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PREVALENCE OF ANGIOGRAPHICALLY SIGNIFICANT LEFT MAIN DISEASE AT A TERTIARY CARE HOSPITAL

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Abstract

Background: Coronary artery disease (CAD) is the common cause of mortality and morbidity in the developed world as well as in the developing world. CAD was thought to be the disease of developed world but now its prevalence is increasing in developing countries too even after new advancements in diagnostic and therapeutic procedures due to lifestyle changes and rapid urbanization.

Objective: To determine the prevalence of Angiographically Significant Left Main Disease at a Tertiary Care hospital

Methodology: This retrospective study was carried out at the department of cardiology Sandeman provincial hospital Quetta. The current study was carried out from July 2022 to November 2023 after taking ethical review committee approval. All patient had their full blood count, renal function test, liver function test, serum electrolytes, and virology. Patients with a creatinine of more than 2 milligrams per deciliter (mg/dl) and hemoglobin (Hb) less than 10 mg/dl were dropped from the study. In all cases, coronary angiography was performed and percutaneous coronary intervention (PCI) was performed if the vessel was suitable for intervention, and coronary artery bypass grafting (CABG) if the syntax score exceeded 32. All the data was analyzed by using SPSS version 24.

Results: In the current study, a total of 3000 patient's data was selected for the study, during the study duration from July 2022 to November 2023. The frequency of the severe left main coronary artery disease was 100 (3.33%). Of these 100 patients**, t**he male patients in our study were 85 (85%) while female patients were 15 (15%). The mean age of the patients was 58 (8.16) years with minimum age of 28 and maximum age of 92 years. Out of 100 patients with LMS disease, 10(10%) presented with CCS grade I angina, 71 (71%) presented with CCS grade II angina, 15 (15%) presented with CCS grade III angina, and 4 (4%) presented with CCS grade IV angina.

Conclusion: Our study concludes that the frequency of severe left main coronary artery disease is very high. A sovereign risk factor for high mortality and morbidity is left main disease, which is common. Whether the present-day guidelines are enough for angiography in patients with multiple risk factors and stable angina or need redefinition and will be cost-effective is an unanswered question.

Key words: Prevalence; Angiography; Left Main Disease

Introduction

Coronary artery disease (CAD) is the common cause of mortality and morbidity in the developed world as well as in the developing world (1). CAD was thought to be the disease of developed world but now its prevalence is increasing in developing countries too even after new advancements in diagnostic and therapeutic procedures due to lifestyle changes and rapid urbanization (2). Every 5th middle aged person in Pakistan is having CAD (3).

Left main coronary artery is a major blood supply to the left ventricle. It supplies to more than two thirds of the heart muscle (4). A significant left main stem (LMS) stenosis is labelled when there is a reduction of more than 50% of the vessel diameter. LMS disease is found isolated as well as associated with multivessel CAD. LMS stenosis with multivessel disease is found in about 70% of the patients4,5. LMS disease carries a high risk of death and adverse outcomes (5, 6).

It is reported in literature that approximately 5% of patients who had coronary angiography had LMS disease, while total occlusion of LMS is quite uncommon almost incompatible with life (7). A study conducted by Shabeer et al. reported significant LMS stenosis in 8.7% patients who underwent coronary angiography (8). Another study conducted by Hussain et al. reported LMS stenosis in 10.5% patients (9). Another study by Rauniyar et al. found LMS stenosis in only 3.1% patients undergoing angiography (10).

There was very limited study done on this subject in this region. The aim of the present study is to find out the frequency of LMS stenosis in patients undergoing coronary angiography. We know that LMS stenosis is of high importance, because it supplies blood to the 84% of the myocardium (11). So, this study result will help us to determine the magnitude of LMS stenosis in patients of our hospital.

Materials and methods

This retrospective study was carried out at the department of cardiology Sandeman provincial hospital Quetta. The current study was carried out from July 2022 to November 2023 after taking ethical review committee approval for coronary angiography for the presence of significant left main coronary artery disease**.** Patients with left main coronary artery disease >50 % and patients with coronary angiography performed and interpreted by the qualified and trained interventional cardiologist were included in our study. Left main coronary artery disease more than 50 % was considered significant while < 50 % and those patients with prior history of coronary intervention, valvular heart disease, cardiomyopathies, and renal dysfunction were not included in the research.

