



ACUTE CORONARY SYNDROME IN YOUNG ADULTS IN TERTIARY HEALTH CENTER OF RURAL TELANGANA.

Cardiology

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ABSTRACT

As the incidence of non communicable disease is increasing we are finding many young patients getting admitted with Acute coronary syndrome. This is a retrospective study of young adults below 46 yrs of age in our medical college from rural central India over a period of March 2020 to March 2021. This consists of comprehensive data of management, risk factors & clinical features of young acute coronary syndrome. **Methods:** 108 patients who underwent coronary angiogram were included in this study. This is a retrospective record based cross sectional study including patients with acute coronary syndrome of less than 46 years age group at RVM Institute of medical sciences and research center during March 2020 to March 2021. Demographic details, risk factors and investigations and findings were noted. This is a record based study. **Results:** Mean age of the patients was 38.86 years with a standard deviation of 5.325 years and patient with least age was 27 years. STEMI, NSTEMI and Unstable angina were found to be 48.1%, 18.5% and 33.3% respectively. Age of the individuals admitted with ACS are as follows <30 yrs (10.2%), 30-35 (20.4%), 35-40 (26.9%), 40-45 (42.6%). Male 63% and female constituting 37% of population. Risk factors including Hypertension (19%), diabetes mellitus (13%), alcohol (32%), smoking (12%). Ejection fraction of <40 constituting 8.3%, 40-50 constituting 28.7%, 50-60 constituting 35.2%, >60 constitutes 27.8%. management medically done for 68% patients by thrombolytics, managed by PTCA for 33% and by CABG for 4% patients. In 33% of patients managed by PTCA, single stent is used for around 75% of patients. Two stents (19%), three stents and four stents for 3% each. 20% of individuals are diagnosed with normal coronaries, followed by single vessel disease (25%), double vessel disease (12%), triple vessel disease (2%), LMCA lesion (2%), myocardial bridging (18%), coronaries with slow flow (16%), recanalised coronaries (4%), with patent stent (2%). In our study obstructive lesion constitutes 42% and non-obstructive constituting 58%, predominantly involving LAD with mid part of the coronary. **Conclusion:** out of 480 patients who got admitted with acute coronary syndrome of all the age groups 108 patients were found to be less than 46 years. Our study concludes male predominance in young acute coronary syndrome. Presence of risk factors like hypertension and smoking more predominantly. STEMI with Anterior wall myocardial infarction being most common, predominantly single vessel disease affecting mid part of LAD. Majority were managed medically followed by mechanical reperfusion.

KEYWORDS

Acute coronary syndrome, STEMI, UNSTABLE ANGINA

INTRODUCTION

Acute coronary syndrome formerly termed Ischemic heart disease is a condition where there is inadequate supply of blood and oxygen to myocardium. It is a mismatch between demand and supply in myocardial tissues.[1]

Cardiovascular disease is considered as the primary burden of disease worldwide leading to death [2]. Graph is increasing in developing and transitional countries.

In India, coronary artery disease prevalence has witnessed a rapid spike from 1 to 6% in urban population and 4 to 6% in rural population. Cardiovascular diseases leading to the highest incidence of morbidity among young adults in the recent past. [1,2]

Diabetes mellitus, hypertension, hyperlipidemia and addictions including smoking are leading cause of morbidity. Tobacco consumption, being one of the leading causes in the mortality rate of India. This, also leads to being one of the main risk factors for the young myocardial infarction.

Tobacco consumption still being the major risk factor in young adults, other risk factor were low in the Indians [3]. Plaque erosion, the dysfunction of coronary micro vascular, spontaneous dissection of coronary artery, and coronary spasm being the unique syndromes are related in the use of drugs and are more observant in the 15-35yr age group.

Diabetes mellitus is accounting for around 20% risk of developing ACS.[5] Hypertension being considered as separate risk factor. Coronary angioplasty and thrombolysis is the mainstay treatment of choice in myocardial infarction. Nitrates, anti-platelets, beta blockers and anticoagulants are included in the medical management of MI. Aspirin, clopidogrel, beta blockers and statins are used in secondary prevention and are gold standard management.[4]

ACS is primarily presented as IHD and these include ST elevated MI (STEMI), non ST elevated myocardial infarction (NSTEMI) or Unstable angina (UA).

