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Surgical Outcomes in Left Main Coronary Artery Disease in a Tertiary Care Centre - A Retrospective Study

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Abstract: ***Introduction:*** Left main coronary artery (LMCA) disease is an important risk factor for increased mortality and morbidity at all stages of diagnosis and treatment of coronary artery disease. It is often silent, with an unpredictable presentation and has diagnostic and management challenges. Myocardial protection in CABG with cardioplegic heart arrest is effective in improving surgical outcomes. CABG is recommended over PCI for any patient with stable angina, unstable angina, or in asymptomatic disease and significant left main or left main equivalent coronary stenosis. The left main coronary artery (LMCA) is still one of the most challenging areas of disease for both cardiovascular surgeons and interventional cardiologists. Aim of the study: To study the clinical presentation, clinical profile, risk factors and surgical outcomes associated with Left main coronary artery disease. ***Materials and Methods***: This was a retrospective observational study. The study subjects were all the patients with cardioplegic arrested heart who underwent Coronary Artery Bypass Graft (CABG) over a three-year period. All such patients were assessed based on age, gender, presentation, comorbidities, ejection fractions, various vascular factors, post operative complications, mortality and morbidity. The information was obtained from case records, discharge records and death summaries. Results: A total of 100 cases were studied with 80 males and 20 females with age ranging from 21 to 70 years. A significant association was noted between age, gender, weight, mode of presentation, comorbidities, preoperative ejection fraction, LMCA stenosis, number of vessels involved; and mortality. ***Conclusion***: LMCA disease is an independent predictor of increased morbidity and mortality rates among patients with coronary artery disease. CABG is the traditional gold standard therapy for revascularization of LMCA disease, offering greater survival benefits. Understanding factors that predispose patients with LMCA disease to perioperative mortality is essential to formulate strategies to improve patient outcomes.

Keywords: LMCA, Risk factors for LMCA disease, Surgical outcome in LMCA disease, Ejection fraction, CABG

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INTRODUCTION

Left main coronary artery (LMCA) disease is an important subset of coronary artery disease and is an important risk factor for increased mortality and morbidity at all stages of diagnosis and treatment of coronary artery disease [1]. It is often silent, with an unpredictable presentation and presents diagnostic and management challenges. Myocardial protection in CABG with cardioplegic heart arrest is effective in improving surgical outcomes. Low cardiac output states are significantly more common in post coronary artery bypass graft (post-CABG) patients with significant LMCA [2]. CABG is recommended over percutaneous coronary intervention (PCI) for any patient with stable angina, unstable angina, or in asymptomatic disease and significant left main or left main equivalent coronary stenosis. Although percutaneous angioplasty has been performed for unprotected left main coronary artery stenosis [3] surgery is the preferred treatment and improves the likelihood of survival, as shown by the Coronary Artery Surgery Study (CASS) [4] and the Veterans

Administration Cooperative Study [5]. CABG is also recommended for patients with poor left ventricular function, acute myocardial infarction (MI), or life-threatening.

ventricular arrhythmias. The European system for cardiac operative risk evaluation score (EuroScore) is of value in identifying patients at high risk for adverse immediate postoperative outcomes after adult cardiac surgery. The left main coronary artery (LMCA) is still one of the most challenging areas of disease for both cardiovascular surgeons and interventional cardiologists.

AIM OF THE STUDY

To study the clinical presentation, clinical profile, risk factors and surgical outcomes associated with left main coronary artery disease.

MATERIALS AND METHODS

Institutional ethical committee approval was taken with reference number: PBAC: 2152/2021. This was a retrospective observational study conducted at Nizams Institute of Medical Sciences, Hyderabad, in the Department of Cardiothoracic Surgery from 2018 to 2020. The study subjects were all the patients with cardioplegic arrested heart who underwent Coronary Artery Bypass Graft (CABG) during this period.

All such patients were assessed based on age, gender, presentation, duration of disease, post operative complications and their management. The information was obtained from case records, discharge records and death summaries. A total of hundred cases were studied.

