

Twenty-five years of Cardiac Surgery in Nepal: Trials, Tribulations and Triumph

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Abstract

Twenty-five years ago, embarked the start of the era of cardiovascular surgery using the heart lung machine in the country and as we celebrate this humble beginning, we sought to review the advent and the progress made in this field of science over the course of the years in the country; delve in to the challenges and opportunities that it may present in the future to uphold this great profession.

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As we celebrate 25 years of the advent of cardiovascular surgery in Nepal this year it becomes important that we look in to our past – recollecting on how was the initiation of cardiovascular surgery in the country and the challenges of establishment of cardiovascular surgical services, surveying and examining the present situation in the country and then on to the future on what we can envisage and how we can hope to reach in to that realm.

The history of cardiac surgery in Nepal began with the first thoracotomy, which was done in 1963 for an etiology which has not been clearly defined,^{1,2} while the second thoracotomy was done in 1964 for a closed Mitral commissurotomy by Dr. D. N. Gongal at the Bir hospital.^{1,2} Subsequent to this initiation, closed heart surgeries were done in frequent intervals primarily by Dr. L. B. Thapa and his team at the Bir Hospital in Kathmandu. However, compared to our neighboring countries, there remained a lull with regards to initiation of open heart surgery in the country³, and it was only in 1989 that with the help of Dr. Alan W Gale of Australia who performed the first open heart surgery at Bir hospital with his team that visited the country.¹ Subsequently, open heart cardiac surgery continued as an isolated event with the help of foreign medical teams when they visited the country and was performed at Bir Hospital under the leadership of Dr. L B Thapa.^{1,3} Then during a visit by a team of doctors lead by Dr. Leonard Bailey from Loma Linda University in United States performed 30 open heart surgeries in Tribhuvan University Teaching Hospital (TUTH) in Kathmandu in 1993.

The first independent cardiac surgery performed exclusively by Nepalese doctors was in February 27, 1997 at TUTH for an atrial septal defect by Drs. Bhagawan Koirala, B. M. Singh and Govinda Sharma.^{1,3} Following these milestones, isolated cardiac surgeries continued to be performed primarily at TUTH but the numbers remained small. Dr Damodar Pokharel and his team started doing coronary bypass surgeries in Bir Hospital from 2000 onwards, however, it was not until the establishment of Shahid Gangalal National Heart Center (SGNHC) and primarily in the early 2000s and onwards that cardiac surgery began to be a full-fledged program. Henceforth, there has been a steady increase with regards to the numbers of cardiac surgeries performed in the country, increment with regards to tackling complex cardiac procedures and also gradually an increase in the number of institutions performing open heart surgeries within the country.

Whilst reviewing the present scenario for cardiovascular surgery in the country, there are 15 centers capable of performing open heart surgeries at this present time. (Figure 1) Although a majority of these centers are confined within the Kathmandu valley, it is encouraging to appreciate that in the last decade, institutions outside the Kathmandu valley have established cardiovascular surgery services and perform cardiac surgery in a more frequent occurrence.⁴

We evaluated the number of surgeries done annually in the country and compiled data from hospital records and through correspondence and found that 2267 surgeries were done in the year

2019. We chose to collect data from the pre-COVID year of 2019 as the last two years saw a decline in the number of surgeries performed primarily due to COVID 19, which has gradually improved since the advent of 2022.⁵ Of the total of 2267 cardiac surgical procedures done within the country in 2019, most of the surgeries were performed at SGNHC and Manmohan Cardiothoracic Vascular and Transplant Center (MCVTC) and majority of the surgeries performed within Kathmandu valley. (Table 1)

The majority of the procedures continues to be for valvular heart disease with rheumatic etiology (Figure 2), and thus the patients are usually much younger than in western countries.⁶ Congenital heart surgery accounted for the next common procedure followed by surgery for coronary artery diseases. Unfortunately, the number of coronary surgeries continues to increase each year (Figure 2) probably due to the increasing trend of coronary artery disease in the country and in south Asia, and also perhaps due to earlier detection of the disease by our cardiologist as catheterization laboratories continue to expand further in to the peripheries of the country. The mortality for isolated valve surgeries was 1.7%, while combined valve surgeries was 2.8%. Risk of mortality for CABG was 3.9% and the risk of mortality for congenital heart surgery was 9.6%. Although the risk of simple congenital heart surgeries remains low, complex congenital surgeries such as transposition of great arteries, double outlet right ventricle requires improvement in terms of its outcome. There has been tremendous progress made in pediatric cardiac intervention in the country which has resulted in a steady decline in open heart surgeries for low risk, simple congenital disease procedures such as atrial septal defects, patent ductus and coarctation of aorta which may have resulted in a higher than anticipated mortality rate of congenital heart surgery.⁷

Percutaneous valves have recently begun to be implanted within the country but the number for these and endovascular procedures for aortic disease remains negligible, partly due to the cost of these devices. The country does not have a well-established holistic health insurance scheme and thus individuals seeking cardiovascular surgeries do requires out of pocket expenditure for such treatment, and thus the newer devices becomes unaffordable to a majority of our patients. Thus, there remains a foremost challenge to introduce new innovation and modalities of treatment in the country and also to ensure that such devices and even newer medications are more easily available in the country. Majority of the cardiac surgeries in the government supported centers remain heavily subsidized; heart surgery for children below 15 years of age and elderly patients above the age of 75 years, and recently for patients seeking tertiary intervention for rheumatic heart disease being provided without any costs. Further underprivileged patients can also receive partial subsidy of hundred thousand rupees for treatment of other heart diseases as well. These services have had a great influence in allowing the disadvantaged group of patients to receive free service for cardiovascular surgery.

