

Original Article

EARLY AND LATE OUTCOME OF CORONARY ARTERY BYPASS GRAFTING SURGERY IN PATIENTS WITH POOR LEFT VENTRICULAR FUNCTION

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Objective: Our aim of study was to determine early and late outcomes of CABG in patients with poor left ventricular function. The CABG surgery is beneficial in patients who have poor left ventricular function manifested by an ejection fraction 30% or even less. These are the high risk patients but CABG surgery not only promote their survival but also improve their functional status. They are easy victims of increased operative mortality and diminished long term survival.

Methods: In our study we identified 63 patients who underwent CABG surgery despite poor LV function. Data was collected during their follow up visits or telephonic follow up conducted by us. We used pre op. IABP in 2(3.17%) patients. Among these 63 patients 36(57.14%) were documented as healthy and Stable, 9(14.29%) were expired during follow up and in 18(28.57%) follow up was not continued because 4(6.35%) have no contact numbers and 14(22.22%) phones were switched off. The average duration from 2008 to 2015 was taken to be 42.5 months approximately. Each patient necessarily received atleast one IMA. : The surgical strategy included approach through median sternotomy. All cases were started as off-pump CABG. Elective conversion to on-pump CABG was done for cases not tolerating off-pump.

Results: In this retrospective study we have analyzed the early and late outcomes of CABG in low EF group. Main findings of the study are an acceptable hospital mortality i.e. mortality rate among patients with EF <30% is 1.59% at our tertiary care center However, post-surgery complications prevailed.3 (4.7%) patients encountered deep wound infection and same ratio suffered renal failure.We observed the early outcomes i.e. in hospital mortality evaluated to be 1.58%. These results reflect improving results of surgery in this high risk group.

Conclusion: Our study demonstrated that all of our patients received atleast one arterial graft i.e. internal mammary artery. The minimum standard set by STS is that atleast 95% of the patients must receive internal mammary artery. This contributes to the survival benefit of the patients and also improves the quality of life and reduces reoperation rates. In this retrospective study we have analyzed the outcome of CABG in low EF group. Main findings of the study are an acceptable hospital mortality.We concluded that acceptable morbidity and mortality rates prevailed among this high risk group at our tertiary care center. We believe that improvements in cardiac anesthesia, surgical technique, extracorporeal perfusion, perioperative care and postoperative management have contributed significantly to better outcomes.

Keywords: Poor ejection fraction,CABG,Left ventricular dysfunction,Early and late outcomes,IMA,Median sternotomy.

Introduction

In patients with symptomatic multi-vessel coronary artery disease and severely depressed left ventricular (LV) function (ejection fraction [EF] \leq 0.30), coronary artery bypass grafting (CABG) is the optimal therapeutic approach and remains superior to medical therapy.^{1,2,3} Recent clinical series reporting on the outcome of CABG suggest that up to 15% of patients present with severely depressed LV function.⁴ The postoperative outcome of these patients has traditionally been worse compared with patients with moderate to good LV function.⁵ An analysis from the New York

State cardiac surgery database including patients who underwent CABG from 1997 to 1999 showed that in-hospital mortality and morbidities were significantly higher in patients with depressed LV function compared with patients with normal LV function.⁶ In this study, the mortality rate of the group with an EF less than or equal to 0.30 was 4.8% compared with 1.4% in patients with normal LV function. More recently it has been suggested that off-pump CABG may be beneficial in patients with severely depressed LV function by avoiding prolonged ischemic times.⁷ Ejection fraction is a test that determines how well your heart pumps with each beat. Left ventricular

ejection fraction (LVEF) is the measurement of how much blood is being pumped out of the left ventricle of the heart (the main pumping chamber) with each contraction.

A single retrospective study has been done in Pakistan.⁸ Unfortunately, little is known with respect to long-term survival and its predictors in this patient population. Here, we report our clinical experience in a contemporary single-center series of patients with severely depressed LV function who underwent CABG from 2008 to 2015. In present study we sought to determine the early outcome and predictors of early mortality as well as late mortality in this patient population. Furthermore, we performed a subgroup analysis comparing conventional CABG with off-pump CABG.

