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Original research article

Clinical And Angiographic Profile of Acute Coronary Syndrome in Young Patients

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ABSTRACT

AIM: CLINICAL AND ANGIOGRAPHIC PROFILE OF ACUTE CORONARY SYNROME IN YOUNG PATIENTS during COVID ERA

Background: Cardiovascular diseases are becoming more prevalent in younger people in India, which is causing a demographic shift in the disease. In the Indian population, there is a dearth of data comparing the different aspects of acute coronary syndrome in young and old patients. The objective of this study is to assess the clinical and angiographic characteristics in both young and elderly individuals.

Methods: This was a prospective cross sectional observational study which enrolled 90 patients <45 years and 34 patients > 45 years. Comparison of clinical presentation, electrocardiography, echocardiographic findings, conventional and non-conventional risk factors with angiographic findings were made.

Results: A total of 90 patients under the age of 45 were enrolled in group 1, and 34 senior patients older than 45 were included in group 2. Mean age in Group 1 and 2 was 39.79 ± 5.15 years and 59.74±8.21 years. Male sex, smoking, family history of CAD, raised lipoprotein was more in younger population. Younger patients were more likely to have single vessel disease, while the elderly were more likely to have multi vessel disease.

Conclusion: Younger patients with ACS have a good prognosis with a predominance of SVD.

Keywords: Young ACS, ANGIOGRAPHIC PROFILE

INTRODUCTION

In India as well as the rest of the world, cardiovascular disease is the leading cause of death. About 25% of all deaths in India are due to CVD. Younger people are now experiencing acute myocardial infarctions more frequently. The incidence of risk factors for acute myocardial infarction is rising quickly and is a contributing factor to ACS in young people as a result of urbanization, emerging economies, and a growing middle class embracing western eating habits[1,2] Over the past 30 years,

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CAD rates have climbed in India. Asian Indians have an AMI risk that is 3–4 times higher than that of white Americans, 6 times higher than that of Chinese, and 20 times higher than that of Japanese.[3-4] Younger cases of AMI in Indians are more severe, widespread, and have a malignant course. The majority of ACS cases in Indians cannot be accounted for by conventional risk factors. Rising rates of CAD among young Indians point to a potential contribution from non-traditional risk factors. Information on new risk factors for CAD in Indians is scarce. In this study, acute coronary syndrome patients with ages under and over 45 are evaluated in terms of their clinical characteristics and angiographic profiles. It also investigates numerous significant as well as novel risk factors for coronary artery disease in either group of participants.

Material and Methods

This was a prospective cross sectional observational study conducted at a tertiary hospital of north India between March 2020 to December 2021. 90 consecutive individuals with ACS who met the inclusion criteria and were under 45 years of age as well as 34 elderly patients with ACS who were over 45 years of age were included in the study. The institutional ethics committee approved the trial, which strictly adhered to the standard clinical guidelines. Prior to enrolment, all patients or their legal guardians provided written informed consent. The study consisted of patients >18 years old with unstable angina, NSTEMI, and STEMI. Patients with acute or chronic infections, hepatic or renal insufficiency, a history of systemic disorders such as hypothyroidism or hyperthyroidism, cerebrovascular accidents, or COPD were excluded.

Definitions and data collection

Diagnoses of NSTEMI, STEMI, and unstable angina were made using previously established standard definitions. Chest discomfort was noted as either typical angina, atypical chest pain, or nonanginal chest pain. Details on risk factors such as age, gender, and a family history of premature CAD (first degree relatives with men <55 years and females <65 years) were recorded. For all patients, a history of smoking, dyslipidemia, diabetes, hypertension, and other toxic substance use was obtained. Anthropological information was noted. The Asian definitions and standards were used to measure and classify BMI and waist circumference. Diabetic patients were those with FS > 126 mg%. Greater than 150 mg% serum triglyceride levels were regarded as high. All patients were asked about their smoking history. Without the usual risk factors, serum LCL-C >130% was regarded as high, and in individuals with one or more risk factors, serum LDL >100% was regarded as abnormal. Serum HDL-C levels of 40 mg% in males and 50 mg% in females were considered low.

