



**ORIGINAL RESEARCH PAPER**

**General Medicine**

**COMPARATIVE STUDY OF PLATELET INDICES IN CORONARY ARTERY DISEASE**

**KEY WORDS:** Coronary Artery Disease, Myocardial Infarction, Platelet, Stable Angina, Unstable Angina.

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**ABSTRACT**

**Background:** Acute coronary syndrome encompasses a range of coronary artery diseases, including unstable angina and myocardial infarction. The primary causes of coronary artery disease are atherosclerosis and its complications. Atherosclerotic lesions and thrombus development are largely influenced by platelets and their activity. Platelet indices are simple and reliable indications of new cardiovascular event biomarkers, and they may be used to stratify cardiovascular risk. Investigating this association might enable us to take prompt action. **Aim:** Study aimed to analyse the platelet indices in patients with Coronary Artery disease(CAD) and to study the association of platelet indices and the type of Coronary Artery disease. **Materials And Method:** Present study was a Hospital based case control study conducted for a period of 6 months. Data collected from March 2020 to August 2022. A total of 80 cases were included in the study with 40 in CAD group and 40 in control group. Clinical history will include age, gender, history of precipitating, previous episodes of chest pain, ECG findings and type of CAD were recorded. Platelet indices were done in blood samples collected from the patients. Results were analysed using SPSS 20.0 version and the association was tested using Chi square test. **Results:** Most common age group affected in CAD was 51 to 60years. Male predominance was seen in both groups. The platelet indices, the mean platelet volume(MPV), platelet distribution width(PDW) and plateletcrit(PCT) were significantly higher in CAD groups when compared to the control group. **Conclusion:** The present study showed a significantly higher MPV, PDW and PCT in CAD patients in comparison to control group. Among CAD patients, MI patients had significantly higher platelet indices than stable CAD patients. Hence platelet indices can be used as simple and cost effective predictive parameters to predict CAD. Their use in a risk stratification system to predict MI and in response to intervention are worthy of consideration.

**INTRODUCTION:**

Coronary artery disease is the world's leading cause of death and morbidity (CAD).<sup>1</sup> Acute coronary syndromes (ACS), which include unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction, are the most frequent causes of mortality in individuals with CAD (STEMI). Both the prevalence and incidence of ACS are high in Indians.<sup>2</sup>

India has an age-standardized CAD death rate that is greater than the global average of 235 per 100,000 people, at 272 per 100,000.<sup>3</sup> The rising incidence of CAD among Indians may be attributed to lifestyle modifications, the westernisation of eating habits, the rising prevalence of diabetes mellitus, and likely hereditary factors.<sup>4</sup>

Platelet functions and morphology have been altered, which is thought to be the pathogenesis of CAD. The essential factor in the beginning of atherosclerotic lesions as well as coronary thrombogenesis is platelet hyperactivity. Larger platelets have stronger thrombotic ability and are more metabolically and enzymatically active when compared to smaller platelets.<sup>5</sup>

Platelet function is determined by the platelet indices like platelet count, mean platelet volume(MPV), platelet distribution width(PDW) and platelet large cell ratio(P-LCR). PDW and an elevated MPV have both been identified as significant contributing variables to thromboembolism.<sup>6</sup>

Patients with coronary atherosclerosis have reported increased platelet consumption, which may be addressed by a pathophysiological association between platelets and atherosclerotic arteries. Increased amounts of immature platelets have been found in patients with ACS and those who have previously experienced stent thrombosis, according to several investigations.<sup>7</sup> Furthermore, in stable patients with CAD receiving antiplatelet treatment, elevated levels of

immature platelets are linked to greater residual platelet aggregation. This premise is still debatable despite the fact that numerous research has examined platelet count, MPV, and PDW between patients with CAD and control groups.

**AIMS AND OBJECTIVES:**

To study platelet indices in patients with CAD and to compare the association between platelet indices in CAD and control group.

**MATERIALS AND METHODS:**

Present study was a Hospital based case control study conducted in Department of Pathology, Sree Mookambika Institute of Medical Sciences, Kulasekharam for a period of 6 months. Data collected from March 2020 to August 2022. Cases are those who are diagnosed with ACS based on clinical presentation and investigation while controls are those without any clinical or other evidence of acute coronary syndrome.

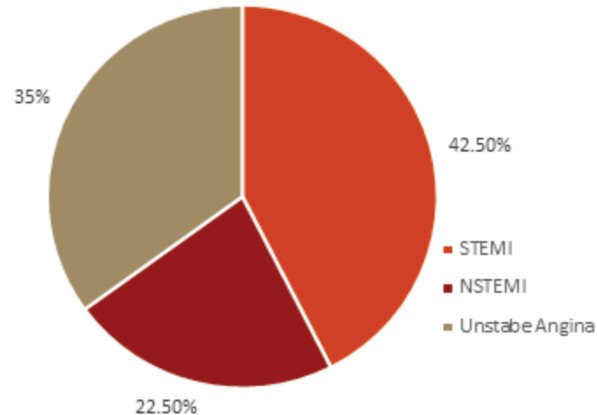
All Diagnosed cases of coronary artery diseases during the study period was included in the study. Patients with bleeding disorders, blood dyscrasias, sepsis, history of blood transfusion and those receiving drugs which can cause thrombocytopenia and also patients with infections known to cause thrombocytopenia were excluded from the study.

