

# Spectrum of Surgically Treated Congenital Heart Diseases: Single Center Experience

Surgically Treated  
Congenital Heart  
Diseases

Faiz Rasool, Imran Hashim<sup>2</sup>, Jamal Butt<sup>2</sup> and Armaghan Ahmad<sup>2</sup>

## ABSTRACT

**Objective:** Congenital heart disease is the most common birth defect. Congenital heart disease was the underlying cause of an estimated 261 247 deaths globally in 2017. Childrens hospital Lahore is one of the top three high volume center in Pakistan, where more than 1000 cases of congenital heart disease are surgically treated. In this article author has discussed spectrum of diseases which are being treated surgically at Children's Hospital Lahore.

**Study Design:** A Retrospective Study

**Place and Duration of Study:** This study was conducted at the Children's Hospital/Institute of Child Health Lahore from January, 2019 to December, 2019.

**Materials and Methods:** Depending on diagnosis of condition and co morbid status a combined decision between pediatric cardiologists and surgeons was made regarding choice of intervention in the cath conference after reviewing the echocardiogram, angiogram, CT, pulse oxymetry etc.

**Results:** 1177 patients underwent cardiac surgeries. 402 (34%) underwent closed heart surgeries. 61% were male. Age group 1 month to 12 months was the most common age group that made 34% of all cases., TOF, VSD and PDA made the bulk of cases.

**Conclusion:** Most of the congenital heart diseases can be managed surgically at our institute. With the rising incidence of CHD in Asian countries such as Pakistan, establishment of pediatric cardiac surgery units have allowed for the provision of quality care. VSD closure, TOF repair and PDA ligation were the most commonly performed surgical procedures.

**Key Words:** congenital heart diseases, ventricular septal defect, tetralogy of fallots

**Citation of article:** Rasool F, Hashim I, Butt J, Ahmad A. Spectrum of Surgically Treated Congenital Heart Diseases: Single Center Experience Med Forum 2021;32(6):2-4.

## INTRODUCTION

Congenital heart disease is the most common birth defect.<sup>1</sup> Congenital heart disease was the underlying cause of an estimated 261 247 deaths globally in 2017,<sup>2</sup> In a meta-analysis of 260 studies, the mean prevalence of CHD was 9.4 per 1,000 live births<sup>3</sup> with the highest prevalence in Asia. Although one study<sup>4</sup> revealed the prevalence of CHD of 4/1000 live births in Pakistan, another study<sup>5</sup> showed the prevalence of 15/1000 live births but the true prevalence is unknown because of births at rural areas and at homes which are not documented and are not evaluated by health care professionals. It is estimated that every year 42000 babies are born with CHD in Pakistan<sup>6</sup>

<sup>1</sup>: Department of Pediatric Cardiac/Cardiovascular Surgery / Pediatric Surgery<sup>2</sup>, Children's Hospital, Lahore.

Correspondence: Dr. Faiz Rasool, Assistant Professor of Pediatric Cardiac/Cardiovascular Surgery, Children's Hospital, Lahore.

Contact No: 0300-9454461

Email: faiz03009454461@gmail.com

Received: February, 2021

Accepted: April, 2021

Printed: June, 2021

According to cardiothoracic surgeon registry there are 0.52 (0-25.97) pediatric cardiac surgeons per million populations globally. Large disparities exist between regions, ranging from 0.08 pediatric cardiac surgeons per million populations (sub-Saharan Africa) to 2.08 pediatric cardiac surgeons (North America),<sup>7</sup>. With population of 200 million and only 17 pediatric cardiac surgeons in Pakistan, the figure is 0.08 / million in Pakistan.

Children's hospital Lahore Is one of the top three high volume center in Pakistan, where more than 1000 cases of congenital heart disease are surgically treated. In this article author has discussed the spectrum of diseases which are being treated surgically at Children's hospital Lahore.

## MATERIALS AND METHODS

From 1<sup>st</sup> January 2019 to 31<sup>st</sup> December 2019, all the patients who underwent surgery at children's hospital/institute of child health Lahore were retrospectively reviewed. Depending on diagnosis of condition and co morbid status a combined decision between pediatric cardiologists and surgeons was made regarding choice of intervention in the cath conference

after reviewing the echocardiogram, angiogram, CT, pulse oxymetry etc.

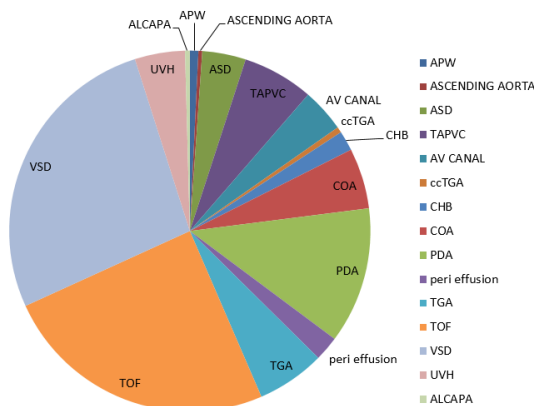
**RESULTS**

in year 2019, total of 1177 patients underwent cardiac surgeries. (fig 1 table 1) 402 (34%) underwent closed heart surgeries. 61% were male. Age group 1 month to 12 months was the most common age group that made 34% of all cases. (table 2 figure 2) PDA ligation was the most common closed heart operation. Other included pulmonary artery banding, modified BT shunt, coarctation of aorta repair, permanent pace maker implantation, aortico pulmonary window ligation and drainage of pericardial effusion. 775 (66%) patients underwent open heart surgeries. VSD was the most common diagnosis (27%).

