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Review Article

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EXPLORING THE RELATIONS & VARIATIONS OF RISK FACTORS, SYMPTOMS AND DIAGNOSTIC TOOLS IN ACUTE CORONARY SYNDROME

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ABSTRACT

Acute coronary syndrome (ACS) refers to a group of conditions that include ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI) and unstable angina (UA). The Genome Database study estimated that there were 1.2 million incidental ACS patient in year 2017.Data for 2020, from USA estimate a total of 3.5 million deaths with approximately 7% caused by MI, assuming a 30% of fatality rate. This is a type of coronary syndrome, which is responsible for 1/3rd of total death in people older than 35. Some forms of (Chronic heart disease) CHD can be a symptomatic, but ACS is always symptomatic, our study aims to give a detailed information on the analysis of symptoms and diagnostic tests and risk factors in acute coronary syndrome affected inpatients. It wasa prospective observational study that was conducted in Trust Multispecialty Hospital, Kakinada. 223 patients (subject) who got admitted in hospital in the duration Nov'22 to Nov'23. Mainly SOB, cough, palpitation where the major symptoms are selected. Type-II DM, hypertension, overweight were the major risk factors. ECG & 2D-ECHO were mostly used to diagnosis ACS. Mainly the variations of symptoms and estimate the risk factors related to ACS and their contribution in the disease would be monitored. There are important dissimilarities in clinical presentation, aggregation of comorbidities, cardiovascular risk factors among men and women with acute coronary syndrome (ACS). Compared with men, despite the well-known older age and more pronounced frailty, they more often experiencemyocardial infarction in the absence of obstructive coronary arteries (MINOCA), which makes diagnosis and treatment of ACS among women more challenging compared with men. Women and men do both benefit from guideline-recommended treatment, although, compared with men, women with ACS have a higher adjusted risk of early death, which equalises between both sexes within the first year.

KEYWORDS: Broad, Prevalent, Severity, Vigilance, Rehabilitation, Dysfunction, Plaque, Thrombosis, Biomarkers, Necrosis, Suspected.

INTRODUCTION

Acute coronary syndrome is broad term for three types of coronary artery disease which are potentiallylife threating conditions occur when a blockage causes blood flow to your heart to suddenly slow or stop.

Acute coronary syndrome involves three types of coronary artery disease that damage or destroy heart tissue. the specific type depends on some following factors-a) where the blood flow to your heart is blocked, b) how long the blockage lasts, c) the amount of damage it causes.

Symptoms of the acute coronary syndrome depends upon location and severity of the blockage, an also age, gender and other medical conditions. Major symptoms are – a) chest pain, b) palpitation, c) sweating, d) cough, e) shortness of breath.

Acute coronary syndrome can affect anyone. However, certain risk factors raise likelihood of developing ACS. This can be categories into 2 types. 1) Non-modifiable risk factors: examples- age, gender, family history. 2) Modifiable risk factors: example- high blood pressure, high blood glucose level, smoking, alcohol consumption, overweight.

It's not severe enough to cause cell death or a heart attack, but the reduced blood flow may increase risk of a heart attack. Acute coronary syndrome often causes severe chest pain or discomfort. It is a medical emergency that needs a diagnosis and care right away. A

coronary angiography test can showyour doctor how well blood is moving through heart. If blood moves slowly, or not at all through coronary arteries, either a narrowed, or blocked artery. Doctors can do an emergency procedure called angioplasty. This surgery or procedure can open narrowed or blocked blood vessels.

Coronary heart disease and acute coronary syndrome remain widely prevalent and still is the top causeof death in people over 35 years of age. It is essential that providers all over the world maintain a high degree of suspicion and vigilance while assessing patients with possible ACS. Along with this, public education and recognition of symptoms are crucial. Another important aspect of controlling this disease is public education about lifestyle modification and making people aware of healthier life choices. A critical aspect of STEMI and ACS timely treatment depends on adequate emergency medical services availability and training. Another crucial step of ACS control and prevention is education about lifestyle modification including smoking cessation, regular physical activity, and dietary modifications. Only through this multi-prong approach can practitioners control this high mortality disease

Sometimes, doctors will do heart bypass surgery to get blood flowing to your heart muscle again. Most people who have had a heart attack also need cardiac rehabilitation. This will help slowly increaseexercise level and learn how to follow a healthy lifestyle. If heart can no longer pump blood to your body as well as it used to have heart failure and will need lifelong treatment. Usually, a person who has had a heart attack can slowly go back to normal activities, but they will need to take steps to prevent another heart attack. Through this study, we can determine if testing patients for endothelial dysfunction will help identify which patients are more likely at risk to have another heart attack in thefuture.

