



CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH SEVERE LEFT VENTRICULAR DYSFUNCTION: EARLY OUTCOMES

Imran Khan^a, Irfan Azmatullah Khwaja^a, Saeed Afridi^a, Samreen Jan^a,
Madiha Iqbal^a, Abdul Waheed^a

ABSTRACT

OBJECTIVE: To study the in-hospital outcome of coronary artery bypass grafting (CABG) in patients with severe left ventricular dysfunction at a high volume center.

MATERIAL AND METHODS: An observational study was conducted from March 2012 to March 2013 in cardiac surgery unit at Punjab Institute of Cardiology, Lahore. Eighty consecutive patients who had undergone on-pump CABG, operated by the same surgical team, with a severe LV dysfunction (EF < 35%), were included in the study. Preoperative, intraoperative and postoperative variables were recorded and analyzed using Statistical Package for Social Sciences version 20.0 to find the in-hospital outcome.

RESULTS: Total number of patients included was 80 (n=80). Mean age was 61.80 ± 11.47 years. Patients with angina Canadian Cardiovascular Society Class III or IV were 32 (40%). Eight patients (10%) had left main coronary artery disease. Emergency CABG was performed in 8 (10%) patients. Mean postoperative hospital stay was 8.32 ± 2.45 days. Acute kidney injury was observed in 4 (6%) patients post-operatively. Five (7%) cases went into post operative exploration for hemorrhage and three (4%) patients had stroke after CABG. In-hospital mortality was recorded in 3 (4%) patients out of eighty cases.

CONCLUSION: CABG in patients with severe left ventricular dysfunction can be performed with acceptable mortality and morbidity.

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INTRODUCTION:

The post operative outcome of patients with poor left ventricular systolic function (ejection fraction less than 35%) undergoing coronary artery bypass grafting (CABG) has traditionally been worse.¹ Despite higher mortality and morbidity, optimal treatment for patients with low ejection fraction is still controversial. Preferred choice of treatment in patients with severe left ventricular function is still surgical revascularization due to the fact that these patients have dismal long term prognosis with less than 43% survival on medical therapy alone vs 63% survival 5 years after surgery.²

Mortality has decreased over the years due to improvements in myocardial protection techniques, perioperative pharmacological and mechanical cardiac support manoeuvres, but CABG in patients with severe LV dysfunction still remains a challenge.³

Heart transplant is another option but in a coun-

try like Pakistan with no resources for cardiac transplant, CABG remains a viable option for patients with severe Left ventricular systolic dysfunction.⁴

CABG, although the main stay of treatment, has many complications. In this study we sought the outcome of CABG in patients with low ejection fraction in our patients in terms of in hospital mortality and frequency of major complications.

MATERIAL AND METHODS:

This prospective observational hospital based study of 80 consecutive patients who had undergone coronary artery bypass grafting, aged range 20-70 years from 1st March 2012 to 31st March 2013. The hospital data base of the Punjab Institute of Cardiology was searched for this purpose and patients variables were recorded.

Patients with ischemic coronary artery disease undergoing on pump coronary artery bypass surgery for symptomatic severe three vessel disease having ejection fraction less than 35% were included in the study. Patients having non viable myocardium on thallium scan, patients of end stage renal disease on maintenance dialysis, myocardial infarction within the previous 24 hours and patients undergoing concomitant valvular surgery were excluded from study.

^a Punjab Institute of Cardiology,
Lahore-Pakistan

* Corresponding author:
Email: imran_kmc@hotmail.com

All the information was collected on a specially designed Proforma. It included recording of preoperative, intraoperative and postoperative variables and follow up during hospital stay till discharge.

All patients underwent transthoracic two-dimensional echocardiography at rest performed preoperatively and at two days postoperatively. Regional contractile function was evaluated by using a GE-Vingmed Vivid 7 echocardiograph, equipped with a 1.7 MHz transducer in the second harmonic mode.