Inclusion criteria:

1. Age ≥20 years.
2. Who have significant left main coronary artery disease with >50% stenosis.
3. Patients who underwent CABG with cardioplegic arrested heart.

Exclusion criteria:

1. Patients below 20 years of age.
2. Patients with associated other coronary anomalies like aneurysm, abnormal origin, arteritis, aortic dissection.
3. Preoperative renal dysfunction, hepatic dysfunction, neurological stroke.
4. Undergoing concomitant surgeries like valve replacement, valve repair, aneurysm repair, etc.

Data analysis:

All data from case records such as presenting complaints, diagnosis, surgical procedure performed, OT records, and follow up record was collected and entered in excel spread sheet. Continuous data is presented as Mean and Standard Deviation, and categorical data as percentages.

Observations and Results

A total of hundred cases were studied with male to female ratio, M:F of 4:1.

Age and gender distribution: In the present study, there was one (1%) case each in 21 to 30 and 31 to 40 years age group. There were 24%, 54% and 20% cases in 41 to 50, 51 to 60 and 61 to 70 years age group respectively.
It was observed that there were 80 (80%) males and 20 (20%) female cases.

Weight distribution: Of the 100 cases, 40 (40%) cases had body weight in the range of 61-70 kg and 25 (25%) cases in the range of 71-80 kg, 23 (23%) cases had body weight in the range of 51-60 kg, 9 (9%) cases had weight in the range of 40-50 kg, 3 (3%) cases had weight in the range of 81-90 kg and 1(1%) case had weight in the range of 91-100 kg.

Mode of presentation: Unstable angina was the presentation in 70 (70%) cases, stable angina in 20 (20%) cases and 10 (10%) cases presented as myocardial infarction.

Comorbidities: Diabetes mellitus was present in 40 (40%) cases, hypertension was seen in 40 (40%) cases, hypothyroidism was seen in 03 (03%) cases; 02 (02%) cases had history of cerebrovascular accident (CVA) and 01 (1%) cases had pre-operative congestive cardiac failure (CCF).

Risk factors: Risk factors were noted in 48 cases, of which 18 cases had history of smoking and 30 cases had history of alcohol consumption.

Pre-operative ejection fraction (EF): Out of 100 cases, 39 (39%) cases had pre-operative EF in the range of 51-60%, 22 (22%) cases had in the range of 41- 50%, 18 (18%) cases had pre op EF in the range of 61-70%, 16 (16%) cases had in the range of 31-40% and 5 (5%) cases had in the range of 20-30%.

Left main coronary artery (LMCA) stenosis: Of the 100 cases, 66 (66%) cases had LMCA stenosis in the range of 50-60%, 10 (10%) cases in the range of 61-70%, 08 (8%) cases in the range of 71-80% and 16 (16%) cases in the range of 81-90%.

Number of involved vessels: In the present study, 85 (85%) cases had LMCA+TVD, 12 (12%) cases had LMCA+DVD, 3 (3%) cases had LMCA disease.

Condition of target vessels: The condition of the target vessels was good in 10 (10%) cases and diseased in 90 (90%) cases.

Number of grafts: Of the 100 cases, single vessel was grafted in 5 (5%) cases, two grafts in 13 (13%) cases, three grafts in 42 (42%) cases, four grafts in 28 (28%) cases, five grafts in 10 (10%) cases and six grafts in 2 (2%) cases.

Vein quality: Vein quality was average in 86 (86%) cases and good in 14 (14%) cases.
Left internal mammary artery (LIMA) quality: Of the 100 cases, LIMA quality was good in 20 (20%) cases, average in 68 (68%) cases and poor in 12 (12%) cases.

Requirement of Intra-aortic balloon pump (IABP): Of the 100 cases, IABP was required in 10 (10%). Of these, pre op IABP insertion was required in 1 case (1%), intra-op IABP insertion was required in 8 cases (8%) and post op IABP insertion was required in 1 case (1%).
Mode of surgery: Of the 100 cases, 10 cases underwent emergency CABG and 90 cases underwent elective CABG.

