

## Congenital Heart Surgery: Analysis of 102 Cases

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### Abstract:

**Congenital heart diseases (CHDs) are a group of problems in the structure of the heart that is present at birth. Signs and symptoms depend on the specific type of problem. Symptoms can vary from none to life-threatening. CHD is prevalent throughout the world including Bangladesh. It is the leading cause of birth defect-related death. Most of the patients with CHDs need corrective surgery and life-long follow up with heart care. In this series, 102**

**cases of CHD patients were operated, 82 of them were of atrial septal defect (ASD), 12 ventricular septal defect (VSD), 2 Tetralogy of Fallot (TOF) and 6 patent ductus arteriosus (PDA). Operative and post-operative periods were uneventful. There were no major complications including death.**

*Key words: Congenital heart diseases, ASD, VSD, TOF, Cardiac Surgery.*

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### Introduction:

Congenital heart diseases (CHDs) are a group of problems in the structure of the heart that is present since birth. Signs and symptoms depend on the specific type of problem. They frequently present early in life but sometimes may go undetected throughout the life<sup>1</sup>.

Symptoms can vary from none to life-threatening. Shortness of breath, bluish discoloration of skin, stunted growth to heart failure may be the symptoms.

The incidence of congenital heart diseases varies from 4/1000 to 50/1000 live births<sup>2</sup>. Every year 35000 babies in the USA are born with CHD. It is the leading cause of birth defect-related deaths, and 223000 deaths occurred throughout the world in 2003<sup>3</sup>.

Very little is known about the incidence of CHD in Bangladesh. It is estimated that the incidence is 25/1000 live births with predominance of ventricular septal defect (VSD) followed by atrial septal defect (ASD). Tetralogy of Fallot is the commonest cyanotic CHD<sup>4</sup>.

The diagnosis and management of congenital heart diseases have greatly improved over the past few decades.

As a result, almost all children who have CHD survive to adulthood and can live active and productive life.

Most of the patients with congenital heart disease need corrective surgery and life long follow up with heart care even though Interventional cardiology offer minimally invasive alternatives to surgery for some patients.

### Martials and surgical Procedure:

One hundred and two diagnosed cases of CHDs underwent corrective surgery during the period from June 2014 to December 2015. Surgical procedures were done in the National Institute of Cardiovascular Diseases (NICVD) and Al Helal Specialized Hospital, Dhaka.

ASD (secundum and primum) and VSD cases were operated under cardiopulmonary bypass with ischemic arrest. Under direct visualization, the defects were closed directly or with patch graft wherever required.

Patent ductus arteriosus (PDA) cases were legated under direct vision with silk sutures and transfixed with 4/0 polypropylene suture (PROLENE®).

Total correction of TOF was done by closing VSD with pericardial patch and right ventricular (RV) muscles were excised for RV hypertrophy. In some cases of TOF pulmonary arteriotomy was done and pulmonary valves were excised. PA augmentation was made with pericardial patches.

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Postoperatively drainage tubes were removed on the 3<sup>rd</sup> post-operative day in all cases.

**Results:**

One hundred and two CHD surgeries were done during June 2014 to December 2015. Age ranged from 5 years to 60 years with 41 males and 61 females having ratio of 2:3. Age and sex distribution are shown in Table I.

**Table-I**

*Age and sex distribution of study population (N=102)*

| Age range    | Male      | Female    | Total      | Percentage |
|--------------|-----------|-----------|------------|------------|
| 07- 10 years | 4         | 7         | 11         | 10.8       |
| 11-20 years  | 9         | 17        | 26         | 25.5       |
| 21-30 years  | 16        | 24        | 40         | 39.2       |
| 31-40 years  | 06        | 09        | 15         | 14.7       |
| 41-50 years  | 04        | 03        | 07         | 6.9        |
| 51-60 years  | 02        | 01        | 03         | 2.9        |
| <b>Total</b> | <b>41</b> | <b>61</b> | <b>102</b> |            |

Majority i.e. 82 (80.4%) surgeries were done for ASD followed by VSD (12 out of 102 i.e. 11.8%) cases.

