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ORIGINAL ARTICLE

Coronary artery bypass grafting in patients with left ventricular dysfunction presented at Peshawar Institute of Cardiology.

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ABSTRACT... Objective: To determine the outcomes of patients undergoing coronary artery bypass grafting having reduced ejection fraction. **Study Design:** Retrospective Observational study. **Setting:** Peshawar Institute of Cardiology. **Period:** August 2021 to May 2022. **Material & Methods:** We included a number of (n=120) patients who were undergone for CABG with mild to severe left ventricular dysfunction. Data was extracted from electronic medical record (EMR) and entered in SPSS version 25.00. Ethical approval was taken from hospital ethical review board committee. **Results:** Mean age of patients were (57.40±9.311), mean cross clamp time (71.88±26.765) mean bypass time (109.77±43.763), mean hospital stay (4.63±.879) and mean ICU stays (41.60±16.385). 46.7% patients were in CCS III, 41.7% CCS II and 6.7% in CCS IV. In NYHA class 43% were with NYHA II & III and 6.7% with NYHA IV. 21.7% patients were with mild LV dysfunction, 43.3% with moderate and 35% severe LV dysfunction. Association of left ventricular dysfunction towards post-operative outcomes and clinical history has significant association at p <0.05. **Conclusion:** Coronary artery bypasses grafting extensively used for the treatment of patients with left ventricular dysfunction. Although medical management are also widely use and acceptable for moderate to severe LV dysfunction. Our study suggested that left ventricular dysfunction are strongly associated with post-operative out comes and clinical presentations.

Key words: Coronary Artery Bypass Grafting, Coronary Artery Disease, Ejection Fraction (EF).

INTRODUCTION

Coronary artery bypass grafting, a clinical procedure has been applied broadly for the therapy of patients with coronary artery disease, distinguishing patients who will advantage from this clinical technique has been a subject of great interest.[1] It is notable that patients with compromised left ventricular function and with low ejection fraction (EF) have much less survival rates.[2] Whether or not coronary artery bypass surgery, a medical process works on the chance of long term endurance for these patients has been generally examined.[3] Many examinations have confirmed the way that the possibilities of long term survival can be advanced for patients with compromised left ventricular function in any case, the conditions underneath which long time survival happens have now not been enough characterized.[4]

It is stated that 5.8 million patients in the United States and 15 million in Europe have coronary heart disease.[5] Coronary artery disease is the most broadly diagnosed substrate for heart failure in industrialized United States of America.[6] Nonetheless, the role of coronary artery pass grafting (CABG) inside the treatment of patients with coronary artery disease and heart failure has no longer been obviously settled.[7] In the clinical trials at some stage in the Seventies, an combination of 2234 patients with ongoing strong angina have been randomly allotted to go through CABG or get scientific treatment alone.[8] The findings from these trials brought about suggestions helping the utilization of CABG to allow impairing side results unfastened from

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angina, particularly among high risk subgroups with sizable coronary artery disease.[8] These trials rejected patients with extreme left ventricular dysfunction (patients with a release a part of <35%).[8]

Another trial of meta- analysis was conducted which showed that 7.2% of the patients who went through randomization, had an ejection fraction 40% or less and just 40% had an essential side effects of heart failure instead of angina.+ Besides, these trials originate earlier than the significant improvement in clinical treatment and cardiac surgery technique which have brought on the continuing rules.[9] Recently, observational examinations supporting an advantage of CABG and the expansion of contemporary evidence based scientific and system related treatments have prompted significant scientific revascularization regarding the coronary artery disease with its risk in patients with ischemic cardiomyopathy.[9] The function of myocardial revascularization in patients with suggestive coronary artery disease associated with left ventricular (LV) dysfunction (ischemic cardiomyopathy) is not yet obviously characterized.[10]

