DEVELOPING / ESTABLISHING A CARDIAC SURGERY UNIT AT KARACHI INSTITUTE OF HEART DISEASES

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Objectives: Coronary artery disease is the commonest cause of morbidity and mortality in the world. CABG surgery is one of the definitive treatment modality for patients with CAD. This study retrospectively analysed the initial data of a newly developed cardiac surgery unit at KIHD.

Methods: The data was collected by patient analysis and tracking system. The data was classified as pre-operative, operative and post-operative.

Results: 360 consecutive patients were included in this study. 270 were males (75%) and 90 were females (25%). The mean age was 62 years (range 35-85 years), 30(8%) had left main stem disease, 268 (74%) had 3 vessel disease and 62 (17%) had 2 vessel disease. The mean ejection fraction was 38% (Range 20-60%).

The average number of grafts were 3.2 (range 1-5). LIMA was used in 95% of patients. The mean bypass time was 85 mins. in 3 grafts and 102 mins. In 4 grafts. The mean cross-clamp time was 58 mins. 20 patients (5%) developed complications which includes atrial fibrillation, heart blocks, stroke, chest and leg infections.The mortality rate was 2.2% (8 patients).

Conclusion: Our data shows good and acceptable results can be obtained in a newly established cardiac surgery unit with limited staff and resources.

Keywords: Coronary Artery Disease, Cardiac Surgery, Coronary Artery Bypass Grafting.

INTRODUCTION

Cardiac diseases are the most common cause of death in the world[1].

Cardiac surgery is one of the most important methods of managing treatable heart ailments.

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Karachi being the most thickly populated city of Pakistan[2], has the maximum number of Cardiac patients in the country.

Karachi Institute of heart Diseases, started its Emergency & OPD services in 2006, which were thereafter extended to proper inpatient & Coronary Care Unit.

Angiography & angioplasty were started with the commissioning of the 2 cath. labs.

As the patients for angiography and angioplasty increased in numbers, the need for Cardiac surgery unit was felt in order to give better services to patients who needed bypass surgery after angiography, and to patients who needed

surgical cover while having angioplasty.

To achieve this end a space was allocated for the cardiac surgical unit which had an operation theatre, a 4 bedded Intensive Care Unit, CSSD, Store, Doctors room & a Consultant office[3].

ICU & OT equipment was purchased, and 2 cardiac surgeons were hired to run the show.

The support staff like OT , Anaesthsia, ICU, CSSD staff was inexperienced and few in number.
The non-consultant hospital doctors were again few and had very little experience in Cardiac Surgery.

Once the staff, space and equipment were allocated, work was started on getting the space cleaned up and civil works were started to bring it to the minimum acceptable level.

The staff were sent to other cardiac surgery units in the city to gain working experience.

Equipment which were available were checked for any problems in their usability, whereas the equipment which were not available, were bought at once.

Once the house was put in order, the cardiac surgery was started on 23rd of November 2008. A coronary artery bypass grafting was done "A small step for the man, but a giant leap for the mankind".

Since the first case, we have performed 360 consecutive Open Heart Surgeries at KIHD, majority of which were Coronary Artery Bypass Operations, with excellent results and a very low morbidity & mortality rate of 2%.

METHODS:

All patient data was collected and stored on Microsoft Excel, according to Patient Analysis and Tracking System.

The data was later on analysed under three categories.

1) **Preoperative Data:** Age, Sex, Severity of disease, Ejection Fraction, incidence of Diabetes mellitus and Hypertension.

2) **Intraoperative Data:** Number of grafts, Incidence of LIMA usage, Type of cardioplegia used, Cross clamp time, Bypass time, Body temperature on bypass.

3) **Postoperative Data:** Average discharge time, Discharge medications, Morbidity & Mortality , its incidence and causes. Reopening , its incidence and causes. Intra Aortic Balloon Pump its incidence, use and causes in our service.

RESULTS

1) Preoperative Data

Age: The pts. who were operated during this period had an age range of 35 to 85 yrs. With a mean age of 62 yrs.

