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OUTCOMES OF CABG IN PATIENTS WITH LEFT VENTRICULAR DYSFUNCTION IN KP

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Abstract
Objective: To assess the outcomes of CABG in patients with left ventricular dysfunction in KP
Methodology: The current prospective study was conducted from January 2022 to January 2023 at the cardiology department of Khalifa Gul Nawaz Teaching Hospital MTI Bannu and Peshawar institute of cardiology Peshawar after approval from the ethical review board of the hospital. Those who have undergone planned solitary CABG and LVEF of <40% as assessed through echocardiography during the time. The study excluded individuals with left ventricular aneurysms, previous CABG, or CABG with other valve procedures. Patients provided informed consent and follow-up was conducted monthly, with echocardiograms when needed. The median follow-up period was 11.7 months.
Results: Both male and female participants were selected in which 112 (75.67 %) of them were males and 36 (24.32 %) were females. 92.56 % and 1.34 % were operated through on and off-pump method. The mean ICU and hospital duration was 3 and 6 days. There were 6 (4.05 %) deaths during the early 30 days after the surgery followed by complications such as Inotropic support for less than 24 hours in 34 (22.97 %) patients. The LVEF (%) during pre-operative assessment was 36.82± 6.23, but after the CBAG surgery, it improved up to 42.51± 7.38. similarly, the LVDD (mm) mass was also reduced from 49.48 ±5.24 to 48.11 ±5.74 with a value of p 0.009.
Conclusion: Coronary artery bypass grafting is a safe surgical approach for patients having left ventricular dysfunction with minimum morbidity and mortality following surgery. In addition, it can also help to enhance the quality of life and left ventricular function as well.

Keywords: Coronary Artery Bypass grafting, LVEF, LVDD, PCI, NYHA score

Introduction:

Worldwide, coronary artery disease (CAD) ranks third place in terms of causes of mortality among both genders such as males as well as females. It is among the most prevalent forms of cardiovascular disease [1]. A particularly common operation for individuals suffering coronary

artery disorders is bypass grafting of the coronary arteries, or CABG [2]. It has been found that several risk factors before surgery can influence the results of CABG [3]. Historically, high blood pressure, diabetes, left primary cardiac illness, low ejection fraction of the left ventricle (LVEF), getting older, gender such as female, along kidney disease are associated with poor results following CABG [4]. Comparative studies have shown that patients with significant left ventricular dysfunction (EF of 35 percent or below) had equivalent or superior survival following CABG compared to PCI [5]. In those who have met the requirements for expanded therapies, our research has previously documented acceptable intermediate outcomes following standard open-heart surgery, indicating that such procedures might serve as an option for more advanced therapies for carefully selected individuals with severe left ventricular dysfunction [6]. Currently developed, possible choices for on-pump CABG include off-pump CABG along with on-pump beating-heart CABG, particularly for people who have diminished left ventricular function [7]. The main reasons for the procedure are to improve survival and relieve angina, which is greatly aided by ABG. Death and disability are among the conventional outcome indicators used to evaluate the effectiveness of CABG. Nevertheless, in a growing older as well as poorer patient group, the total death related to CABG has decreased due to advancements in before-surgery care, bypass surgery, particularly procedures involving surgery [8]. Research on patients following CABG who have poor ejection fraction continues to be ongoing [9,10]. Even though these patients have a higher chance of complications following surgery, better long-term outcomes have been reported [11]. Therefore, this research study aimed to determine the efficacy of CABG among left ventricular dysfunction individuals who had separate CABG procedures performed at our hospital.

Objective:

To assess the outcomes of CABG in patients with left ventricular dysfunction in KP

Methodology:

The current prospective study was conducted from January 2022 to January 2023 at the cardiology department of Khalifa Gul Nawaz Teaching Hospital MTI Bannu and Peshawar institute of cardiology Peshawar after approval from the ethical review board of the hospital. Both genders were included in the study with 112 males and 36 females participants. those who have undergone planned solitary CABG and LVEF of <40% as assessed through echocardiography during the time. we have excluded individuals with left ventricular aneurysms, those who had undergone earlier CABG, and those who had both CABG with other valve procedures. Standardized diagnostics well as angiographic criteria were used to determine the indications regarding bypass surgery. Each aspect of prior-to-surgery, surgical, and after-surgery information was gathered. The surgical as well as discharged data were investigated. Every patient gave their signed informed permission. For the first period of 03 months, follow-up was accomplished with monthly regular assessments; after that, it was accomplished with telephonic conversations or routine cardiology appointments. When required, an echocardiogram was carried out on a few individuals during follow-up. For every patient, the median follow-up period was 11.7 months. Transthoracic echocardiography (TTE) was collected before to surgery, and TTE was carried out throughout follow-up. When we first began this study, we called the patients that we could get in contact with to do echocardiography. Echocardiography is a typical method used to evaluate ejection fraction. It measures the volumes of the heart's chambers at different points during the rhythm of the heart. Assessments were made of additional echocardiographic variables, including mitral including tricuspid regurgitation, left ventricular end-diastolic diameter (LVDD), and left ventricular end-systolic diameter (LVSD). Following CABG, angiotensin-converting enzyme inhibitors (ACEIs), statins, antiplatelet medications, including renin-angiotensin-aldosterone system inhibitors, additionally β-blockers medications were advised for the participants. All the collected was properly analyzed by using the SPSS 23 version.

Results:

In the present study, both male and female participants were selected in which 112 (75.67 %) of them were males and 36 (24.32 %) were females. The mean age of the patients was 60 ± 8.90 years. 68 (45.94 %), 101 (68.24 %) of them have DM as well as HTN. Along with carotid artery disease (12.16 %) and kidney failure (3%) were also diagnosed among the individuals pre-operatively. New York Heart Association (NYHA) was also determined before surgery in which 47.97 % of them were in NYHA class I & II, in addition to 52.02 % of them were in class III& IV. 34.45 %, 60.18 of them have single and double vessel diseases. The pre-operative Left ventricular ejection fraction (LVEF) was 36.82± 6.23 and the left ventricular end-systolic diameter (LVSD) was 37.32 ±5.91 before the surgery. Along with this, 11.48 % of them moderate mitral valve regurgitation as shown in Table 1 given below.

Table 1 Demographic and Pre-operative Variables

Pre-operative characteristics	Number	Percentage
Age (years)	**60 ± 8.90**	
Male	112	75.67 %
Female	36	24.32 %
Diabetes Mellitus (DM)	68	45.94 %
Hypertension (HTN)	101	68.24 %
Smoking	58	30.19 %
Peripheral artery disease	13	8.78 %
Carotid artery disease	18	12.16 %
kidney failure	3	2.01 %
New York Heart Association (NYHA)		
Class I & II	71	47.97 %
Class III& IV	77	52. 02%
Vessels involved		
Single vessel	7	4.72 %
Two vessels	51	34.45 %
Three vessels	90	60.81 %
Left main coronary artery (LMCA)	31	20.94 %
Echocardiogram Findings		
Left ventricular ejection fraction (LVEF)	36.82± 6.23	
Left ventricular end-systolic diameter (LVSD)	37.32 ±5.91	
Left ventricular end-diastolic diameter (LVDD)	49.48 ±5.24	
Moderate mitral regurgitation (MMR)	17	11.48 %
Moderate tricuspid regurgitation (MTR)	3	2.01 %

Table 2 highlights the parameters during surgery. 92.56 % and 1.34 % were operated through on and off-pump method. Additionally, 59.06 % of them have good and 40.54 % have very scourged quality vessels along with sequential anastomosis (6.08 %) was performed. The mean ICU and hospital duration was 3 and 6 days.

Table 2 Variable During Surgery

Parameters	Number	Percentage
Surgical techniques		
On-pump	137	92.56 %
Off-pump	2	1.34 %
On-pump with beating heart	9	6.08 %
Internal thoracic artery (ITA) Use	133	88.51 %
Quality of vessels		
Good	88	59.06 %
Very scourged	60	40.54 %
Number of grafts (Mean, SD)	2.8 ±0.6	
Endarterectomy of Coronary Artery		
Left Anterior Descending Artery (LAD)	15	10.13 %
Sequential Anastomosis	9	6.08 %

I CU stay (days) median	3 (1-50)
Hospital stay (days) median	6 (3-75)

Table 3 shows the late and early death and disability of the participants. There were 6 (4.05 %) deaths during the early 30 days after the surgery followed by complications such as Inotropic support for less than 24 hours in 34 (22.97 %) patients, development of pleural effusion that required drainage in 19 (12.83 %) and pulmonary complications 43 (29.05 %), in addition to superficial wound infection 3 (2.02 %) were also evolved in patients. Moreover, during late follow-up, the death of 13 (9.15 %) patients occurred, in addition, for 7 (4.92 %) reinterventions of the coronary artery had been done. 12 (8.45 %) had suffered from heart failure according to NYHA class III, IV.

