

An Observational Study On Risk Factors, Clinical Profile And Management Of Acute Coronary Syndrome In Tertiary Care Hospital

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Abstract:

Background: ACS Encompasses A Wide Range Of Clinical Manifestations From STEMI To NSTEMI Or UA. It Is More Frequent In India, Which Has A Greater Rate Than The Rest Of The World. STEMI Individuals Were More Likely To Be Identified Than NSTEMI Or UA. The Most Common Cause Underlying ACS Is Atherosclerosis. Hypertension, Diabetes, Dyslipidemia And Social Habits Are All Major Risk Factors. In Majority Of Individuals Suffering From NSTEMI Have A Higher Annual Death Rate Than Those Experiencing STEMI. The Study's Major Goal Is To Find Out Which Risk Variables Lead To ACS In An Observational Study. To Identify The Therapeutic Plan For Patients Based On Clinical Profile, To Assess The Co Morbidities As Well As The Therapeutic Approach And The Parameters On Which ACS Has Indeed Been Confirmed.

Materials And Methods: After Receiving Approval From The IEC, This Is A Six Months Prospective Type Of Observational Study Conducted At Gandhi Hospital In Secunderabad. The Study Included 147 Individuals Who Met The Study Eligibility Requirements. The Essential Information Is Acquired From The Case Reports And Medical Health Records Of Individuals Who Are Diagnosed With ACS. The Data Which Is Collected Was Statistically Examined.

The Data Is Depicted Using Charts, Graphs, P Value. The Gathered Information Was Analyzed Using SPSS Version 20 Statistical Software, Which Included Chi-Square Test And One-Way ANOVA.

To Exhibit Diverse Features, Charts And Graphs Are Generally Portrayed Using Pie And Bar Diagrams, Descriptive Analysis Represents Mean, Maximum And Minimum Value Of Character And Chi-Square Is Being Used To Determine Correlation Between 2 Characters. One Way ANOVA Is Often Used To See The Means Of 2 Samples Are Substantially Different.

Results: The Current Study Focuses On An Observational Analysis Of Factors Effecting ACS, Clinical Characteristics And ACS Management In Hospitals. Males Are More Susceptible To ACS Than Females According To The Study. Patients Aged 55 To 65 Were Found To Have A Higher Prevalence Of ACS. STEMI Individuals Seem To Be More Common Than NSTEMI-ACS. Our Study Has Shown That HTN, DM Are The Most Common Co Morbid Conditions In ACS Patients. Alcohol And Smoking Are The Significant Contributing Factors For ACS. Statistically Significant Variation Is Seen In Troponin And LDL In Patients Diagnosed With STEMI, NSTEMI And UA. The Standard Therapy Provided To The Study Population Includes Anticoagulants, DAPT, ACE Inhibitors, Beta Blockers And Lipid Lowering Therapy.

Conclusion: Our Study Revealed That Alcohol Is The Major Risk Factor, Followed By Diabetes, Smoking, Hypertension, Obesity And Tobacco Use. Patient Data Was Gathered, And Based On Evaluations, The Standard Treatment Provided To The Study Population Includes Anticoagulants, DAPT, Statin, ACE's, Betablockers.

Key Word: Acute Coronary Syndrome, Dual Antiplatelet Therapy, Atherosclerosis, Hypertension

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I. Introduction

ACS is a term that encompasses a pathophysiologic and clinical spectrum that results in acute MI. Acute Coronary Syndrome includes Unstable Angina as well as STEMI or NSTEMI. The most common risk factors for ACS are age, gender, Hypertension, diabetes mellitus, high blood cholesterol, smoking of cigarettes and lack of physical activity. Pain and discomfort in the chest are the most common clinical manifestations for ACS. ACS can be diagnosed with electrocardiogram, serum biomarkers and 2D-Echo. The medications which effectively treat syndrome are antiplatelets, nitrates, beta adrenergic blockers, and calcium channel blockers.

II. Material And Methods

This Cross sectional observational study was carried out on patients of Department of cardiology at Gandhi Hospital, Secunderabad, Hyderabad, Telangana. A total 147 adult subjects (both male and females) of aged ≥ 18 , years were for in this study.

Study Design: Cross sectional observational Study.

Study Location: The study has been conducted at Gandhi Hospital, Secunderabad, Hyderabad, Telangana.

