Original Article

GENDER DIFFERENCE AND ATTRIBUTED RISK FACTORS IN LEFT MAIN STEM DISEASE AND ITS SHORT TERM OUTCOME

Abdul Wajid Khan Faisal[a*], Muhammad Hassan Iqbal[a], Samra Haq[a], Syed Asif Ali[a], Sheeraz Ahmed Khan[a], Waqas Latif[b]

[a]Punjab Institute of Cardiology, Lahore-Pakistan, [b]University of Health Sciences,Lahore-Pakistan
* Corresponding author: drwajidkhan@hotmail.com

Submission Date : 13-09-2020
Acceptance Date: 02-10-2020
Publication Date: 02-11-2020

Author's Contribution

AWKF: Consultant Incharge, Design of the study, Final proof reading. HI: Article writing, SH: Concept, SAA: Patients data collection. SAK: Data Collection, WL: Statistical Analysis

All authors declare no conflict of interest.

This article may be cited as: Faisal AWK, Iqbal MH, Haq S, Ali SA, Khan SA, Latif W. Gender difference and attributed risk factors in Left Main Stem Disease and its short term outcome. J Cardiovasc Dis 2020;16(4):130 - 134

ABSTRACT

BACKGROUND: Coronary artery disease (CAD) is one of the leading causes of death worldwide. Among CAD left main stem (LMS) disease is a major cause of cardiovascular morbidity and mortality in both genders. Atherosclerosis is the major cause of LMS disease. Coronary Artery Bypass Grafting (CABG) is considered as the mainstay of treatment other than evidence based optimal medical therapy. But in the past two decades due to advancements in the patient selection criteria and intravascular imaging, Percutaneous Coronary Intervention (PCI) is one of the effective treatment option.

OBJECTIVE:To determine the frequency of left main stem disease in both genders, in different age groups and to look for major attributed risk factors and outcome of disease on short term follow up.

MATERIAL AND METHODS: It is a descriptive observational study conducted in the department of cardiac catheterization, Punjab Institute of Cardiology, Lahore. Over the period of six month from Jan 1st to 30th June 2020. Patients with left main stem disease having 50% or more stenosis were included in the study. More than 70% stenosis was taken as severe LMS disease. Patients with normal left main stem or having less than 50% stenosis were excluded. Patients were followed up from hospital record and or telephonic communication and assessed for risk factors and outcome i.e, death on short term follow up minimum till the hospital discharge and maximum upto 8 months.

RESULTS: Out of total 5127 patients, prevalence LMS disease was seen in 3.5% (179) patients, male were 149(83.2%), female were 30(16.8%). Mean age of male patients was 57.4 ± 10.7 years(min.26, max 94), female 56.97± 9.6 years (min.33,max 75). Severe left main disease was present in 84(47%) patients i.e. male 74(49.7%) and female 10(33, 3%).While patients with moderate disease were 94(52.5%) i.e. male 74 (49.7%) and female 20 (66.7%). Distal LMS disease was present in 138(77%) patients, males were 114(76.5%) and female 24(80.0%),while ostial LMS was present in only 32(17.8%),male 27(18.1%) and female 5(16.7%). Risk factors and outcome data of only 112/179 patients was available. Hypertension was present in 63(56.25%) i.e. 49(52.7%)male and female 14(73.7%) with p value =0.226.

45 patients were found to be diabetic (40.2%) out of which 37(39.8%) were male and 8 were female (42.1%)] with p value =0.879. A total number of 43(38.4%) were smoker, male 42(45.2%) and only 1female (5.3%) [p value=0.001. Positive family history was present in 24(21.4%)[male21(22.6%) and

female3(15.8%)] (p value=0.760). Hyperlipidemia was present in 13(11.6%), [male12 (13.0%), female 1(5.6%)], p value=0.691. Isolated LMS was present in 2 female patients, all male patients had LMS disease along with other vessel/vessels involvement. 46 males and 10 females underwent CABG. PCI was done in 4 patients male 3 and 1 female. On follow up total number of 13 patients, male 10 and female 3 expired including 8 (14.3%) post operatively 7(15.2%) male and 1(10%) female.

CONCLUSION:LMS disease with other coronary artery involvement is more common in males and isolated LMS is seen in females only. It has very high mortality rates. Hypertension is a major risk factor of LMS disease in both genders, while smoking is a major risk in male patients.

KEY WORDS: Left main stem disease, gender, outcome, Coronary artery bypass grafting.

