ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 7, Issue – 3, May – 2022 , Page No. : 302 - 308

Angiography extent of coronary artery disease and clinical outcome

[1]Dr. Najmus Saqib, MBBS, MD, DNB Hyderpura, House No. 15/2, Janipur, Jammu, J&K.

[2]Dr. Ankit Kalra, MBBS, MD, DNB Hyderpura, House No. 15/2, Janipur, Jammu, J&K.

Corresponding Author: Dr. Najmus Saqib, MBBS, MD, DNB Hyderpura, House No. 15/2, Janipur, Jammu, J&K.

Citation this Article: Dr. Najmus Saqib, Dr. Ankit Kalra, "Angiography extent of coronary artery disease and clinical outcome", IJMSIR- May - 2022, Vol – 7, Issue - 3, P. No. 302 – 308.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Coronary Artery Disease (CAD) is the major cause of morbidity and mortality burden in the world. Young patients with CAD are specific subset of population requiring attention. Various studies shown that, young adults are characterized by a less extensive coronary disease, mainly as one-vessel form. The less extensive coronary artery disease and high prevalence of complex lesions observed in young patients might suggest that premature coronary artery disease is associated with rapid disease progression rather than with a gradually evolving process. The coronary artery angiography is a diagnostic tool in diagnosing the affected vessels of the heart. This cross - sectional study included a total of 106 cases presented with acute myocardial infarction. Coronary angiography was performed in all the patients. The left anterior descending artery was Infarct Related Artery (IRA) in 60.4% patients, right coronary artery in 22.6% and the left circumflex coronary artery in 18.7% patients. Left Main disease was seen in 2.8% of the patients, majority of the patients (75.5%) had single vessel disease which was seen on coronary angiography, followed by double vessel disease (16%). 8.5% had multi vessel disease and 2.8 % had left main disease. Primary PCI was performed in all patients. There were no deaths during interventional procedures. The study concluded that majority of the patients had single vessel disease, which was seen on coronary angiography. Also patients need to be educated on early hospitalization as early diagnosis and early interventions are essential for young MI patients to reduce mortality. No Major adverse cardiovascular outcomes happened on 3 month follow up.

Keywords: Coronary Artery Disease, Angiography, PCI, Heart disease and Clinical outcomes

Introduction

The growth of cardiology as a specialty may be explained by a study of the attention given to acute myocardial infarction.[1] Pathologists believed that coronary arteries were end arteries and that occlusion must always lead to sudden death. Sir William Osler perpetuated this belief by writing that "The symptoms of coronary vessels are not very characteristic; it is only rarely diagnosed during life".

Coronary Artery Disease (CAD) is the major cause of morbidity and mortality burden in the world. Young patients with CAD are specific subset of population requiring attention.[2]

The World Health Organization diagnosis of myocardial infarction depends on the presence of at least two among

these factors, i.e., typical chest pain for more than 20 minutes, ECG changes with development of Q waves, bundle branch block or ST segment elevation or depression of at least 0.1 mv for 24 hours and increased cardiac enzymes (Creatinine Phosphokinase, Troponins).[3]

Various studies shown that, young adults are characterized by a less extensive coronary disease, mainly as one-vessel form. The less extensive coronary artery disease and high prevalence of complex lesions observed in young patients might suggest that premature coronary artery disease is associated with rapid disease progression rather than with a gradually evolving process.[4]

The coronary artery angiography is a diagnostic tool in diagnosing the affected vessels of the heart. Literature suggests that short- and long-term follow-up after coronary angiography has the association between extent of coronary artery disease.[5-8]

In-patient with acute coronary event both per-cutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) are associated with excellent immediate survival (mortality of 0.8% *vs.* 1.4% for PCI and CABG respectively at 30 d) as well as long term survival outcomes at end of 5 years.[5] But PCI seems to associate with lower rate of repeated acute coronary events and revascularization procedures when compared to CABG at the end of 5 years (repeat myocardial infarction 89.9% vs 96.6% for PCI *vs.* CABG).[6]

The present study aimed to study the angiography extent of coronary artery disease and clinical outcomes among young patients on follow up at 3 months with primary end points as – death, non-fatal MI, need for revascularization and Stroke.

Methodology

This cross - sectional study was done in Department of Cardiology in Medanta, the Medicity, from July 2017 to April 2018 after obtaining the permission from ethical committee.

A total of 106 cases presented with acute myocardial infarction were included in the study after obtaining the informed consent.