Study Duration: The study was conducted for 6 months.

Sample size: 147 patients.

Sample size calculation: The sample size was estimated on the basis of a single proportion design. The target population from which we randomly selected our sample was considered 20,000. We assumed that the confidence interval of 10% and confidence level of 95%. The sample size actually obtained for this study was 147 patients. Patients were divided into three groups (each group had 100 patients) according to diagnosis. We planned to include 200 patients (Group I- 50, Group II- 100, Group III - 50) .

Subjects & selection method: After receiving approval from the IEC, this is a six months prospective type of observational study conducted at Gandhi hospital in Secunderabad. The study included 147 individuals who met the study eligibility requirements. The essential information is acquired from the case reports and medical health records of individuals who are diagnosed with ACS. The data which is collected was statistically examined.

Inclusion criteria:

1. Patients who are over the age of 18.
2. Should include at least any one from the below criteria:
 - Changes in ECG consistent with ACS,
 - Positive biochemical markers for ACS,
 - Typical angina lasting more than 20 minutes,
 - Imaging changes consistent with ACS,
 - Patients who have a history of valvular heart disease.

Exclusion criteria:

1. Patients below 18 years of age.
2. Individuals with a history of HF.

Procedure methodology

Acute MI (STEMI, NSTEMI, and UA) are all part of the ACS. Ischemia and death of cardiac tissue due to insufficient blood flow and oxygenation, commonly caused by thrombus formation on a ruptured atherosclerotic plaque in the epicardial arteries, is known as myocardial infarction. ACS, commonly known as unstable angina, is characterized by sudden chest discomfort that occurs while resting. The risk of ACS rises with age, becoming more common beyond the age of 60. These diseases are still among the most frequent life-threatening illnesses in developed countries. Men are more likely than women to develop ACS. ACS is more common in older individuals; 60-65 percent and 33 percent of MI's, respectively, occur in individuals over 65 and >75 years of age. Patients over the age of 65 account for 80 percent of all MI-related deaths. Chest pain or discomfort, with or without dyspnea, nausea, and diaphoresis are all signs of ACS. Female and diabetic individuals are more prone to present with atypical symptoms such as shortness of breath, pain or pressure in the lower chest or upper abdomen, dizziness, lightheadedness or loss of consciousness, upper back pressure, or excessive exhaustion. Clinical history, ECG alterations, an elevation in cardiac enzymes, and imaging evidence of wall motion abnormalities are used to make the diagnosis. In terms of thrombolytic therapy versus percutaneous intervention, the treatment depends on the time of the presentation and local resources. Nitrates, pain relievers, aspirin, anticoagulants, ACE inhibitors, beta blockers, diuretics, and ARBs are given to all patients. Anticoagulation and antiplatelet medication for individuals with Unstable angina or non-Q wave myocardial infarction, as well as reperfusion methods for patients with Q wave myocardial infarction, are examples of potentially life-saving interventions. Following reperfusion therapy, a number of additional pharmaceutical therapies are also useful in individuals with Q wave myocardial infarction. Our study focuses mainly on the factors affecting ACS and treatment regimen in the patients with ACS.

Statistical analysis

- *Software used: SPSS version 20*
- *Sample Size = 147*
- *Confidence interval is 95%, hence p value < 0.05 is considered significant*
- *Test performed: One way ANOVA, chi square test*

III. Result

Table 1: Gender Distribution

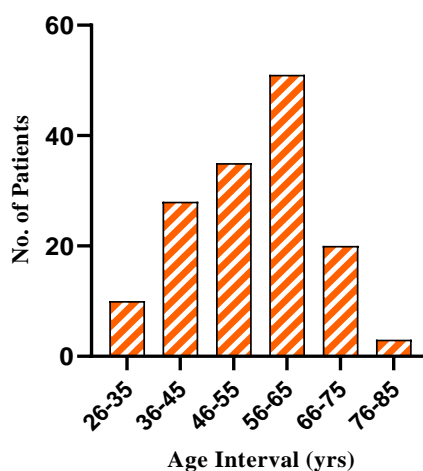
Gender	N	%
Male	108	73
Female	39	27

The above table represent the gender wise distribution of the study population. It was found that in the study population male with 73% are predominant than females with 27%.