(J Cardiovasc Dis 2020;16(4):130 - 134)

INTRODUCTION:

Coronary artery disease (CAD) is the most prevalent type of heart disease. It is a leading cause of morbidity and mortality in both genders. Among CAD left main stem (LMS) disease is important because LMS is responsible for 84% of the blood supplied to left ventricle in case of left dominant system.[1] The patients with severe LMS stenosis have a very high risk of major cardiovascular events. Significant stenosis of LMS is diagnosed in 5–7% of patients undergoing coronary angiography.[2] The most common cause of left main artery disease is atherosclerosis, as with other coronary arteries.[3] Left main coronary artery disease may present with increased anginal frequency and carotid disease.[4] LMS disease is considered significant if greater than 50% diameter stenosis, and left main equivalent disease is as severe (> 70%) diameter stenosis of the proximal left anterior descending and proximal left circumflex.[5]

Coronary angiography is the gold standard to diagnose LMS disease. Other modalities include intravascular ultrasound imaging (IVUS), fractional flow reserve (FFR/IFR) and coronary vasodilatory reserve (CVR). Coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI) are the treatment options for LMS disease.[6] CABG is considered superior to PCI historically.[7,8] As interventional techniques have developed, the outcomes of patients with left main disease treated with PCI have improved. PCI is now taken as a good alternative to CABG in unprotected LMS disease.[9] Un-operated LMS disease has three-year mortality rate of 50%.[10] Considering the importance of LMS disease, we planned this study in our population to look for gender difference and risk factors of the disease, intervention done and short term outcome.

MATERIAL AND METHODS:

This study was conducted in cardiac catheterization Department of Punjab Institute of Cardiology, Lahore over a period of six months from 01-01-2020 to 30-06-2020. More than 50% LMS disease was taken as significant. Patients with mild disease or normal left main stem were excluded from the study.

Patients were followed up for intervention done and outcome from medical record or telephonic communication. Minimum follow-up was upto hospital discharge and maximum outcome upto 8 months. Data of 112 patients were collected. Results were compiled in frequency and percentage.[8] Chi square and Fisher's exact test were used to check the significance of outcome variable with age, gender and risk factors. P value of <0.05 was considered significant. Data was analyzed on SPSS-23.

RESULTS:

During the study period 5127 patients with 3960 males (77.2%) and 1167 females (22.8%) underwent coronary angiography. Out of 5127 patients 179 (3.5%) were found to have LMS disease(Table 1). The prevalence of LMS disease in male was 3.7%(149) and in female was 2.6%(30) with p value of 0.051.Out of 179,male to female ratio was 5:1, males were 149(83.2%) and female 30(16.8%). Overall mean age was 53.16 years, [male 53, female 54], while mean age of patients having LMS disease was 54.4 ±10.5. Mean age of male 57.43 ± 10.7 years and in female 56.97± 9.6 years. The minimum and maximum age years was 26 & 94 for males and 33 & 75 in females respectively with p value of 0.826. (Table 2)

Regarding risk profile, data of only 112/179 patients was available (93 males and 19 females). Hypertension was present in 63(56.25%),49(52.7%) male, female14(73.7%)with p value =0 .226. 45 patients were found to be diabetic (40.2%) out of which 37(39.8%) were male and 8 were female (42.1%) with p value =0.879. A total number of 43(38.4%) were smoker, male 42(45.2%) and only 1 female (5.3%), p value = 0.001. Positive family history was present in 24(21.4%) male 21(22.6%) and female 3(15.8%) p value=0.760. Hyperlipidemia was present in 13(11.6%), male12 (13.0%), female 1(5.6%), p value=0.691. (Table 2)

Severe left main disease was present in 84(47%), male 74(49.7%), female 10(33.3%). Moderate disease was found in 94(52.5%), male 74 (49.7%), female 20(66.7%), and clot was present in only 1(0.5%) that was male. (Table 3)

Distal LMS disease was present in 138(77%), male 114(76.5%), female 24(80.0%), while ostial was present in only 32(17.8%), male 27(18.1%), female 5(16.7%). (Table 4)

Isolated LMS disease was seen in 2 patients both were female and no male patient. (Table 5)

Only 56 out of 112 patients (50%), male 46 and female 10 underwent surgery (p value=0.576). PCI was done in 4 patients male 3 and female 1 p value=0.530. On follow up death of 13 patietns was confirmed including 10 males and 3 females.

Table 1: Total population which underwent coronary angiography

	Male	Female	Total	p-value
Total population (n)	3960	1167	5127	
Total population Mean Age (years)	53	54	53.16	
Without LMS disease	3811	1137	4948	0.051
With significant LMS disease	149	30	179	

	n	Prevalence	Mean age	SD	Min age	Max age
Patients with LMS disease	179	3.5%	54.4	10.5	26	90

