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Assessing the Increased Risk of Myocardial Infarction in Diabetes Mellitus Patients and Strategies for Prevention

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Abstract - Myocardial infarction (MI) is a leading cause of morbidity and mortality globally, with individuals suffering from diabetes mellitus (DM) facing a significantly higher risk than non-diabetic individuals. Epidemiological studies reveal that the incidence of myocardial infarction and sudden cardiac death in diabetic patients is notably elevated, particularly among females, with the risk being two-fold greater in men and up to four-fold higher in women. Moreover, silent myocardial infarction is observed more frequently in diabetic patients during autopsy compared to non-diabetics. Myocardial infarction in diabetes can be attributed to a combination of factors, including increased blood glucose levels, atherosclerosis, and thrombosis. These factors damage blood vessels and nerves that regulate heart function, accelerating the development of coronary artery disease. Individuals with diabetes are at a higher risk of experiencing heart disease at a younger age, with myocardial infarction and stroke being the leading causes of death in this population.

Preventive measures play a crucial role in reducing the risk of MI in diabetic patients. Primary prevention strategies such as controlling blood pressure, managing dyslipidemia, reducing obesity, smoking cessation, and regular physical activity have been proven to significantly lower the chances of MI. This study aims to evaluate the high risk of myocardial infarction in diabetic patients and to assess preventive measures, including pharmacological and non-pharmacological interventions. By analyzing the clinical data of 200 patients from Olive Hospitals, Hyderabad, the study intends to identify key risk factors, therapeutic strategies, and preventive steps for myocardial infarction in diabetes mellitus patients. Early detection and intervention are essential in mitigating the elevated cardiovascular risks associated with diabetes..

***Key Words*:** Myocardial infarction, diabetes mellitus, dyslipidaemia,

1.INTRODUCTION *(Size 11, Times New roman)*

Myocardial infarction is a cause of morbidity and mortality all over the world which is more common in patients with diabetes mellitus than those without diabetes.

Acute myocardial infarction is with a higher incidence of critical complications, more frequent mortality, in spite of all possible care and clinical presentations.

Thus there are requirements for special attention for diagnosis and skill in management.

There is epidemiologic and clinical data to suggest there is at least twice common in men and four fold atherosclerotic coronary artery diseases in women with diabetes. According to records, myocardial infarction (MI) and sudden death is estimated to be greater by 50% in male and 150 to 300% in female, mean while silent MI data during autopsy of patients with hospital record is 3 times more common in diabetes patients compared to others. It is seen in premenopausal female and in males in their 4th an 5th decades of life.

COMPLICATIONS OF DIABETES MELLITUS

Myocardial infarction is one of the most common form of coronary heart disease and most important complication of diabetes mellitus.

Occlusion of coronary artery decreases the flow of blood which causes some of the heart muscle to become infracted which is supplied by coronary artery in myocardial infarction. In myocardial infarction, when artery is blocked due to plague formation on vessel walls, a part of the heart muscle will b affected.

There are two types of myocardial infraction, one is ST-segment elevation MI (STEMI) and other is non-ST-segment elevation MI (NSTEMI) which is diagnosed by characterized changes in the electro cardiography (ECG). Change in ST-segment elevation in ECG leads to STEMI and if there is presence of cardiac biomarker such as troponin along with ST-segment elevation leads to NSTEMI.

It is said that acute myocardial infarction can be due to thrombosis.

Atherosclerosis along with inflammation is the very important factor for thrombosis.

Blood vessel and nerves that control heart and blood vessel are damaged due to increase blood glucose in diabetes.

As long as a person is suffering from diabetes mellitus there will be more chance to the patient to develop heart diseases like myocardial infarction.

People with diabetes has a risk to develop heart disease at younger age when compared to people without diabetes.

Most common cause for death in adults with diabetes is heart attack nd stroke.

There is twice risk for death rate from heart disease or stroke or myocardial infarction in people with diabetes as compare with people without diabetes mellitus.

PREVENTIVE MEASURES OF ACUTE MYOCARDIAL INFARCTION

PRIMARY PREVENTION

•REDUCING BLOOD PRESSURE: Gradual reduction of blood pressure in patients with acute myocardial infarction and hypertension is necessary, due to which occurrence of MI can be avoided.

•CORRECTING DYSLIPIDEMIA: Dyslipidemia is mostly seen in diabetes mellitus patients which is associated with higher risk of myocardial infarction.

•REDUCING OBESITY: Reducing inactive lifestyle and improving the level of physical activities which reduces obesity.