The European system for cardiac operative risk evaluation score (EUROSCORE): In the present study, out of 100 cases, EURO score was 5-9 in 76 cases (76%), 10 -14 in 19 cases (19%) and ≥15 in 05 cases (05%).

Mortality and morbidity: Of the 100 cases, mortality occurred in 08 cases (08%). Morbidity was noted in 20 cases (20%). Tracheostomy with prolonged mechanical ventilation was required in 03 cases (03%), femoral artery embolectomy was required in 02 cases (02%), Deep Sternal Wound Infection (DSWI) was noted in 03 cases (03%), CVA with hemiplegia was noted in 03 cases (03%), surgical site infection (SSI) was noted in 07 cases (07%) and acute kidney injury (AKI) was noted in 02 cases (02%)

Table 1 Analysis of various factors in association with mortality and morbidity

Age in years	Age	No. of cases N=100	Mortality N=8	Significance	Morbidity N=20	Significance
	21-30	1		P=0.001	1	P=0.029
	31-40	1			0	
	41-50	24			4	
	51-60	54	1		5	
	61-70	20	7		10	
Gender						
	Male	80	4	P=0.049	10	P=0.053
	Female	20	4		10	
Weight in Kg						
	41-50	2	0		0	
	51-60	18	2	P=0.94	3	P=0.04
	61-70	30	3		3	
	71-80	32	2		4	

	81-90	18	1		10	
Mode of presentation						
	Unstable angina	70	3	P=0.005	10	P=0.049
	Stable angina	20	1		4	
	Myocardial infarction	10	4		6	
Comorbidity						
	Diabetes mellitus	40	3	P=0.006	12	P=0.38
	Hypertension	40	2		5	
	Hypothyroidism	3	0		1	
	Cerebrovascular accident	2	2		1	
	Preoperative congestive cardiac failure	1	1		1	
Risk factors						
	Smoking	18	6	P=0.047	13	P=0.038
	Alcohol consumption	30	2		7	
Pre-op ejection fraction						
	20-30	5	2	P=0.045		P=0.039
	31-40	16	3			
	41-50	39	3			
	51-60	22	0			
	61-70	18	0			

Significant association was noted between age and mortality and morbidity with p=0.001 and p=0.029 respectively.
Significant association was noted between gender and mortality with p=0.049, whereas p value was not significant for gender and morbidity correlation.
No significant association was noted between body weight and mortality with p=0.94 but for morbidity the p value was significant at p=0.04.
Significant association was noted between mode of presentation and mortality with p=0.005 and also for morbidity with p=0.049.
Significant association was noted between presence of co morbidities and mortality with p=0.006 but it was not significant for morbidity as p value was at 0.03.
Significant association was noted for smoking and alcohol consumption with mortality and morbidity with p value of 0.047 and 0.038 respectively.
Significant association was noted between preoperative ejection fraction with mortality and post-operative morbidity with p value of 0.045 and 0.039 respectively.

Table 2 Analysis of vascular factors in association with mortality and morbidity

LMCA stenosis (%)		No. of cases N=100	Mortality N=8	Significance	Morbidity N=20	Significance
	50-60	66	1		7	
	61-70	10	1		4	
	71-80	8	2	P=0.015	5	P=0.034
	81-90	16	4		4	
Number of involved vessels						
	LMCA+TVD	85	4	P=0.007	13	P=0.09

	LMCA+DVD	12	2		6	
	LMCA	3	2		1	
Condition of vessel						
	Good	10	2	P=0.19	3	P=0.5
	Plaquey, diseased	90	6		17	
Number of graft vessels						
	One	5	0	P=0.017	0	P=0.846
	Two	13	1		2	
	Three	42	2		10	
	Four	28	1		5	
	Five	10	2		2	
	Six	2	2		1	
Vein quality						
	Good	14	2	P=0.39	5	P=0.21
	Average	86	6		15	
LIMA quality						
	Good	20	1	P=0.13		P=0.30
	Average	68	4			
	Poor	12	3			
IABP insertion						
	Pre-op	1	0	P=0.55	1	P=0.65
	Intra-op	8	2		3	
	Post-op	1	1		0	

LMCA: left main coronary artery, DVD: double vessel disease, TVD: triple vessel disease, LIMA: left internal mammary artery, IABP: intra-aortic balloon pump

Significant association was noted between LMCA stenosis with mortality and morbidity with p value at 0.015 and 0.034 respectively.

