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## RESEARCH ARTICLE

### RISK FACTORS FOR ACUTE CORONARY SYNDROME PATIENTS IN TERTIARY CARE HOSPITAL

<sup>1</sup>Dr. A. Hosalli, <sup>1</sup>Dr. A. R. Metgudmath, <sup>2</sup>Dr. V. B. Metgudmath, <sup>1</sup>Dr. R. Badiger, <sup>1</sup>Dr. V. Munavalli,  
<sup>\*1</sup>Dr. Ashwin, <sup>1</sup>Dr. Dinesha and Dr. Abhishek

<sup>1</sup>Dept of Medicine JNMC, KLE Belgaum

<sup>2</sup>Dept of Cardiology JNMC, KLE Belgaum

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#### ABSTRACT

The frequency of ACS is increasing as the population ages, and therefore, knowledge of knowing who are at high risk is essential. This study was aimed at exploring the risk factors among acute coronary syndrome (STEMI, NSTEMI, Unstable Angina) patients. This cross-sectional study was carried out in the Department of Medicine and Cardiology, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum. A total of 400 patients of age more than 18 years who presented with Acute Coronary Syndromes were included in the study. Patients were subjected to various clinical examination, as well as some required investigations including . The data obtained was coded and entered into the Microsoft Excel Spreadsheet. The data was analysed and the final results and observations were tabulated. The results revealed that majority of the patients were male as well as MI patients (75.75%). In the present study risk factors attributed were non hypertensives (60.5%), diabetics (60.5%), Age less than 65 years, not on anti platelet therapy outside(89%), not thrombolysed (94.5%), non smokers (84.75%), Non tobacco chewers (89.25%). But the factors which showed significant association were male gender, age <65years.

**Conclusion:** Males are more commonly affected compared to females. The commonest presentation are chest pain alone, chest pain with breathlessness, atypical presentations like syncope, epigastric pain/ burning sensation/etc. Cases of MI were more as compared to that of Unstable Angina in spectrum of Acute Coronary Syndromes.

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## INTRODUCTION

Acute coronary syndromes (ACS) encompass a spectrum of coronary artery disease, from unstable angina to transmural myocardial infarction (Ross *et al.*, 1999). Despite the developments regarding its diagnosis and treatment in recent years, acute coronary syndromes (ACS) keep its place of the most important reason of morbidity and mortality. Cardiac diseases have been known to be the number one cause of deaths since the beginning of twentieth century (Van de Werf, 2003). It has been observed that known cardiovascular risk factors such as smoking, diabetes mellitus, obesity and hypertension are associated with MPV (Boos, 2007 and Muscari *et al.*, 2008). The reasons for increased platelet size are not fully understood. It is possible that changes in the secretion and metabolism of biologically active substances during aging, increasing body fat, diabetic changes in metabolism, high blood pressure, exposure to tobacco-derived toxins and an acute coronary event, all may stimulate the bone marrow to produce large platelets (Boos, 2007).

However, aspirin or similar drugs containing acetylsalicylic acid, which was used in a proportion of the included participants, did not modify the observed association between MPV and risk of MI. The effect of acetylsalicylic acid on MPV is not clarified, but the absence of an effect of interaction between MPV and anti-platelet therapy on the risk of MI in the present study indirectly suggests little if any effect of anti-platelet therapy on MPV, which is in accordance with previous findings (Erhart, 1999 and Guthikonda, 2008).

Patients with serious hepatic and renal disease, those previously detected to have malignancy, and subjects receiving an anticoagulant, anti-inflammatory or antiplatelet therapy were not included to the study. Since the fact that acetyl salicylic acid had no influence on platelet volume as revealed by earlier studies, ACS and stable AP patients receiving acetyl salicylic acid were not excluded from the study (Kishk, 1985). Since the fact that acetyl salicylic acid had no influence on platelet volume as revealed by earlier studies, ACS and stable AP patients receiving acetyl salicylic acid were not excluded from the study (Kishk, 1985). Platelets were heterogeneous

*\*Corresponding author: Dr Arjun Hosalli,  
Department of Medicine JNMC, KLE Belgaum*

cells in terms of size, density, and activity (Karpatkin, 1969). Platelet volume is an important indicator for platelet function and activation (Bath, 1996). Larger platelets contain more secretory granules and mitochondria and are known to be more active than small platelets (Thompson, 1983; Martin, 1983). Hence the present study was undertaken to study the risk factors for cardiovascular diseases.