•SMOKING CESSATION: Smokers risk which is developing cardiovascular disease like myocardial infarction is reduced by smoking cessation. By 2 years of smoking cessation, coronary heart disease risk is eliminated to half.

•EXERCISE: Inactive lifestyle is one of the main reason for cardiovascular disease like myocardial infarction. Regular physical exercise reduces the risk of cardiovascular diseases.

AIMS AND OBJECTIVES

AIM:

To assess the high risk of myocardial infarction in patients with diabetes mellitus and its prevention.

OBJECTIVES:

TO EVALUTE THE FOLLOWINGS:-

•The risk factors of myocardial infarction in patient with diabetes mellitus

•The therapeutic action in patient with myocardial infarction.

•How to prevent myocardial infarction in diabetes mellitus patient.

• The possibility of myocardial Infarction in older group patients

NEED FOR THE STUDY

•In current situation 1 in 10 people is having diabetes mellitus and which lead to many heart conditions but most commonly myocardial infarction which people are not aware of.

•People with diabetes mellitus have higher chance of developing myocardial infarction than without diabetes mellitus.

•Myocardial infarction can be prevented by some small steps for people who are having diabetes mellitus.

•In myocardial infarction STEMI (ST elevated myocardial infarction) is the reason for 10% death.

•To evaluate the effectiveness of aspirin in prevention of myocardial infarction patient with diabetes mellitus.

•To evaluate the nonpharmacological management for myocardial infarction in diabetes mellitus patients.

PLAN OF WORK

•Selection of topic .

•To review the literature .

•Designing the data collection form.

•Designing the informed consent form .

•Based on inclusion and exclusion criteria patients were recruited.

• Patients counselling.

•Measurement and documentation of cardiac parameter.

•Statistical analysis and reporting the collection data.

METHODOLOGY

This is a Retrospective cohort study which evaluates the prevention and effectiveness in patients with myocardial infarction along with diabetes mellitus who were presented to olive hospital for treatment.

The study will be done after getting permission from the HR of the hospital to obtain the patient's data from the medical record department (MRD), all the eligible participants data will be collected in data collection form which includes demographic data such as name, age, gender, address, social habits, chief complaints, date of admission, IP number, personal history, family history, diagnosis, past medications, co morbidity conditions, lab reports and prescribed medications to recognize whether the patients with diabetes mellitus are at high risk of myocardial infarction. Also to evaluate the risk factors of myocardial infarction in patients with diabetes mellitus, therapeutic actions in patients with myocardial infarction and how to prevent myocardial infarction in diabetes mellitus patients.

STUDY DESIGN

The study is single center Retrospective cohort study.

STUDY SITE

Olive Hospitals, Nanal Nagar, Hyderabad, Telangana.

DURATION OF STUDY

Data will be collected from the medical record department (MRD) that fit the inclusion criteria for myocardial infarction patients with diabetes mellitus in a time period of 6 months.

STUDY POPULATION

SAMPLE SIZE- 200 Patients.

STUDY CRITERIA

INCLUSION CRITERIA:-

•Men and women.
•Patients of age group above 30 years.
•All patient's with pre-existing co morbidity like diabetes mellitus.
•All the patients are diagnosed with myocardial infarction.
•Patients residence in both urban and rural areas.

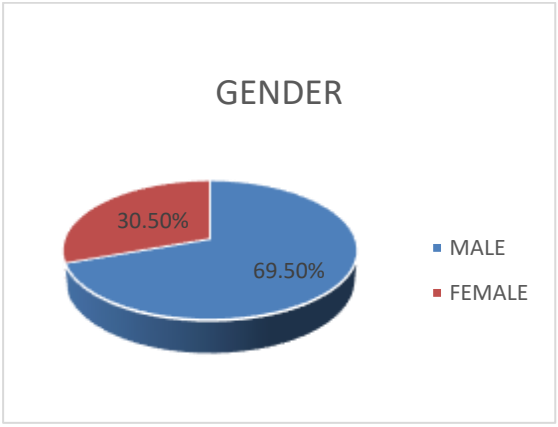
EXCLUSION CRITERIA:-

•Pregnant or lactating women.
•Patient's having active pathological bleeding (peptic ulcer disease).
•Patient's having history of intracranial hemorrhage.
•Patients with severe hepatic impairment.