**Table-II**

*Congenital heart lesions undergoing surgery (N=102)*

| Defects      | Male      | Female    | Total      | Percentage    |
|--------------|-----------|-----------|------------|---------------|
| ASD          | 31        | 51        | 82         | 80.3          |
| VSD          | 05        | 07        | 12         | 11.8          |
| PDA          | 03        | 03        | 06         | 5.9           |
| TOF          | 02        | 0         | 02         | 2.0           |
| <b>Total</b> | <b>41</b> | <b>61</b> | <b>102</b> | <b>(100%)</b> |

Patch closure was done in most cases of the ASD and VSD. Direct closure was done in 11 cases of ASD and 4 cases of VSD. (Table 3)

**Table-III**

*Types of operation done in ASD & VSD*

| Defects | Direct closure | Patch closure | Total |
|---------|----------------|---------------|-------|
| ASD     | 11             | 71            | 82    |
| VSD     | 04             | 08            | 12    |

Out of 82 ASD cases, 75 were ASD secundum and 7 were ASD primum type.

6 PDA lesions were ligated under direct vision. Total correction was done in all cases of TOF.

Average cross clamp time in ASD was 26 minutes, with minimum 22 minutes and maximum 30 minutes. In VSD

average cross clamp time was 45 minutes with minims of 40 minutes and maximum of 50 minutes.

In TOF, the average cross clamp time was 90 minutes.

**Table-IV**

*Cross clamp time in different surgeries.*

| Cross clamp time | Minimum | Maximum | Average |
|------------------|---------|---------|---------|
| ASD              | 22      | 30      | 26      |
| VSD              | 40      | 50      | 45      |
| TOF              | 70      | 110     | 90      |

Operative procedures and postoperative recovery were uneventful in most of the patients. There were no major post-operative complications. No deaths occurred in this series.

**Discussion:**

In recent years, there has already been general agreement on the indications for treating most of the cardiac malformations in order to improve the natural history of the disease. But still strong disagreement exists regarding timing and methods of treatment. Corrective surgery is needed in most of the cases. Types of surgical procedures vary depending on the specific heart defect. Some of the CHDs can be completely repaired and defects that are more complex often may require several surgeries over the time. In fact, at present, with the advances in pre, peri and post-operative care, congenital heart surgery can be performed in adults with reasonable morbidity and mortality.<sup>5</sup> In the present series, 65.7% patients were older than 20 years of age. However, the outcomes of surgery in these adult CHD patients were very good. In an analysis of the Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database ((2000–2009)<sup>6</sup> including 5265 patients ageing ≥18 years, the overall, in-hospital mortality was 2.1%, and 27% had ≥1 complication. On the other hand, the present series had no in-hospital mortality or major complications. These findings might be due in part to selection bias, with exclusion of more complex cases. Noteworthy here, like the series presented here, mortality was 0% in ASD patients in Congenital Heart Surgery Database.<sup>6</sup> One of the current controversies in the field of adult CHD is whether patients should be cared for at an adult or pediatric facility and by an adult or pediatric heart surgeon. In a series<sup>5</sup> of 303 operations performed on adults (age ≥18 years) with CHD, 185 operations were performed in an adult hospital and 118 in a pediatric hospital, 46 operations were performed by an adult heart surgeon and 257 by a congenital heart surgeon. Mortality was

similar at the adult and pediatric hospitals (4.3% versus 5.1%), but was markedly higher in the adult surgeon group compared with the pediatric surgeon group (15.2% versus 2.7%;  $p = 0.0008$ ). By multivariate analysis, risk factors for mortality included older age at the time of surgery ( $p = 0.028$ ), surgery performed at a children's hospital ( $p = 0.013$ ), and surgery performed by an adult heart surgeon ( $p = 0.0004$ ). In the present study, all the CHD surgeries were performed by the adult cardiac surgeons with good success as evidenced by no mortality and absence of significant complications. This may be attributed by the fact that paediatric cardiac surgery is a relatively new specialty in Bangladesh, and as a result of which the adult cardiac surgeons have to deal with almost all sorts of congenital heart diseases.

The study demonstrates the feasibility and safety of congenital heart surgery in Bangladesh.

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