Statistical Analysis

A pre-made study proforma had all the data that were recorded. SPSS Statistics for Windows (version 24.0, Professional) (IBM Corp., Armonk, New York, USA) was used to conduct the statistical analysis. For quantitative data, the data were described using the arithmetic mean SD, while frequency (%) was used for qualitative (categorical) data. By using the Student's unpaired t test for numerical normal data, the means of the two groups were compared. For non-normal data, the Mann Whitney U test was used. For paired normal data, the Student's paired t test was used, and the Wilcoxon Signed Rank test was used for paired non-normal data. When comparing categorical variables (i.e., looking at relationships between qualitative/quantitative variables), the chi-square test was applied if there were 5 or more items in each cell, and Fisher's exact test was applied in all other cases. To compare the mean across three or more groups of data, one-way ANOVA was employed. The Pearson correlation coefficient was then used to analyze and study the association between different variables and ACS. For linear relationships, scatterplots were obtained. When considered relevant, results were

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graphically depicted using Microsoft Excel 2016. All statistical tests were two-tailed. Statistical significance was defined as a p-value < 0.05.

Results

90 patients under the age of 45 and 34 patients above the age of 45 were admitted to our hospital during the study with a diagnosis of ACS.

Patients in the younger group had a mean age of 39.79 ± 5.15 years, while those in the elderly group had a mean age of 59.74 ± 8.21 years. In Group 1, the majority of the patients (95.6%) were between the ages of 31 and 45, while in Group 2, 61.8% were between the ages of 46 and 60. Similar percentages of women were found in both groups.

Table 1 compares the clinical profile and full baseline data for the two groups.

In the current study, 32 patients (35.6%) in Group 1 were smokers compared to 4 patients (11.8%) in Group 2, and 50 patients (55.6%) were tobacco chewers compared to 20 patients (58.8%) in Group II.

STEMI occurred in 83.3% of the young group and 70.6% of the elderly group. In both groups, all patients presented with typical angina. In both groups, the majority of the patients (72% in group 1 and 70.8% in group 2) had AWMI. Similar rates of dyspnea, palpitations, syncope, and sweating were seen in both groups. In both groups, 35% vs. 32% of patients had diabetes, which was a similar number. When compared to the old group, a larger percentage of younger individuals had retained left ventricular function (38.9% vs. 88%). Although total cholesterol was numerically higher, the P value was not significant. Homocysteine, triglyceride, and low-density lipoprotein levels did not significantly differ between the two groups. However, the younger group had higher levels of lipoprotein A.

56 patients (62.2%) in the young group had single vessel disease, compared to 14 (41.25%) in the elderly group on coronary angiography. Only in the young group were recanalized LADs observed in 7 cases, while angiography results for 1 patient were normal. Young people (53.3%) with double vessel disease typically involved LAD + LCX, while the elderly (57.2%) were more likely to have involvement of LAD + RCA. Younger individuals (n = 62; 68.9%) and the elderly (n = 28; 82.4%) both had the highest prevalence of LAD involvement. Significant differences between the two groups in RCA involvement were observed when coronary angiographic findings were analyzed.

Correlation of age with various parameters

In Group 1, there seemed to be no correlation between age and total cholesterol, while in Group 2, there appeared to be a slight negative correlation between age and total cholesterol. In Group 1, there did not seem to be any correlation between HDL and age. In Group 2, Pearson's correlation revealed a slight negative association between age and cholesterol. In Group 1, there seemed to be no correlation between LDL and age, while in Group 2, there appeared to be a modest negative correlation between LDL and age. In Group 1, there seemed to be a minor positive correlation between Lipoprotein A and age, but in Group 2, there seemed to be a negative correlation. In Groups 1 and 2, there seemed to be a slight positive correlation between hsCRP and age, but only in Group 1 was it significant (p=0.029).