Table 2: Age wise Distribution

Age Interval (years)	N	%
26-35	10	7
36-45	28	19
46-55	35	24
56-65	51	35
66-75	20	13
76-85	3	2

Figure 1: Age wise Distribution

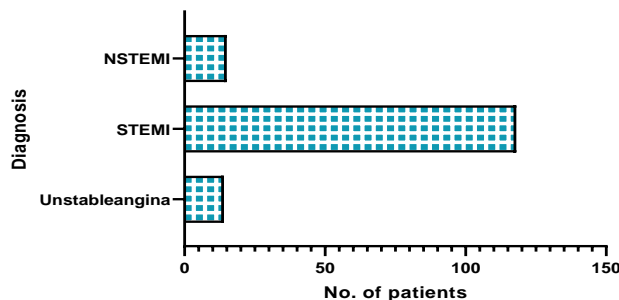


The above table and figure represent the age wise distribution of the study population. It was found that patients between the age group 56-65 (35%) are predominant.

Table 3: Distribution Based on Diagnosis

Diagnosis	N	%
Unstable angina	14	10
STEMI	118	80
NSTEMI	15	10

Figure 2: Distribution Based on Diagnosis

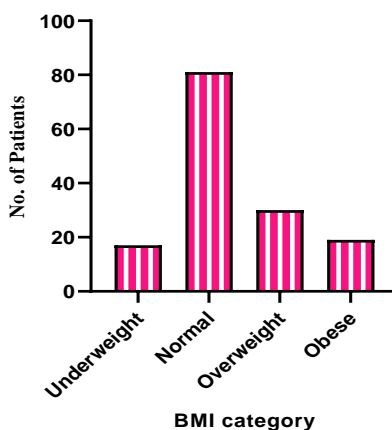


The above table and figure represent the distribution based on diagnosis of the study population. It was found that patients with STEMI (80%) are predominant than NSTEMI (10%) and Unstable angina (10%).

Table 4: Distribution Based on Body Mass Index

BMI	Category	N	%
<18.5	Underweight	17	12
18.5-24.9	Normal	81	55
25-29.9	Over weight	30	20
30 and above	Obese	19	13

Figure 3: Body Mass Index



The above table and figure represent the distribution based on BMI of the study population. The study population comprises of 147 patients. Among them 55% of patients have normal BMI, 20% and 13% of patients are overweight and obese respectively, 12% of patients were found to be underweight.

Table 5: Comorbidities found in the study population

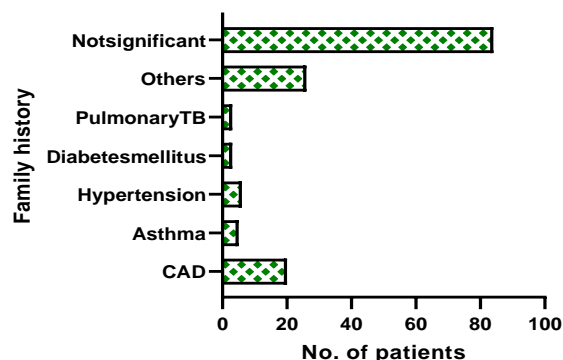
Comorbidity	N	%
Diabetes mellitus	67	46
Hypertension	43	29
Thyroid disorder	1	1

The above table represent comorbidities found in the study population. Among all comorbidities diabetes mellitus is more contributing factor for ACS which accounts for 46%. The next major cause involve hypertension which is 29%. The thyroid disorder is less common which accounts for 1%.

Table 6: Family History

Family History	N	%
CAD	20	14
Asthma	5	3
Hypertension	6	4
Diabetes mellitus	3	2
Pulmonary TB	3	2
Others	26	18
Not significant	84	57

Figure 4: Family History

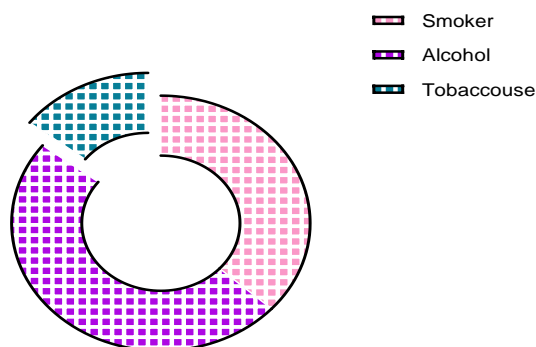


The above table and graph represent family history in the study population. The major factor for ACS regarding family history is CAD which is 14%. Among all the factors asthma, hypertension, diabetes mellitus, pulmonary TB and others shows 3%,4%,2%,2% and 18% respectively. A statistically significant relationship does not exist in the family history.

