

## THE MORTALITY IN LEFT MAIN STEM DISEASE; A SINGLE-CENTRE STUDY FROM PAKISTAN

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### ABSTRACT:

#### INTRODUCTION:

*Left main stem (LMS) disease carries a special consideration as it supplies the major part of myocardium. It carries a very high mortality that is around 15 % in 15 months follow up. Patients managed medically have highest mortality followed by percutaneous intervention (PCI) and then coronary artery bypass grafting (CABG).*

#### AIMS & OBJECTIVE:

*In order to know about the actual fate of our patients having LMS disease, we conducted the study specially for the patients who do not undergo CABG considered as the gold standard management in this population.*

#### MATERIAL & METHODS:

*The study was conducted in angiography department of Punjab Institute of cardiology Lahore. Data was collected of LMS disease patients between Jan 2020 to June 2020. Patients with known coronary artery diseases (previous history of PCI / CABG) were excluded. Patients having LMS stenosis  $\geq 50\%$  was considered significant and were included in the study. Patients were followed up for 12-18 months. Total 112 patients were enrolled. Out of which 23 patients lost followup and 89 patients completed their follow up. Data was analyzed on SPSS 23. Fisher exact test was used for comparison. P value of  $< 0.05$  was considered significant.*

#### RESULTS:

*Out of 112 patients 89 patients completed follow up. Among these 76 (85.4%) were male patients, 13 (14.6%) were females. Fifty seven patients underwent CABG, 03 patients had PCI while 29 patients remained on medical management. All patients had moderate to severe LMS stenosis with or without involvement of other coronary arteries. One patient had clot in LMS. Majority of patients had distal involvement of LMS i.e. 70 patients (78.7%). Hypertension was the most common underlying risk factor 50 patients (56.2%) followed by Diabetes 42.7% and smoking 38.2%. Out of 89 patients, 22(24.7%) patients died during the study period. Mortality was 13(23%) amongst CABG group and 9 (31%) amongst medically treated patients. The PCI group was very small to confer any significance comprising 3 patients only. Result indicated that the higher mortality rate was observed in patients who were managed medically followed by CABG. The p-value of 0.532 indicates that the difference was insignificant.*

#### CONCLUSION:

*The left main stem disease carries a very high mortality. CABG is superior to the medical management as already known but it lacks statistically significance in our population. The mortality remains high whatever the management you opt.*

#### KEY WORDS:

*Mortality, Left main stem, CABG, PCI, medical management.*

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## INTRODUCTION:

Left main stem (LMS) disease carries a special consideration as it supplies the major part of myocardium. It carries a very high mortality that is around 15 % at 15 months follow up. Patients managed medically have highest mortality followed by Percutaneous Intervention (PCI) and

were included in the study. Patients were followed up for upto 18 months. Total 112 patients were enrolled. Out of which 23 patients lost follow-up and 89 patients completed their follow up. Data was analyzed on SPSS 23. Fisher exact test was used for comparison. P value of < 0.05 was considered significant.

### European Society of Cardiology Guidelines (2014)

Recommendation for the type of revascularization in patients with left main stem disease

	CABG		PCI	
	Class	Level of Evidence	Class	Level of Evidence
LMS disease with SYNTAX score $\geq 22$	I	B	I	B
LMS disease with SYNTAX score 23–32	I	B	Ila	B
LMS disease with SYNTAX score $\geq 32$	I	B	III	B

CABG = coronary artery bypass grafting; LMS = left main stem; PCI = percutaneous coronary intervention.

then coronary artery bypass grafting (CABG) (17.4% Vs 15.8% vs 11.4% respectively)<sup>1</sup>. Nearly half of the patients die over a span of 3 years if they are not intervened.<sup>2</sup> In our population mortality of 29% is reported at one year follow up<sup>3</sup>. CABG is considered a class I treatment for significant LMS disease as shown in the table below. In hospital mortality of LMS disease patients is low 2.5%<sup>4</sup>. Recently PCI also emerged as a good alternative with favorable results.<sup>5,6</sup>

The patients who did not undergo CABG either because of co-morbidities or patient's own preference have to be managed medically with worse outcome. In order to know about the actual fate of our patients having LMS disease, we conducted the study specially the patients who do not undergo CABG which is the gold-standard management for these patients.

## MATERIAL AND METHODS:

The study was conducted in angiography department of Punjab Institute of cardiology Lahore. Data was collected of LMS disease patients between Jan 2020 to June 2020. Patients with known coronary artery diseases (previous history of PCI / CABG) were excluded. Patients having LMS stenosis  $\geq 50\%$  was considered significant and

## RESULTS:

Out of 112 patients 89 patients completed follow up, 76 (85.4%) were male and 13 (14.6%) were female. Fifty seven patients underwent CABG, 03 patients had PCI while 29 patients remained on medical management. 22(24.7%) patients died during the study period. All patients had moderate or severe LMS disease with or without involvement of other coronary arteries. One patient had clot in LMS. Majority of patients had distal involvement of LMS i.e. 70 patients (78.7%). Hypertension was the most common underlying risk factor 50 patients (56.2%) followed by Diabetes 42.7% and smoking 38.2% (Table 1).