Acute coronary syndrome (ACS) refers to a range of clinical presentations almost always associated with rupture of an atherosclerotic plaque in a coronary artery with subsequent partial or complete thrombosis. The syndrome includes unstable angina (UA), non–ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction (STEMI).

Despite a similar pathophysiology of UA and NSTEMI, the differentiation is based on the severity of symptoms and the presence of certain biomarkers. Chest pain is more severe in myocardial infarction (MI). Moreover, biomarkers of myocardial necrosis are released few hours after the onset of chest pain in NSTEMI but not after UA. These biomarkers consist of cardiac-specific troponins T or I and CK-MB (muscle and brain fraction of creatinine kinase).

All patients presenting to the ED with chest discomfort or other symptoms suggestive of ACS should be considered high-priority triage cases. Evaluation and treatment should follow a predetermined, institution-specific protocol for chest pain. If the initial diagnosis and treatment plan are unclear to theED physician, immediate cardiology consultation is advisable. Each year in the United States, 6 to 7 million persons present to EDs with the symptom of chest pain or other symptoms suggestive of possible ACS; of these, approximately 20% to 25% receive a final diagnosis of UA or MI. The differential diagnosis of patients with chest.

Clinicians commonly assume that the more cardiac risk factors a patient has (cardiac risk factor burden), the higher the risk of acute coronary syndromes in those with suspected acute coronary syndromes. In the emergency department (ED) setting, Jayes et al observed that individual risk factors were not useful for diagnosing acute coronary syndromes but did not study the role of cardiac risk factor burden on clinical decision-making. As a result, the role of cardiac risk factor burden in the ED setting remains unclear. Recently, the Framingham Heart Study found that patients with 2 or more cardiac risk factors had a substantially higher lifetime risk for cardiovascular disease, but this was a population-based longitudinal study, limiting this study's generalizability to the ED population. Additionally, associations between cardiac risk factors and acute coronary syndromes are not uniform across the entire population. Different cardiac risk factors are associated with acute coronary syndromes in men and women. However, the effect modification of age on the relationship between cardiac risk factor burden and acute coronary syndromes is not well studied.

Using a contemporary database, we sought to determine whether cardiac risk factor burden was associated with the risk of acute coronary syndromes and to determine its usefulness in the ED setting.In addition, we explored how age and other clinical variables modified the relationship between cardiac risk factor burden and acute coronary syndromes.

There's no cure for acute coronary syndrome, but early diagnosis and prompt treatment can protect your heart from further damage and help it work as well as possible. Your healthcare provider can discuss ways to reduce risks and avoid complications. Acute coronary syndrome treatment focuses onrelieving pain and improving blood flow so your heart can work as well as possible, as quickly as possible. Your healthcare provider recommends treatment based on the specific condition you have.

Treatment typically involves a combination of medication and procedures to open your arteries and restore heart function.

METHODOLOGY

The methodology chapter of the thesis deal with the manner that includes the method and approach, selection of sample, data analysis, method of data collection,

ethical considerations, and limitation forthe dissertation. The study involved both qualitative and quantitative approach for the analysing of various risk factors. This section includes chief complaints of patient, history of present illness, past medical history and other demographic details.

Prospective observational study was performed for the study. The prospective study is mainly done to find out the aetiologies of disease/disorder. The distinguishing feature of a prospective cohort study is that at the time that the investigators begin enrolling subjects and collecting baseline exposure information, none of the subjects have developed any of the outcomes of interest.

The study usually involves taking a cohort of subjects and watching them over a long period. The outcome of interest should be common; otherwise, the number of outcomes observed will be too small to be statistically meaningful (indistinguishable from those that may have arisen by chance). All efforts should be made to avoid sources of bias such as the loss of individuals to follow up during the study. Prospective studies usually have fewer potential sources of bias and confounding than retrospective studies.

