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ORIGINAL ARTICLE

Prevalence of Angiographically Significant Left Main Disease at a Tertiary Care Hospital in Karachi; A Large Cardiac Interventional Study

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ABSTRACT

Objective: To determine the prevalence of significant left main coronary artery disease (Stenosis more than 50%) at NICVD Karachi.

Method: We conducted this observational cross-sectional study retrospectively at NICVD Karachi. Our institution analyzed both emergency and elective coronary angiography data from 5th July 2018 to 5th July 2020 for the existence of significant left main coronary artery disease. A study of coronary artery disease only included patients with significant left main coronary artery disease. Approximately 50% stenosis was considered significant left main coronary artery disease.

Results: A total of 10,828 patients were selected for the study population, out of the total of 8975 males and 1853 female patients who underwent coronary angiography during our mentioned period at NICVD Karachi, 327 patients (3%) showed significant left main coronary artery disease. 277 patients (83%) were male and 50(17%) were female. About 50% of patients were between the ages of 60 -80 years old Minimum age was 32 years and the maximum age was 95 years. Hypertensive were 5197 (48%) and diabetes was 2480 (22.9%). The maximum number of patients in CCS grade II angina is about 239 (73.0%).

Conclusion: High prevalence of disease in the Left major coronary artery is associated with greater mortality and morbidity in our CAD patients.

Keywords: Coronary artery diseases, left main coronary artery, coronary intervention, coronary angiography.

INTRODUCTION

The main cause of death and morbidity in the world is coronary artery disease (CAD).[1] The burden of CAD has been increasing in developing countries despite advances in therapeutic and diagnostic approaches, due to rapid urbanization, smoking, and dietary changes.[2] An estimated 1 out of 5 people in Pakistan's middle age group has an underlying cardiovascular disease.[3] Good number of cases present with significant LMCA disease. We defined significant CAD as narrowing of the left main stem by more than 50%, or of any of the three major epicardial arteries of more than 2mm diameter, by >70%. Patients undergoing coronary arteriography are diagnosed with significant LMCA disease in 4 to 6%.[4] Around 70% of the time, LMCA disease is associated with multi-vessel CAD.[5–7] These patients have a poor prognosis with medical management and benefit from early intervention.[8,9] Although LMCA disease may be suspected from the severity of the symptoms, ST-Segment elevation in AVR on 12 lead electrocardiography(ECG) or stress ECG, early appearance of ischemia on noninvasive testing, or left ventricular cavity dilatation on myocardial perfusion imaging, there is currently no reliable non-invasive method for predicting LMCA disease, presently it is diagnosed by Coronary arteriography.[10] Internationally large number of trials looked for the prevalence of LMCA disease but local data regarding this subject is scanty.

MATERIAL AND METHODS:

After taking ethical review committee approval we retrospectively studied patients who were admitted at NICVD Karachi from 5th July 2018 to 5th July 2020 for coronary angiography for the presence of significant left main coronary artery disease, left main coronary artery disease >50 % were considered significant, coronary angiography performed and interpreted by the qualified and trained interventional cardiologist were included. Left main coronary artery disease more than 50 % were 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. A frequency, mean, and mode analysis of all the collected data was conducted using SPSS version 22.

RESULTS

A total of 10,828 patients were selected for the study population, During the period we have chosen, NICVD Karachi performed coronary angiography on 8975 males and 1853 female patients. Of these, 327 patients (3%) had severe left main coronary artery disease. 277 patients (83%) were male and 50 (17%) were female About 50% of patients were aged 60 -80 years old Minimum age was 32 years and the maximum age was 95 years

There was a mean age of 55.97 years among the patients. The prevalence of hypertension among 5197 patients (48%) and diabetes among 2480 patients (22.9%) was high. In 327 patients with the left main disease, 166 (50.7%) had hypertension and 88 (27%) had diabetes.

Out of 10,828 patients, 2534 (23.4%) presented with Canadian Cardiovascular Society (CCS) grade I angina, 6356 (58.7%) presented with CCS grade II angina, 1375 (12.7%) presented with CCS grade III angina and 379 (3.5%) presented with CCS grade IV angina. Out of 327 patients with LMS disease, 26 (8%) presented with CCS grade I angina, 239 (73.0%) presented with CCS grade II angina, 47 (14.3%) presented with CCS grade III angina, and 16 (4.8%) presented with CCS grade IV angina.

Table 1: Gender Distribution (n=327)

Gender	n	%
Male	277	83%
Female	50	17%

Table 2: Age-wise distribution (n=327)

Age 20-40 years	Age 40-60 years	Age 60-80 years	Age 80-100 years
2	144	166	15
0.6%	44%	50.7%	4.5%

Table 3: Baseline Demographic parameters of Study Population (n=327)

Patients	Total No	Patient with LMS
Study population	10,828	327
Male	8975 (83%)	277 (85%)
Female	1853 (17%)	50 (15%)
Hypertensive Patients	5197 (48%)	166 (50.7%)
Diabetics	2480 (22.9%)	88 (27%)
Canadian Cardiovascular Society (CCS) I	2534 (23.4%)	26 (8%)
Canadian Cardiovascular Society (CCS) II	6356 (58.7%)	239 (73.0%)
Canadian Cardiovascular Society (CCS) I	1375 (12.7%)	47 (14.3%)
Canadian Cardiovascular Society CCS grade I	379 (3.5%)	16 (4.8%)

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 10,828. The significant left main disease was found in 327 cases (3%). According to our data,[22] the reason for the higher rate is that our patients develop significant changes during their delay in arriving at the lab, as compared to the international data. Our study had an average age of 55.97 years, and we saw coronary heart disease in extremely young people. If we started screening early then as in the rest of the world,[23] the figure would be similar to international data. In our study, 277 (85%) of the patients were males and 50 (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 88 diabetics among 327 patients with left main stem disease. There were 96 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, 166 (50.7%) were hypertensive. The relationship is very interesting. In comparison with diabetes, hypertension usually presents late.[26,27] 8% of patients who had significant Left Main CAD were in class I angina, while 73% were in class II angina, 14.3% in class III, and 4.8 % were in CLASS 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 % 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

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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