As far as gender distribution is concerned with regards to management, 7 females and 50 male patients underwent CABG. In medical management group 23 male patients and 6 female patients. In PCI all three patients were male (table 2).

Out of 89 patients, 22(24.7%) patients died during the study period. 13 patients died amongst CABG group (23%). 9 (31%) patients died amongst medically treated patients. The PCI group was very small to confer any significance comprising 3 patients only (Table 3).

Result indicated that the higher mortality rate was

**Table 1: Base Line Characteristic**

Characteristic	Categories	Frequency	Percent (%)
Gender	Male	76	85.4
	Female	13	14.6
Management	CABG	57	64.0
	PCI	03	03.4
	Medical management	29	32.6
Mortality	Yes	22	24.7
	No	67	75.3
LMS	Moderate	44	49.4
	Tight	44	49.4
	Clot	1	1.1
Site	Mid	3	3.4
	Distal	70	78.7
	Diffuse	1	1.1
	Ostial	13	14.6
	Proximal	1	1.1
	ostial, distal	1	1.1
Risk Factors	Diabetics	38	42.7
	Hypertensive	50	56.2
	Family History	23	25.8
	Smoking	34	38.2
	CHL	13	14.6

**Table 2: Gender distribution with respect to management.**

Management	Gender		p-value
	Male	Female	
CABG	50	7	0.596
	87.7%	12.3%	
PCI	3	0	
	100.0%	0.0%	
Medical Management	23	6	
	79.3%	20.7%	
Total	76	13	
	85.4%	14.6%	

observed in patients who were managed medically followed by CABG. The p-value of 0.532 indicates that the difference was insignificant (Table 4).

**Table 3: Mortality in Left Main Stem disease patients.**

Total patients (n)	89
Total Death	22 (24.7%)
Total CABG done (n)	57
PCI done (n)	03
Medical Management	29
Death in CABG group	13 (23%)
Death in Medical Management	9 (31%)
Mortality in PCI	0%

**Table 4: Association of mortality with different management in LMS disease.**

Management	Mortality		p-value
	Yes	No	
CABG	13 (22.8%)	44(77.2%)	0.523
PCI	0 (0.0%)	3 (100.0%)	
Medical Management	9 (31.0%)	20 (69.0%)	
Total	22 (24.7%)	67 (75.3%)	

**DISCUSSION:**

Left main stem disease is quite crucial as it supplies major part of myocardium. Left main involvement denotes more severe disease as it has definite association with carotid artery disease<sup>8</sup>. So the patients have more mortality as compared to the patients who have other coronary arteries involved. Hypertension is a major risk factor of LMS disease<sup>9</sup> as is seen in the study. Other risk factors like diabetes, smoking, family history of premature coronary artery disease and dyslipidemia are less prevalent.

The guidelines recommend both PCI as well as CABG for the treatment of LM stenosis in patients with coronary artery disease.<sup>10</sup> CABG is so far the gold standard for management of these patients. Recently robotic cardiac surgery has shows excellent results, Su Cs et al.<sup>11</sup> reported mortality rate of 1.4% (robotic) Vs 10.2% (conventional) in left main surgical revascularization.

However some patients do not undergo CABG due to personal preference or co-morbidities. These patients have to be managed medically. In our patients only three were managed by PCI because all patients had involvement of other coronary arteries along with LMS except one patient who had isolated left main stem disease, so PCI was not feasible in these patients.

Left main stem involvement is actually a bad news. Whatever the management strategy planned these patients have very high mortality. In our study overall mortality was 22 (24.7%), 13 (22.8%) in surgically managed and 9 (31.0%) in medically managed patients. High prevalence of adverse cardiovascular events was seen in patients with left main coronary artery disease, who had diabetes, followed by smokers, male gender and elderly patients. These four factors have negative prognostic effect in these patients. Patients with such high risk features have high risk for ischemia related complications over the course of follow up even after therapeutic intervention. Therefore achieving secondary prevention is an essential element in this group even after therapeutic intervention has been accomplished.<sup>12,13</sup>

Recently a meta analysis by Ahmad et al showed comparable long-term mortality after PCI with DES and CABG in patients with LMCAD. There was also no significant differences in cardiac death, stroke, or MI between PCI and CABG. Unplanned revascularization procedures were more common in PCI.<sup>14</sup> Stent thrombosis is a major drawback after PCI which is reported to be around 2%.<sup>15</sup> Recent advances in PCI shows superiority in short term but over a period of 3-5 years due to lesser adverse events CABG has similar results to PCI.<sup>16</sup> Medically

managed patients have survival rate of nearly 50% over a period of 3 years as shown by Predescu et al<sup>2</sup>. Our study also showed a high mortality rate of 31% over a period of 12 to 18 months. Ten years death rate of CABG vs PCI is (21.6% vs 30.2%)<sup>17</sup> as shown by Ramadan et al. The nutshell of discussion is that mortality of left main stem disease is very high whatever management you use but the CABG is superior to all.

#### CONCLUSION:

The left main stem disease carries a very high mortality. CABG is superior to the medical management as already known but it lacks statistically significance in our population. The mortality remains high whatever the management you opt. Hypertension is the main risk factor for this deadly disease if we can control this in our population, we might save our population from this death tolling condition.

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