Significant association was noted between number of vessels involved and mortality with p value at 0.007, whereas there was no significant association with postoperative morbidity with p value at 0.09.

No significant association was noted between condition of target vessels and mortality as p value was 0.19 and also it was insignificant for morbidity with p value of 0.5.

Significant association was noted between number of grafted vessels and mortality with p value of 0.017, whereas it was insignificant for postoperative morbidity with p value at 0.846.

No significant association was noted between quality of harvested vein with mortality and morbidity with p values at 0.39 and 0.21 respectively.

No significant association was noted between quality of LIMA with mortality and morbidity with p values at 0.13 and 0.30 respectively.

No significant association was noted between requirement of IABP with mortality and morbidity with p values at 0.55 and 0.65 respectively.

Table 3 Analysis of mode of surgery and EUROSCORE in association with mortality and morbidity

		No. of cases N=100	Mortality N=8	Significance	Morbidity N=20	Significance
Mode of surgery						
	Emergency	10	4	P=0.001	6	P=0.016
	Elective	90	4		14	
EUROSCORE						
	1-4	0		P=0.0003	0	P=0.19

	5-9	0			13	
	10-14	7			7	
	>15	1			0	

EUROSCORE: The European system for cardiac operative risk evaluation score

Significant association was noted between the mode of surgery with mortality and morbidity with p value of 0.001 and 0.016 respectively.

Significant association was noted between EUROSCORE and mortality with p value of 0.00003, whereas it was insignificant for morbidity with p value of 0.19.

DISCUSSION

The present study was undertaken to analyse and assess various risk factors and their association to surgical outcomes in LMCA disease. LMCA disease is an independent indicator of increased morbidity and mortality rates among patients with coronary artery disease [6]. LMCA disease is associated with multivessel coronary artery disease in 70% of cases. Significant LMCA disease is present in about 30% of patients undergoing coronary artery bypass grafting (CABG) and its incidence is on the rise with the increasing prevalence of cardiovascular risk factors, an aging population and as a treatment for chronic diseases becomes more sophisticated [7].

CABG is the traditional gold standard therapy for revascularization of LMCA disease, offering greater survival benefits [7]. Factors contributing to surgical outcomes are age, mode of presentation, poor condition of target vessels, poor quality of vein grafts and LIMA, poor pre-operative EF. This study is of 100 patients with LMCA disease who underwent CABG over a period of three years. All cases were operated on cardiopulmonary bypass, under a cardioplegic arrested heart. LIMA was harvested as a pedicled graft in all cases. Great saphenous vein was harvested by open technique. In cases where LIMA quality was poor, CABG was done using only vein graft. Quality of vein was assessed by eyeballing, number of branches, and caliber (thin vein/ good caliber) of the vein. The following discussion is based mainly on clinical presentation, risk factors, and their association with surgical outcomes i.e., whether mortality or morbidity was analysed using chi-square test. The outcome in the presence or absence of each risk factor in the current study was compared with contemporary studies analysing the association of respective risk factors with surgical outcome.

Age: In the present study, the mean age at presentation was 57.57 ± 7.82 years. Of 100 cases, mortality was noted in 08 cases (8%), all of which were of the age >50 years. A significant association was noted between age at presentation and mortality with higher age associated with increased risk of mortality with p=0.001. Similar findings were noted by Murtaza and Baig *et al* in which elderly patients had higher mortality (P<0.001) and increased length of ventilation and hospital stay (P=0.056, P=0.032) [8].

In a study by Nicolini *et al***,** the percentage of patients < 60 years of age was 18.9%. Patients < 60 years of age reported significantly lower overall mortality (p<0.0001) and cardiac-related mortality (p<0.0001) [9].