Table 2: Demographic features of patients with LMS disease

	Male	Female	p-value	Total
LMS disease (n)	149 (83.2%)	30(16.8%)	.051	179
Mean Age (years) with LMS disease	57.43 ± 10.7	56.97 ± 9.6	0.826	54.4 ± 10.5
Minimum Age with LMS disease	26	33		26
Maximum Age with LMS disease	94	75		90
Diabetes Mellitus	37/93 (39.8%)	8/19 (42.1%)	0.879	45
Hypertension	49/93 (52.7%)	14/19 (73.7%)	0.226	63
Family History	21/93 (22.6%)	3/19 (15.8%)	0.760	24
Smoker	42/93 (45.2%)	1/19 (5.3%)	0.001*	43
Hyperlipidemia	12/93 (13.0%)	1/19 (5.3%)	0.691	13
Surgery done	46	10	0.576	56
PCI done	3	1		4
Deaths confirmed	10	3	0.425	13
Expired post OP	7/46(15.2)	1/10(10%)		8

Table 3: Severity of LMS disease

	Male	Female
Severe	74	10
Moderate	74	20
Clot	01	

Table 4: Site of involvement LMS disease

	Total	Male	Female
Distal	138	114	24
Ostial	32	27	05
Ostial, distal	01	01	0
Mid	05	04	01
Diffuse	01	01	0
proximal	02	02	0

Table 5: Isolated LMS disease.

Males	O (out of 149)	P value
Females	2 (out of 30)	0.027

DISCUSSION:

In the well developed part of the world,coronary artery disease (CAD) is the single largest cause of death and is one of the leading causes of disease burden.[11] Increased mortality and morbidity is associated with significant left main stem disease.[12] Left main stem disease is often silent.[13]

Significant (defined as a greater than 50 percent angiographic narrowing) left main coronary artery disease (LMCAD) is found in 4 to 6 percent of all patients who undergo coronary angiography.[14]

In this study out of 5127 patients, LMSD was present in 3.5 % (179) of patients male gender is considered as a coronary risk factor for LMCAD with more than 70% prevalence. The percentage of male patients is higher in some studies.[15] In other studies it is not different between two groups.[16,17] Only in one study, the percentage of male patients is lower (48% vs. 69%) in patients with LMCAD. Although isolated LMCAD is more common in females.[18,19] In our study, there were only two patients with isolated LMS disease and both were females. It is possible that this pattern of disease may not be atherosclerotic and may be as a part of connective tissue disorder but this needs to be studied further.

There were 149 (83.2%) male and 30(16.8%) female with ratio of 5;1. In our society smoking is more common among males so this risk factor might put them into added risk for developing LMS disease.

Most of the studies showed that the main cause of isolated LMCA ostial disease is atherosclerosis especially early atheroma.[20] Thompson et al.[21] reported that patients with isolated coronary ostial stenosis are mostly young to middle-aged women who present with severe symptoms of short duration and a low incidence of coronary risk factors.

In this study, distal LMS disease was more common .In 138(77%) of patients having distal LMS disease and it was more common in female about 24(80%) then male 114(76.6%) .

The mean age for patients with LMCA stenosis was 55-69 years in different studies [16,22]Association between advanced age and the presence of LMCAD is equivocal, while in some studies age is considered a coronary risk factor for LMCAD. [17,23]

Mean age in our study was 54.4 ± 10.5 years. Mean age of male patients was 57.43 ± 10.7 years and of female patients was 56.97± 9.6 years. Patients had coronary involvement at very early age i.e 26 years (minimum age) so if start our screening at early age as in the rest of the world the figure will drop further.

The role of diabetes, hypertension, dyslipidemia and smoking as risk factors for LMCAD are controversial with prevalence of 13.6-61%, 22-72%, 30-82.5% and 13-55%, respectively in various studies. The prevalence of diabetes, hypertension, dyslipidemia and smoking is not different between two groups in some studies. [18,19,22] The prevalence of diabetes[17] dyslipidemia [19,24] smoking[25] is higher in some studies. In one study, the prevalence of hypertension, dyslipidemia, and smoking in patients with LMCAD is less common. [26] The prevalence of family history of CAD is 12-47% in different studies.

In our study hypertension was found in most of the patients. 63(56.2%) patients were hypertensive. Male 49(53.3%) (followed by smoking 42(45.7%) and DM 37(39.8%), in female HTN was present in 14 (73.7%) followed by DM 8 (42.1%) and family history 3 (15.8%). The median survival was 6.6 years in medically treated patients with significant atherosclerotic left main stem disease, and 6.2 years for medically treated patients with severe left main stem equivalent disease in the Coronary Artery Surgery study. [27] On short term follow up total number of 13 patient were expired. In a study by Zalewska-Adamiec et al overall mortality of LMS disease patients was 14.6% and in patients undergoing surgical revascularization had mortality of 11.4 %, the results were comparable with our study, but the follow up was 15 months in the study[28].

CONCLUSION:

LMS disease with other coronary artery involvement is more common in males and isolated LMS is seen in females only. It has very high mortality rates. Hypertension is a major risk factor of LMS disease in both genders, while smoking is a major risk in male patients.

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