Table 7: Social Habit

Social Habit	N	%
Smoker	58	39
Alcohol	77	52
Tobacco use	23	16

Figure 5: Social Habit



The above table and figure represent social habits regarding ACS in the study population. It was found that alcohol with 52% are predominant which comprised as a major cause. The next contributing factor is smoking with 39 % and tobacco with 16%.

Table 8: Ejection Fraction Based on Diagnosis

Diagnosis	Ejection Fraction (%)			P value
	Minimum	Maximum	Mean± SD	
Unstable angina	16	68	48.64±14.07	0.2388
STEMI	18	75	43.30±10.60	
NSTEMI	18	74	42.67±14.73	

Statistically significant difference was not found in the ejection fraction based on diagnosis. The above table represent EF based on diagnosis in the study population. Statistically significant difference was not found in the EF based on diagnosis.

Table 9: Laboratory parameters

Diagnosis	Parameter								
	Troponin			TC			LDL		
	Min	Max	Mean± SD	Min	Max	Mean± SD	Min	Max	Mean± SD
Unstable angina	1.50	5000	439.9±353.7	83.40	231	153±39.77	33.72	144.4	77.69±34.44
STEMI	6.80	27200	5960±726.1	49.80	394	183.7±62.99	27.76	339	108.2±45.37
NSTEMI	8.10	21351	4991±1812	98.40	252.1	170.8±45.01	40	170.3	101.5±35.04
P value	0.0351*			0.1645			0.0479*		

*Statistically significant difference was found

The above table represent lab parameters for ACS in study population. Troponin and LDL were more significant parameters in ACS.

Table 10: Treatment

Drug Category	STEMI		NSTEMI		Unstable angina	
	N	%	N	%	N	%
STK	15	10	0	0	0	0
Anticoagulants	114	97	13	87	14	100
DAPT	118	100	15	100	14	100
Statin	118	100	14	93	14	100
Beta blockers	110	93	15	100	14	100
ACEI's	115	97	15	100	14	100
ARB's	08	07	04	27	01	07
Calcium Channel Blockers	10	08	05	33	03	21
Diuretics	90	76	10	67	11	79
Insulin	23	19	02	13	03	21
Others	118	100	15	100	14	100

The above table represents the distribution of drugs based on the type of ACS. The treatment provided to the patients includes anticoagulants, DAPT, statin, betablockers, ACEI's, ARB's, calcium channel blockers, diuretics, insulin, other medications include PPI's, laxatives, antihistamine, antiemetics etc. 10% of the patients diagnosed with STEMI are thrombolysed with streptokinase.

IV. Discussion

ACS comprises of three main categories - STEMI, NSTEMI, and UA. ACS is mainly caused by changes in blood supply to heart tissues resulting in ischemia or infarction of the tissue thus affecting the heart function. This blood flow changes may be due to plaque formation or clot formation in the blood vessels supplying the tissues of heart. This clot size is reduced by either thrombolysis or percutaneous coronary intervention aiding reperfusion.

This prospective observational study includes 147 patients who have been diagnosed with acute coronary syndrome. Majority of them are male accounted for 73 % (108) and females 27% (39) of the total patient population (**Table 1**).

In the study population the age groups 56-65 years (51%), 46-55 years (35%) were prone to myocardial infarction when compared with other age groups (**Table 2 and figure 1**). The risk factors may include social habits, dietary habits hypertension, diabetes, family history of CAD.

In our study population most of the patients are diagnosed with STEMI 80% (118) than NSTEMI 10 % (15), UA 10% (14) as in (**table 3 and figure 2**). Of those patients diagnosed with STEMI, 10% (15) patients who are presented within window period are thrombolysed with STK to dissolve the intracoronary thrombi achieving reperfusion and relieves chest pain. (**Table 10**)

In our study population most of the patients 55% (81) have normal BMI range from 18.5-24.9, 13% (19) of them were obese having BMI 30 and above following which 20% (13) are overweight, i.e., BMI range of 25-29.9 (**Table 4 and figure 3**). Obesity and overweight were connected to a higher risk of acute coronary syndrome in both physically healthy and sedentary people, nonsmokers and those who smoke, and those who adopted a heart-healthy diet more or less closely. Some people may have high BMI but may still be healthy which might be due to high muscle mass than fat. So the patient must be checked for the blood levels of cholesterol, TG, LDL, HDL even though the patient has normal BMI or high BMI. Obese patients must be screened regularly for the blood lipid levels and lipid lowering therapy, dietary changes has to be made in them.