Late reviews have added good outcomes following revascularization on this organization of patients different collection have precise much less fine and, highly, inconsistent outcomes.[10] Quite a bit of this contention originates from absence of uniform requirements for defining huge LV dysfunction.[11] In addition, patients selection with true ischemic cardiomyopathy take place through angina, as opposed to people with LV disorder coming approximately because of irreversible myocardial fibrosis, will decisively had an effect on the surgical as well as late mortality.[11]

Coronary artery bypass grafting is mostly used in those patients who had moderately to severe LV dysfunction. Most of the patients did not recover with medical management although they got first line management therapy of heart failure or other dysfunctional state. The objective of our study was to determine the outcomes of patients undergoing coronary artery bypass grafting having reduced ejection fraction. We assess those patients who had mild to severe left ventricular dysfunction undergone for CABG presented with coronary artery disease. Surgical intervention is the best method to accomplish the ventricular dysfunction.

MATERIAL & METHODS

This retrospective observational study was carried out at Peshawar institute of cardiology, KPK. Retrospective chart were review from August 2021 to May 2022. We included a number of (n=120) patients who were undergone for CABG with mild to severe left ventricular dysfunction. Data was extracted from electronic medical record (EMR). Ethical approval was taken from hospital ethical review board committee (ERC/07/136). The trial was conducted in compliance with the international on Harmonization guidelines for good clinical practices and according to the declarations of Helsinki.[10]

Statistical Analysis

The data were entered in SPSS version 25.00. Descriptive statistics was used to calculate mean and ±SD. Frequency and percentage was calculated for qualitative variables e.g. marital status, clinical presentation and etc. Chi square was applied for the association left ventricular dysfunction with post operative outcomes at p value <0.05.

Inclusion Criteria

- Patients undergone for CABG.
- Patients treated with CAD
- Patients with an ejection fraction <45

Exclusion Criteria

- Patients with an ejection fraction of >45%.
- Valvular and congenital surgery
- Re-opening

RESULTS

A total of (n=120) were included in our study after meeting the inclusion criteria:

Table-I illustrate the mean age of patients which predict that were (57.40±9.311), weight (69.20±10.973), mean Height (160.70±8.204), mean cross clamp time (71.88±26.765) mean

bypass time (109.77±43.763), mean hospital stay (4.63±.879) and mean ICU stay (41.60±16.385). If we discuss according to the gender wise 66.7% male and 33.3% female were included in this study. 36.7% patients were educated at matriculation level. Area wise distribution showed 25% were from Peshawar, 21.7% from mardan and 3.3% from Khyber agency. 21.7% were hypertensive, 16.7% diabetic, 6.7% history of stroke, 11.7% tobacco user, 15% both hypertensive and diabetic and 6.7% having previous history of myocardial infarction. 46.7% patients were in CCS III, 41.7% CCS II and 6.7% in CCS IV. In NYHA class 43% were with NYHA II & III and 6.7% with NYHA IV. 21.7% patients were with mild LV dysfunction, 43.3% with moderate and 35% severe LV dysfunction. If we discuss about post-op complications, 30% patients develops wound infection, 28% atrial fibrillation, 8% bleeding, 5% kidney failure, 18% pneumonia and 10% were readmitted because of other complications. Pre and post-op medical management, 33% were with Aspirin and clopedogril, 36% Beta Blocker, Aspirin/clopedogril and diuretics 20% with antiarrthymic drugs. 95% patients were discharged and 5% death assessed.