On pump CABG was performed during moderate hypothermic cardiopulmonary bypass by the same surgical team. Myocardial protection was provided by intermittent coronary perfusion with tepid blood cardioplegia and continuous topical hypothermia with cold saline. Distal anastomoses were performed during a period of aortic cross-clamping; complete revascularization was attempted in all patients using at least one internal mammary artery as a graft conduit. Proximal venous anastomoses were constructed while the patient was rewarmed. The sternotomy wound was then closed in layers and patients were shifted to the Intensive Care Unit.

Clinical outcomes regarding post operative complications were noted in all patients postoperatively during hospital stay. Post operative complications like, postoperative stroke (a diagnosis of stroke was made if there was evidence of new neurological deficit with morphological substrate confirmed by computed tomography or nuclear magnetic resonance imaging) and acute kidney injury (defined as a serum creatinine level ≥ 2 mg/dL after surgery)⁵ and reexploration (defined according to Kirklin and Barratt-Boyes criteria)⁶ were recorded. Patients were followed up till discharge.

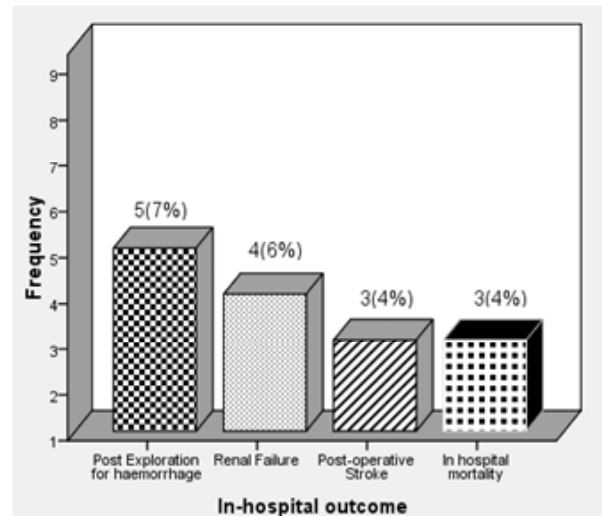
STATISTICAL ANALYSIS:

Statistical analysis was performed using the SPSS (release 20.0; SPSS, Inc; Chicago, IL) system for windows. Continuous variables were expressed as mean \pm SD (Standard Deviation) while categorical variables were expressed as frequencies and percentages.

RESULTS:

Results showed (table 1) that out of 80 patients 48(60%) were male and 32(40%) were female. The mean age of CABG patients with LV dysfunction was 61.80 ± 11.47 years. Smoking was found to be a common risk factor while hypertension 44(54%) and Diabetes mellitus 28(35%) were less common risk factor. The trend towards severity of

Figure-1: In hospital outcome in CABG Patients with severe LV Dysfunction



angina CCS class III or IV was observed in 40% in LV dysfunction patients. The mean number of grafts implanted per patient was 3.41 ± 1.23 . The mean cardiopulmonary bypass time was 100.32 ± 21.63 minutes, mean aortic cross-clamp time was 71.11 ± 31.07 minutes and mean post operative hospital stay as 8.32 ± 2.45 . In hospital outcome (figure 1) in these patients with LV dysfunction was postoperative exploration for haemorrhage

Table-1: Demographic and clinical characteristics of CABG Patients with severe LV Dysfunction

Variable	Mean \pm SD/%
Age	61.80 \pm 11.47
LVEF (%)	30.86 \pm 3.58
Gender	Male 48 (60%)
	Female 32 (40%)
Current/ex-smoker	61 (77%)
Diabetes mellitus	28 (35%)
hypertension	44 (54%)
LMCAD	8 (10%)
CCS class III or IV	32 (40%)
Emergent surgery	8 (10%)
Number of grafts	3.41 \pm 1.23
Cross-clamp time (min)	71.11 \pm 31.07
Cardiopulmonary bypass time (min)	100.32 \pm 21.63
Postoperative hospital (days)	8.32 \pm 2.45

in (7%), renal failure in (6%) postoperative stroke and mortality was 4%.