Morbidity was noted in 20 cases (20%) postoperatively. A significant association was noted between morbidity and age at presentation with age >50 years associated with increased risk of postoperative complications with p=0.029. Similar findings were noted by Nicolini *et al* in which patients < 60 who underwent CABG had a lower risk of adverse outcomes than older patients with decreased incidence of acute myocardial infarction (p=0.01) and stroke rates (p<0.0001) [9].

Gender: In the present study, males had an overall high incidence of LMCA compared to females. Of 100 cases, 80 cases were male and 20 cases were females. A significant association was noted between gender and mortality. Similar findings were noted by Takagi *et al* in which women had greater comorbidity and more complex lesions, resulting in a higher incidence of cardiac death (p=0.005) [10].

Weight: In the current study, the average weight of the subjects was 70.47 ± 10.20 kg with 8% mortality. No significant association was noted between weight and mortality with p=0.94. Similar findings were noted in a study conducted by Reeves *et al* in which overweight, obese, and severely obese patients were not at higher risk of adverse outcomes than normal-weight patients and were less likely than normal-weight patients to require transfusion (ORs from 0.42 to 0.86) and concluded that obesity does not affect the risk of perioperative death and other adverse outcomes compared to normal weight [11].

Of 20 cases in the current study with postoperative morbidity, the majority of the cases had weight >70kg. A significant association was noted between body weight and the development of postoperative complications with p=0.04. Similar

findings were noted in a study done by Tolphin *et al* in which obese patients had higher rates of postoperative myocardial infarction (5.9% vs 3.4%) and low cardiac output syndrome (24.5 vs 18.6%) and increased hospital stay than nonobese patients [12].

Mode of presentation: In the present study, the most common mode of presentation was unstable angina. A significant association was noted between mode of presentation and mortality with p=0.005. Similar findings were noted by Murtaza and Baig *et al* in which unstable angina was the most common mode of presentation and mode of presentation had a significant association with mortality(p<0.001) [8].

Morbidity was noted in 20 cases (20%) postoperatively. A significant association was noted between mode of presentation and morbidity with p=0.49. Similar findings were noted in a study done by Bin Mahmood *et al* [13] in which, in hospital, postoperative outcomes revealed higher rates of prolonged ventilation (11.7% vs 4.8%; P < 0.001), pneumonia (6.6% vs 3.9%; P = 0.016) and stay in the intensive care unit (3.7 ± 4.0 vs 3.2 ± 2.7 days; P = 0.014) in patients with acute coronary syndrome.

Comorbidities: In the present study, 46 cases (46%) had comorbidities. Of 46 cases, the majority of the cases had both DM & HTN. A significant association was noted between the presence of comorbidities and the occurrence of mortality with p=0.006. Similar findings were noted by Clough RA *et al* [14] in which following comorbid conditions were noted to be significant predictors of in-hospital mortality: diabetes (OR,1.19;95% CI, 1.01- 1.40; P=.03), vascular disease (OR, 1.67; 95% CI, 1.41-1.97; P<.001),chronic obstructive pulmonary disease (OR, 1.57; 95% CI, 1.29-1.91; P <0.01), peptic ulcer (OR, 1.34; 95% CI, 1.05-1.71; P=.02), and dialysis-dependent renal failure (OR, 3.68; 95% CI, 2.65-5.13; P<.001).

Morbidity was noted in 20 cases postoperatively. No significant association was noted between the presence of comorbidities and occurrence of postoperative complications with p=0.38. Similar findings were noted by Pacaric *et al* [15] in which no significant association was noted between the presence of comorbidities and the development of postoperative complications. In a study done by Ferraris *et al* [16] multivariate risk factors for morbidity emphasized that measures of small body stature (as measured by blood volume) and chronic illness or anemia and indices of chronic illness are multivariate predictors of morbidity. The authors concluded that the risk factors for morbidity are different from those for mortality, with parameters of chronic illness being more commonly associated with prolonged hospital stay and serious postoperative complications.