Diabetes and hypertension is the most common co-morbidities observed in our study population which attributes for 46% (67) and 29% (43) respectively, less common co morbidity observed is thyroid (1%) (**Table 5**). Alcohol, smoking, tobacco are the major risk factors for heart disease.

In our study population family history has no significant impact on patient development of the disease, I.e., 57 % (84) of the patients have no significant family history contributing for disease. 14 % (20) of the patients have CAD as family history. **K Leander, J Hallqvist, et al.** found that having a family history of CAD is not only higher risks for MI in both sexes, but it also has synergistic effect with other cardiovascular risk factors. HTN and DM attributes 4% (6) and 2% (3) as a family history in patients, following which asthma 3% (5) and TB 2% (3). Other family histories (CVA, cardiac death, MI) include CVA, cardiac death, MI. (**Table 6 and figure 4**)

Smokers and tobacco account for 39% (58) and 16% (23) of the total patients in the study respectively (**Table 7 and figure 5**). Smoking causes CHD, HTN, heart attack, stroke, aneurysm, PAD by changing the blood chemistry from the chemicals released from smoking. These changes can cause plaque buildup which can be composed of either cholesterol or scar tissue, calcium and other material to build up in coronary artery leading to atherosclerosis. Blood supply to the area reduces causing stroke or heart attack or even death.

In our study population 52% (77) of the patients were alcoholics (**Table 7 and figure 5**). Alcohol use has the potential to harm the heart. Arrhythmias, tachycardia, elevated blood pressure, atrial fibrillation, weakening heart muscle, heart attack, and stroke are all potential side effects. Clot formation, high blood pressure, and bad cholesterol can all lead to stroke. These findings contradict the findings of the **CREATE** registry and the study performed by **Yadav et al study**, which found that smoking and HTN are the most significant risk factors, followed by diabetes, dyslipidemia. In our analysis, the key risk factor being alcohol, which was followed by diabetes, smoking, hypertension, and tobacco use.

Generally, patients with STEMI have left ventricular dysfunction thus reduced LVEF. In our study population the mean ejection fractions of UA, STEMI, NSTEMI are 48.64, 43.30, 42.67 ($p=0.2388$) respectively. Significant difference is not found in the EF of the patients. (**Table 8**)

Troponin is the most important indicator of extent of heart tissue damage in ACS. The mean troponin I in UA, STEMI, NSTEMI patients are 439.9, 5960, 4991 ($P=0.0351$) respectively and in our study patients with STEMI have peak troponin levels when compared with those without STEMI. Troponin is a highly sensitive marker of myocardial infarction that is required for the detection of MI in a clinical situation where ischemia is present. The mean LDL values in UA, STEMI, NSTEMI patients are 77.69, 108.2, 101.5 ($P=0.0479$) respectively with the peak mean value in STEMI patients. There is a significant positive relation with ACS. The mean cholesterol values of UA, STEMI, NSTEMI patients are 153, 183.7, 170.8 ($P=0.1645$) respectively (**Table 9**).

The standard treatment provided in the study population includes anticoagulants, DAPT (Aspirin, clopidogrel), statins, ACE's, ARB's, diuretics, beta blockers, CCB's (**Table 10**). If patient is diabetic then they are given Insulin (HAI). Patient must be monitored for risk of bleeding when on DAPT, anticoagulants. ARB's are used as alternatives for ACE in case dry cough is predominant with ACE. Other treatment given is ranitidine, PPI, laxatives, anti-emetics etc.

V. Conclusion

Our study revealed that alcohol is the major risk factor, followed by diabetes, smoking, hypertension, obesity and tobacco use. Patient data was gathered, and based on evaluations, the standard treatment provided to the study population includes anticoagulants, DAPT, Statin, ACE's, betablockers.

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