Table 3 Late and Early Mortality and Morbidity

Variables	Number	Percentage
Early < 30 days		
Mortality	6	4.05 %
Early Complications		
Low cardiac output syndrome	15	10.13 %
Intra-aortic balloon pump	18	12.16 %
Inotropic support > 24 hours	34	22.97 %
New-onset atrial fibrillation	31	20.80 %
Reoperation for bleeding	7	4.72 %
Pleural effusion needs drainage	19	12.83 %
Postoperative renal failure	14	9.45 %
Hemodialysis	5	3.37 %
Cerebrovascular accident	3	2.02 %
Pulmonary complications	43	29.05 %
Superficial wound infection	3	2.02 %
Late Complications N=142		
Mortality	13	9.15 %
Cardiac related	3	2.11 %
Other than cardiac	11	7.74 %
Reintervention of Coronary artery	7	4.92 %
Heart failure (NYHA III, IV)	12	8.45 %

Table 4 represents the echocardiographic changes after the operations. The LVEF (%) during pre-operative assessment was 36.82± 6.23, but after the CBAG surgery, it was improved up to 42.51± 7.38 with a p-value of 0.001. similarly, the LVDD (mm) mass was also reduced from 49.48 ±5.24 to 48.11 ±5.74 with a value of p 0.009.

Table 4 Post-operative Changes in Echocardiographic Parameters

Echocardiographic variables	Pre-operative	Post-operative	p-value
LVEF (%)	36.82± 6.23	42.51± 7.38	0.001
LVSD (mm)	37.32 ±5.91	36.89 ±5.41	0.780
LVDD (mm)	49.48 ±5.24	48.11 ±5.74	0.009

Discussion:

Finding LVEF following CABG in individuals with Ischemic cardiomyopathy is thought to be an important factor in determining the result. Surgical revascularization has been demonstrated to improve functionality and overall lifespan for individuals with left ventricular dysfunction [12]. Despite the increased surgical risk for individuals with significant left ventricular failure and

persistent MI, CABG remains the most commonly used procedure to treat these individuals while enhancing their prospects [13]. In the present study, the mean ICU and hospital duration was 3 and 6 days, along with this, the early and late mortality was 4.05 % and 9.15 %. Similarly, a study conducted by Fukunaga N et al reported that the results showed little variations in the outcomes among those who had a left ventricular size of 5.4 cm or less and individuals with an LV diameter of 5.5 cm or bigger in those with an LVEF of less than 20%. LV size anticipated death, significant disability, along with operational death (odds ratio, 5.5, P <.001) as well as the extended duration of the hospital (odds ratio, 3.4, P .026), accordingly, for individuals going through separated CABG [14]. According to Salihi S et al There were 8 individuals with a 5% overall inpatient death rate. In 152 (90%) of the cases, there was a late follow-up (median follow-up period of 56,5 [3-87] months afterward). In 16.3% of cases, fatality occurred during subsequent follow-up visits After surgery, the mean LVEF rose considerably (P<0.01) from 38.78±5.59% to 43.29±8.46%. The rates of congestive heart failure, and reintervention of the coronary artery, along with mean late survival were 89.4±3.1%), 88.7±3.9%, and 86.3±3.3%, respectively [15]. However, in our study, the overall death rate was 4.05 % and 9.15 % of them had died during the late follow-up visits.in addition, LVEF (%) was also significantly improved after the surgery from 36.82± 6.23 to 42.51± 7.38 with a p-value of 0.001. Another, comparable study conducted by Khaled S et al found that the LVEF significantly improved following surgery, going from 29.76±4.86 pre-surgery to 33.53±9.65 post-surgery. In different research, postpartum LVEF rose about 25.6±5.2 to 31.08±5.5 [16]. Angina, also known as heart disease status significantly improved, according to the investigators [17]. In the present study, 92.56 % and 1.34 % were operated through on and off-pump method. Additionally, 59.06 % of them have good and 40.54 % have very scourged quality vessels along with sequential anastomosis (6.08 %) was performed. While Salehi M et al reported that in patients with LVD, off-pump CABG produced similar preliminary and intermediate results as on-pump coronary artery bypass. Off-pump CBAG could have better outcomes in those who had single vessel disease and we had performed for 10 % of the patients have single vessel problems [18].

Conclusion:

Coronary artery bypass grafting is a safe surgical approach for patients having left ventricular dysfunction with minimum morbidity and mortality following surgery. In addition, it can also help to enhance the quality of life and left ventricular function as well.

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