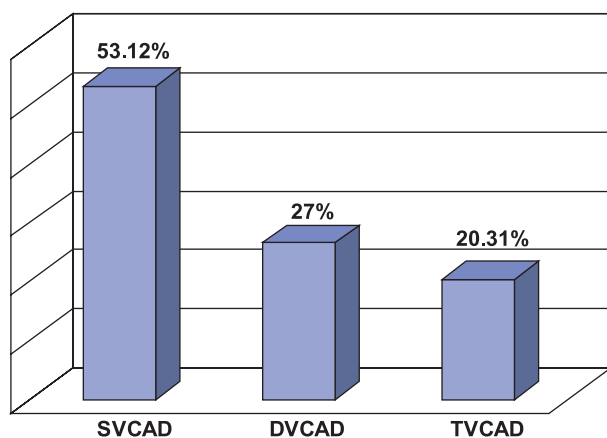**Fig.-2:** *Age distribution of study population*



**Fig.-3:** *Angiographic pattern of study population*

## Discussion:

Coronary artery disease (CAD) is predominately manifest in older individuals, but the disease process begins in the young. Although myocardial infarction (MI) registries estimate that 2% to 6% of all infarctions involve individuals under the age of 45,[1] autopsies of young adults under the age of 34 have shown that 50% have intimal atherosclerosis.[6] Prior literature emphasizes that cigarette smoking, cocaine use, diabetes, and dyslipidaemia are prominent risk factors in the development of early atherosclerosis.[1] Short term mortality studies indicate that these patients have a more favourable outcome.[1,7,8] The incidence of CHD is declining in the UK in all age groups. The actual prevalence of the disease was found to be 0.5% in men and 0.18% in women between 35 and 44 years, 20.5% in men, and 17.1% in women over the age of 60 years. However, CHD in younger population aged less than 40 years was found to represent only 3% of all patients with CHD.[19]

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. Smoking has been traditionally recognized as the most common risk factor for heart disease.[19] Obesity is a growing concern among young adults and children. The disproportionate rise in prevalence of heart disease among certain ethnic groups like people of Asian Indian origin has been of great interest and these people tend to get MI at a younger age in addition to more complex coronary artery abnormalities.[9]

Cigarette smoking has been strongly associated with CAD in the young adult. Kannel et al[10] found in patients included in the Framingham Heart Study, the relative risk for CAD was about three times higher in smokers age 35 to 44, compared to nonsmokers.[5] Repeated exposure to cigarettes and the resulting frequent catecholamine surges damage endothelial cells, leading to dysfunction and injury of the vascular intima. Coronary vasospasm may occur in angiographically normal coronary arteries even in the absence of stimulants or sympathomimetic agents.[5]

In our study among these young patients smoking was the most common risk factor (64%). Patwary et al[11] in a study in Bangladesh has shown that smoking was present as the commonest risk factor (73.33 %) in young patients. Diabetes and hyperlipidemia are also frequently present in young CAD patients. Patwary MSR et al[11] has shown that young patient in their study 53.33 % were dyslipidaemic and 41.67 % were hypertensive. In the present study dyslipidaemia was present among 50 % patients, 37.55 % were hypertensive which are similar findings.

Although insulin-dependent diabetics are at high risk for CAD, diabetes is found in only about 15% to 20% of all young CAD patients. Other relative risk factors are hyperhomocysteinemia,[12,13,14,18] elevated fibrinogen, and abnormal blood viscosity.[5] Anecdotal cases suggest that diabetes in women may have a more powerful role than in men. Smoking in combination with oral contraceptives poses a 13-fold increase in CAD mortality.[5] Truncal obesity and increased body mass index (BMI) have recently been proposed as potential independent risk factors, particularly in young women with CAD. Almost entirely unexplored are the roles of

emotional distress, anger, and sudden or extreme physical exertion. Similarly understudied is the role of inflammation, either measured by systemic inflammatory markers such as high sensitivity C-reactive protein, or manifest as frank vasculitis. Because chlamydia, mycoplasma, and *H. pylori* are often thought of as having a pathogenetic role in CAD.[5]

Angiographic pattern was analyzed in different studies. Biswas PK et al[15] 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 %). In our study we have similar findings-SVCAD was the commonest entity and LAD was the most commonly involved vessel. Patwary MSR et al[11] had similar findings in their study in Bangladesh. In our study number of female patients was significantly higher (17.18 %) and none of them were smoker. Hypertension (72.72 %) and DM (27.27 %) was much higher among female patients. Glover et al[16] mentioned that in MI before 36 – TVCAD was higher than SVCAD (42 % vs. 32 %). Kanitz MG et al[17] has found in their study SVCAD as the commonest condition (62 %), smoking as the main coronary risk factor. In the present study findings are also similar.

## Conclusion:

Although acute coronary syndrome fortunately is an uncommon entity in young adults aged 40 years or less, it constitutes an important challenge for both the patient and the treating physician. It has a devastating effect on the more active life of young patients. These young patients also 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. Risk factor identification and control is very crucial in the primary and secondary prevention in young patients with CAD.

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