

# LEFT MAIN STEM CORONARY ARTERY STENOSIS: TWO-YEAR FOLLOWUP IN 30 PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING (CABG)

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## SUMMARY

**Objective:** To analyze the survival prognosis in patients with left main stem coronary artery lesion after surgical revascularisation (CABG) in first two years.

**Patients:** Between August 2000 and August 2002, 30 patients (27 men and 3 women) were operated for left main stem coronary artery lesion. Mean age was 55.97 years. Preoperatively 28 patients presented with angina pectoris. The majority of the patients (93.3%) belonged to the New York Heart Association class III. Mean EF was 37%. Significant four-vessel disease was present in 7 patients (23%), triple vessel disease occurred in 21 patients (70%) and double vessel disease in 2 patients (7%). Significant co-morbid factors included hypertension (80%), diabetes mellitus (43%), and smoking (23.3%). All the patients were operated as an emergency. Average grafts per patient were 3.1. All patients were considered for LIMA, selection being based upon the severity of symptoms, left ventricular function, and suitability of the coronary vessels for grafting. LIMA was used to perform a bypass for LAD in 24 patients.

**Results:** Operative mortality, defined as death within 30 days of surgery, was 6.66%. Two out of total three deaths occurred while within the hospital postoperatively. After 2 years of follow-up only one more death was observed (3.33%). All three deaths were linked to coronary conditions. Among the survivors 96.29% (26 out of 27 patients) remained asymptomatic after two years. Only one patient reported shortness of breath and was categorized under angina class I of New York Heart Association.

**Conclusion:** Our observations suggest that post CABG survival prognosis in patients with left main stem coronary artery lesion appears very good after two years of follow-up.

**Key Words** · Left main stem coronary artery · CABG · Survival

## INTRODUCTION

Advances in surgical myocardial revascularisation techniques have had an important impact on the prognosis of LMCA lesion. In 1921 when James Herrick originally described the left main coronary artery stenosis, the out come of this lesion was really poor. In 60's and 70's Conley and colleagues analyzed the out come of 163 medically treated cases of LMCA stenosis. Even at that time survival rate was 79 % after 1 year and only 50 % after 3 years. The importance of CABG not only in reducing the mortality in long-term but even its role in reducing symptoms, improving quality of life and increasing exercise tolerance can't be overlooked. Our goal in

this retrospective study is to analyze the initial (2 years) outcome of LMCA lesion after CABG. The purpose of this study was to determine the role of CABG in patients with LEFT MAIN STEM lesion which proved to be > 90% after 2 years.

## METHODS

### Patient Population

Among the 266 patients who received CABG from August 2000 to August 2002 in the Cardio thoracic department of Liaquat National Hospital, patients with the following criteria were included in the study:

- 1) The presence of Left Main Stem lesion, as defined by stenosis of > 90%.

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- 2) Absence of concomitant procedure at the time of CABG surgery i.e. Aneurysm resection or valve surgery.

### Data analysis

The collected data included variables like age, sex, and presence of risk factors for atherosclerosis such as cigarette smoking, diabetes, hypertension, and renal impairment. Selective coronary angiography was performed by femoral technique. Several views of coronary artery were analyzed including right anterior oblique, left anterior oblique and spider views.

Various surgical aspects were also analyzed including number of vessels grafted, by pass time and cross clamping time.

Post operative use of inotropes /IABP, I.C.U stay, ward stay as well as post operative infections were also taken into account.

### Clinical and angiographic variables in patients undergone CABG (Table A)

CLINICAL VARIABLES	TOTAL PATIENTS (n=30)
Age (mean) in years	56
Males, %	90
Angina Class > III %	93
Prior MI, %	60
Hx diabetes, %	43.33
Hx hypertension%	80
Hx smoking, %	23.33
Angiographic Variables	
Ejection Fraction (mean)	37.10
Diseased Vessels (mean)	3.1
Mean ECC TIME (Extracorporeal time) min	88.5
Mean Aortic Clamping time (min)	50.7

(Angina class indicates New York Hear Association class, ; MI Myocardial infarction; Hx, history of; min, minutes)

### DATA ACQUISITION

Follow up data on each patient were obtained by sending a standardized questionnaire administered after 2 years. Further inquires were made by telephone calls, records of past hospital admission and re-admission after CABG. In case of any suspected bias a personal meeting was arranged.