Methods

The definition of low EF or impaired ventricular function is an EF of less than or equal to 30% as assessed by 2D and color echo. Retrospective analysis of pre-operative, operative and post-operative data of patients with EF less than or equal to 30% undergoing first time isolated CABG at our institution from 2008 to 2015. Data was collected during their follow up visits or telephonic follow up conducted by us. We included the patients who underwent first time elective or urgent isolated CABG with an EF of 30% or less. Those undergoing an emergency procedure or in cardiogenic shock pre-operatively, redo surgery or having combined valvular and CABG operations were excluded. All pre-operative, intra-operative and post-operative variables were taken from STS data base maintained for every cardiac patient, this includes telephonic interviews at one month through 7 years post-surgery so all the data is reliable. Additional information was taken from patient's record files, if required. In our study to we monitor the patient health and condition which also included hospital mortality and follow up. The maximum duration of which is being 7 year after surgery. EURO II score was used for risk stratification of patients. Emergency procedures were situations requiring immediate surgical intervention like cardiogenic shock, ongoing ST segment changes and failed or complicated PCI. Urgent procedures were situations where surgery was required as a priority during next few days e.g. left vain stenosis, unstable angina requiring IV nitrates or heparin.

Surgical Strategy: The surgical strategy included

approach through median sternotomy. All cases were started as off-pump CABG. Elective conversion to on-pump CABG was done for cases not tolerating off-pump CABG. After completion of surgery patients were shifted to CICU with inotropic supports or IABP. After the removal of inotropic supports/IABP, patients were assessed and shifted out of ICU. Patients were discharged from the hospital after satisfactory rehabilitation.

Results

63 Poor LV patients in which CABG was performed were studied. Data was collected during their follow up visits or telephonic follow up conducted by us. The average months of whole data will be 42.5 months from 2008 to 2015. We observed the early outcome i.e. in hospital mortality which was evaluated to be 1.58%. However, post surgery complications prevailed. 3 (4.7%) patients encountered deep wound infection and same ratio suffered renal failure. We used IABP in 2(3.17%) patients. According to sts, renal failure may be taken as increased serum creatinine upto double after CABG surgery although it returns to normal before discharge. Deep wound infection is defined as infection of incision that either involves muscles/tissues and is culture positive.

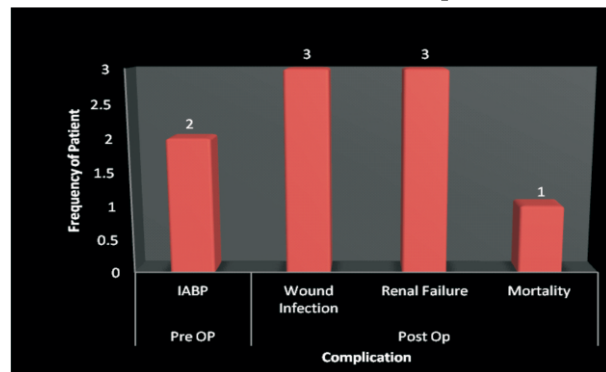


Fig-1: Early outcomes after CABG.

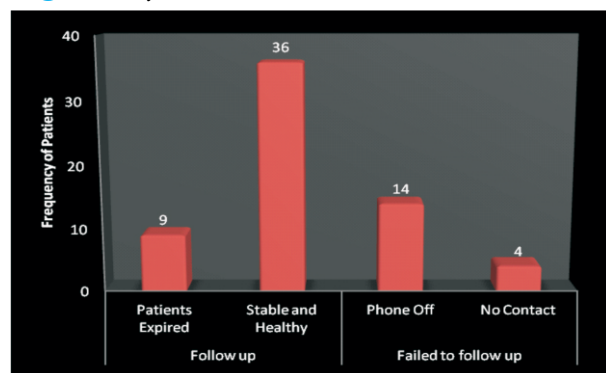


Fig-2: Distribution of patients according to followup

(2008 to 2015)