After receiving patients' informed permission, brought nil by mouth (NBM) to the catheterization laboratory and in case of patients were diabetic, they received good hydration before and after the procedure good hydration with normal saline and if on metformin, it was held for 48 hours before and 48 hours after the procedure. All patient had their full blood count, renal function test, liver function test, serum electrolytes, and virology. Patients with a creatinine of more than 2 milligrams per deciliter (mg/dl) and hemoglobin (Hb) less than 10 mg/dl were dropped from the study. In all cases, coronary angiography was performed and percutaneous coronary intervention (PCI) was performed if the vessel was suitable for intervention, and coronary artery bypass grafting (CABG) if the syntax score exceeded 32. All the data was analyzed by using SPSS version 24. For some variables like gender, frequency and percentages were determined while for other variables like age means and standard deviation was calculated.

Results

In the current study, a total of 3000 patient's data was selected for the study, during the study duration from July 2022 to November 2023. The frequency of the severe left main coronary artery disease was 100 (3.33%). (Figure 1) Of these 100 patients**, t**he male patients in our study were 85 (85%) while female patients were 15 (15%). (Figure 2)The mean age of the patients was 58 (8.16) years with minimum age of 28 and maximum age of 92 years. Out of these 100 patients, 1 (1%) patient was in the age range of 20-40 years, 42 (42%) patients were in the age range of 41-60 years, 51 (51%) were in the age range of 61-80 years while 6 (6%) patients were in the age range of 81-100

years. (Figure 3) The prevalence of hypertension among 100 patients was 45(45%) and diabetes was 20 (20%). Out of 3000 patients, 750 (25%) presented with Canadian Cardiovascular Society (CCS) grade I angina, 1680 (56%) presented with CCS grade II angina, 330 (11%) presented with CCS grade III angina and 240 (8%) presented with CCS grade IV angina. Out of 100 patients with LMS disease, 10(10%) presented with CCS grade I angina, 71 (71%) presented with CCS grade II angina, 15 (15%) presented with CCS grade III angina, and 4 (4%) presented with CCS grade IV angina. (Table 1)