Sex: Males were 270 and females were 90 in number, giving a ratio of 3:1.

Severity of disease: 30 patients had Left main stem stenosis, out of which 22 had Right Coronary Artery Stenosis along with left main stem stenosis, while 8 had isolated left main stem stenosis.

268 patients had severe 3 vessel coronary artery disease.

62 patients had severe 2 vessel coronary artery disease, out of these 38 patients had LAD plus Cx/OM disease, and 24 patients had LAD plus RCA disease.

Left Ventricular Function: The mean left ventricular ejection fraction was 38% with a range between 20%-60%.

Incidence of Diabetes Mellitus: Of the 360 patients operated in our study 245(68%) had Diabetes Mellitus. Of these 245 patients, 38 were on insulin, 124 were on oral hypoglycaemic agents, 40 were on diet control and 43 were newly diagnosed at the time of angiogram.

Incidence of Hypertension: 115 patients (32%)out of 360 had hypertension,out of these 70 patients (61%) were control on medications,whereas the remaining 45 patients (39%) were uncontrolled & were not on medications.

2) Intraoperative Data

Number of Grafts: The average total number of grafts used were 3.2 (range between 1-5).

Left Internal Mammary Artery was used in 338 cases out of 360 patients which comes to 95% of our caseload.

Type ofCardioplegia : All the patients received Antegrade cold blood cardioplegia, given every 10-15 mins. ,in a bolus of 300-500 ml.

Bypass Time: The Average bypass time was calculated to be 85 minutes,in patients with 3 grafts and 102 mins in patients with 4 grafts, range being between 25 minutes to 150 minutes.

Cross-Clamp Time: The average cross-clamp time was 58 minutes, ranging between 20 to 80 minutes.

Body Temperature : During bypass while doing the bottom ends on cross-clamp the body temperature was maintained between 25degrees celsius to 27 degrees celsius. Rewarming was started during the last bottom end anastomosis, just before cross-clamp was released.

3) Postoperative Data:

Discharge Time: The average discharge time

after bypass was 5.5 days with a range between 4 to 8 days.

Discharge Medications: The routine medications prescribed on discharge were

Dispirin 300 mg once daily

Omeprazol 20 mg once daily

Rosuvastatin 10 mg once daily

Augmentin 1gram 12 hourly

Ciprofloxacin 500 mg 12 hourly

Ponstan Forte one tab 8hourly

Diabetic patients were sent home on insulin 70/30 adjusted 12 hourly dose.

Hypertensive patients were sent home on their preoperative medications, in case they were not on any preop. Antihypertensive medication, Beta blockers, ARBs, Calcium channel blockers were prescribed either alone or in combination as per requirement of the patient.

Any other preop. medication was assessed and started accordingly.

Morbidity: morbidity was observed in 20 patients (5%) due to:

Atrial Fibrillation.

Heart Blocks.

Stroke.

Chest & leg infection.

COPD in Asthamatics & cigarette smokers.

Low cardiac output syndrome requiring IABP.

Blood transfusion reaction.

Mortality: 8 patients died out of 360 in our care (2.2%), The causes of mortality were:

Sudden Cardiac arrythmias like Ventricular fibrillation, Ventricular tachycardia, bradycardia leading to cardiac arrest.

Table 1: Preoperative Data

Characteristics	Number	Percentage
Gender: Male	270	75%
Female	90	25%
Age: Mean	62 Years	
Range	35Years- 85 Years	
Diabetes Mellitus	245	68%
Hypertension	115	32%
L V Function: Mean Range	38% 20%- 60%	
Severity Of Disease:		
Left Main Stem Disease	30	8.3%
Three Vessel Coronary Artery Disease	268	74.4%
Two vessel Coronary Artery Disease	62	17.2%

Table 2: Intraoperative Data

Total No. of Grafts: Mean	3.2
Range	1- 1-5
Left Internal Mammary Artery Used in:	338 (93.8%)
Cross-Clamp Time: Mean	58 mins
Range	20 mins.- 80 mins.
Bypass Time: Mean	
Three Grafts	85 mins
Four Grafts	102mins
Range	25 mins.- 150 mins.