Characteristics	Mean	±SD
Age of the patients (years)	57.40	±9.311
Weight (kg)	69.20	±10.973
Height (cm)	160.70	±8.204
Cross clamp time (minutes)	71.88	±26.765
Bypass time (minutes)	109.77	±43.763
Pulse	81.45	±15.517
Systolic BP	137.07	±21.597
Diastolic BP	84.08	±19.381
SPO2 level	96.18	±4.849
Creatinine level	.8698	±.37503
Hospital stay (days)	4.63	±.879
ICU stay (hours)	41.60	±16.385
Gender		
Characteristics	**Frequency (n)**	**Percentage (%)**
Male	80	66.7%
Female	40	33.3%
Marital status		
Characteristics	**Frequency (n) (%)**	
Un-Married	4 (3.3%)	
Married	52 (43.3%)	
Widow	42 (35%)	
Divorced	22 (18.3%)	
Education Level		
Un-educated	40 (33.3%)	
Primary level	8 (6.7%)	
Matriculation	44 (36.7%)	
Higher Education	28 (23.3%)	
Residence		
Peshawar	30 (25%)	
Charsada	30 (25%)	
Mardan	26 (21.7%)	
Swat	4 (3.3%)	
Dir	8 (6.7%)	
Kohat	2 (1.7%)	
Afghani	2 (1.7%)	
Bannu	6 (5%)	
Abbotabad	6 (5%)	
Hangu	2 (1.7%)	
Khyber Agency	4 (3.3%)	
Medical History		
Hypertension	26 (21.7%)	
Diabetic Mellitus	20 (16.7%)	
Hyperlipidemia	14 (11.7%)	
Previous stroke	8 (6.7%)	
Smoking	14 (11.7%)	
Previous CABG	8 (6.7%)	
Chronic renal insufficiency	4 (3.3%)	
Previous History of Myocardial infarction	8 (6.7%)	
Both HTN and DM	18 (15%)	
CCS Class		
CCS 0	2 (1.7%)	
CCS I	4 (3.3%)	
CCS II	50 (41.7%)	
CCS III	56 (46.7%)	
CCS IV	8 (6.7%)	
Clinical Presentations		
Chest pain	17 (14.2%)	
Shortness of breath	33 (27.5%)	
Sweating	19 (15.8%)	
Burning sensation in epigastrium	22 (18.3%)	
Palpitation	23 (19.2%)	
Vomiting	6 (5%)	
Left Ventricular Function		
Mild LV function	26 (21.7%)	
Moderate LV dysfunction	52 (43.3%)	
Severe LV dysfunction	42 (35%)	
CABG Procedure Type		
On Pump	112 (93.3%)	
OPCABG	8 (6.7%)	
CABG Status		
Elective	68 (56.7%)	
Emergency/urgent	52 (43.3%)	
NYHA Class		
NYHA I	8 (6.7%)	
NYHA II	52 (43.3%)	
NYHA III	52 (43.3%)	
NYHA IV	8 (6.7%)	
Post-op Complications		
Atrial Fibrillation	34 (28.3%)	
GI Complication	36 (30%)	
Wound Infection	10 (8.3%)	
Acute Kidney Injury	12 (10%)	
Pneumonia	22 (18.3%)	

Re-Admission	6 (5%)
Management	
Calcium Channel blockers	2 (1.7%)
Lipid lowering drugs	6 (5%)
Diuretics	24 (20%)
Anti arrthymic drugs	40 (33.3%)
Antibiotics	10 (8.3%)
Aspirin/Clopedogril	2 (1.7%)
Beta blocker, Asprine/ clopedogril and diuretics	36 (30%)
Outcomes	
Discharged	114 (95%)
Death	6 (5%)

Table-I. Demographic profile, clinical presentations and post-op outcomes of the patients: (n=120)

Table-II illustrates the association of left ventricular dysfunction towards post-operative outcomes and clinical history. It is suggested that it has significant association at $p < 0.05$.