RESULTS

DESCRIPTIVE ANALYSIS:-

BASED ON GENDER



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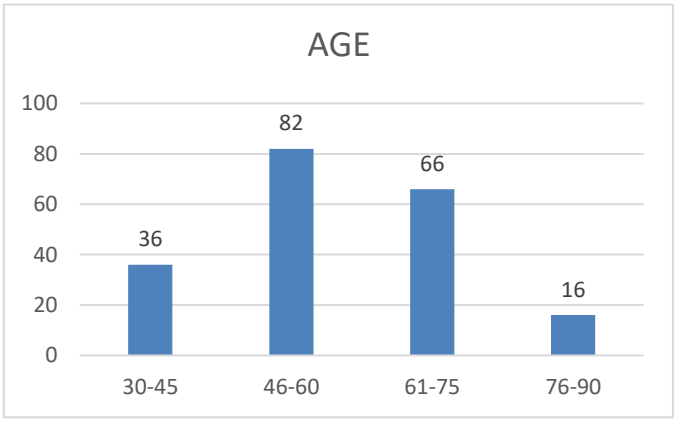

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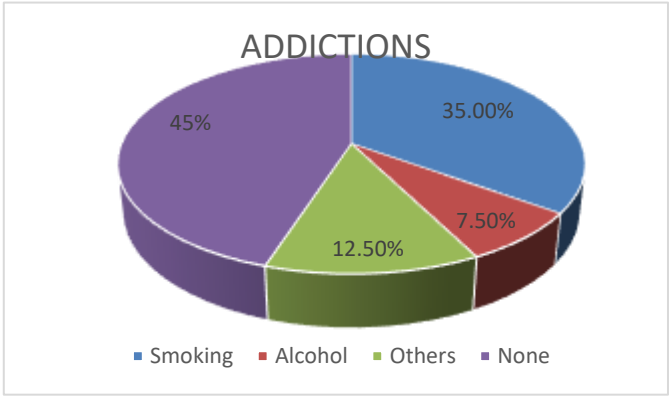

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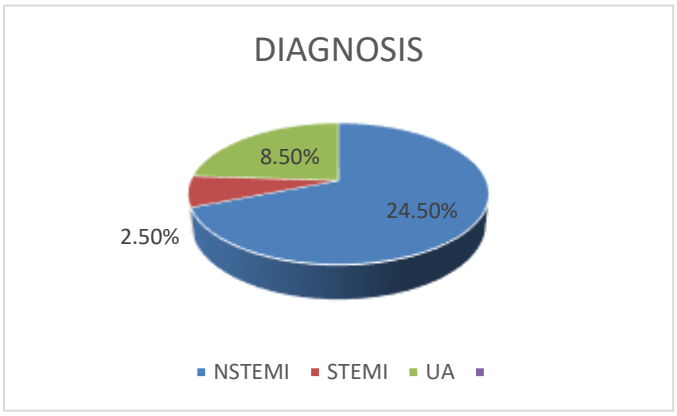
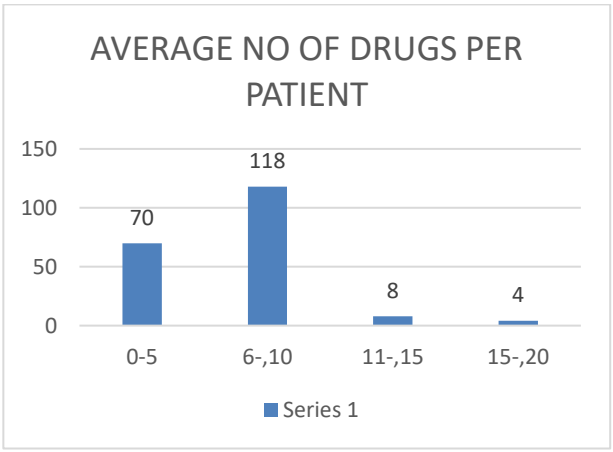
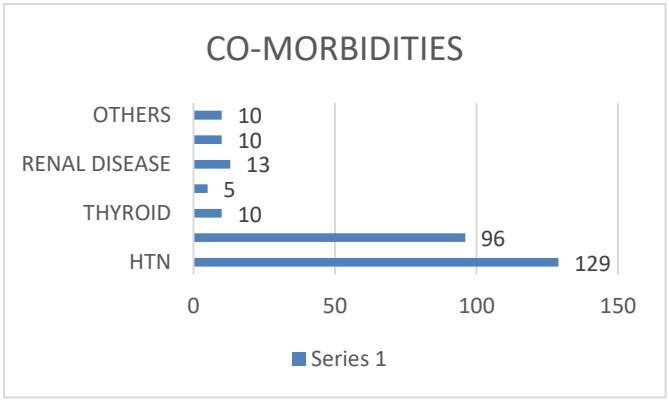