## MATERIALS AND METHODS

The present study was conducted in the Department of Medicine, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum from January 2014 to December 2014. Sample Size was calculated using the formula:  $z\alpha^2pq/d^2 = 4pq/d^2$  where  $z=1.96$  (constant),  $p$ -sensitivity(50)-as obtained from previous studies,  $q$ -(100- $p$ ),  $d$ -absolute error (05) hence 400 patients with complaints of chest pain and equivalents suggesting acute coronary syndrome above the age of 18 years attending Department of Cardiology and Medicine, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi were enrolled.

**Inclusion Criteria:** Any patients admitted to cardio ward with STEMI, NSTEMI, Unstable angina in last six days.

**Exclusion Criteria:** Patients with bleeding disorders, pre-eclampsia, sepsis, recent blood transfusion, patients who have underwent recent major operation or trauma, previous myocardial infarction in 6mts. Data was obtained by interview regarding demographic status, history of present illness, other comorbid conditions, personal and treatment history. Further these patients underwent clinical examination followed by systemic investigations which includes Complete blood count, Blood urea nitrogen, Serum creatinine, Random blood sugar, 12 lead ECG, Troponin-I, CK-MB. (whenever required). Based on clinical presentation, examination and investigations, patients were evaluated for; Symptom profile, Risk factors (HTN, DM-2, Smoking, tobacco, etc.), Clinical Examination, Haematological variations (including Mean Platelet Volume and Platelet count, Trop-I, CK-MB.), ECG, 2D- ECHO whenever necessary. To determine the effect of anti-platelet therapy on platelet count and mean platelet volume our study divided them into anti platelet therapy taken outside, i.e; after the onset of chest pain but before admission to hospital (anti-platelet therapy taken -YES) group and anti platelet therapy taken after coming to the hospital(anti-platelet therapy taken-NO) group.

**Statistical methods:** The data obtained was coded and entered into the Microsoft Excel Spreadsheet. The categorical data was expressed in terms of rates, ratios and percentages and continuous data was expressed as mean  $\pm$  standard deviation.

**Ethical clearance:** Prior to the beginning the study was approved by the Institutional Ethics Committee, Jawaharlal Nehru Medical College, Belagavi. Written informed consent was obtained from the patient before enrollment.

## RESULTS

Majority of the patients were males (75.5%). The male to female ratio was 3.08:1. 'p' value for platelet count when compared between male and female was statistically significant ( $p,0.001$ ). In the present study majority of the patients were MI patients (75.75%). The MI patients to USA patients ratio was 3.123:1. The 'p' value between the two groups was not significant. Majority of the patients were non hypertensives (60.5%). Hypertensives to non hypertensives ratio was 1.53:1, MPV and Platelet counts were high in Hypertensives (8.927fl & 2.80 lacs) respectively. Majority of the patients were diabetics (60.5%). Diabetics to non diabetics ratio was 1.77:1, MPV and Platelet counts were high in Diabetics (8.979fl & 2.764 lacs) respectively.

In the present study majority of the patients were not taken anti platelet therapy outside (89%). Non taken anti platelet therapy to taken anti platelet therapy ratio was 8.09:1. Statistically significant for platelet count. In the present study majority of the patients were not thrombolysed (94.5%). Non thrombolysed to thrombolysed ratio was 17.18:1. In the present study majority of the patients were non smokers (84.75%). Non smokers to smokers ratio was 5.55:1. In the present study majority of the patients were non tobacco chewers (89.25%). Non tobacco chewers to tobacco chewers ratio was 8.3:1. The average values of MPV and platelet counts are  $8.9\pm 1.48$  fl and  $2.7\pm 0.88$  lacs in patients of acute coronary syndromes. We had 44(11%) patients who had taken anti-platelet therapy outside before admission and 356(89%) patients who had not taken anti platelet therapy outside and on comparison of platelet count and MPV between these two groups, 'p' value was 0.05 and 0.7 for platelet count and MPV respectively which was statistically significant for platelet count but not for MPV between these two groups, hence showing that platelet count is dependent on anti platelet therapy but MPV is an independent risk factor.

