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Original Research Article

A study of Involvement of Number of Coronary Blood Vessel in Myocardial Infraction

Dr. Shashikanth[1], Dr. Anand[2], Dr. Dalawai Kashappa Pritam[3], Dr. D. Sanjana[4], Dr. H.R. Karthik[5], Dr. Kishor[6]

[1]Professor, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.
[2]Assistant Professor, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.
[3]Junior Resident, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.
[4]Junior Resident, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.
[5]Junior Resident, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.
[6]Junior Resident, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.

Corresponding Author
Dr. Dalawai Kashappa Pritam, Junior Resident, Department of General Medicine, Adichunchanagiri Institute of Medical Sciences (AIMS), B.G. Nagara, Mandya, Karnataka, India.

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ABSTRACT

Background
Cardiovascular diseases (CVDs) have become increasingly prevalent over the past two centuries and stand as a leading cause of mortality worldwide. Among CVDs, coronary artery disease (CAD) imposes a substantial burden, contributing significantly to death, disability, and economic strain. The Global Burden of Disease study highlights India's alarming age-standardized CVD death rate of 272 per 100,000 population, significantly exceeding the global average of 235. Moreover, CVDs manifest in the Indian population approximately ten years earlier than in Western populations. This study aims to investigate the association between coronary artery disease (CAD) and the involvement of coronary blood vessels, particularly in patients with associated comorbidities.

Methods
This prospective observational study collected data from myocardial infarction patients admitted to the cardiac care unit at AIMS BELLUR from August 2023 to November 2023. Inclusion criteria encompassed all myocardial infarction patients admitted during this period, while exclusion criteria included cases with a family history of myocardial infarction or congenital coronary artery anomalies. Data, including demographics, medical history, and risk factors, were extracted from patient case sheets. Statistical analysis, including descriptive statistics and correlation coefficient calculations, was conducted to assess relationships between variables.

Results

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Of the 110 patients included in the study, the mean age was 56.7±8.6 years, with 65% being male. Patients with three-vessel disease were significantly older than those with single- or two-vessel disease. There was a notable association between comorbidities such as diabetes mellitus, hypertension, hyperlipidaemia, and family history with the severity of CAD.

Conclusion

Patients with comorbidities, particularly hypertension and diabetes mellitus, exhibit a higher prevalence of involvement of multiple coronary blood vessels in myocardial infarction. These findings emphasize the importance of proactive risk factor management in reducing the burden of CAD.

Keywords: Cardiovascular Disease, Coronary Artery Disease, Myocardial Infarction, Comorbidities, Prevalence.

INTRODUCTION

The prevalence of cardiovascular disease has been increasing over the past two centuries. According to world health organization report, cardiovascular disease are the main leading causes of death worldwide.[1] Coronary artery disease is the leading cause of death, disability and financial burden compared to other disease.[2] According to the findings of the Global Burden of Disease study, India exhibits an age-standardized cardiovascular disease (CVD) death rate of 272 per 100,000 population, significantly surpassing the global average of 235. Notably, cardiovascular diseases affect the Indian population approximately a decade earlier than their Western counterparts.[3,4] Coronary artery disease can be found in various locations such as the proximal, mid, and distal parts of the arteries or even simultaneous disease of several arteries.[5-7] Right and left coronary arteries supply blood to the heart muscle. Coronary arteries are the first branches that separate from the aorta and are separated from the right and left Valsalva sinus. The Left Main (LM) coronary artery which is separated from the left Valsalva sinus is divided into two branches - the Left Anterior Descending artery (LAD) and Left Circumflex artery (LCX).[8]

Coronary artery disease is now frequently encountered in all population, which usually involves the coronary blood vessels, not many studies available in this regard. Therefore, present study was designed to evaluate involvement of number of coronary blood vessels in patients with associated comorbidities who presented to Adichunchangiri hospital. These findings should enable health care providers to reduce or treat coronary artery disease risk factors by planning

MATERIAL & METHOD

This prospective observational study was done by gathering data from records of myocardial infarction patients admitted to the cardiac care unit at AIMS BELLUR. The study period is from August 2023 to November 2023. Inclusion criteria cover all myocardial infarction patients admitted during this period, while exclusion criteria include cases with a family history of myocardial infarction or congenital coronary artery anomalies.

The methodology involves collecting information from patient case sheets in the cardiac care unit and medical intensive care unit (MICU) using a structured form. Data such as file number, gender, age, and risk factors like hypertension, diabetes mellitus, and hyperlipidemia were extracted and recorded manually.

Statistical analysis

Statistical analysis was entail by entering the data into an Excel sheet and employing descriptive statistics like frequency, percentage, mean, standard deviation, and correlation coefficient to assess relationships between variables**.**

RESULT

A total of 110 patients fulfilling inclusion criteria were included in the study. With mean age of

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56.7±8.6yrs, among them 65% were male and 35% were female patients. The mean age of patients in SVD was 52.3±10.5years, whereas those with 2VD were 61.2±10.5yrs and patients with 3VD has a mean age of 65.1±10.5 years.