Finally in the absence of any response to our inquiry, possibility that the patient had died was confirmed with the death registry. In that case the circumstances of death were determined from hospital records and by telephonic interviews with the family members.

## RESULTS

### POPULATION CHARACTERESTICS

The patient population (table A) consisted of 27 men and 3 women (total 30), mean age 55.97 years (range 36-70 years, SD +8.9). Cardiovascular risk factors other than age were present in 25 (83.33%) patients. Angina pectoris was present in 28 patients all were having USA. 18 patients (60%) had a history of pre-operative MI. Two patients have already had CABG in the past.

The left ventricular E.F measured preoperatively was 37.10% (SD ±11).

The mean number of grafts per patients was 3.1%. All the patients received venous grafts while LIMA was used for LAD in 24 patients. Mean extracorporeal circulation time was 88.5 minutes (SD +22.6) and mean aortic clamping time was 50.7 minutes (SD +13.09).

Mean I.C.U stay was 2.2 days while the mean ward stay was 4.93 days. All the patients were given postoperative inotropes.

### FOLLOW UP

The mean follow up duration in September 2004 was 24 months. Data were obtained on the out come of all surviving patients. All 27 survivors answered the questionnaire.

### FUNCTIONAL OUTCOME

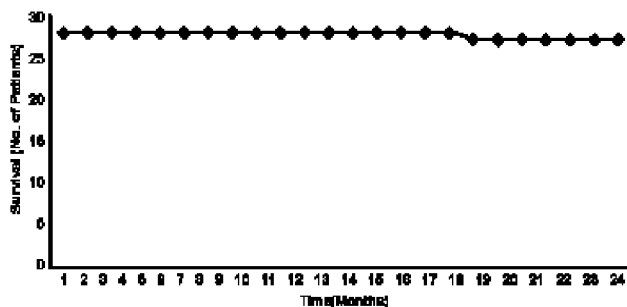
At the time when the data were compiled one of the 27 survivors was complaining of mild angina, which began after 1.5 years of surgery. Of the 11 patients of working age, 10 (90%) resumed their jobs and only one patient took premature retirement. 2 patients were readmitted due to surgical wound infection at second week of follow-up which were given added I/V antibiotics with satisfactory outcome.

All patients received Beta-blockers and an antiplatelet drugs.

## MORTALITY

The overall mortality at the end of two years was 10% (3 deaths; One female and two males). Two patients died before hospital discharge, one in the I.C.U and one in the ward. The third patient died at home after nearly 20 months of CABG. Among those who died in hospital, one died on the day of surgery because of low cardiac output and other died due to cardio pulmonary arrest. The cause of death of the patient died at home was due Ca Breast. Operative mortality, defined as death within 30 days of surgery, was 6.66%.

## Survival Analysis Curve



## INFLUENCE OF CLINICAL AND ANGIOGRAPHIC VARIABLES

In the analysis three factors appeared to be associated with the occurrence of the coronary events as a cause of death. These include Aortic clamping time, extracorporeal circulation time and HTN. All 3 patients had an aortic clamping time of > 50 minutes and an extracorporeal circulation time of > 80 minutes. All were hypertensive. Two out of three patients had a deranged UCE preoperatively with one patient with diagnosed CRF. 1 out of 3 females died indicating a higher incidence of death 33% as compared to males (7.40%).

## CONCLUSION

Among patients with ischemic heart disease, those with left main stem coronary artery stenosis have attracted most attention due to their gloomy prognosis. We retrospectively reviewed the case records of 30 patients with mean ejection fraction of 37.10%, who underwent coronary artery bypass grafting between August 2000 and August 2002. All the patients had greater than 90% obstruction of the

left main coronary artery. Significant four-vessel disease was present in 7 patients (23.3%), triple vessel disease occurred in 21 patients (70%) and double vessel disease in 2 patients (6.66%). They were aged 36 to 70 years (mean, 55.97 years), and 27 of them were male. Significant co morbid factors included hypertension (80%), diabetes mellitus (43.3%), and smoking (23.3%). The majority of the patients (93.3%) belonged to the New York Heart Association class III. The number of grafts used ranged from 2 to 4. Average grafts per patient were 3.1. The mean duration of hospital stay was 7.2 days. The 27 patients who survived were followed up for 24 months. At the 2-year follow-up, 26 of the 27 patients (96.29%) who were alive moved up from angina class III to asymptomatic stage and only one symptomatic patient in New York Heart Association Class I.