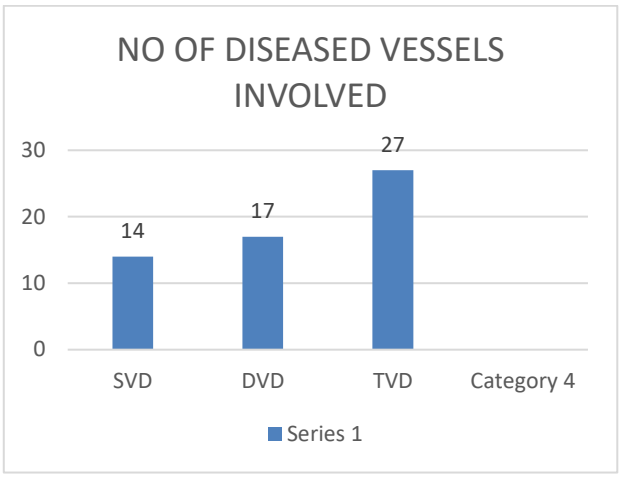
AVERAGE NO OF DRUGS PER PATIENT



BASED ON CO- MORBIDITIES



BASED ON NO OF DISEASED VESSELS INVOLVED



DISCUSSION

We have conducted the study to asses the risk factor of myocardial infarction in diabetes mellitus patients and how to prevent it.In the prospective observational study, total no of 200 patients were considered based on the inclusion and exclusion criteria. The patients were having heart conditions along with co-morbidities like diabetes mellitus and Hypertension but most of the cases were myocardial infarction .

The patients with age group of 46-60 years had maximum no of cases of myocardial infarction .

Total 82 patients were in the age group of 46-60 years In which 53 were male patients and 29 were female patients. We have seen in study that male patients were more in number as compare to the female patients.

We have also seen the patients of age group 30-45 years (36 patients), 61 -75 years (66 patients) , 76-90 years (16 patients)Apart from hypertension and diabetes mellitus the patient also had co-morbidities such as hypothyroidism, renal disease , liver disease and others .

Depending upon diagnosis patients in the study they are divided NSTEMI , STEMI and UNSTABLE ANGINA. Where it has been done and shown the among 200 patients 49 patients were diagnosed with NSTEMI, 5 patients were diagnosed with STEMI and 17 patients were diagnosed with UNSTABLE ANGINA.NSTEMI are more common than STEMI.

The patients are further divided into no of vessels involved because patients have either single , double , triple vessels disease.In study 200 patients, we have seen 14 patients with single vessel disease , 17 patients were seen double vessels disease and 27 patients were seen triple vessels disease.

Myocardial infarction can be prevented by small dosing of Aspirin (75-100mg) to the patient who is having major diabetes mellitus. Slow and small dosing of Aspirin

prevents blood clotting and its prevent ACS(acute coronary syndrome) which in further could cause myocardial infarction.

According to the study we have seen addiction in 200 patients , in which 70 patients of smoking addiction were seen , 15 patients were addicted to alcohol , 25 patients were addicted to tobacco , 10 patients were addicted to other types and remaining 80 patients were not addicted to anything .In the study we have seen that smoker have higher risk of developing myocardial infarction if they are also having co-morbidities like diabetes mellitus and hypertension.

In the study we have seen that number of prescribe drugs in 200 patients were 6-10 type of drugs for 118 patients and highest number of drugs 16-20 types were given to 4 patients.

CONCLUSION

We conducted an observational study on myocardial infarction with diabetes mellitus patients for a period of 6 months . we conducted our study by taking sample size of 200 patients out of which 69.5% were male and 30.5% were female .according to the age wise distribution , patients in the range of 46-60 years were more in number suffering with myocardial infarction many patients also have co-morbid conditions like hypertension , diabetes mellitus hypothyroidism and others .

The patients are diagnosed as NSTEMI , STEMI and UA. Based on ECG TMT troponin1. More patients were diagnosed with NSTEMI many patients were having TVD . These patients were treated with aspirin and antiplatelets drugs before and after PTCA were performed .

Hence , further studies are required on larger sample size so that the people can be aware that those who are having diabetes mellitus have higher risk of developing myocardial infarction . But it can be prevented by some simple measures as we discussed .

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BIOGRAPHIES

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