Discussion

India, being a rapidly developing country, has undergone significant transitions in various areas, including the demographic pattern of some diseases. Globalization on a large scale and changing socioeconomic and lifestyle factors have also changed the epidemiology of the major non-communicable diseases. South Asians, particularly Indians, are more likely than other communities to acquire CAD at a younger age. The prevalence of CAD among the young population is rising. The

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risk factors for CAD in the young population, however, are not fully described. Our study included 90 patients under the age of 45 who had ACS and 34 elderly patients over the age of 45.

We observed that STEMI frequently occurred in both young and old patients. Similar rates of diabetes, hypertension, and dyslipidemia were present in both groups. The single risk factor that was more prevalent in the younger group was smoking. The group had a higher prevalence of single vessel disease while the older population had a higher prevalence of multiple vessel disease.

The mean age of the patients in groups 1 and 2 of our study was 39.79 ± 5.15 years and 59.74 ± 8.21 years, respectively. Male predominance was seen, which is consistent with findings from other studies (Esteban MR etal[5] and Bush N eat al[6]).

In the younger population in group 1, 32 (35.6%) of the patients smoked, compared to 4 (11.8%) in group 2. According to research by Haque et al. (2010), smoking was the most prevalent risk factor (64.06%) among young patients.[7] In the current study, 50 (55.6%) of those in Group 1 chewed tobacco, compared to 20 (58.8%) in Group 2. 33 (36.7%) people in group 1 had a positive family history, compared to 8 (23.5) people of group 2. According to Stanek et al., ACS also appeared earlier in life when there was a positive family history.[8] When smoking, hypertension, and a favorable family history were present, the disparities between age groups were more obvious.

According to Chen TS et al. (2014), younger patients were more likely to be male, overweight, and present with STEMI than their older counterparts. Younger patients tended to have smoking, family history, and dyslipidaemia more commonly than patients over the age of 45. Patients older than 45 years of age typically presented with non-ST segment elevation myocardial infarction, a greater degree of ischemia burden, and left ventricular dysfunction.[9]

Alkhawam H et al. (2016) discovered that individuals with CAD had higher odds of smoking, having dyslipidemia, being diabetic, having a BMI >30 kg/m(2), having a family history of early CAD, and being male in gender.[10] Diabetes was one of the leading risk factors for CAD patients, according to Jamil S et al (2021), with an odds ratio of 1.98 (p=0.011), followed by hyperlipidemia at 1.85 (p=0.021). The odds ratio for smoking history was 2.93 (p 0.001). [11]

Angiographic profile

56 (62.2%) patients in group I and 14 (41.2%) patients in group II both had single vessel disease. When the results of the two groups' coronary angiographies were compared for single, double, and triple vessel disease, there was a significant difference (p=0.012) between the two groups.

LAD+ LCX were the most common vessels involved in young individuals with double vessel disease, while LAD+ RCA were the most common vessels involved in the elderly. In 62 (68.9%) of the patients in Group I and in 28 (82.4%) of the patients in Group II, the left anterior descending (LAD) was frequently involved.

When coronary angiography results from the two groups were compared, the Right coronary artery showed a significant difference between the two groups; p=0.04. However, when LAD, LCX, and LM were compared between the two groups, there was no discernible difference. According to Haque A et al. (2010) [7], the most prevalent lesion, with a 53.12% prevalence, was SVCAD. DVCAD was present in 26.56% of patients, and TVCAD was prevalent in 20.31% of patients. Bush N et al (2021)[6] discovered that single-vessel disease was more common in younger individuals, while multivessel involvement was more common in elderly people. ST elevation myocardial infarction (STEMI), which was observed in 536 (78.7%) of patients, was the most frequent clinical presentation, according to Patil R et al.[11]

Study Limitations

124 individuals is a relatively low sample size for this clinical investigation but appears to be enough for a statistical analysis that is adequately powered. Because this study was single-centered and

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nonrandomized, a larger patient group would have been optimal for studying the outcomes in this patient population. The restrictions of a small sample size may be solved by combining data from other centers. Since the study was conducted at a tertiary referral facility, there may be some referral bias present, making it difficult to extrapolate the findings outside of this setting.