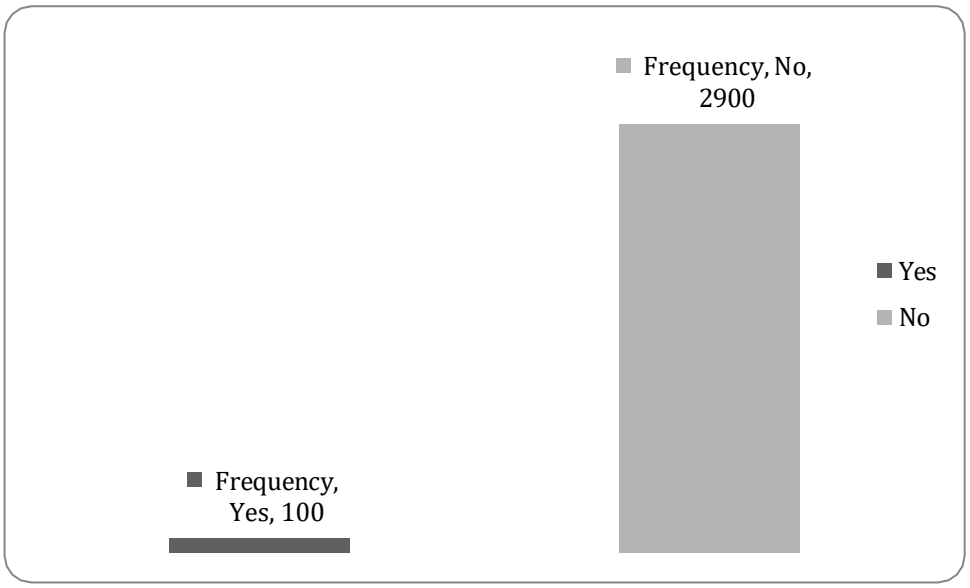

Figure 1: Frequency of severe left main coronary artery disease

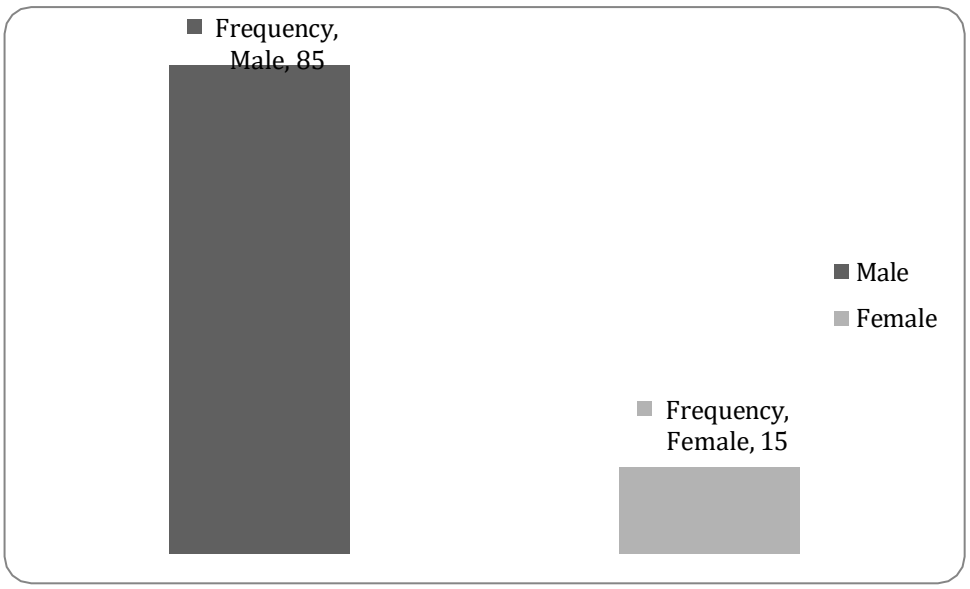

Figure 2: Gender wise distribution of severe left main coronary artery disease

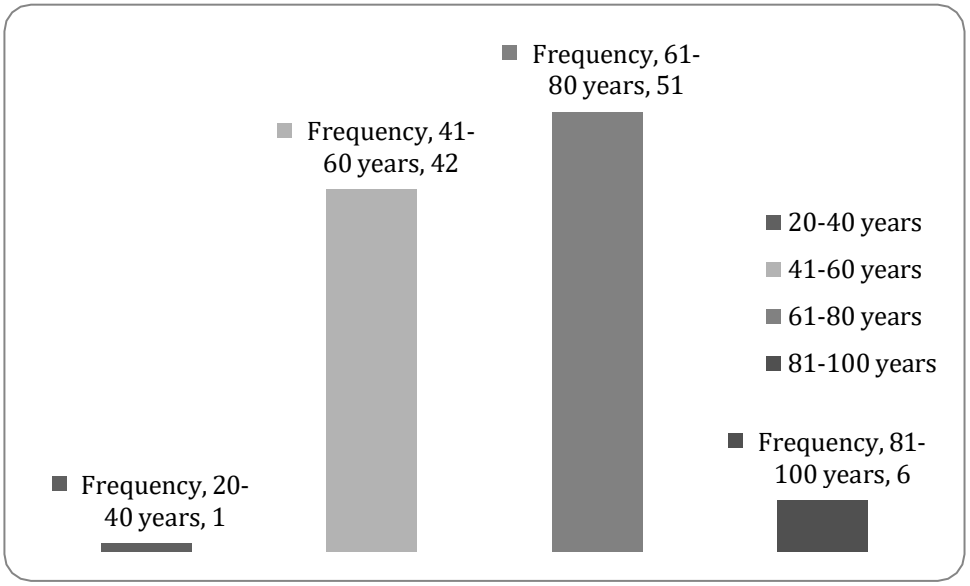

Figure 3: Age wise distribution of severe left main coronary artery disease

Table 1: Demographic profile of the patients with severe left main coronary artery disease

Parameters	Frequency (%)
Diabetes	20 (20%)
Hypertension	45(45%)
Canadian Cardiovascular Society (CCS) grade I	10(10%)
Canadian Cardiovascular Society (CCS) grade II	71 (71%)
Canadian Cardiovascular Society (CCS) grade III	15 (15%)
Canadian Cardiovascular Society (CCS) grade IV	4 (4%)