As with the rapid evolution of cardiac surgery worldwide, there has been advances made in county for treating complex cardiovascular diseases such as aortic surgeries, surgeries requiring circulatory arrests and minimal invasive surgeries with satisfactory outcome. However, there is need for progress to be made in surgical treatment for heart failure – namely insertion of ventricular assist devices and cardiac and lung transplant which still remains elusive. This was primarily because until recently organ procurement was deemed unlawful even in brain dead patients. With the ease in litigation, we hope that these procedures can be looked in to in the near future. The use of extra corporeal membrane oxygenation (ECMO) has increased recently within the country and in the presence of the

present pandemic its importance has been well highlighted and few institutions are doing ECMO runs on a regular basis.

At present, there are approximately 25 surgeons trained in cardiovascular surgery who are practicing within the country, which is still minimal for a country with over 28 million population. Cardiovascular disease is the single biggest cause of mortality in the country, with approximately 26.9% of all deaths attributed to it.⁸ Nepal ranks at lower level in South Asia, if you compare the numbers of open heart surgeries per 100,000 population.⁹ With the huge disease burden of cardiovascular diseases in Nepal, there is a need to increase such trained individuals and also help in finding these trained individuals placement for work. At present, three institutions are overseeing a training program for cardio vascular and thoracic surgery in the country with six seats provided annually. The motivation for young doctors to train in this field at present remains truncated and often this training program goes vacant – implying that junior doctors are yet to foresee a greater future in cardiovascular surgery. We need to adopt policies to encourage more physicians to enroll into training programs, introduce incentives and improve the working conditions of our institutions with cardiovascular surgical capabilities. The present clinicians within the society are the custodians and we need to create an environment to ensure that junior doctors foresee a future in this great profession.



- A: Chitwan Medical College
- B: National Medical College
- C: Lalitpur:
Nepal Medicit Hospital
- C: Bhaktapur:
Shahid Dharma Bhakta National Transplant Center
- C: Kathmandu:
 1. Shahid Gangalal National Heart Centre
 2. Manmohan Cardiothoracic Vascular and Transplant Center
 3. Norvic International Hospital
 4. Green City Hospital
 5. Bir Hospital
 6. Grande International Hospital
 7. Vayodha Hospital
 8. Hospital for Advanced Medicine and Surgery
- D: Dhulikhel Hospital
- E: BP Koirala Institute of Health Sciences (BPKIHS)
- F: Nobel Medical College Teaching Hospital (NMCTH)

Figure 1. Map of Nepal showing institution capable of performing cardiovascular surgery in 2022

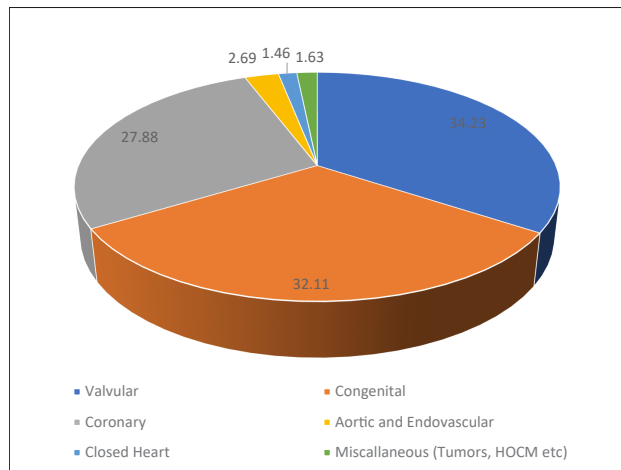


Figure 2. Types of Surgery done in 2019 in percentage

Table 1. Total number of cardiac surgeries performed in the country in 2019

Name of Institutions	Procedures performed (N)
BP Koirala Institute of Health Sciences	74
Greencity Hospital	13
MCVTC	463
Nepal Cancer Hospital	1
Nepal Medicity	47
Noble Medical College	18
Norvic International Hospital	15
SDBNTC	6
SGNHC	1630
Total Surgeries	2267

MCVTC - Manmohan Cardio Thoracic Vascular and Transplant Center, SDBNTC – Shahid Dharma Bhakta National Transplant Center, SGNHC – Shahid Gangalal National Heart Center

Conclusion

In this report, we have summarized the current status of cardiovascular and thoracic surgery in Nepal. Nepal has seen major advances in cardiovascular surgery in the last three decades with increase in number of institutions capable of providing service to its populations and capabilities to perform procedures of advanced complexities. Although well-established now within the country, the challenges for the near future remains in the ability for expansion of these services to the peripheries of the country and the need to ensure that new therapies and new technologies are brought in to the country in a cost-effective mechanism.

The authors declare no conflict of interest.

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