Risk factors of smoking and alcohol: In the present study, 18% cases had a history of smoking and 30% had a history of alcohol consumption. Mortality was noted in 8 cases, of which 06 cases had a history of smoking and 02 cases had a history of alcohol consumption. A significant association was noted between risk factors and mortality with p=0.047. Postoperative complications were noted in 20 cases, of which 13 cases had a history of smoking and 07 cases had a history of alcohol consumption. A significant association was noted between risk factors and postoperative morbidity with p=0.038. A significant association of smoking and alcohol consumption on mortality and postoperative complications was noted. Postoperative cessation of smoking and lifestyle modifications reduce morbidity.

A study conducted by Rosoff DB *et al* [17] in evaluating the relationship between alcohol consumption, tobacco use, and cardiovascular disease showed that alcohol consumption was also associated with increased myocardial infarction (MI) and coronary heart disease (CHD) risks for MI. Conversely, alcohol maintained an association with coronary atherosclerosis. In comparison, after adjusting for alcohol consumption, smoking retained its association with several CVD outcomes including MI CHD heart failure and large artery atherosclerosis.

Preoperative ejection fraction: The mean preoperative EF was noted to be 44.97±11.51%. The majority of the cases i.e., 39 cases (39%) had mild LV dysfunction i.e., EF in the range of 40-49% followed by 40 cases with good LV function with EF in the range of 50-70%. Mortality occurred in 8 cases, of which 2 cases had EF < 30 % i.e., severe LV dysfunction and 3 cases had EF in the range of 30-39 % i.e., moderate LV dysfunction. A significant association was noted between preoperative EF and mortality with p=0.045. Similar findings were noted in a study done by Soliman Hamad [18] *et al*, in which when long term survival and expected survival were compared, a relatively poorer outcome was noted in all subjects with an ejection fraction of < 50%. In subjects with a preoperative ejection fraction of > 50%, long-term survival exceeded expected survival.

Number of involved vessels: Of 100 cases in the present study, the majority of the cases i.e., 85 cases (85%) had LMCA + TVD followed by 12 cases (12%) with LMCA + DVD. Of 8 cases in which mortality was noted, 4 cases had LMCA + TVD, 2 cases had LMCA + DVD and 02 cases had LMCA. A significant association was noted between the number of involved vessels with p=0.007. Similar findings were noted in a study done by Lopes NH *et al* [19] in which three-vessel disease was associated with a worse prognosis compared to single- or two-vessel disease in patients with stable coronary disease and preserved ventricular function at 5- year follow-up.

Condition of target vessels: Of 100 cases, the majority of the cases i.e., 90 cases (90%) had diseased and plaquey vessels. Most of the cases had target vessels in the range of 1.25mm to 1.5 mm indicating a small target vessel size. 10 cases (10%) had good target vessels. No significant association was noted between the condition of target vessels and mortality with p=0.19. In a study done by Desai ND [20] *et al*, among all grafts, diabetes and small target vessel diameter were associated with an increased risk of graft occlusion, and grafting to a target vessel with more severe proximal stenosis was associated with a decreased risk of graft occlusion. Small target vessel size adversely affected graft patency and grafting to a target vessel with more severe proximal stenosis improved graft patency.

Number of grafts: Of 100 cases, the majority of the cases i.e., 42 cases (42%) had 3 vessels grafted of which mortality occurred in 02 cases, 4 vessels were grafted in 28 cases (28%) of which mortality occurred in 01 cases, five vessels were grafted in 10 cases (10%) of which mortality occurred in 02 cases, six vessels were grafted in 02 cases (02%) of which mortality occurred in 2 cases and two vessels were grafted in 13 cases (13%) of which mortality occurred in 01 case. A significant association was noted between the number of grafts with mortality with p=0.017. Of 20 cases in which morbidity was noted, 02 cases had two-vessel grafts, 10 cases had three grafts, 05 cases had four grafts, 02 cases had five grafts and 01
case had six grafts. No significant association was noted between the number of grafts and the occurrence of postoperative complications with p=0.846. Similar findings were noted by Gimenes C *et al* [21] in which no significant association was seen between the number of grafts and morbidity.