DISCUSSION:

The prevalence of severe ischemic heart disease is high due to the common use of thrombolytic therapy, angioplasty and stenting, and postponing surgical treatment until coronary artery disease progresses; thus patients undergoing CABG have more risk than previously.⁷

Our results showed that LV dysfunction was found to be more common in men. Our results are comparable with the study by Filsoufi et al which found that the risk of LV dysfunction was more common in men than women (69% vs. 29%)⁸, Another study by Nishi et al established that the LV dysfunction in males was more than females (64.28% vs. 35.71%).⁹ Present study demonstrated similar results. Wang¹⁰ et al found that female gender had slightly more LV dysfunction as compared to males (47.72% vs. 52.27%). These contradictory results may be due to bias in selection of female patients.

The present study provides evidence that patients were older (61.80 ± 11.47 years) and had greater risk factors i.e. smoking (77%), diabetes mellitus (35%) and hypertension (54%). Davoodi¹¹ et al showed similar results older age (58.02 ± 9.40 years), hypertension (53%) and diabetes mellitus (36.6) while smoking was observed to be less common (20.4%) in patients who undergone CABG with severely decreased left ventricular ejection fraction (LVEF).

Nishi⁹ et al also reported older age 66.0 ± 9.3 years and risk factors like hypertension (60%) and diabetes mellitus (70%) in patients who have undergone CABG with severely decreased left ventricular ejection fraction (LVEF). Khan¹² et al also showed that LV dysfunction patients were found to be older patients mean age 58.4 ± 9.5 and had greater risk factors smoking (50%), diabetes mellitus (58%) and hypertension (73.7%).

Ascione¹³ et al has also reported 3% to 7% in-hospital mortality rate in patients with EF <30%. Khan¹² examined 4.7% mortality rate in patients with EF <30%. In our study, the postoperative mortality rate was 4% and rate was similar to that

reported in previous studies.

Wu¹⁴ et al reported 6.6% mortality while, Saxena¹⁵ et al and Di Carli¹⁶ et al demonstrated 9% and 9.3% 30-day post-operative mortality in patients with EF <30% respectively, Davoodi¹¹ et al and Nishi⁹ et al showed 2.3 and 2.4% mortality rate in patients with EF <30% respectively, due to different environmental factors and co-morbid conditions.

Shapira OM¹⁷ et al reported a mean duration of postoperative hospitalization of 8 days in patients with poor left ventricular systolic function. Our study showed a mean of 8 days stay in the hospital after the surgery. Alderman et al² observed a mean duration of postoperative hospitalization of 12 days in patients with poor left ventricular function after surgery and Wu¹⁴ et al showed prolonged mean hospital stay, (25 days) in patients with poor left ventricular function after CABG. Present study showed dissimilar results due to small sample size.

Hillis¹⁸ et al showed that acute kidney injury after CABG is an independent predictor of mortality. Topkara¹ et al found postoperative AKI 4% in patients with EF <30%.

Shapira OM¹⁷ et al found postoperative vascular events 5.2% in patients with LV <30%. Saxena¹⁵ et al reported postoperative stroke and exploration for haemorrhage 4.2% and 5.6% respectively in patients with severe left ventricular dysfunction.

We can conclude that CABG in patients with severe left ventricular dysfunction can be performed with acceptable mortality and morbidity. We believe that all patients with coronary disease amenable to grafting, even with poor LV function, and akinetic or dyskinetic regions of the LV will benefit from surgery.

Patients with a viable myocardium in whom CABG was delayed showed higher mortality than those who were operated early and there is evidence that hibernation is a dynamic process, it is evident that revascularization should be considered early.

CONCLUSION:

CABG in patients with severe left ventricular dysfunction showed good results and can be performed with acceptable mortality and morbidity.



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