STEMI was defined as an ST segment in two contiguous leads with more than 1mm elevation. NSTEMI is defined as with ST segment depression or either flat T waves and T wave inversions with cardiac enzymes elevated. Unstable angina compromises clinical features of ACS without any ECG changes or non elevated enzymes.[7]

OBJECTIVES:

To determine demographic characteristics and risk factors of patients presenting as young ACS. To study the management strategy used.

Study Type: Retrospective record based cross sectional study including patients presented from March 2020 to March 2021.

Data Source:

In hospital collection of data from the Medical record department of general medicine and cardiology in RVM Institute of medical sciences and research centre, Laxmakkapally, Mulugu, Telangana. Data consisting of demographics, clinical presentation, medical history, addictions, investigations, treatment process during period of hospital stay.

Inclusion Criteria:

All consecutive young Acute coronary syndrome patients from March 2020 to March 2021 between the age less than 46 yrs. COVID Rapid antigen test- Negative.

Exclusion Criteria:

Patients with myocarditis, cardiomyopathy and pulmonary embolism.

STATISTICAL METHOD:

Values are expressed as Mean $\pm$ SD, frequency, percentages, Bar and

line graphs are used for data representation. Chi square test and Fischer's exact test was used to find the association between demographic variables and study parameters. In all analysis, $P < 0.05$ was considered to be significant. All statistical analyses were performed using SPSS statistical software, version 20.

RESULTS:

Table 1: Age, gender distribution and clinical presentation of patients

Study Variable	Frequency (n = 108)	Percent
Gender		
Male	68	63
Female	40	37
AGE in years		
<30	11	10
30-35	22	20
35-40	29	27
40-45	46	43
CLINICAL PRESENTATION		
CHEST PAIN	77	71
SOB	16	15
SWEATING	2	2
PALPITATION	2	2
OTHERS	6	6
More than 2 complaints	5	5

Mean age was 38.8 years (S D: 5.325). Minimum age observed was 27 years. From our results there is increased incidence among 40-45 years. Majority of patients were male who constituted 63%. Majority presented with history of chest pain.

Table 2: Risk factors, echo findings and disease pattern in patients.

Study Variable	Frequency (n = 108)	Percent
Risk factors		
HYPERTENSION	19	18
DIABETES	13	9
ALCOHOL	32	30
SMOKING	12	11
Enzymes		
TROP I	76	70
CKMB	73	68
Echo findings		
Normal	60	55.6
Mild LV dysfunction	40	37
Moderate LV dysfunction	6	5.6
Severe LV dysfunction	2	1.9
EF		
<40	9	8.3
40-50	31	28.7
50-60	38	35.2
>60	30	27.8
Type of lesion		
AWMI	42	39
IWMI	7	7
LWMI	3	3
Normal	56	52
Diagnosis		
ST ELEVATION MI	52	48
NSTEMI	20	19
UNSTABLE ANGINA	36	33

ECHO findings of 40 patients (37%) patients showed mild left ventricular dysfunction, moderate left ventricular dysfunction and severe left ventricular dysfunction was found in 6 (5.6%) patients and 2 (1.9%) patients respectively.

Ejection fraction with more than 60% are around 27.8% patients and between 50%-60% include 35.2% patients, between 40%-50% include 28.7% patients and less than 40% include 8.3% patients, 37% of patients had ejection fraction less than 50%.

Hence there by our results suggest that there is subsequent risk factor for decreased left ventricular function and decreased ejection factor for patients presenting with ACS.

51.9% of the patients did not have wall infarction. 38.9% had anterior wall MI. Inferior wall and lateral wall MI was minimal comparatively.

In the present study 48.1% had ST elevation MI and 33.3% had unstable angina. Prevalence of NSTEMI was 18.5%.

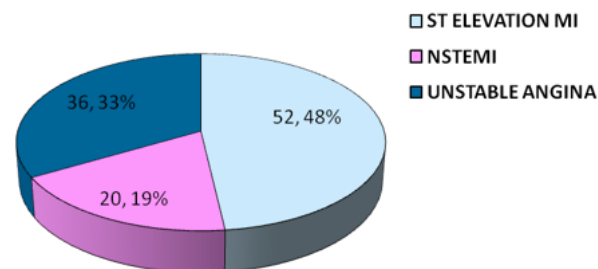


Figure 1: Distribution according to diagnosis.