**Table 1. Sociodemographic profile of patients with Cardiovascular diseases**

Variables		Number	Percentage
Gender	Males	302	75.50
	Females	98	24.50
Hypertension	Yes	158	8.927
	No	242	8.917
Diabetes	Yes	256	8.979
	No	144	8.889
Presentation	Myocardial Infarction	303	75.75
	Unstable Angina	97	24.25
AGE	$\leq 64$	274	68.5
	$>65$	126	31.5
Anti platelet treatment taken prior to hospitalization	Yes	44	11
	No	356	89
Thrombolysed prior to hospitalization	Yes	22	5.5
	No	378	94.5
Smoking	Yes	61	15.3
	No	339	84.7
Tobacco Chewing	YES	43	10.8
	NO	357	89.2

We had 22 patients who were thrombolysed outside as compared to the 378 patients who were not thrombolysed and on comparison of platelet count and mean platelet volume between these two sub groups 'p' value for platelet count and mean platelet volume were 0.19 and 0.13 respectively, which were not statistically significant, showing that platelet indices are independent risk factors. The present study revealed that although there was association seen between various factors like smoking, Tobacco chewing, prior treatment with antiplatelets as well as thrombolisation. The factors which showed statistically significant are between male to female platelet count. Age less than 65 years to more than 65 years 'p' value (p=0.011) was statistically significant for platelet count.

## DISCUSSION

Activated platelets play an important role in the pathogenesis of coronary artery disease. The central mechanism is the formation of a platelet fibrin plug at the site of a ruptured atherosclerotic plaque, potentially leading to myocardial infarction (Klovaite *et al.*, 2009). Platelet count, mean platelet volume, a simple and reliable indicator of platelet size that correlates with platelet activation might be an emerging cardiovascular risk marker and potentially helpful in stratifying cardiovascular risk. Studying the correlation may help us to understand better and reduce the chance of myocardial infarction in the apparently healthy subjects (Lippi *et al.*, 2009; Abdullah, 2012). In Slavka *et al.*, 206554 patients of acute coronary syndromes were studied between Jan 1996 to July 2003 and showed that individuals with lower MPV (8.7 fL), hazard ratios for overall vascular mortality gradually increased to 1.5 in the highest category (11.01 fL). The relationship of MPV to ischemic heart disease was even stronger and increased from 1.2 (8.71 to 9.60 fL category) to 1.8 in the highest category (11.01 fL) (Slavka *et al.*, 2011).

The present one year cross-sectional study was done from January 2014 to December 2014 at Department of Cardiology, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum. A total of 400 acute coronary syndrome patients who presented to the hospital during the study period were included. Patients underwent clinical, haematological, biochemical examination. Electrocardiograph, platelet count and mean platelet volume were also done. In this study the mean age group out of 400 acute coronary syndrome patients was 57.81 years with lowest being 26 years and highest being 87 years. Amongst 97 females, the mean age group was 59.48 years and the lowest being 30 years and highest being 86 years. Amongst 303 males mean age group was 57.26 years and the highest age group was 87 years and the lowest age group was 26 years. Males were 74.5% and females were 24.5%, which was seen in accordance with Klovaite *et al.*<sup>(12)</sup> where in males were 46% and females were 54% but in contrast to other study Slavka *et al.*<sup>(15)</sup> where in males were less, i.e; 43% and females (43.4%) respectively.

In our study we also showed that patients of age less than or equal to 64 years were more in number and constituting of about 68.5% as compared to patients of age more than 65 years (31.5%), and also the platelet counts were high in patients of less than 64 years which was statistically significant. In our

present study 40% of the patients were hypertensives and 60% were non hypertensives with mean platelet volume of 8.92fl and 8.91fl respectively and platelet count of 2.80 lac and 2.73 lac respectively with no statistical difference amongst the two group and it is in accordance with Klovaite *et al.* where in they showed 58% of hypertensives and 42% were non hypertensives. In our study there were 64% diabetics and 36% non diabetics with mean platelet volume of 8.97fl and 8.88fl respectively and platelet count of 2.76 lac and 2.76 lac respectively with no statistical difference amongst the two group.

In our study among 400 acute coronary syndrome patients, 303 were myocardial infarction patients and 97 were unstable angina patients. In comparison of platelet count and mean platelet volume amongst the two sub groups where the 'p' value was 0.9 and 0.7 respectively, there was no statistically significant difference between the two sub groups as seen in concordance with Mercan *et al.* where the 'p' value for platelet count was 0.7 and for mean platelet volume was 0.9 respectively amongst the unstable angina and myocardial infarction sub groups.

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