Table 3: Postoperative Data

Characteristics	Number	Percentage
Discharge time: Mean	5.5 Days	
Range	4-8 Days	
Mortality	8	2.2%
Morbidity	20	5
IABP	8	2.2%
Reopenings	10	2.7%

Renal failure postoperatively due to chronic kidney disease, acute tubular necrosis

Stroke

Disseminated Intravascular coagulation

Low Cardiac Output Syndrome

Reopening: 10 patients (2.7%) were reopened in the postoperative period due to bleeding (7 patients) and tamponade (3patients); 2 patients had to be reopened twice out of the lot.

Intra Aortic Balloon Pump: IABP was required in 8 patients (2.2%) for low cardiac output syndrome in the post operative period. All of these were inserted in the theatre in the immediate post op period,either while coming off bypasss, or after coming off bypass. One patient had IABP inserted in ICU. One of these patients died post operatively.

DISCUSSION

A new cardiac surgery centre in an underdeveloped country with limited resources and poor patients ought to have poor results especially at the beginning, till such time atleast when the teething problems of initial evolving stage are overcome.

However we were very lucky that our patients had a very favourable outcome from the very start and when we compared our results with results in the international literature, our results stood out high.

The mean age group of our cases were recorded to be 62 years with a range between 35 years to 85 years, which is not so different from the average age group reported in other studies of 66 years [4].

The sex distribution in our study was 75% males : 25 % females; more or less the same demographics are seen in other studies with 78 % males & 22 % females[4].

The average number of total grafts done in our patients was 3.2 (range 1-5), which compares favourably with other studies with an average graft rate of 3.1[5].

Left Internal Mammary artery was used in 95% of our cases which is significantly higher than that used in other centres. The average use LIMA in other studies is much less esp in patients above 70 years of age, the overall LIMA use has been 71%[6].

The average bypass time in our cases was recorded to be 85 minutes,in patients getting 3 grafts (range 25 minutes to 140 minutes) which compares favourably with the average bypass time reported in the literature i.e 78 minutes[7].

Reopening of 11patients (2.8%), due to bleeding in 7 patients, Hypotension due to cardiac tamponade in 3 patients, and cardiac arrest while closing the chest in 1 patient compares favourably with an internationally accepted reopening rate of 3%-7%[8].

Intra Aortic Balloon Pump was used in 8 patients (2.2%), & 7 out of these were inserted in theatre ,one in ICU. Internationally the rate of IABP usage is much higher between 7.8% - 20.8%[9].

Morbidity was observed in 20 patients (5%), due to stroke, chest & leg infections, COPD in asthmatics and cigarette smokers,low cardiac output syndrome, blood transfusion reaction, atrial fibrillation, bradycardia due to conduction defects. This morbidity compares favourably with a 5.9% morbidity reported in the literature[10].

The mortality rate at KIHD of 2.2% matches favourably with the international overall mortality rate of 4.8%[5].

During this initial period at KIHD , we had very few trained personnel, The support staff had no idea how sensitive the field of cardiac surgery

is & how much vigilant one has to be. However not only have we been able to give internationally accepted good results , but we have also trained our theatre technicians, Anaesthesia technicians, ICU technicians, CSSD department personnel. The paradox is that the byproduct of this exercise (training of Paramedical staff) is also a very important aspect of the outcomes.

CONCLUSION

"When there is a will there is a way" , this is the central idea of our story.

When we started our journey it was undoubtedly ground zero ,with just a demarcated space, Incomplete equipment, untrained staff; and now Thank God we are in a much more comfortable position with acceptable facilities, good internationally acceptable results, and good home trained staff.

This only proves that good results can be obtained in newly established cardiac surgery centre with dedication, hard work and good luck.

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