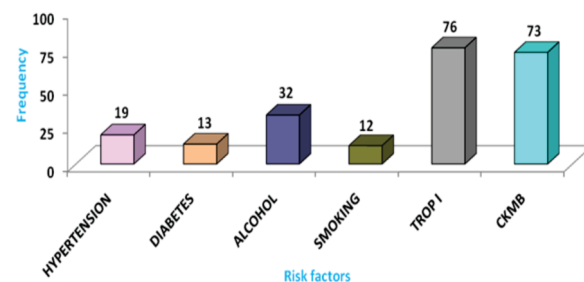


Figure 2: Distribution according to risk factors.

Out of 108 patients under study 45 patients presented with obstructive disease which Present study shows presence of risk factors as follows: 17.6% had hypertension, 8.6% had diabetes, 29.6% consumed alcohol, 11.1% had history of smoking. In 70.4% of patients TROP I was elevated and 67.6% had high CKMB.

Table 3: Management and conclusion

Study Variable	Frequency (n = 108)	Percent
MANAGEMENT		
MEDICAL MANAGEMENT	68	63
PTCA	36	33
CABG	4	4
NO. OF STENTS (PTCA =36)		
1 STENT	27	75
2 STENTS	7	19
3 STENTS	1	3
4 STENTS	1	3
Conclusion		
NORMAL CORONARIES	22	20
SINGLE VESSEL DISEASE	27	25
DOUBLEVESSEL DISEASE	13	12
TRIPLE VESSEL DISEASE	2	2
LMCA	2	2
MYOCARDIAL BRIDGING	19	18
SLOW FLOW	17	16
RECANALISED	4	4
PATENT STENT	2	2

Out of 108 patients 20% constitutes normal coronaries, 25% with single vessel disease, 12% with double vessel disease, 2% with LMCA occlusion and triple vessel disease each, 18% with myocardial bridging, 16% with slow flow with otherwise normal coronaries, 4% with recanalised coronaries and 2% with patent stent.

63% were managed medically as angiographic reports reported normal coronaries with mild to moderate myocardial Bridging. 36 patients corresponding to 33.3% of total population underwent stenting. Remaining 3.8% including 4 patients were referred for CABG.

Above table shows number of stents required for angioplasty. From our study majority of patients who had underwent PTCA were managed by using single stent reporting of 24.1% out of 32.4% of patients managed by PTCA. Followed by two stents constituting 6.5% followed by three and four stents constituting 0.9% each.

Table 4: Obstruction and vessel involved

Study Variable	Frequency (n = 108)	Percent
Others	63	58
Obstructive	45	42
Obstructive (n=45)		
LAD	27	25
RCA	1	1
LAD + RCA	6	6
LAD + LCX	6	6
RCA + LCX	2	2
LAD + RCA + LCX	3	3

Out of 108 patients 45 patients presented with obstructive lesion constituting 42%. Out of these 42% LAD is the vessel predominantly involved individually. It is also predominant vessel to be involved in double vessel disease.

It was found that proximal part of vessel involved in 36 patients (33.3%), mid part involving 50 patients (46.2%) and distal segment involving in 14 patients (12.9%). Normal coronaries without any lesion seen in 10 patients (9.25%).

DISCUSSION:

There was study acute coronary syndrome in Andhra Pradesh eluru where Of the 1151 cases included in this study, 120 were in the younger age group (<40 years) contributing 10.42% of the total cases. The mean age of CAD in young is 36.11 years, the youngest being 22 years. Of 120 cases of CAD single-vessel disease (SVD), predominantly the left anterior descending artery, was the most prevalent. [9] Compared to our study where youngest being 27 years and similar results in case of single vessel disease involving LAD being predominant cause.[8]

Our study showed similar results as Demographic and angiographic profile in premature cases of acute coronary syndrome: analysis of 820 young patients from South India where a majority of patients were 31–40 years of age and males were predominant in both the groups[8] which reported increased incidence among males and on contrary increased incidence is found among age group of 40–45 years of both age groups.

In a study it shows result of male incidence of 91.8%. [10] There were also others where they show increase predominance of ACS in males.

In the present study 48.1% had ST elevation MI and 33.3% had unstable angina. Prevalence of NSTEMI was 18.5%. A single tertiary care center study states that ST-elevation ACS (STE-ACS) accounted for 82% and Non-ST-elevation ACS (NSTEMI-ACS) accounted for 18% of cases. AAMI constituted 58% incidence. IAMI and LWMI accounting for 23% and 1% respectively out of overall 82% of STEMI.[11]

Similarly our study also showed incidence of AAMI(38.9%), IAMI(6.5%), LWMI(2.8%) out of overall 58% with highest incidence remains to be of STEMI with AAMI on the contrast there is increase in incidence of NSTEMI.