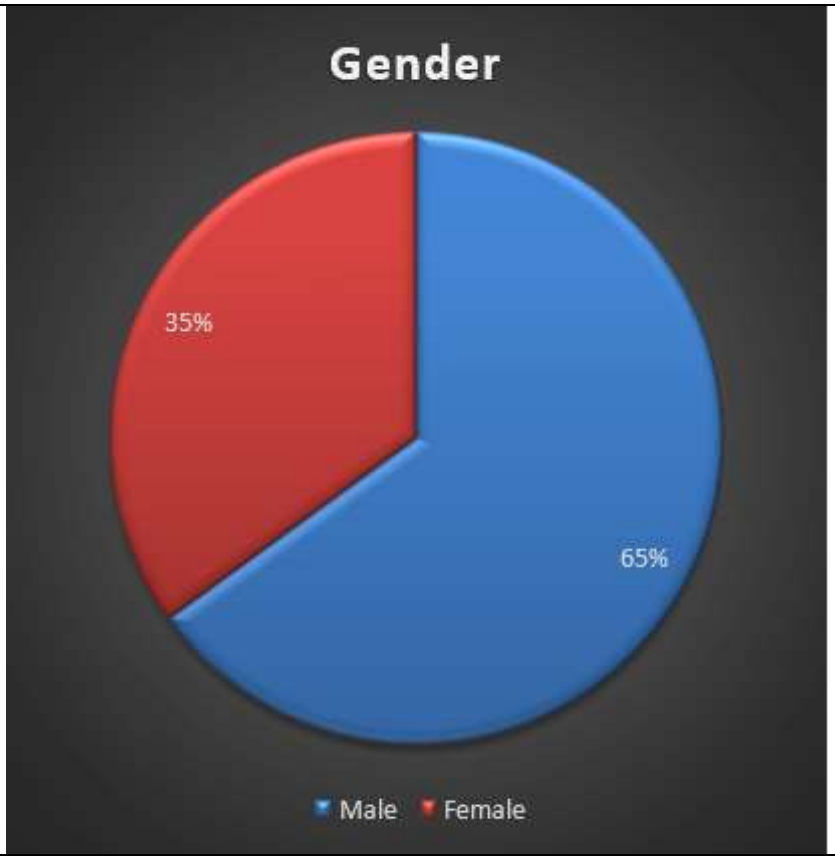

Figure 1: Gender distribution

Comorbidities		SVD N (%)	2VD N (%)	3VD N (%)	p-value
Diabetes mellitus	Yes	25 (54.3)	32 (72.7)	17 (85.0)	0.01*
	No	21 (45.7)	12 (273)	3 (15.0)	
Hypertension	Yes	24 (52.2)	34 (77.3)	18 (90.0)	0.01*
	No	22 (47.8)	10 (22.7)	2 (10.0)	
Hyperlipidaemia	Yes	26 (56.5)	30 (68.2)	16 (80.0)	0.01*
	No	20 (43.5)	14 (31.8)	4 (20.0)	
Family history	Yes	16 (34.7)	15 (34.1)	8 (40.0)	0.01*
	No	30 (65.3)	29 (65.9)	12 (60.0)	
Total		46	44	20	

Table 1: Showing the relation of comorbidities with number of vessel involvement

There is significant higher incidence of the diabetes mellitus, hypertension, dyslipidemia and family history among the patients with triple vessel disease, compared to patients with double vessel disease and single vessel disease. (P<0.05)

DISCUSSION

Understanding the intricate relationship between coronary blood vessels and myocardial infarction, commonly known as a heart attack, is paramount in cardiovascular research and clinical practice. Myocardial infarction, a leading cause of mortality worldwide, occurs when

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there is a disruption in blood supply to the heart muscle, often due to blockage in one or more coronary arteries. The involvement of a varying number of coronary blood vessels in myocardial infarction poses intriguing questions about its etiology, prognosis, and management strategies. This study delves into the nuanced aspects of how the number of coronary blood vessels involved influences the severity, outcomes, and therapeutic approaches in myocardial infarction cases.[9]

Present study documented with there is significant higher incidence of the diabetes mellitus, hypertension, dyslipidemia and family history among the patients with triple vessel disease, compared to patients with double vessel disease and single vessel disease. ($P<0.05$) Similar to present study, Naghsthtabrizi B et al., documented higher incidence of the triple vessel disease in patients with diabetes, hypertension and other comorbidities compared to the patients without comorbidities.[10] Five years after follow-up, patients with stable coronary disease and preserved ventricular function experienced a more adverse prognosis if they presented with three-vessel disease as opposed to single- or two-vessel disease.[11]

In concordance to present study, Nabati M et al., involving 201 participants, a notable correlation was observed between the severity of coronary artery disease (measured by number and extent) and certain risk factors such as diabetes mellitus, hyperlipidemia, and hypertension.[12] These findings align with the results of the present study. Similar to our present study, advanced age, diabetes mellitus, hyperlipidemia, and hypertension emerged as significant risk factors for coronary artery disease by Silbiger J et al.[13] Conversely, no noteworthy associations were detected between other risk factors in either group.

The study suggests that diabetes mellitus and hypertension exhibit a particularly robust association with three-vessel coronary artery disease, while diabetes mellitus, hypertension, and hyperlipidemia demonstrate significant correlations with coronary artery disease overall. Therefore, based on these findings, it is recommended that healthcare providers implement a fundamental strategy aimed at mitigating the impact of these risk factors on coronary artery disease.

CONCLUSION

To conclude, the present study suggests that in our study, patient with comorbidities like hypertension, diabetes mellitus and others have the higher prevalence of involvement of more number of coronary blood vessel in myocardial infraction and lesser coronary blood vessels involved in patients with no comorbidities.

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Conflict of interest: Nil

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