Inclusion criteria

1. 18-45 years of patients
2. Patients who are willing to participate.

Exclusion criteria

1. Patients with other co-morbid illnesses.
2. Previous MI or CABG

A detailed physical examination was performed. Coronary angiography was performed in all the patients to assess the number and type of vessels involved and percentage of lesion.

All subjects were evaluated and followed up for 3 months with Primary endpoints as non-fatal MI, death or need for coronary revascularization, stroke and secondary endpoints as any Major or Minor bleeding episodes.

Data collected was tabulated and expressed in frequency, percentage, mean and standard deviation as applicable. Data was analyzed by using computer-based SPSS program version 24.0 for statistical analysis.

Observations and results

This cross-sectional study included a total of 106 patients according to inclusion criteria.

Coronary angiography was performed in 106 patients to assess the number and type of vessels, which were involved, and percentage of lesion. Significant coronary disease is defined as at least a 70% reduction in the internal diameter of the right, left anterior descending or left circumflex coronary arteries and their branches, or

≥50% reduction in the internal diameter of the left main coronary artery. Moderate disease is defined as 50% to 69% stenosis of major coronary artery segments, 70% to 100% of minor segments or 30% to 49% of the left main coronary. Minimal disease is defined as less coronary obstruction than that for moderate disease. Angiographically normal coronaries have no appreciable stenosis. In the present analysis, patients with minimal or moderate disease were combined and classified as having non-obstructive disease.

It was observed that the mean age of the participants was 39.34 ± 4.007 years and majority of the participants were males.

Table 1: Coronary Angiogram in patients presenting as AMI

Infarct Related Artery	Number	Percentage
Left Anterior Descending	64	60.4
Left Circumflex	15	14.2
Right Coronary Artery	24	22.6
Left Main + LAD	3	2.8

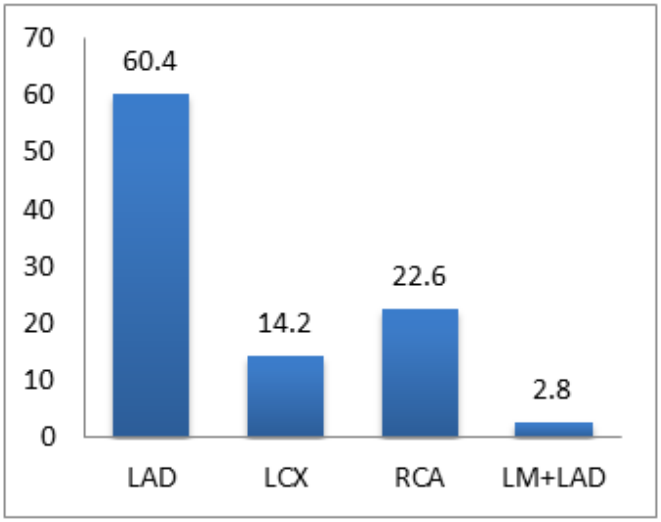


Figure 1: Coronary Angiogram in patients presenting as AMI

Table 1 depicts, angiographic procedures carried out in all patients presenting as AMI. The left anterior descending artery was infarct related artery (IRA) in 60.4% patients, right coronary artery in 22.6% and the left circumflex coronary artery in 14.2% patients. Left Main disease was seen in 2.8% of the patients.

Table 2: Number of vessels involved

Number of vessels involved	Number	Percentage
SVD	80	75.5
DVD	17	16
TVD	9	8.5
Left main disease	3	2.8

Figure 2: Number of vessels involved

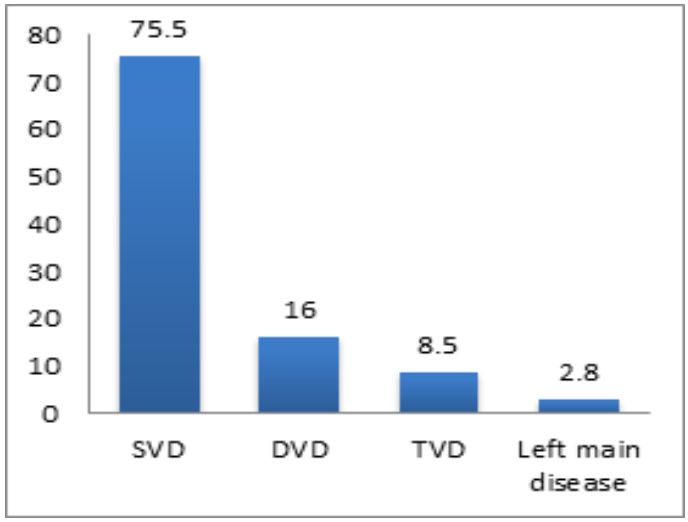


Table 2 depicts that, majority of the patients (75.5%) had single vessel disease which was seen on coronary angiography, followed by double vessel disease (16%). 8.5% had multi vessel disease and 2.8 % had left main disease.

