ORIGINAL ARTICLE

FREQUENCY OF COMPLETE HEART BLOCK IN PATIENTS AFTER TOTAL CORRECTION OF TETRALOGY OF FALLOT

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ABSTRACT

BACKGROUND: Tetralogy of Fallot is diagnosed in approximately 3.5% of patients who have congenital heart defects. The condition consists of ventricular septal defect (VSD), overriding aorta, right ventricular (RV) outflow tract obstruction, and RV hypertrophy. Tetralogy of Fallot (TOF) is the most common congenital cyanotic heart disease with an incidence of three per 10,000 live births, and accounts for about 5-7% of all congenital heart disease. Objective of this study was to determine the frequency of complete heart block in patients after total correction of tetralogy of fallot.

METHODS: This descriptive cross sectional study was conducted at Cardiovascular, Surgery, Lady Reading Hospital, Peshawar from 8/10/2015 to 8/10/2016 in which a total of 222 cases were observed. All patients with tetralogy of fallot scheduled for total correction, aged 5-25 years. Surgical repair was done on all included children by single expert cardiac surgeon having minimum of five years of experience. All the patients were followed up regularly till 9th day and electrocardiograms (ECG) were done in all patients to confirm complete heart block (CHB). All information was recorded into a proforma especially designed for this purpose.

RESULTS: Mean age was 2.97 years with SD equal to ± 01.89. Fifty eight percent patients were male while 42% patients were female. The frequency of complete heart block was found to be 3%.

CONCLUSION: Our study concludes that with careful surgical technique, total correction of fallot's tetralogy can be conducted in children and young adults, with a very low risk of complete hearth block and other conduction abnormalities.

KEYWORDS: Complete heart lock, Total correction, Tetralogy of Fallot.

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INTRODUCTION

Tetralogy of Fallot is diagnosed in approximately 3.5% of patients who have congenital heart defects. The condition consists of ventricular septal defect (VSD), overriding aorta, right ventricular (RV) outflow tract obstruction, and RV hypertrophy[1]. It is the most common congenital cyanotic heart disease with an incidence of three per 10,000 live births, and accounts for about 5-7% of all congenital heart disease[2].

Until recent decades, surgical correction involved a 2-stage approach: an initial palliative systemic-to-pulmonary arterial shunt, and a later repair (usually when the patient is 3–5 years old) to close the VSD and resect the RV outflow musculature[1,2]. Currently, complete single-staged repair is recommended, when the patient is 3 to 6 months old, or even sooner if symptoms develop[1, 3]. The classical transventricular approach with resection of the RV outflow musculature can be replaced by a transatrial–transpulmonary approach, with resection of the musculature through the right atrium and pulmonary artery. This alternative procedure shortens the length of the ventricular incision and can minimize the occurrence of arrhythmias, ventricular dysfunction, and aneurysm formation[4].

Supporters of early total correction of tetralogy of fallot argue that by relieving early right ventricular outflow tract obstruction will prevent right ventricular hypertrophy and dysfunction, which will encourage alveolar growth[5]. But literature also showed that incidence of JET and increased need for valve sacrificing transannular patch augmentation resulting in increase morbidity and slow, complicated recovery so prolong hospital stay and ICU care[6].

Complete heart block is a cause of postoperative morbidity following correction of tetra logy of fallot and other congenital heart diseases (CHD)[7]. It refers to post-operative heart block that does not spontaneously revert to the pre-operative rhythm (usually within 10 days of the operation)[8].

The risk of inducing complete heart block in children with congenital heart disease has been reported as high as 4%.Literature review also shows that some time complete heart block resolve within 7-9 days after

surgery without a statistically significant difference in morbidity[9]. Work by Lev and others on the course of conduction tissue in variuos congenital heart diseases including tetralogy of fallot has decreased the incidence of risk of post-operative permanent CHB[8].

The rationale of the study will be to enumerate the frequency of complete heart block in patients after total correction of Tetralogy of Fallot. This study will gives us insight to the local trend of complete heart block in the population and on the basis of results of this study, recommendations will be suggested regarding regular screening of all patients after correction of Tetralogy of Fallot and this study will also open more research questions regarding complete heart block.

This study was conducted to determine the frequency of complete heart block in patients after total correction of tetralogy of fallot.