Discussion

Coronary artery disease (CHD) is the leading cause of death in affluent nations while it is one of the leading causes of disease burden in emerging nations (11). This era has seen a new epidemic of coronary artery disease (12). All stages of diagnosis and treatment of coronary artery disease remain at risk for morbidity and mortality associated with left main coronary artery disease (LMCA) (13). The symptoms of left main stem pathology are often silent,(14) with an unpredictable presentation, which makes diagnosis and treatment more challenging. About 4 to 6 percent of coronary angiography patients have substantial left main coronary artery disease (LMCAD) (angiographic narrowing greater than 50 percent) (15). Approximately 70 percent of the time, it leads to multi-vessel coronary artery disease (16). It is not always easy to identify a significant left main disease. Left main narrowing is routinely understated and overestimated by angiography. Particularly, in diseased segments such as those at the ostial or distal bifurcation, or if there are dense calcium deposits or eccentric disease, this is true (17). A symptomatic coronary artery disease caused by LMCA stenosis is, however, an uncommon cause of medical attention,(18) so patients most of the time do not visit the hospital very often. Angioplasty is available in very few centers in our part of the world as well as most patients are taken to a catheterization lab when they have class III or IV angina, so the prospect of finding a left main disease is reduced even further. About 24% of Sudden Cardiac Deaths are caused by coronary heart diseases and cardiac anomalies together (19). Approximately 40% of sudden deaths are not witnessed (20). The remaining 3-5% of cases are unsolved (21). There is no indication at this time of what contributions coronaries will make to these unexplained and unwitnessed cases. The number of angiographies and percutaneous coronary interventions we performed during our study was 3000. The significant left main disease was found in 100 cases (3.33%). A previous study reported higher prevalence in comparison to our study (22) and this might be due to delay in arriving at the lab. Our study had an average age of 58 years, and we saw coronary heart disease in extremely young people. This is not in accordance with the international data (23). In our study, 85 (85%) of the patients

were males and 15 (15%) were females. Thus, the ratio of females to males was 2.4:1. Accordingly, males are more likely to suffer from coronary diseases than females (24). There were 20 diabetics among 100 patients with left main stem disease. There were 80 non-diabetics. In diabetics, mortality is 2 to 4 times higher despite diabetes being a major risk factor (25). It may be the same custom of late presentation that led to their low figure and in the age group they came to us, they lost a great deal. Among the patients with the left main disease, 45 (45%) were hypertensive. The relationship is very interesting. In comparison with diabetes, hypertension usually presents late (26,27). 8 Out of 100 patients with LMS disease, 10(10%) presented with CCS grade I angina, 71 (71%) presented with CCS grade II angina, 15 (15%) presented with CCS grade III angina, and 4 (4%) presented with CCS grade IV angina. Additionally, the cohorts show that more patients fall into the category of angina for which angiography is not typically advised, and by the time these patients get to the catheterization lab, they are largely lost. According to international data Left main (LM), stenosis is visualized in around 3-5% of all coronary angiograms (28). Our data reflect the occurrence of significant left main coronary artery disease to be 3.3 % while in Pakistan a study by Hussain Ch et al (29) it is 10.5% reason already explained by him that their patient's performance was very late to the cath lab and during this delay they got significant changes. Another study in Pakistan by Shaikh MY et al (30) showed the incidence of left main disease was 16.2% because they included patients even with a minor visible plaque while significant left main coronary artery disease was 4.5% by them. The difference with another study may be due to a difference in hospital strategy (early conservative) where patients with STEMI are thrombolysis, NSTEMI are treated medically, and only small a portion of patients does their angiograms so most of the left main disease cases are missed. The incidence of the left main disease at the time of presentation whether it is the culprit or not warrants early surgical or percutaneous interventions.

Conclusion

Our study concludes that the frequency of severe left main coronary artery disease is very high. A sovereign risk factor for high mortality and morbidity is left main disease, which is common. Whether the present-day guidelines are enough for angiography in patients with multiple risk factors and stable angina or need redefinition and will be cost-effective is an unanswered question.

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