Key issues discussed include how to decide when to do a prospective observational study in light of its advantages and disadvantages with respect to alternatives, and the report summarizes the challenges and approaches to the appropriate design, analysis, and execution of prospective observational studies to make them most valuable and relevant to health-care decision makers.

Randomly selected 223 patients were involved in the study. The study is conducted in duration fromNov'22 to Nov'23. For the sample selection some certain exclusion and inclusion criteria.

Inclusion criteria

1. Patients who are having ACS with or without hypertension and high blood cholesterol.
2. Both males & females
3. Both alcoholic & non- alcoholic and smoker & non-smoker
4. Patients with co-morbidities like hepatic problem & cardiovascular problem.

Exclusion criteria

1. Neonate & infants
2. Pregnant woman
3. Breastfeeding
4. Patients who are not having ACS

We have collected the data according to the specific data collection form.

Data analysis is done using Pearson's correlation co-efficient. And also, for statistical help was taken from MS-EXCEL 2021 and graphs and other calculations.

The study involved analysis of data sets obtained from patients with their consent at time of data collection and other data (articles) on public demand, hence the ethical committee approval is not necessary for further publication.

DISCUSSION

Table-I shows that among these 223 subjects, 2/3rd patients are male and 1/3rd patients are female. NSTEMI has dominated in both male and female patients. Due to physical and lifestyle differences male patients are more prone to developing ACS.

Table-II shows that in n male patients who are in between 55 to 65 years of age, having higher risk of developing ACS. In female patients who are in between 65 to 75 years of age, having higher risk of developing ACS. Due to the huge differences of diet and lifestyle, the patients who are from urban area are having higher risk of developing ACS.

Table-III shows that chest pain and S.O.B, palpitation are the major symptoms for all the types of ACS. But sweating is mostly seen in UA whereas palpitation is mostly occurred in NSTEMI and STEMI.

Table-IV shows that hypertension, type-II DM, overweight are the major risk factors in ACS affected patients. Including all of them, smoking is also a major risk factor for NSTEMI & STEMI. But for UA, type-II DM, overweight are the major risk factors.

Table-V shows UA is mainly diagnosed with ECG (abnormal T inversion& abnormal ST depression). NSTEMI is diagnosed with serum creatinine level, ejection fraction & ECG (abnormalU inversion). STEMI is diagnosed with ejection fraction & ECG (abnormal ST elevation).

Table I: Gender wise distribution of patients with acs (n=223)

Gender	UA	Nstemi	Stemi
Male	25	84	55
Female	12	31	16

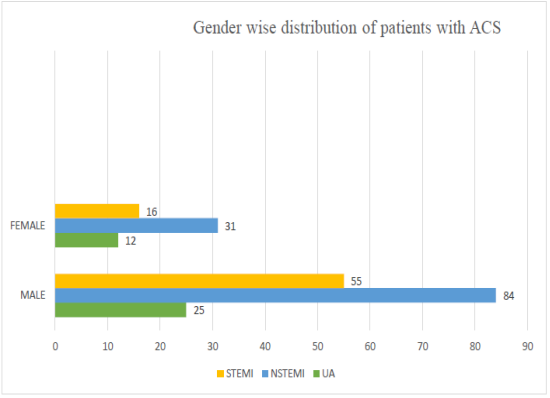


Table II: Age wise distribution of patinets with acs in population (n=223).

Gender	<45 years	45-55 years	55-65 years	65-75 years	>75 years	Urban area	Rural area
Male	12	39	47	52	14	102	62
Female	4	8	18	20	9	37	22

Table III: Analysis of variation symptoms in patients acs (n = 223)

Symptoms	UA	Nstemi	Stemi
Chest pain, S.O.B, Palpitation	30	35	33
Chest pain, S.O.B,	7	6	11
Chest pain, S.O.B, Sweating	31	6	11
Chest pain, palpitation	2	11	6
S.O.B, Palpitation	3	6	25

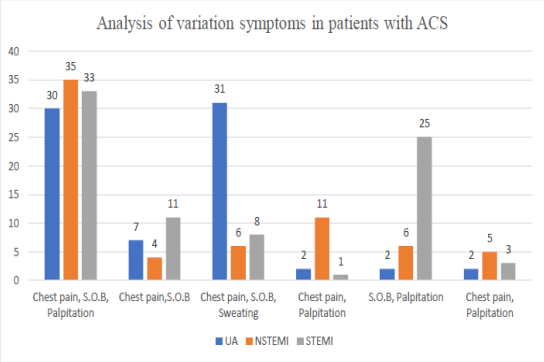


Table IV: Risk factors in patients with acs (n=223).