Vein quality: Of 100 cases, vein quality was good in 14 cases (14%) and average in 86 cases
(86%). Of 8 cases in which mortality was noted, 02 cases had good quality vein and 06 cases had average vein quality. No significant association was noted between the quality of vein and mortality with p=0.39. Similar findings were noted in a study conducted by Brennan JM *et al* [22] in which the relation of high quality and low-quality veins to 12 post-op outcomes was examined. Women were more likely than men to have low SVG quality (22% vs. 14%, p<0.001), but the effect of low SVG quality on outcomes was similar in women and men.

LIMA quality: No significant association was noted between LIMA quality and
mortality with p=0.13. Similar findings were noted in a study conducted by Karthik *et al* [23]. There were no significant differences in risk-adjusted, in-hospital mortality or morbidity whether LIMA was used or not.

Requirement of IABP: Of 100 cases in the present study, 10 cases (10%) required IABP insertion. No significant association was noted between IABP insertion and occurrence of
mortality with p=0.55. Similar findings were noted in a study conducted by Okonta KE *et al* [24] in which, out of the 107 patients who had IABP insertion, 59 (55.1%) patients had IABP inserted preoperatively and 48(44.9%) postoperatively. Mortality was 15.0% for the reoperative insertion group versus 29.0% for the postoperative group respectively (p=0.005).

Mode of surgery: In the present study, 10% underwent emergency surgery who had unstable hemodynamics and MI, 90% underwent elective surgery. Of 8 cases in which mortality was noted, 04 cases underwent emergency surgery and 04 cases under elective surgery. Significant association was noted between mode of surgery and mortality with p=0.001.
Of 20 cases in which morbidity was noted, 06 cases underwent emergency surgery and 14 cases underwent elective surgery. Significant association was noted between mode of surgery and morbidity with p=0.016.

EUROSCORE: In the current a significant association was noted between higher Euroscores and mortality with p=0.00003. In a study done by Barros de Oliveira MP *et al* [25] the applicability of Euroscore in patients undergoing coronary artery bypass graft (CABG) surgery was evaluated. The score had a sensitivity of 88.4%, specificity of 79.3%, a positive predictive value of 40.7%, a negative predictive value of 97.7%, and 80.6% concordance. The accuracy measured by the area under the ROC curve was 0.892 (95% CI 0.862-0.922). The Euroscore proved to be a simple and objective index, revealing a satisfactory discriminator of postoperative evolution in patients undergoing CABG surgery.

Mortality: Mortality was noted to be 8% in the current study. Similar findings of 6.9% were noted by Lehmkul *et al* [26]. Higher mortality noted in the current study was due to increased age at presentation and increased number of patients presenting with higher EUROSCORE and with lower pre-op EF. The commonest cause of mortality was low cardiac output AKI requiring dialysis, followed by sepsis.

Morbidity: Postoperative complications were noted in 20% of cases. Similar findings were noted in a study done by Arif *et al* [27] where CVA was noted in 3.4% of the cases and DSWI was seen in 0.3% of the cases.

CONCLUSION

LMCA disease is an independent predictor of increased morbidity and mortality rates among patients with coronary artery disease. CABG is the traditional gold standard therapy for revascularization of LMCA disease, offering greater survival benefits. Understanding factors that predispose patients with LMCA disease to perioperative mortality is essential to formulate strategies to improve patient outcomes. A significant association was noted between gender and mortality with a higher rate of mortality observed in females.

presenting with LMCA disease. Unstable angina was the most common mode of presentation and was noted to have a significant association with mortality and morbidity. A significant association was noted between cigarette smoking and alcohol consumption with mortality and morbidity. Risk factors significantly associated with mortality were higher age at presentation, presence of comorbidities, lower preoperative EF, number of grafts, the requirement of IABP, higher EUROSCORE at presentation. The commonest cause of mortality was low cardiac output followed by AKI followed by sepsis. Risk factors significantly associated with morbidity were age, weight, and mode of presentation. Vein quality was average in most of the cases with no significant association with morbidity or mortality. The greater the number of risk factors, the higher is the incidence of morbidity and mortality following CABG in patients with LMCA disease.

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