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Coronary Angiographic Pattern in Patients Aged >45 Years: A Prospective Study

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Abstract
Background: Cardiovascular Diseases (CVD's) remain the biggest cause of death worldwide. Recent trends suggest that disease incidence has escalated and has started affecting younger age group also. **Aims and objectives:** This study was conducted to study the coronary angiographic pattern in patients aged >45 years.**Materials and Methods**: All patients >45 years who underwent coronary angiography and angioplasty were included in the study. Subjects meeting the inclusion criteria were selected. Detailed history, clinical examination, electrocardiography findings, echocardiography findings were studied. Angiographic findings were then correlated with the risk factors, demography and electrocardiographic findings.**Results**: A total of 100 patients were included in the study. Majority were in the age group 55-64 years (n=50) with a mean age of 60.59±7.16 (mean±SD). There was a male preponderance (83, 83%). Most common angiographic finding was double vessel disease in 25% followed by triple vessel disease in 23%, followed by single vessel disease in 22%. Most common angiographic pattern among the males was Triple vessel disease & Double vessel disease (26.5%) while in females, it was non-critical CAD(47.1%). The most common abnormal ECG finding was ST elevation MI in 35% participants.**Conclusion**: DVD was the most common angiographic abnormality which was followed by TVD and SVD.RCA was the most common culprit vessel in the majority of patients, followed by LAD and LCX.
Keywords: Coronary Angiography, Electrocardiography

Introduction
Cardiovascular Diseases (CVD's) remain the biggest cause of death worldwide. Recent trends suggest that disease incidence has escalated and has started affecting younger age group also. Incidence of CVD's has been on increasing trend not only in urban areas but in rural areas also. Its prevalence was estimated to be 3-4% in rural population and 8-10% in urban population, based on cross sectional surveys.[1] Coronary artery disease involves reduction of blood flow to heart muscle due to build up of plaque (atherosclerosis) in the arteries of heart.[2] Common symptom is chest pain or discomfort which can travel into shoulder, arm, back, neck or jaw. Other symptoms by which patients presents includes heartburn, shortness of breath or uneasiness. Usually symptoms precipitate with exercise or emotional stress.[3] It is classified into Stable Angina, Unstable Angina, NSTEMI, STEMI. Conventional risk factors include Age, Family History, Race, Lipoprotein A , HDL Cholesterol while modifiable risk factors include diet, alcohol, smoking, obesity, hypertension, diabetes mellitus, mental stress. Despite the advance in other diagnostic methods, coronary angiography (CAG) remains to be the gold standard in diagnosis of coronary artery diseases. The use of coronary interventions has grown rapidly over the last few years. New improvements in techniques, hardware, operator experience, pharmacology, and safety as shown by clinical studies have expanded the use of coronary interventions. Over the last two decades, several refinements have been made to DES such as reduction of stent strut size, use of newer anti-proliferative drugs, bioabsorbable stents, etc. This has led to improved outcomes of PTCA over the years. The indications have expanded to more complex coronary lesions, which

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were previously treated by surgery as a default.[4-7]

Aims and objectives
This study was conducted to study the coronary angiographic pattern in patients aged >45 years.

Material and methods
The present study was carried out in the Department of Cardiology & Department of Medicine, G. R. Medical College, Gwalior & JA Group of Hospitals, Gwalior from Jan 2020- June 2021. All patients >45 years who underwent coronary angiography and angioplasty were included in the study. Subjects meeting the inclusion criteria were selected. Detailed history, clinical examination, electrocardiography findings, echocardiography findings were studied.. Angiographic findings were then correlated with the risk factors, demography, addiction history, other comorbidities and electrocardiographic findings.

Results
A total of 100 patients were included in the study. Majority were in the age group 55-64 years (n=50) with a mean age of 60.59±7.16 (mean±SD). There was a male preponderance (83, 83%). When we consider the presenting symptoms, 81 out of 100 patient presented with chest pain, 13% patient had breathlessness, 40% patient had ghabrahat (uneasiness), 13% patient had sweating, 11% patients had atypical presentation. In the younger population of 45-54 year age group, triple vessel disease was least common (6%) as compared to 55-64 year age group (30%) and ≥65 Years (21%). The most common angiographic pattern among the males was Triple vessel disease & Double vessel disease (26.5%) while in females, the most common finding was non-critical CAD(47.1%). While studying the correlation of CAD & gender, the p value was 0.002 which was statistically significant showing that the risk for CAD/ACS increases significantly with male gender as compared to females. In the study, 47 out of 100 participants were smokers (49.39% in males vs 35.2% in females).

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20% patients had positive family history. Among the participants with   positive family history, 95% had CAD (DVD>SVD>TVD).

Table 1: Age wise distribution of study participants

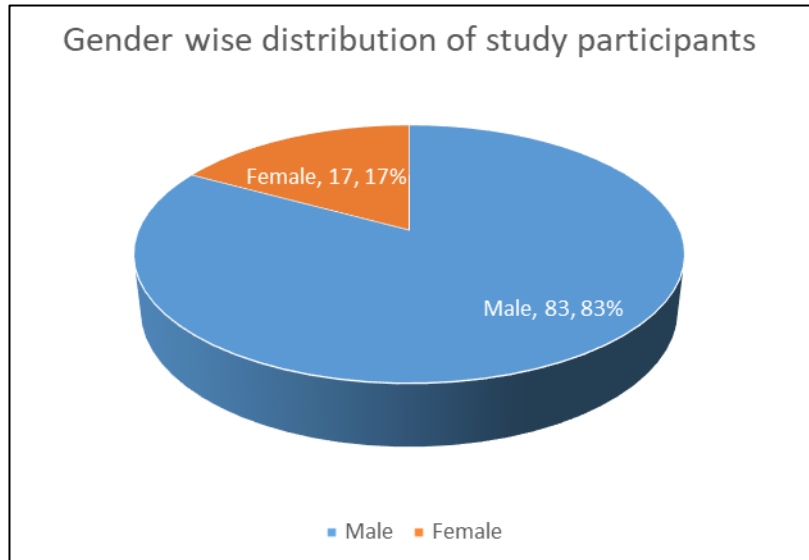| Age Group	N	%
45-54 Year	17	17%
55-64 Year	50	50%
≥65 Year	33	33%
Total	100	100%

