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ORIGINAL ARTICLE

Overview of the First 500 Cardiac Surgeries Performed at Peshawar Institute of Cardiology, Peshawar, Pakistan

SYED SHAHKAR AHMED SHAH[1], ABDUL NASIR[2], MUHAMMAD TARIQ[3], MUBASHIR ZAREEN KHAN[4], MUHAMMAD BILAL[5]
[1]*Professor, Dean and Medical Director Peshawar Institute of Cardiology Peshawar Pakistan*
[2]*Assistant professor Department of Adult cardiac surgery, Peshawar Institute of Cardiology Peshawar Pakistan*
[3]*Assistant professor HOD Adult Cardiac Surgery Peshawar Institute of Cardiology Peshawar Pakistan .*
[4]*Assistant professor Department of Adult cardiac surgery, Peshawar Institute of Cardiology Peshawar Pakistan .*
[5]*Senior Registrar Department of Adult Cardiac Surgery, Peshawar Institute of Cardiology Peshawar Pakistan*
Corresponding author : Muhammad Bilal, Email: kmcite216@gmail.com

ABSTRACT

Objective: To examine the postoperative outcome of the first 500 cardiac surgeries performed at the newly established cardiac institute in Peshawar, Pakistan.

Material and methods: This retrospective observational study examines the first 500 cases of cardiac surgery conducted at Peshawar Institute of Cardiology in Peshawar, Pakistan, between December 2020 and October 2021. Off-pump coronary artery bypass (OPCAB), on-pump coronary artery bypass (ONCAB), mitral valve replacement (MVR), aortic valve replacement (AVR), Conventional Ventricular Septal Defect closure (VSD), and congenital procedures were performed by PIC expert faculty.

Results: The mean age of the patients was 51.56±17.03 years. There were 371 (74%) males and 129 (25.8%) females. EuroSCORE II recorded was 1.88±0.76. 308 (61.6%) patients presented with Triple-vessel coronary artery disease, followed by Severe symptomatic aortic regurgitation 43 (8.6%). Total 337 coronary artery bypass grafting (CABG) surgeries were performed. 303 ONCAB and 34 OPCAB surgeries. In-hospital mortality was observed in 9 (1.8%), and 17 (3.4%) patients who had postoperative surgical bleeding. The mean ventilation time recorded was 5.66±1.7 hours. The mean hospital recorded was 4.93±1.4 hours

Conclusion: Establishing a high-quality cardiac institute in Peshawar has resulted in remarkable outcomes in terms of management and surgical treatment of cardiac diseases.

Keywords: Cardiology, surgery

INTRODUCTION

Cardiovascular diseases have surged greatly in Pakistan during the last couple of decades. A huge portion of this disease burden is hidden and is increasing with each passing day[1, 2]. The leading cause of mortality in underdeveloped countries is cardiovascular disease, approximately 86% of these deaths were reported in developing countries[3].The development of a specialized cardiac care institute requires infrastructure, finances, specialized cardiac equipment, and a great faculty[4-7]. As a result, all such specialized cardiac public sector institutions in our country have been developed in metropolitan cities. Therefore, policies should be modified to improve the standard of health care, make it available and affordable to patients living in rural areas[8-10].

The concept of developing cardiac care institutes in different regions has been described in South Korea to fulfill patients' needs[11].PIC, being a robust modern cardiac institute with emphasis on teaching and training can also help in producing more young cardiac surgeons to address the dearth of cardiac surgeons in this region

The development of a public sector specialized cardiac care institute in Khyber Pakhtunkhwa, province of Pakistan was long inevitable due to the huge number of cardiac patients traveling to Islamabad, Karachi, Multan for cardiac interventions or surgeries and thousands of patients awaiting interventions at cardiac centers outside this province before the start of Peshawar institute of cardiology. After completing one thousand open-heart surgeries in less than a year time, this institute has contributed to a significant reduction in the number of patients awaiting cardiac interventions outside the province, mitigating earlier admissions, reducing traveling time, regular follow-up visits, and treatment costs to patients.

KPK, bordering Afghanistan, has been affected the most by the last two decades of the war on terror. There has been a significant rise in poverty during this time.In this situation, the introduction of the SehatInsaaf card by GOKP has been a game-changer. Cardiac patients who couldn't afford treatments are being offered surgeries and treatments on daily basis completely free of cost, with the government bearing the expenses of all patients.Themajority of cardiac diseases are prevalent in a low socioeconomic population who could not afford cardiac care [12].