Further, Primary PCI was performed in all patients. There were no deaths during interventional procedures. In addition, we evaluated the in-hospital outcome of these patients, which included symptom-free discharge from hospital, post MI angina, heart failure, post MI arrhythmias, mitral regurgitation, cardiogenic shock cardiac arrest survivors and in-hospital mortality.

Table 3: In hospital outcomes

Variables	Number	Percentage
Persistent Chest pain	6	5.6
Heart Failure	6	5.6
AV Block	7	6.6
Arrhythmias	8	7.5
Moderate Mitral Regurgitation	2	1.8
Cardiogenic Shock	17	16.03
Post CPR survivor	1	0.9
Death	1	0.9

Figure 3: In hospital outcomes

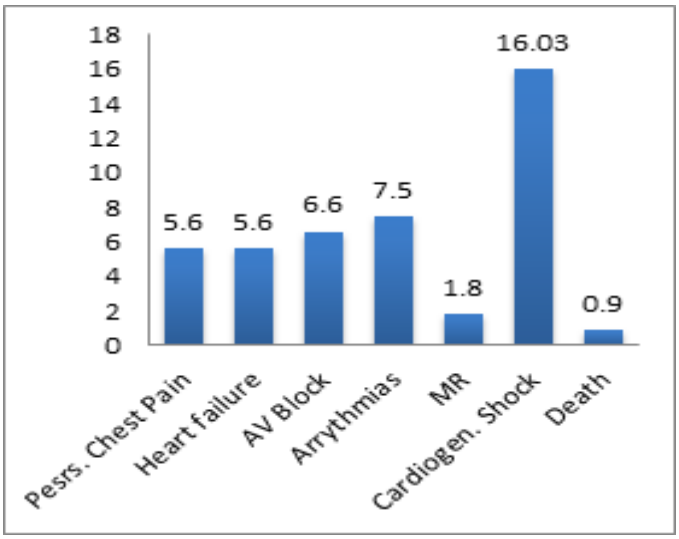


Table 3 depicts that, 48 (45.28%) patients developed complications during the acute MI phase. Six (5.6%) of them had persistent chest pain, 6 (5.6%) developed heart failure. Heart failure was classified into four categories according to Killip classification. Killip III was found in 3 (2.8%) patients and Killip IV was found in 3 (2.8%) patients. Eight (7.5%) patients had severe rhythm disturbances — atrial fibrillation in 1 patient, ventricular tachycardia in 6 patients and ventricular fibrillation in 1 patient. 16.03% patients were in cardiogenic shock and were stabilized with inotropic support with only 1 requiring staged PCI.

The present study further observed that Moderate Mitral regurgitation (MR) was found echocardiographic ally in 2 (1.8%) patients. One (0.9%) patient developed moderate MR and 1(0.9%) patient severe MR. One (0.9%) patient was survivor of cardiac arrest. Outcome was excellent in young patients during the index hospitalization, in hospital mortality occurred in 1 patient (0.9%). Patient had extensive anterior AMI and cardiogenic shock.

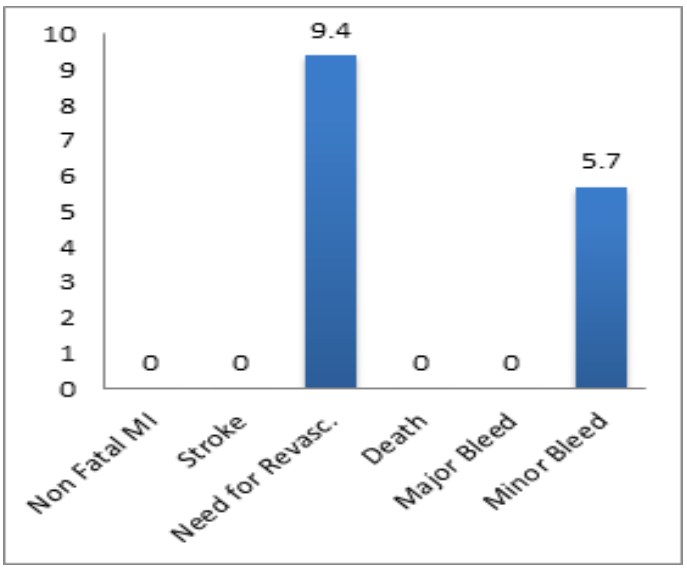
All patients were started on optimized medical treatment and were followed for 3 months both telephonically and as outpatient on Day 15, Day 30 and at 3 months. There was no MACE (non-fatal MI, stroke, death) on follow up. Revascularization was done in 9.4% of patients who were stable but were planned for staged PCI at 6 weeks.