Characteristics	x^2 Value
Hospital stay	2137.962[a] (df= 992, p =000)
ICU stay	1412.849[a] (df=1120, p = .000)
Post-op complications	844.563[a] (df=448, p=.000)
Medical History	144.300[a] df=128, p>0.05)
Clinical presentation	63.044[a] (df=32, p =.000)
CCS class	62.411[a] (df=25, p=.000)
NYHA class	36.951 [a] (df=4, p=.000)
Ejection Fraction	34.392[a] (df=4, p=.000)

Table-II. Association of left ventricular dysfunction towards outcomes:

DISCUSSION

Our retrospective observational study was conducted for the determination of left ventricular dysfunction among coronary artery bypass grafting patients. We assessed that the mean age of patients in our study group was 57 years, most of the patients were in this age group who developed left ventricular dysfunction. We enrolled all those patients in our study that had mild, moderate and severe left ventricular dysfunction on the basis of echocardiography. Patients were categorized and assessed on the basis of symptoms, clinical history CCS class and NYHA class. Most of the patients were in CCS class III and NYHA class II and III. In our study setting mostly patient went undergone on-pump CABG. On-pump CABG percentage was high as compared to OPCAB.

The reason was that mostly patients were at moderate LV dysfunction and triple vessels diseases. That why the status of CABG was on-pump. Although, those patients who had mild LV dysfunction and also mild coronary artery disease, were underwent for OPCAB. Symptomatic status of the patients was that mostly developed chest pain, shortness of breath, sweating and pain in epigastrium. Those patients that had severe LV dysfunction also had heart failure and symptomatically NYHA class IV and CCS class III - IV. Post-op complications in our study showed that most of the patients developed atrial fibrillations, AKI and Pneumonia.

A randomized control trail method was directed by Eric J. Velazquez, M.D. Indicated in their factual arrangement become stuck to, clinical conditions caused hybrid due to 17% of patients who had been randomly allotted to clinical treatment and 9% who were haphazardly related to CABG.[12] Per-therapy investigations suggest that this imbalance in crossover rates among agencies modified the results of the vital purpose to-deal with exam by using decreasing the treatment effect of CABG comparative with medical treatment.[12]

In spite of the fact that they agree with that those results are informative, when you consider that they reflect certifiable medical course, in which the choice of CABG changed into no longer stimulated through randomization, these in line with-medical examinations should be analyzed correctly.[12] As expected, CABG was related with an early risk of loss of life from any reason among all patients who went through the strategy.[13] At the point when patients had been treated with CABG and focused scientific treatment for coronary artery disease and left ventricular dysfunction, they were presented to an early risk because of the surgical intervention.[13] The total number of death was higher in the surgical organization than within the medical treatment institution for over 2 years after randomization.[14]

Percentage of GI complications in our study was high as compared to other complications. Theses complications might be because of patient's personal health hygiene, most of them back from home after one week and got infected. Re

admission rate was also high as those patients were re-admitted because of wound infection and sometime on the basis of chest pain. On the basis of follow up and medicine history which was given at the time of discharge and pre-op, it is suggested that mostly patients were at the group of antiplatelets, diuretics and antiarrthymic.

As recommended by using past researches, the surgical survival is basically subject challenge to the determination of patients, in whom severe angina is the overwhelming side effect[15], displaying the presence of ischemic yet probably appropriate myocardium, and the avoidance of patients introducing solely with CHF non-compulsory to irreversible myocardial fibrosis.[16] With this model applied for choice of patients, the long time survival rate on this surgical series (80%) approximates that for medicinally treated with patients with ordinary LV capability.[17] In this way apparently myocardial revascularization annuls the adverse impact of LV dysfunction on survival observed in sufferers treated with entirely through medical treatment.[18]

CONCLUSION

Coronary artery bypasses grafting extensively used for the treatment of patients with left ventricular dysfunction. Although medical management are also widely use and acceptable for moderate to severe LV dysfunction. According to the results of our study it is concluded that left ventricular dysfunction are strongly associated with post-operative out comes and clinical presentations at $p<0.05$. Most of the patients are discharged after procedure and they do not show any major complications and less mortality rate with any cardiovascular cause.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Waqar Masud Malik	Data collection.	
3	Kifayat Ullah	Data collection.	
4	Attiya Hameed Khan	Write first draft and analysis.	
5	Kiran Jamal	Editing.	
6	Abdul Nasir	Data collection.	
7	Syed Shahkar Ahmed Shah	Data collection.	