Compared with the survivors, the deceased patients were characterized by higher age, a longer aortic clamping time, a longer extracorporeal circulation, presence of renal dysfunction and a higher percentage of females as compared to males. 2 patients who already have had CABG in the past survived without any complication even with a remarkably low EF (15 & 30%).

The early and late outcomes of the 30 patients with left main stem lesion submitted to bypass grafting showed a hospital mortality of 6.66% and a surprisingly low late mortality of 3.33% (at follow-up time of 24 months). These figures, when taken in conjunction with a symptomatic relief rate of 96% at 24 months, have encouraged us to continue to recommend coronary artery grafting as the treatment of choice of left main stem disease.

Our annotations propose that coronary bypass carries an acceptable mortality risk and may offer an improved quality of life in patients with left main stem lesion.

## DISCUSSION

Stenosis of the left main coronary artery (LMCA) is found in 3%-5% of patients undergoing coronary angiography<sup>3</sup>. The 30 patients in our study who had been operated on for left main stem coronary artery lesion were selected from a population of total 266

patients who underwent CABG. This amounted to 11.2% of all coronary patients who have had a CABG in our hospital over a two-year period. This proportion seems high as compared to the percentage generally reported (0.7-12.6%). 2,4 Dr. Florence et al has reported this value as high as 22.9% in a study conducted in 2002.<sup>5</sup>

Coronary artery bypass grafting (CABG) may be indicated when a coronary angiogram shows >50% stenosis in the presence of any of the following:

- Severe angina which is unresponsive to medical therapy
- Marked S-T depression of exercise ECG
- LEFT MAIN STEM CORONARY ARTERY STENOSIS
- Severe triple vessel disease
- Angina with left ventricle dysfunction

CABG is a safe operation with elective surgical mortality frequently reported at around 2-4%, depending on the case-mix.<sup>(6)</sup> Various factors influence surgical mortality including age, sex, degree of left ventricular impairment and the presence of other co-morbid conditions including diabetes mellitus, obesity and hypertension<sup>(6)</sup>. In some studies, additional predictors include angina class, prior MI, renal dysfunction, and clinical congestive heart failure. The success and complication rate of CABG is dependent on surgeon and surgical center expertise and experience<sup>(7,8)</sup>. Sub-group analysis demonstrates that patients with more than 50% left main stem stenosis had the greatest survival benefit with CABG<sup>(9,10,11,12,13)</sup>. Survival benefits are also seen in patients with triple vessel disease or two vessel disease including proximal LAD stenosis<sup>(9,11)</sup>. Those with the most severe coronary artery disease have the most to gain from coronary artery surgery and the benefits are greatest in those with left main stem disease followed by triple vessel disease and least for those with single or two. CABG considerably improves symptoms of angina, exercise capacity and reduces the need for anti-anginal therapy<sup>(14)</sup>. In our study, following CABG, over 96% of survived patients was free of angina at two year. This is consistent with the studies showing that patients experience a better quality of life following CABG<sup>(15,16)</sup> and report less

limitation in physical activity<sup>(16)</sup>. Moreover, 90% of patients of working age were effectively functional two year after CABG. The benefits achieved with CABG should be maintained with appropriate secondary preventative measures, including lipid lowering therapy and aspirin therapy.

Early operative mortality was 6.66% in our study. This is almost consistent with several series of LMCA lesion, which is reported as low as 4.7%<sup>(5)</sup>. There was a surprisingly low mortality of 3.33% after 2 years. The overall mortality at the end of our study was 9.99%. This mortality was associated with a longer extracorporeal circulation time and a longer aortic clamping time. In Rolfe's<sup>(17)</sup> studies an extracorporeal circulation time longer than 140 minutes was a factor, which is consistent with our study also. These figures, when taken in conjunction with a symptomatic relief rate of 96% at 24 months, have encouraged us to continue to recommend coronary artery grafting as the treatment of choice of left main stem disease.

The results of this retrospective study involving 30 patients with LMCA lesion undergoing CABG are encouraging in terms of overall survival after two years and remarkable if operative mortality is excluded. Indeed, if we exclude operative mortality 96.66% patients remained alive. This value is much higher than reported in previous studies. The outcome in terms of functional ability is also found to be much superior in our study.

Our observations suggest that coronary bypass carries an acceptable operative mortality risk and may offer a superior quality of life in patients with left main stem lesion.

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