No patient had any episodes of major bleeding both procedures related and DAPT related. Minor bleeding was seen only in 5.7% of patients, which was controlled without any significant intervention or hospitalization as depicted in table 4.

Table 4: Primary and Secondary Outcomes on 3 months follow up in patients

	Number	Percentage
Non-Fatal MI	0	0
Stroke	0	0
Need for Revasc.	10	9.4
Death	0	0
Major Bleed	0	0
Minor Bleed	6	5.7

Figure 4: Primary and Secondary Outcomes on 3 months follow up in patients



Discussion

In this cross-sectional study, a total of 106 presented with acute myocardial infarction were included in the study after obtaining the informed consent. Data was analyzed and discussed with literature.

In the present study the mean age was 39.34 ± 4.007 years and majority of the study participants were males. Findings are consistent with the study conducted by C Gyldenkerne, et al. (2019), reports that study subjects' range between 59-73 and majority (66%) study subjects were males.[7] In similar study conducted by Kumar V, et al. (2020), observed that mean age of the participants was 39.34 ± 4.007 years and majority were male (97.8%) patients and 19.1% patients were very young (≤30 years).[8]

In the present study 1 patient died before the angiographic study. The left anterior descending artery was infarct related artery (IRA) in 60.4% patients, right coronary artery in 22.6% and the left circumflex coronary artery in 18.7% patients. Left Main disease was seen in 2.8% of the patients. In similar study conducted by Kumar V, et al. (2020), reported that 2 patients died, LAD was infracted in 71.9%, RCA in 14.6%, LCX in 10.1% and LM in 2.3% patients. In another study conducted by PP Deshmukh et al. (2019), found that 61% patients had obstructive CAD, 31.7% patients had non obstructive CAD. LAD was infracted in 46.4% patients; RCA was infracted in 7.3%.[9]

It was observed that majority of the patients (75.5%) had single vessel disease which was seen on coronary angiography, followed by double vessel disease (16%). 8.5% had multi vessel disease and 2.8 % had left main disease. Similarly a study conducted by PP Deshmukh et al. (2019), observed that 53.7% patients had single vessel disease followed by 4.9% double vessel disease and 2.4% triple vessel disease. In another study conducted by C Gyldenkerne, et al. (2019), reports that 23.28% patients had single vessel disease followed by 25.35 double vessel disease and 51.21% triple vessel disease.

In the present study 48 (45.28%) patients developed complications during the acute MI phase, Moderate Mitral regurgitation (MR) was found echocardiographic ally in 2 (1.8%) patients. One (0.9%) patient developed moderate MR and 1(0.9%) patient severe MR. One (0.9%) patient was survivor of cardiac arrest. Outcome was excellent in young patients during the index hospitalization, in hospital mortality occurred in 1 patient (0.9%). Patient had extensive anterior AMI and cardiogenic shock. All patients were followed for 3 months both telephonically and as outpatient on Day 15, Day 30 and at 3 months. There was no MACE (non-fatal MI, stroke, death) on follow up. Revascularization was done in 9.4% of patients who were stable but were planned for staged PCI at 6 weeks.

McGill Jr HC, et al. (2000), reported in-hospital and six-month mortality has been shown to be 0.7% and 3.1%, respectively.[10] This compares favorably to their older counterparts whose in-hospital and six-month mortality were 8.3% and 12%, respectively[10]. Beyond five years

post-MI, however, there is an alarming drop in survival among ‘‘young’’ MI patients with mortality exceeding 15% at seven years.[11] and being between 25-29% at 15 years.[12,13]. Heart failure, malignant ventricular arrhythmias, angina pectoris and re-infarction were found to be associated with higher mortality. The strongest independent risk factor reported is left ventricular ejection fraction of 45% or less (OR 4.4: 95% CI, 1.6-12.4).[14] In particular, the rate of sudden cardiac death appears to be dramatically increased in ‘‘young’’ MI patients compared to the general population of a similar age. Risgaard et al. demonstrated a more than 74-fold increase in mortality[12]. Nonetheless, over the last three decades, in-hospital and 30- day mortality have markedly decreased probably due to improved acute management of MI.