A total of 80 cases were included in the study with 40 in CAD group and 40 in control group. Clinical history will include age, gender, history of precipitating, previous episodes of chest pain, ECG findings and type of CAD were recorded. Blood samples (2 ml) were collected from each patient and control individuals and poured into a vacutainer tube containing K2EDTA. Platelet count, MPV, PDW and PCT were analysed immediately after blood collection using an automated cell counter at the haematology laboratory. Data entered in excel sheet. Statistical Analysis was carried out using SPSS 20.0 version. Chi square test was done to assess

statistical significance. A P value of < 0.05 was considered statistically significant.

**OBSERVATION AND RESULTS:**

Most common age group affected in CAD group was 51 to 60 years seen in 13(32.5%) cases with a mean age of 56.65 years. Most common age group affected in control group was 41 to 50 years seen in 15(37.5%) cases with a mean age of 49.67 years. Comparison between both groups showed statistical significance. Male predominance was seen in both groups with 32(80%) and 26(65%) and in CAD group and control group respectively. Distribution of type of CAD in Cad group was given in table 1.



**Table 1: Type Of CAD**

Mean platelet indices were increased in CAD group than control group. Among the platelet indices MPV, PDW and PCT showed statistical significance with a p value <0.0001. (Table 2). No significance was found between type of CAD and platelet profile in CAD group patients.

**Table 2: Comparison Of Platelet Indices In Both Groups.**

Platelet indices		CAD group	Control group	Mean difference with 95% CI	p value
PLT	Mean	291450.00	28606.00	262844	p>0.782
	SD	96366.00	75617.00		
MPV	Mean	9.70	7.40	2.30*	p<0.0001
	SD	1.43	0.88		
PDW	Mean	19.33	15.85	3.48*	p<0.0001
	SD	2.25	1.65		
PCT	Mean	0.25	0.23	0.02*	p<0.0001
	SD	0.01	0.01		

**DISCUSSION:**

In the present study, most common age group affected in CAD patients was 5<sup>th</sup> decade seen in 13(32.5%) cases. This was comparable to studies done by Khandekar MM et al.<sup>9</sup> Mehrpouri M et al.<sup>10</sup> and Al-Nozha, MM et al.<sup>11</sup> showed predominant age group in Cad patients was 51 to 60 years. This was comparable to the present study. Mean age group of CAD patients in the present study was 56.65 years. This was similar to Mehrpouri M et al.<sup>10</sup> and Al-Nozha, MM et al.<sup>11</sup> but the mean age group was high in studies done by Larsen SB et al.<sup>12</sup> and Patil KS et al.<sup>13</sup> showed a mean age group of 64 and 60.37 years respectively.

In the current study both groups showed male predominance. Similar to the present study male predominance was also seen in Al-Nozha, MM et al.<sup>11</sup> Shechter M et al.<sup>14</sup> and Maha A et al.<sup>15</sup>

In the current study among CAD patients, 17 (42.50%) had AMI followed by 14(35%) had unstable angina and 9(22.50%) had stable angina. 54 (43.2%) male patients & 23 (18.4%) female patients were diagnosed with NSTEMI whereas STEMI

was diagnosed in 38 (30.4%) male & 10 (8%) female patients in a study conducted by Varghese TP et al.<sup>16</sup> and Liu Y et al.<sup>17</sup> in their study included 114 cases of CAB in which 33 were stable angina pectoris (SAP) cases, 39 unstable angina pectoris (UAP) and 42 acute myocardial infarction (AMI) cases. This was comparable to the current study.

Platelet indices were considerably higher in CAD patients than control group in the present study. Among the platelet indices, MPV, PDW and PCT showed statistical significance. Eswaran A et al.<sup>18</sup> from their study showed that in both groups, platelet count was within normal range (150-450) 109/L. When examined between the CAD and N-CAD groups, MPV, PDW and PCT showed statistical significance but the Platelet count did not demonstrate any statistical significance, with p-values of 0.790. This was comparable to the current study.

Study conducted by Patel KS et al.<sup>13</sup> found that MPV, PDW and P-LCR were significantly higher in STEMI and NSTEMI groups when compared to the NCCP group.

Yue L et al.<sup>19</sup> showed that the levels of PDW, MPV and P-LCR were increased significantly (p-value less than 0.05) in CHD patients. no statistically significant difference was found for PC and PCT between the two groups.

**CONCLUSION:**

In the present study, patients with acute coronary syndromes exhibited greater platelet volume indices than the control group, but these elevated levels are unrelated to the type of CAD. In the emergency department, platelet indices can be employed as simple and reasonably priced predictive parameters with other laboratory tests. Therefore, measuring platelet volume indices may be useful in identifying pro-thrombotic events. These variables, however, cannot be regarded as CAD risk factors.

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Nil.

**CONFLICTS OF INTEREST:**

There are no conflicts of interest

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