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## COMPLETE HEMOGRAM PROFILE IN CORONARY ARTERY DISEASE

\*Sankara Thiagarajan P and Balasubramaniyan S and Paari N

Department of Medicine, Rajah Muthiah Medical College and Hospital, Annamalai University,  
Annamalainagar, Tamilnadu, India - 608002

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### ABSTRACT

**Introduction:** Coronary artery disease is a leading cause of mortality and morbidity in India. Early markers of atherosclerosis are under research. This study is an initial step to identify the importance of basic blood count parameters in relation to coronary artery disease. **Aims and Objectives:** To analyze complete hemogram in patients with Coronary artery disease. **Materials and Methods:** The study will be conducted among the patients admitted with Coronary Artery Disease in the medical wards/CCU/ICU of RMMC&H, Chidambaram. It is a prospective observational study. 50 consecutive patients admitted for coronary artery disease are included in the study. Hemogram profile is done for all the subjects which includes Hb, PCV, MCV, MCHC, MCH, WBC, RBC, Platelets and peripheral smear. **Results:** Anemia was found in 48% of the study population of which microcytic hypochromic anemia was the most common type. 40% of patients had leucocytosis and 8% had leucopenia. Leucocytosis was predominated by neutrophilia in 80% of those with leucocytosis. **Conclusion:** Anemia and leucocytosis were found to be significantly high in coronary artery disease population. Further studies are needed to evaluate the use of these parameters as risk predictors of coronary artery disease.

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## INTRODUCTION

Coronary artery disease is a leading cause of mortality and morbidity in India. Incidence of coronary artery disease is on the rise because of less healthy lifestyles. Identification of early markers and risk factors will help in reducing the burden of CAD. Although atherosclerosis is a multifactorial process, inflammatory and immunological factors are considered to play critical roles<sup>2</sup>. Recently, there have been many studies investigating the role of inflammatory and biochemical markers derived from complete blood count (CBC) in CAD<sup>3</sup>. This study is an initial step to identify the importance of basic blood count parameters in relation to coronary artery disease.

### Aims and Objectives

To analyze complete hemogram in patients with Coronary artery disease

## MATERIALS AND METHODS

Type of study: Prospective observational study  
Sample size :50  
Study group :50 consecutive patients admitted in RMMC&H with coronary artery disease

The study will be conducted among the patients admitted with Coronary Artery Disease in the medical wards/CCU/ICU of

RMMC&H, Chidambaram, which is a 1200 bedded tertiary care hospital serving the rural population.

Coronary artery disease includes stable angina, unstable angina and myocardial infarction (STEMI and NSTEMI).

Coronary artery disease is diagnosed with clinical symptoms, signs, ECG, cardiac enzymes and ECHO.

Hemogram profile is done for all the subjects which includes Hb, PCV, MCV, MCHC, MCH, WBC, RBC, Platelets and peripheral smear

### Inclusion Criteria

- All adult patients diagnosed with Coronary artery disease for the first time.
- Both gender

### Exclusion Criteria

Patients with conditions altering hemogram profile like infections, blood loss, malignancy, chronic kidney disease and those on cytotoxic drugs

## RESULTS

**Table 1** Age wise distribution of anemia

Age	Peripheral Smear				Total
	Normal	Microcytic hypochromic anemia	Dimorphic anemia	Megaloblastic anemia	
40-50 Years	3	1	0	0	4
51-60 Years	12	8	2	0	22
61-70 Years	7	7	1	1	16
Above 70 Years	4	3	1	0	8
Total	26	19	4	1	50

**Table 2** Sex wise distribution of anemia

Sex	Peripheral Smear				Total
	Normal	Microcytic hypochromic anemia	Dimorphic anemia	Megaloblastic anemia	
Male	15	7	1	0	23
Female	11	12	3	1	27
Total	26	19	4	1	50

Anemia was found in 48% of the study population of which microcytic hypochromic anemia was the most common type. Dimorphic anemia was found in 4 patients and one patient had megaloblastic anemia. Anemia was more frequent in females than males. Hemoglobin and red cell indices coincided with the type of anemia.

**Table 3** White blood corpuscles

WBC	No. patients	Percentage
Below 4000	4	8.0
4000-11000	26	52.0
Above 11000	20	40.0
Total	50	100.0

40% of patients had leucocytosis and 8% had leucopenia. Leucocytosis was predominated by neutrophilia in 80% of those with leucocytosis. 15% had lymphocytosis and in 5% other components like monocytes and eosinophils were elevated.

**Table 4** Platelet

Platelet	No. patients	Percentage
Below 1.5 lakhs	10	20.0
1.5-4.5 lakhs	28	56.0
Above 4.5 lakhs	12	24.0
Total	50	100.0

56% of the patients had normal platelets while 24% had thrombocytosis and 20% had thrombocytopenia.

## DISCUSSION

Leukocytosis can be considered as a marker of inflammation which occurs in atherosclerotic lesions. Leukocytes play a key role in the initiation and progression of the disease through plaque formation and stabilisation<sup>1</sup>. In terms of ACS pathophysiology, leukocytes themselves are directly responsible for myocardial injury. Leukocytes release cytokines, bringing about further macrophage recruitment and the proliferation of smooth muscle cells within the vascular wall.

In addition, protease secretion leads to endothelial damage of the coronary vessels, exposing thrombogenic collagen and predisposing the vessels to thrombus formation<sup>1</sup>. Elevated WBC counts are associated with several coronary risk factors, including smoking, elevated serum triglyceride and cholesterol levels.

Association between elevated hematocrit and coronary artery disease has been well documented but decreased hematocrit was the predominant finding in our study. Some studies like the ARIC study<sup>4</sup> have shown anemia as a risk predictor of coronary events.

Anemia has the propensity to increase cardiac output and hence its workload secondary to decreased afterload and increased preload finally leading to ventricular dilatation. The increased oxygen demand coupled with decreased oxygen carrying capacity increase the risk of developing CAD. Platelets have clear roles in thrombosis and contribute to inflammation. Under stress, activated platelets help neutrophils adhere to the subendothelial matrix. Chirkov and colleagues have shown that there is increased platelet aggregability and resistance to nitric oxide in patients with stable angina pectoris and ACS, compared with patients without CAD.

Platelets also synthesize interleukin-1 beta (IL-1 $\beta$ ), an important mediator of platelet-induced activation of the endothelial cells, which, in turn, induce chemokines that up-regulate the molecules that promote endothelial adhesion of neutrophils and monocytes<sup>5</sup>. This increased total platelet-monocyte binding has been shown in ACS patients<sup>6</sup>. Nearly all of the cellular elements in the blood, including WBCs, red blood cells (RBCs), and platelets, are involved in the underlying pathogenesis of atherosclerosis. These markers not only play a role in the development of CAD in asymptomatic patients, but they predict recurrent events and death in patients who already have CAD.

## CONCLUSION

- Anemia and leucocytosis were found to be significantly high in coronary artery disease population. Further studies are needed to evaluate the use of these parameters as risk predictors of coronary artery disease.
- The tests are inexpensive and widely available. Risk prediction through these simple parameters will greatly help in reducing the burden of coronary artery disease.

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