Peshawar Institute of cardiology, an ultra-modern cardiology institute was inaugurated on 16th December 2020, providing facilities such as the latest and fully equipped 24\7 cardiac emergency, cath lab, coronary artery angiography, and angioplasties, and cardiac surgical facilities.

With the start of PIC, Access to quick and affordable cardiac care has become very easy for the people of Khyber Pakhtunkhwa. This center is providing full cardiac surgical coverage to the people of Khyber Pakhtunkhwa and adjacent Afghanistan. More than 1000 cases have been performed to date. This study only announces the beginning of this maiden public sector specialized cardiac institute in Khyber pakhtunkhwa,pakistan.

MATERIAL & METHODS

This retrospective observational study examines the first 500 cases of cardiac surgery conducted at Peshawar Institute of Cardiology in Peshawar, Pakistan, between December 2020 and October 2021.

Before undergoing cardiac surgery, patients selected for any procedure had to meet the American Heart Association recommendations and had to get approval from the heart team, as per hospital protocol. The patient and his family gave their informed consent prior to surgery. For risk stratification, the European System for Cardiac Operative Risk Evaluation (EuroSCORE) II online calculator was employed[13].

Off-pump coronary artery bypass (OPCAB), on-pump coronary artery bypass (ONCAB), mitral valve replacement (MVR), aortic valve replacement (AVR), Conventional Ventricular Septal Defect closure (VSD), and congenital procedures were offered to patients by PIC expert faculty.

For Minimally invasive atrial septal defect (ASD) closure, Aortic Valve Replacement (AVR), and Mitral Valve Replacement (MVR) access was gained through a tiny transverse anterior thoracotomy incision with wedge sternum excision opposite the third and fourth Costosternal joints for all surgeries. In all cases, snares were used to cannulate the superior and inferior vena cavae. Cardiopulmonary bypass was achieved when cannulation was completed. The temperature of systemic hypothermia was 28 degrees Celsius. In antegrade (induction) and tetraplegia (intermittent maintenance) cardioplegia, the Vitalitec Cygnet®

Flexible Aortic Clamp was employed. Every 10 to 15 minutes, the modified St. Thomas Hospital solution was used again. For venting, the root and right superior pulmonary vein (RSPV) were employed. We entered the LA through a transeptal approach after retracting stitches for the right atrial appendage and septum following plegic arrest. A metal arm retractor was utilized to expose the mitral valve, whereas retraction sutures were employed to expose the aortic valve.

The OctoBase sternal retractor, Octopus stabilizer, Urchin positioner, and AccuMist Blower were used in the OPCAB. As the first strategy, OPCAB myocardial protection was achieved using intracoronary shunts ranging in size from 1.0 to 2.0 mm from the left internal mammary artery (LIMA) to the left anterior descending artery (LAD). ONCAB and valvular procedures were performed through a median sternotomy with a target activated clotting time of more than 480 seconds and myocardial protection delivered antegrade (graft plegia was preferred by a few surgeons) or retrograde with topical cooling.

Echocardiography was performed before and after the procedure to assess cardiac function and complications. Patients were observed and tracked throughout their hospital stay to determine the length of hospital stay (LOHS), ventilator support, postoperative bleeding, and mortality. For data analysis IBM SPSS Statistics 21 was used.

RESULTS

This study was conducted on 500 patients who underwent cardiac surgery at Peshawar Institute of Cardiology, Peshawar, Pakistan. The mean age of the patients was 51.56±17.03 years. There were 371 (74%) males and 129 (25.8%) females. EuroSCORE II recorded was 1.88±0.76. There were 143 (28.6%) diabetic patients, 174 (34.8%) patients who suffered from hypertension, and 163 (32.6%) were active smokers (Table 1).

The majority of the patients 308 (61.6%) presented with Triple-vessel coronary artery disease, followed by Severe symptomatic aortic regurgitation 43 (8.6%). The rest of the diagnosis statistics can be seen in Table 2. Total 337 coronary artery bypass grafting (CABG) surgeries were performed. 303 (60.6%) were ONCAB surgeries and 34(6.8%) were OPCAB surgeries. The frequency of the rest of the procedures are presented in Table 2.