Consequently, the results need to be interpreted carefully. Selection bias cannot be completely ruled out. Due to the short study period and the rigorous data gathering required for the Covid-19 pandemic, it's possible that some crucial details were missed. Due to the short duration of this trial, repeated admissions were not evaluated because patients were only seen for brief periods of time. Improvement was not evaluated since treatment factors were not taken into account during the investigation. The patient's adherence to the medicine was not monitored.

CONCLUSION

Young patients with acute coronary syndrome have a good prognosis with a predominance of SVD, and the most prevalent risk factors included smoking, chewing tobacco, family history of CAD, hypertension, diabetes, hyperlipidemia, male sex, physical inactivity, and obesity. Age and any of the serum lipid parameters were not found to significantly correlate with one another in the study, but there was a very slight positive correlation between hsCRP and age. These ACS patients need to have intensive clinical monitoring. Better risk factor management and understanding of preventive measures are required. Assessment of risk and clinical treatment of various ACS subtypes will benefit from analysis of differences in risk factors since it will enable more tailored prevention and treatment.

TABLE 1: Baseline characteristics in both groups

Gender	Group I	Group II	
Male Female	71 (78.9%) 19 (21.1%)	28 (82.4%) 6 (17.6%)	
Mean age	39.79 ±5.15	59.74±8.21	
Smoking	32 (35%)	4 (11.8%)	
Chewing tobacco	50 (55.6%)	20 (58.8%)	
Hypertension	22 (24.4%)	8 (23.5%)	
Diabetes	32(35.6%)	11 (32.4%)	
Family history	33 (36.7%)	8 (23.5%)	
Chest pain	90 (100 %)	34 100%	
Shortness of Breath	43 (47.8)	16 (47.1)	
Palpitation	61 (67.8)	24 (70.6)	
Sweating	50 (65.6%)	23 (67.6)	
Syncope	13 (14.4)	5 (14.1)	
Mean BMI	24.46 ±2.13	23.82±2.01	

TABLE 2 : Biochemical parameters

Fasting blood sugar	125.31 ±50.68	118±41.65	
Total cholesterol mg/dl	167.19±46.07	199.21±42.57	
Triglyceride	172.68±104.07	193.82±99.4	
HDL	44.16±10.93	49.56±11.8	
LDL	98.16±35.8	113.06±29.47	
VLDL	27.12±9.64	33.79±9.41	
Lipoprotein A	27.58±14.44	22.79±8.53	
Hs CRP	4.49±3.48	4.51±2.76	
Homocysteine	15.78 ±2.5	16.9±3.03	
HbA1c	6.43±1.57	6.67±2.26	

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Total cholesterol > 200	20 (22.2%)	16 (47.2%)	
LDL > 130	24 (26.7%)	10 (29.4%)	
Triglyceride > 150	38 (42.2%)	19(55.9%)	

Table 3: Echocardiography finding

LV DYSFUNCTION	Group 1 AGE <45 YRS	Group 2 AGE >45 YRS
NORMAL	35(38.9%)	3(8.8%)
MILD	25(27.8%)	10(29.4%)
MODERATE	23(25.5%)	17(50%)
SEVERE	7(7.7%)	4(11.8%)

Table 4: Coronary Angiography

Coronary Angiography	**Group 1**		**Group 2**		**P Value**
	Number	**Percent**	**Number**	**Percent**	
Single vessel disease	56	62.2%	14	41.2%	0.012
Double vessel disease	15	16.7%	7	20.6%	
Triple vessel disease	11	12.2%	12	35.3%	
Recanalized left anterior descending	7	7.8%	0	0.0%	
Normal	1	1.1%	1	2.9%	

TABLE 5: Distribution of double vessel disease

Double vessel disease	Group I	Group II
	N (%)	N (%)
LAD+ LCX	8(53.3%)	3(42.8%)
LAD+RCA	5(33.3%)	4(57.2%)
RCA+ LCX	2(13.3%)	-

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