**Table No.1: Spectrum of surgically managed congenital heart diseases**

diagnosis	Number of cases	Palliative procedure	Corrective procedure
VSD	317 (27%)	44	273
TOF	291 (25%)	81	211
PDA	144 (12%)		144
TAPVC	75 (6%)		75
TGA	72 (6%)	12	60
COA	64 (5%)		64
Univentricular heart	53 (4.5%)	53	0
AV canal defects	46 (4%)	7	39
ASD	46 (4%)		46
Pericardial effusion	26 (2%)		26
ccTGA	6 (0.5%)	6	0
CHB	21 (1.7%)		21
Ascending aortic aneurysm	4 (0.3%)		4
ALCAPA	5 (0.4%)		5
AP window	9 (0.7%)		9

**surgically traeted congenital heart diseases**



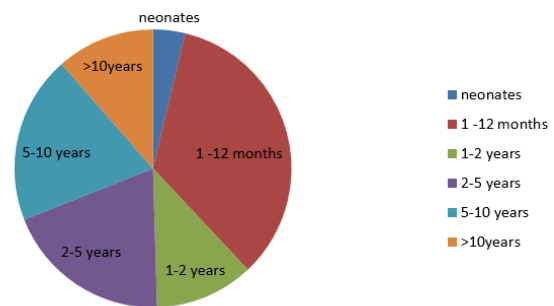
**Figure No.1: TOF, VSD and PDA made the bulk of cases**

VSD closure was the most common operation. Pulmonary hypertension was the most common indication for the VSD closure. (table 3) Tetralogy of fallot (TOF) was second most common diagnosis that accounted for 24% of all cases. As shown in the table, most of the patients underwent total correction. Those patients who were having intractable hypercyanotic spells were treated with modified BT shunt. As shown in the figure 1, TOF, VSD and PDA made the bulk of cases.

**Table No.2: Age Group**

Male	719 (61%)
Female	458 (39%)
Neonates	44 (3.7%)
1-6 months	224 (19%)
7-12 months	179 (15%)
1-2 years	136 (11.5%)
2-5 years	229 (19.5%)
5-10 years	230(19.5%)
>10 years	135 (11.5%)

**Age distribution**



**Figure No.2: Age Distribution**

**Table No.3: VSD break up**

Diagnosis	Number of cases	procedure
VSD with pulmonary hypertension	233	VSD closure
VSD with aortic valve prolapsed	21	VSD closure ± AV repair
VSD with RVOTO	19	VSD closure + RVOT resection
Multiple VSDs	32	PAB
VSD, FTT	12	PAB

**Comparison with other studies in Pakistan:** As shown in table 4, most common surgically corrected disease in Pthan’s study 8 was TOF which is different from our study. Most common operation in other studies 9-11 was VSD closure which is in coherence with our study. Interestingly, ASD closure was only 4% in our study. This is because most of the ASDs are being closed by interventional cardiologists.

**Table No.4: Comparison with other studies in Pakistan**

Diagnosis	Current study	Pathan et al 8	Mehmood 9	Rizvi 10	Sadiq 11
VSD	27%	21%	30%	40%	32%
TOF	25%	42%	11%		16%
PDA	12%	6%	6%		18%
TAPVC	6%				
COA	5%				
TGA	6%	7.6%	5%		
UVH	4.5%	3.7%			
CAVSD	4%	3.2%	3%	10%	
ASD	4%	5.6%	25%	30%	13%

**Comparison with international studies:** As shown in table 5 our study is in coherence with studies 12-14 with VSD closure being the most common operation.

**Table No.5: Comparison with other international studies**

Diagnosis	Current study	Prince hashem hospital 12	FUad Abbag 13	Marry MK shann 14
VSD	27%	43%	32%	39%
ASD	4%	13%	10%	5%
PDA	12%	8%	15%	10%
PS		6%	10%	2.5%
AS		4%	3%	
COA	5%	3%	3%	1%
TOF	25%	9%	4%	12%
COMPLEX CHD	4.5%	2%	3%	5%
TGA	6%	5.5%	2.5%	3%
AVSD	4%	3.6%		

## DISCUSSION

CHD is the most common congenital birth defect with higher mortality rate. Most recent statistics have recorded an increasing trend in CHD occurrence. Its prevalence has escalated from 4.5 per 1,000 live births in 1970-74 to 9.4 per 1,000 live births in 2010-17 (P <0.001 This meta-analysis also reported the highest average prevalence of mild CHD lesions from Asia compared to other parts of the world (9.3 per 1,000 live births.<sup>3</sup> At Children's Hospital Lahore, we have increased the number of surgeries from 530 in 2016 to 1177 in 2019, that is remarkable 2.2 times increase.

## CONCLUSION

Most of the congenital heart diseases can be managed surgically at our institute. With the rising incidence of CHD in Asian countries such as Pakistan, establishment of pediatric cardiac surgery units have allowed for the provision of quality care. VSD closure, TOF repair and PDA ligation were the most commonly performed surgical procedures.

### Author's Contribution:

Concept & Design of Study: Faiz Rasool  
 Drafting: Imran Hashim, Jamal Butt

Data Analysis: Armaghan Ahmad  
 Revisiting Critically: Faiz Rasool, Imran Hashim  
 Final Approval of version: Faiz Rasool

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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