According to The prevalence, clinical spectrum and the long term outcome of ST segment Elevation myocardial infarction in young study Younger patients with acute MI had preponderance to anterior wall (68.8%), single-vessel disease (50%) and left anterior descending artery being the culprit lesion (67.3%).[12] similar to our study.

According to PATTERN OF CORONARY ARTERY DISEASES study majority of the patients (79.1%) were diagnosed as with ST-elevation myocardial infarction (STEMI) with anterior wall myocardial infarction (MI) as the most common (57.3%) type of MI. Most of the patients (70%) had single vessel diseases (SVD) with left anterior descending artery (LAD) as the most commonly diseases vessel (53.6%). Nine (4.1%) patients had significant left main disease and 6.4% had non-obstructive CAD.[9]

According to The prevalence, clinical spectrum and the long term outcome of ST segment Elevation myocardial infarction in young study risk factors like hypertension(16%), association of smoking and diabetes mellitus is found to be 37.6% and 16.8% respectively.[12] our study shows similar in incidence of hypertension but there is decrease in incidence of smoking and diabetes by approximately half of the values when compared to above study.

According to Prevalence of coronary heart disease and risk factors in an urban Indian population: Jaipur Heart Watch-2. Risk factor prevalence showed that smoking/tobacco use was present in 201 males (36.5%) and 67 females (11.7%). Hypertension (> or =140 and/or 90 mmHg) was present in 200 males (36.4%) and 215 females (37.5%). Diabetes diagnosed by history or fasting glucose > or =126 mg/dl was found in 72 males (13.1%) and 65 females (11.3%).[14]

According to PATTERN OF CORONARY ARTERY DISEASES IN PATIENTS UNDER 40 YEARS OF AGE WITH ACUTE CORONARY SYNDROME Smoking is the commonest risk factor followed by hypertension and family history of CAD.[9]

According to Clinical characteristics and outcomes of young adults with first myocardial infarction: Results from Gulf COAST Young patients represented 26.1% (n = 407) of first AMI cases and were more likely to be men (82.8% vs. 66.5%), current smokers (49.9% vs 19.0%) and have family history of premature coronary artery disease (21.4% vs 10.4%)[14]. above study showed similar results to our study.

According to The prevalence, clinical spectrum and the long term outcome of ST segment, near normal/normal coronary arteries were observed in 12.9% of cases.[12] where as in our study 20% of patients were found to have normal coronaries showing slight increase in normal coronaries.

Out of 50% diseased coronaries there is found to be increased incidence of single vessel disease similar to premature myocardial infarction: clinical profile and angiographic findings study[13].

According to Epidemiological and clinical profile, management and outcomes of young patients (<40 years) with acute coronary syndrome: A single tertiary care center study Risk factors prevalent were smoking (56%), hypertension (29.7%) and diabetes (15.9%). ST-elevation ACS (STE-ACS) accounted for 82% and Non-ST-elevation ACS (NSTEMI-ACS) accounted for 18% of cases. Thrombolysis was done in 51.7% of the cases. Coronary angiography was done in 91.7% and percutaneous coronary intervention (PCI) in 52.2% (95/182) of the total cases. Coronary artery bypass surgery (CABG) was done in 2 patients (1.1%). Among those who underwent coronary angiography, single-vessel disease (SVD) was seen in 53% of the cases.[10] The above study likely coincide with our study in case of association with diabetes, patients managed by thrombolysis and patients advised for CABG. When compared with the above study hypertensive patients are likely low in our population and patients with history of smoking are also low and in majority of patients PTCA was done.

According to **Acute Coronary Syndrome in the Young: Clinical Characteristics, Risk Factors and Prognosis** Mean age was 35.4±4.8 years and 83.7% of the participants were men. Myocardial infarction with single-vessel involvement (44.7%) predominated. Compared to controls, the prevalence in patients was higher for smoking (74.8 vs 33.1%, p<0001), diabetes (14.6% vs 5.1%, p=0.001), low HDL-cholesterol (82.9 vs 34.1%, p<0.001) and obesity (30.0 vs 20.3%, p=0.029). Decreased left ventricular ejection fraction (odds ratio=2.2, p=0.033) and smoking (odds ratio=7.8, p=0.045) were associated with readmission for coronary syndrome showed similar results with decreased ejection fraction and single vessel disease being predominant cause of disease. Similar incidence of diabetes is also noted.[15]