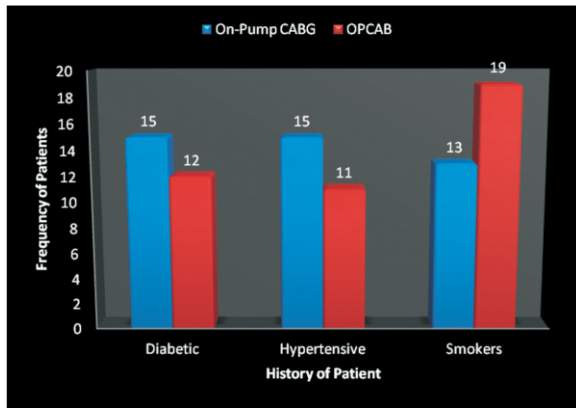


Fig-3: Distribution of patients according to procedure and history

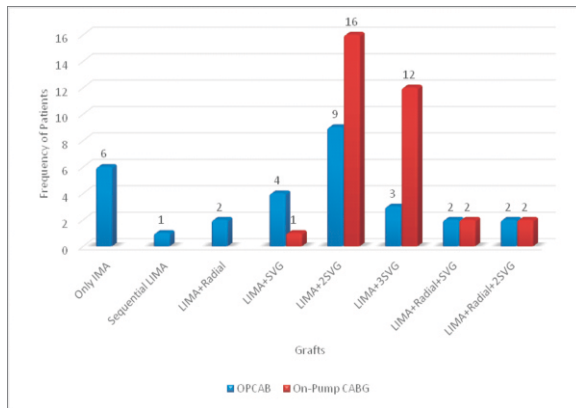


Fig-4: Frequency of patients according to Graft conduit.

Among these 63 patients 36(57.14%) were documented as healthy and Stable, 9(14.29%) were expired during follow up and in 18(28.57%) follow up was not continued because 4(6.35%) have no contact numbers and 14(22.22%) phones were switched off (**Figure 1**).

On-Pump CABG was performed in 34(53.97%) patients and OPCAB in 29(46.03%). Among On-Pump CABG 15(44.12%) were diabetic and same frequency we observed with Hypertension whereas 13(38.24%) were smokers. In OPCAB 12(41.38%) were diabetic, 11(37.93%) were hypertensive, 19(65.52%) were smokers (**Figure 3**).

Discussion

Patients with CAD and advanced ventricular dysfunction have poor prognoses with medical treatment alone despite recent advances. The Coronary Artery Surgery Study (CASS) demonstrated the late outcomes of cabg surgery

that only 38% of medically treated patients (EF <35%) were alive and free of moderate or severe limitations 5 years after the onset of treatment.⁹ Surgical approaches to CAD patients with low EF include CABG, ventricular remodeling, and cardiac transplantation. Lucianiet al., reported an 82% 5-year actuarial post-transplant survival rate in patients with ischemic heart disease and a left ventricular EF <0.30.¹⁰ However cardiac transplantation is not available in Pakistan. Studies evaluating ventricular reconstruction are currently underway, and this option may become an attractive alternative treatment in the near future.^{10,11} Our study has demonstrated that the mortality rate among patients with EF <30% was 1.59%.

Similarly, in considering the early outcomes, the New York State database claims early mortality of patients with EF ≤20% to be 4 times higher than patients with EF >40% (4.6% versus 1.0%). Carr et al., have shown an 11% perioperative death rate in patients with EF between 10% and 20%¹³ More recently, 4% in-hospital mortality rate has been reported in patients with EF <30% [14]. However, the observed 1.59% early mortality rate is lower than those reported in many major studies of isolated CABG in patients with low EF. However, post-surgery complications prevailed. 3 (4.7%) patients encountered deep wound infection and same ratio suffered renal failure. We used IABP in 2(3.17%) patients. These mortality rates decline over time. We believe that improvements in cardiac anesthesia, surgical technique, extracorporeal perfusion, perioperative care and postoperative management have contributed significantly to better outcomes.

Conclusion

Our study demonstrated that all of our patients received at least one arterial graft i.e. internal mammary artery. The minimum standard set by STS is that at least 95% of the patients must receive internal mammary artery. This contributes to the survival benefit of the patients and also improves the quality of life and reduces reoperation rates. In this retrospective study we have analyzed the outcome of CABG in low EF group. Main findings of the study are an acceptable hospital mortality. These results reflect improving results of surgery in this high risk group.

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