Risk factors	UA	Nstemi	Stemi
Hypertension, Type-II DM, overweight, Alcohol, smoking	5	7	7
Hypertension, Type-II DM, Alcohol, Smoking	3	16	9
Hypertension, Type-II DM, alcohol	5	3	7
Hypertension, Type-II DM, Smoking	3	7	15
Hypertension, overweight	3	2	3
Hypertension, Overweight, Type-II DM	7	3	7
Type-II DM, Overweight	13	4	5
Hypertension, Overweight, smoking	5	7	5
Hypertension, Overweight, alcohol	1	5	3
Type- II DM, overweight, smoking	2	9	2
Type- II DM, Hypertension, Smoking	3	2	7
Hypertension, Type- II DM, Overweight, Smoking	12	19	7

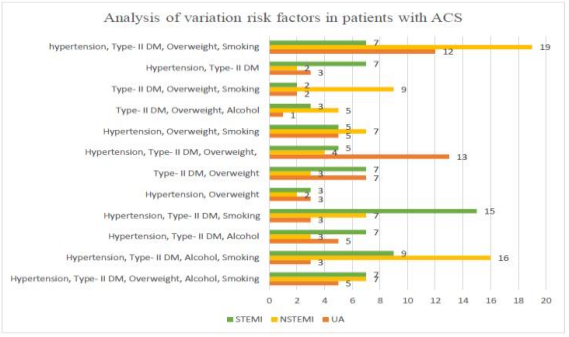
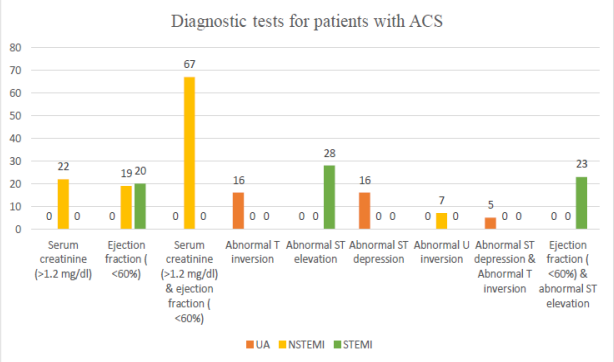


Table V: Diagnostic tests for patients with acs (n=223).

Diagnostic test	UA (37)	Nstemi (115)	Stemi (71)
Serum creatinine(>1.2 mg/dl)	_	22	_
Ejection fraction (<60%)	_	19	20
Serum creatinine (>1.2 mg/dl) & ejection fraction (<60%)	_	67	_

Abnormal T-inversion	16	_	_
Abnormal ST- elevation	_	_	28
Abnormal ST- depression	16	_	_
Abnormal U inversion	_	7	_
Abnormal ST depression & Abnormal T inversion	5	_	_
Ejection fraction & abnormal ST elevation	_	_	23



Ua- Unstable angina
Nstemi- Non-st-elevation myocardial infarction
Stemi- St-elevation myocardial infarction

CONCLUSION

The occurrence of symptoms and effect of risk factors differ by the types of ACS. Type-II DM & hypertension and overweight are the major risk factors for ACS. Patient with type-II DM & overweightis having more chances to get UA whereas patient with hypertension, type-II DM & smoking habit are having more chances to get STEMI. NSTEMI, we mainly saw in patients with hypertension, type-II DM, overweight, smoking. UA can be diagnosed with ECG (abnormal T inversion, abnormal ST depression) where NSTEMI can confirmed by abnormal serum creatinine level (>1.2 mg/dl), ejection fraction (<60%) and ECG (abnormal U inversion). STEMI can be diagnosed with ejection fraction (<60%), abnormal ST elevation. NSTEMI & STEMI affected patients are having major symptoms ofchest pain, shortness of breath, palpitation but in UA we mainly estimated that chest pain, shortness ofbreath, sweating. In this study, the urban lived people are having more chances to get ACS due to their diet & daily lifestyle. Male are more prone to get affected by ACS than female. This study would help to implement preventive measures including lifestyle modification and drug therapy.

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