Conclusion

This cross-sectional study included 106 patients presented with myocardial infarction. The study concluded that majority of the patients had single vessel disease, which was seen on coronary angiography. Also, patients need to be educated on early hospitalization as early diagnosis and early interventions are essential for young MI patients to reduce mortality. Young patients had good in hospital outcomes with less incidence of complications during hospital stay. No Major adverse cardiovascular outcomes like death, non-fatal MI, strokes were seen in young patients and no major bleeding episodes happened on 3 month follow up.

References

1. Kaplan AS. Acute myocardial infarction in patients thirty-five years of age and under. Dis Chest 1967; 51:137– 47.

2. Schoene Berger AW, Radovanovic D, Stauffer JC, Win decker S, Urban P, Niedermaier G, Keller P, Gutzwiller F, Erne P. Acute coronary syndromes in young patients: presentation, treatment and outcome. Int J Car diol 2011;148:300–4.

3. Thygesen, K.; Alpert, J. S.; Jaffe, A. Simoons, M. L.; Chait man, B. R.; White, H. D. (24 August 2012). "Third Universal Definition of Myocardial Infarction". Circulation. 126 (16): 2020–2035.

4. Chen L, Chester M, Kaski J. Clinical factors and angiographic features associated with premature coronary artery disease. Chest 1995; 108:364–9.

5. Olesen KKW, Madsen M, Egholm G, et al. Patients with diabetes without significant angiographic coronary artery disease have the same risk of myocardial infarction as patients without diabetes in a real-world population receiving appropriate prophylactic treatment. *Diabetes Care*. 2017;40(8):1103–1110.

6. Maddox TM, Stanislaw ski MA, Grunwald GK, et al. Nonobstructive coronary artery disease and risk of myocardial infarction. Jama. 2014;312(17):1754–1763.

7. Gyldenkerne C, Olesen KKW, Madsen M, et al. Extent of coronary artery disease is associated with myocardial infarction and mortality in patients with diabetes mellitus. Clin Epidemiol. 2019;11:419-428. Published 2019 May 23. doi:10.2147/CLEP.S200173.

8. Kumar V., Arora V., Jain D., Anwar J., Prasa, D., Kumar V. (2020). Clinical Profile and Outcomes in Young Patients of St Elevation Myocardial Infarction. Frontiers Journal of Cardiology & Cardiovascular Medicine, 1(1), 1-10.

9. Deshmukh PP, Singh MM, Deshpande MA, Rajput AS. Clinical and angiographic profile of very young adults presenting with first acute myocardial infarction: Data from a tertiary care center in Central India. Indian Heart J. 2019;71(5):418-421.

10. McGill Jr HC, McMahan CA, Zieske AW, Tracy

RE, Malcom GT, Herderick EE, et al. Association of coronary heart disease risk factors with microscopic quali ties of coronary atherosclerosis in youth. Circulation 2000;102:374–9.

11. Tuzcu EM, Kapadia SR, Tutar E, Ziada KM, Hobbs RE, McCarthy PM, et al. High prevalence of coronary at hero sclerosis in asymptomatic teenagers and young adults: evidence from intravascular ultrasound. Circulation 2001;103:2705–10.

12. Risgaard B, Nielsen JB, Jabbari R, Haunso S, Holst AG, Winkel BG, et al. Prior myocardial infarction in the young: predisposes to a high relative risk but low absolute risk of a sudden cardiac death. Euro pace 2013;15:48–54.

13. Awad-Elkarim AA, Bagger JP, Albers CJ, Skinner JS, Adams PC, Hall RJ. A prospective study of long term prognosis in young myocardial infarction survivors: the prognostic value of angiography and exercise testing. Heart 2003; 89:843–7.

14. Fournier JA, Cabezon S, Cayuela A, Ballesteros SM, Cortacero JA, Diaz De La Llera LS. Long-term prognosis of patients having acute myocardial infarction when 40 years of age. Am J Car diol 2004;94:989–92.