According to Association of Co-Morbidity and Treatment with the Complications of Acute Coronary Syndrome in Young Patients Less Than 45 Years in Malaysia, The mean age was 39.1 (4.9) years, the male to female ratio was 3:1; 21.2% of patients presented with unstable angina, 58.5% had non-ST elevation myocardial infarction and 20.4% had ST elevation myocardial infarction. The most frequent risk factor of ACS was dyslipidaemia (65.3%), followed by hypertension (43.5%). The significant factors associated with ACS complications were current smoking [adjusted odds ratio (AOR) 4.03; 95% confidence interval (CI): 1.33, 12.23; P-value = 0.014], diabetic mellitus [AOR 3.03; 95% CI: 1.19, 7.71; P-value = 0.020], treatments of fondaparinux [AOR 0.18; 95% CI: 0.08, 0.39; P-value < 0.001] and oral nitrates [AOR 0.18; 95% CI: 0.08, 0.42; P-value < 0.001] shows contrast result with predominant with NSTEMI.[16]

REFERENCES:

1. Bhutta Beenish S, Rai Dilawar Shahjehan. Coronary Artery Disease.

2. N Anand, Shukla, A Ashwal Jayaramy. The Young Myocardial Infarction Study of the Western Indians. YOUTH Registry. GLOBAL HEART, VOL. 14, NO. 1, 2019 March 2019: 27-33.
3. Gulati Rajiv, Behfar Atta. Acute Myocardial Infarction in Young Individuals. VOLUME 95, ISSUE 1, P136-156, JANUARY 01, 2020.
4. M Egred, G Viswanathan, G K Davis. Myocardial infarction in young adults. Postgraduate medical journal. Volume 81, Issue 962.
5. Divakaran Sanjay; Singh Avinainder. Diabetes Is Associated With Worse Long-term Outcomes in Young Adults After Myocardial Infarction: The Partners YOUNG-MI Registry. American diabetes association, Volume 43, Issue 8.
6. Ed Burns, Cadogan Mike. Life Anatomy and Function of the Coronary Arteries. John Hopkins medicine. Myocardial Ischaemia.
7. Deora Surender, Tarun Kumar. Demographic and angiographic profile in premature cases of acute coronary syndrome: analysis of 820 young patients from South India. Cardiovasc Diagn Ther 2016;6(3):193-198.
8. Iragavarapu T, Radhakrishna T, Babu K J, Sanghamitra R. Acute coronary syndrome in young - A tertiary care centre experience with reference to coronary angiogram. J Pract Cardiovasc Sci 2019;5:18-25.
9. Iram Jehan Balouch, Iftikhar Ahmed. PATTERN OF CORONARY ARTERY DISEASES IN PATIENTS UNDER 40 YEARS OF AGE WITH ACUTE CORONARY SYNDROME. Pakistan heart journal.
10. C Pruthvi, Revaiah Krishna, Vemuri Santosh. Epidemiological and clinical profile, management and outcomes of young patients (≤ 40 years) with acute coronary syndrome: A single tertiary care center study. Indian Heart Journal, Volume 73, Issue 3, May-June 2021, Pages 295-300.
11. Singh Bhupinder, Singh Ajaypal, Goyal Abhishek. The Prevalence, Clinical Spectrum and the Long Term Outcome of ST-segment Elevation Myocardial Infarction in Young – A Prospective Observational Study. <https://doi.org/10.1016/j.carrev.2018.07.020> Get rights and content
12. Javier Pineda, Francisco Marin. Premature myocardial infarction: Clinical profile and angiographic findings. International Journal of Cardiology Volume 126, Issue 1, 7 May 2008, Pages 127-129.
13. Gupta R, Gupta VP, Sarna M. Prevalence of coronary heart disease and risk factors in an urban Indian population: Jaipur Heart Watch-2. **Indian Heart Journal**, 01 Jan 2002, 54(1):59-66.
14. Abdulhamied Alfaddagh, Haitham Khraishah. Clinical characteristics and outcomes of young adults with first myocardial infarction: Results from Gulf COAST. IJC Heart & Vasculture Volume 31, December 2020.
15. Marcos R Esteban, Sara M Montero. Acute Coronary Syndrome in the Young: Clinical Characteristics, Risk Factors and Prognosis. Open Cardiovasc Med J. 2014; 8: 61-67.
16. Bachok Norsadiah, Che' Muda Che-Muzaini. Association of Co-Morbidity and Treatment with the Complications of Acute Coronary Syndrome in Young Patients Less Than 45 Years. Malays J Med Sci. 2018 Feb; 25(1): 4