Fig 1: Gender wise distribution of subjects

Table 2: Distribution of study participants according to angiography findings

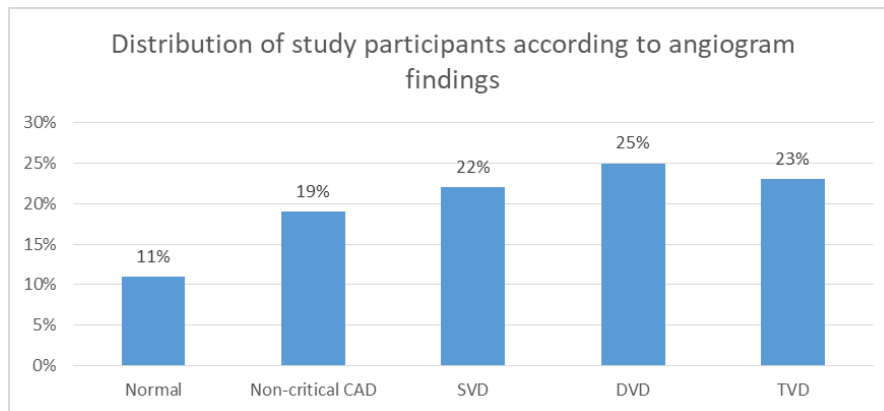| Angiogram findings	N	%
Normal	11	11%
Non-critical CAD	19	19%
SVD	22	22%
DVD	25	25%
TVD	23	23%
Total	100	100%

Fig 2: Distribution of study participants according to angiogram finding

Table 3: ECG findings at the time of admission among study participants

ECG findings	N	%
ST Elevation	35	35%
Q Wave	28	28%
Non-ST elevation	25	25%
Normal	32	32%

As per the ECG, 35% patients had STEMI, 25% had NSTEMI while   32% had normal ECG. As per LV function, 3% participants had

normal LV function , 51% had mild LV dysfunction (EF 46-60%) ,46% had moderate LV dysfunction (EF 30-45%) while none of the participants had severe LV dysfunction (EF<30%)

Discussion

The clinical presentation of acute coronary syndromes (ACS) is broad. It ranges from cardiac arrest, electrical or haemodynamic instability with cardiogenic shock (CS) due to ongoing ischaemia or mechanical complications such as severe mitral regurgitation, to patients who are already pain free again at the time of presentation.[8] The leading symptom initiating the diagnostic and therapeutic cascade in patients with suspected ACS is acute chest discomfort described as pain, pressure, tightness, and burning. Chest pain-equivalent symptoms may include dyspnoea, epigastric pain, and pain in the left arm.

The Framingham Heart Study results demonstrated that the higher the cholesterol level, the greater the risk of coronary artery disease (CAD); alternatively, CAD was uncommon in people with cholesterol levels below 150 mg/dL.

A study by Allen et al found that people who have increases or decreases in blood pressure during middle age have associated higher and lower remaining lifetime risk for cardiovascular disease. This suggests that prevention efforts should continue to emphasize the importance of lowering blood pressure in order to avoid hypertension.[9]

Smoking is a risk factor for CVD in women and men; however, a systematic review and meta-analysis by Huxley and Woodward suggests that in some countries, smoking by women is on the rise; the study suggests that proper counseling and nicotine addiction programs should focus on young women. [10]

Obesity is associated with elevated vascular risk in population studies. In addition, this condition has been associated with glucose intolerance, insulin resistance, hypertension, physical inactivity, and dyslipidemia..[11-12]

In our study chest pain was the most common presenting symptom in patients of CAD which can be associated with diaphoresis, uneasiness etc but atypical site or character of pain should never be neglected specially if the patient is diabetic.

Most common clinical presentation was stable angina followed by AWMI, IWMI and least common was ALWMI. DVD was the most common angiographic abnormality which was followed by TVD and SVD. RCA was the most common culprit vessel in the majority of patients, followed by LAD and LCX. Electrocardiographic, Echocardiographic and angiographic findings were comparable in assessing the severity of CAD. The proportion of co-morbid participants increases with increase in age group more in CAD group than normal group.

Analysis of our study showed elderly age, male sex, diabetes mellitus, hypertension, dyslipidemia, COPD, smoker patients were predisposed to develop more severe CAD assessed in terms of number of vessels involved. Whereas family history, obesity, and tobacco chewing did not have much effect on severity or pattern of artery involvement in the same study population.Depression has been strongly implicated in predicting CAD. [13]

Medical conditions such as end-stage renal disease (ESRD), [14] chronic inflammatory diseases affecting connective tissues (eg, lupus, rheumatoid arthritis), [15] human immunodeficiency virus (HIV) infection (acquired immunodeficiency syndrome [AIDS], highly active antiretroviral therapy [HAART]), [16] and other markers of inflammation have all been widely reported to contribute to the development of CAD.

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