Table 1: Baseline characteristics

Baseline characteristics		Statistics
Age		51.56±17.03
Gender (Male/Female)	Male	371 (74.2%)
	Female	129 (25.8%)
NYHA classification	I	34 (6.8%)
	II	214 (42.8%)
	III	219 (43.8%)
	IV	33 (6.6%)
Left ventricular ejection fraction (LVEF %)		44.84±11.92
EuroSCORE II		1.88±0.76
Diabetes		143 (28.6%)
Hypertension		174 (34.8%)
Smoking		163 (32.6%)

Table 2: Diagnosis and procedures

Diagnosis and Procedures		Statistics
Diagnosis	Large Secundum Atrial Septal Defect	5 (1%)
	Severe mitral valve regurgitation	40 (8%)
	Severe symptomatic aortic regurgitation	45 (9%)
	Severe symptomatic mitral stenosis	53 (10.6%)
	Triple-vessel coronary artery disease	308 (61.6%)
	Two-vessel coronary artery disease	29 (5.8%)
	Ventricular septal defect	20 (4%)
Procedures	Aortic valve replacement	45 (9%)
	ASD CLOSURE	6 (1.2%)
	CABG/ONCAB	303 (60.6%)
	CABG/OPCAB	34 (6.8%)
	Conventional ventricular septal defect closure	20 (4%)
	Mitral valve replacement	83 (16.6%)

Postoperative surgical bleeding was found in 17 (3.4%) patients, In-hospital mortality was observed in 9 (1.8%), Wound infection in 9 (1.8%), Strokein 3 (0.6%),Leg infection in 3 (0.6%), Pericardial tamponade in 2 (0.4%),Acute Renal Failure (ARF) was seen in1 (0.2%).The mean ventilation time recorded was 5.66±1.7 hours. The mean hospital stay recorded was 4.93±1.4 hours, the frequencies of other complications are presented in Table 3.

Table 3: Postoperative outcomes

Post-Operative outcomes	Statistics
Post-operative bleeding	17 (3.4%)
Hospital Stay (days)	4.93±1.4
Ventilation Time (hours)	5.66±1.7
Mortality	9 (1.8%)
Wound infection	9 (1.8%)
Pericardial tamponade	2 (0.4%)
Stroke	3 (0.6%)
Acute Renal Failure (ARF)	1 (0.2%)
Leg infection	3 (0.6%)

DISCUSSION

Local surgeons began performing closed heart procedures in Pakistan in the late 1950s in a few facilities in Karachi, Lahore, and Rawalpindi. However, open-heart procedures were first performed at United Christian Hospital Lahore in 1967-1968 by Dr. Donald Edward Bowes[15].

In developing countries, heart patients often suffer not only from the nature of their disease but also from inadequate facilities[10]. The number of patients in need of heart surgery has increased significantly, and Pakistan has a very limited number of government-funded centers to treat these patients promptly. So the only way out was to recruit these patients and wait for them to undergo surgery. This resulted in significant complications, out-of-hospital cardiac arrest (OHCA), and mortality in patients waiting for coronary artery bypass or valve surgery due to the lack of cardiac facilities across the country. Therefore, the focus of healthcare providers is on expanding coverage for cardiac surgery.

Our local population has a huge number of diabetics, smokers, and hypertension patients which predict a higher risk for cardiac diseases. Peshawar Institute of Cardiology has successfully dealt with the aforementioned conditions through timely surgical procedures, sufficient pre-operative management, and follow-up regularly for successful outcomes. Surgeons need studies conducted at institutions to determine whether international data is consistent with local results[14]. Our cardiac institute has proven remarkable surgical results compared with reliable international standards.

The Peshawar Institute of Cardiology is the most recent and largest healthcare initiative undertaken by the Government of Khyber Pakhtunkhwa. It is the first specialized hospital of its kind, serving cardiac patients not only in KPK but also in our neighboring country Afghanistan. Peshawar Institute of Cardiology is in the frontline of providing cutting-edge technologies and state-of-the-art therapy. Postgraduate training for doctors and nurses, as well as advanced research, has been prioritized. The institute has a highly qualified medical faculty that has introduced tertiary care cardiac operations such as, percutaneous, minimally invasive valve replacements, and Beating Heart coronary bypass surgeries. The hospital has six angiography laboratories and six cardiac operating rooms. It has a capacity to conduct more than 2000 surgeries in a year. The hospital has cardiac diagnostic facilities such as cardiac MR and CT Angiographies, electrophysiological investigations, and nuclear cardiology.

CONCLUSION

With the increasing number of patients in need of cardiac surgery, the opening of new heart surgery centers in Pakistan is imperative. The establishment of the Peshawar Cardiology Institute has made it possible to offer high-quality cardiac surgery care for families who could not afford quality cardiac procedures. The institute has

reported minimum postoperative complications and mortality in its first 500 cardiac surgeries.

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