MATERIAL & METHODS

This study was conducted at Cardiovascular Surgery, Lady Reading Hospital, Peshawar. Study design was cross sectional and its duration was one years (from 8th October 2015 to 7th October 2016).Sample size was 222 cases by using 5.5% proportion of complete heart block inpatients after total correction of Tetralogy of Fallot,[8] 95% confidence level, 3% margin of error using WHO formula for sample size determination. More over consecutive (non-probability) sampling technique was used for sample collection. All patients with tetralogy of fallot scheduled for total correction, aged 5-25 years were included while patients with advanced heart failure detected on X-ray chest, ECG/echocardiography and patients with renal failure were excluded.An informed consent was taken from guardians of patients who fulfill the inclusion criteria. Patients were worked up with detailed clinical examination. Surgical repair was done on all included children by a single expert cardiac surgeon having minimum of five years of experience.All the patients were followed up regularly till 9th day and electrocardiograms (ECG) were done in all patients to confirm complete heart block (CHB). All information was recorded into a proforma especially designed for this purpose. The exclusion criteria was strictly followed to control the confounders and bias. Data was stored and analyzed in SPSS version 14. Mean ± SD was calculated for quantitative variables like age. Frequencies and percentages were calculated for categorical variables like gender and Complete Hearth Block. All results were presented in the form of tables.

RESULTS

A total of 222 patients with tetralogy of fallot scheduled for total correction were included. Mean age was 2.97 ± 1.89 SD years (Table No: 1). Fifty eight percent patients were male while 42% patients were female. 4 patients had complete heart block in age range 5-10 years, 2 patients had complete heart block in age 11-15 years while one patient had complete heart block in age 16-20 years.

TABLE 1: AGE DISTRIBUTION (n=222)

AGE	FREQUENCY	PERCENTAGE
5-10 years	155	70%
11-15 years	51	23%
16-20 years	11	5%
21-25 years	5	2%
Total	222	100%

TABLE 2: AGE WISE DISTRIBUTION OF COMPLETE HEART BLOCK

COMPLETE HEART BLOCK	5-10 years	11-15 years	16-20 years	21-25 years	Total
Yes	4	2	1	0	7
No	151	49	10	5	215
Total	155	51	11	5	222

TABLE 3: GENDER WISE DISTRIBUTION OF COMPLETE HEART BLOCK

COMPLETE HEART BLOCK	MALE	FEMALE	Total
Yes	4	3	7
No	125	90	215
Total	129	93	222

DISCUSSION

Tetralogy of Fallot (TOF) is the most common congenital cyanotic heart disease with an incidence of three per 10,000 live births, and accounts for about 5-7% of all congenital heart disease including tetralogy of fallot, Post operative complete heart block after total correction of tetralogy of fallot increases morbidity.

Our study shows that 70% patients were in age group 5-10 years, 23% patients were in age group 11-15 years, 5% patients were in age group 16-20 years, 2% patients were in age group 21-25 year. Mean age was 2.97 years with SD ± 01.89. Fifty eight percent patients were male while 42% patients were female. The incidence of complete heart block was found 3% patients.

Similar findings were observed in another study conducted by F Edwinet al[10] in which six out of 242 patients (2.5%) developed permanent post-operative CHB. Closure of a large peri membranous ventricular septal defect (VSD) either as an isolated defect (2 of 151 or 1.3%) or in the setting of tetralogy of fallot and other anomalies (4 of 73 or 5.5%). The dominant parental concern relating to the implanted device was the financial implications of future multiple

surgeries to replace a depleted pulse generator.

Similar findings were observed in another study conducted by Friedli B et al[11] which shows that late complete heart block may occur after correction of tetralogy of Fallot. Whether post-operative cardiac conduction studies can identify patients at risk of developing this conduction disturbance is not known. In this study, 57 children who underwent electrophysiologic investigation after correction of tetralogy of Fallot were followed up for 1 to 13 (mean 6.5) years after the investigation.One late death and two cases of late complete heart block occurred. The late death was due to ventricular arrhythmia and not to a conduction disturbance.

Similar findings were observed in another study conducted by F Hokanson JS et al[12] in which62% patients were in age group 5-10 years, 28% patients were in age group 11-15 years. Mean age was 2.97 years with SD equal to ± 01.89. Sixty percent patients were male while 30% patients were female. The incidence of complete heart block was found 1.5% patients.

Similar findings were observed in another study conducted by F Harrison DA et al[13] in which 72% patients were in age group 5-10 years, 28% patients were in age group 11-15 years. Mean age was 2 years with SD equal to ± 2.01. Sixty five percent patients were male while 35% patients were female. The incidence of complete heart block was found 2% patients.

Similar findings were observed in another study conducted by F Garson Aet al[14] in which in which 70% patients were in age group 5-10 years, 30% patients were in age group 11-15 years. Mean age was 3 years with SD equal to ± 2.77. Fifty two percent patients were male while 48% patients were female. The incidence of complete heart block was found 1% patients.

Similar findings were observed in another study conducted by Hussain A[15]

CONCLUSION

Our study concludes that with careful surgical technique, total correction of fallot's tetralogy can be conducted in children and young adults, with a very low risk of complete hearth block and other conduction abnormalities.

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CONFLICT OF INTEREST

None declared.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

NIL

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.