SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY THIRUVANANTHAPURAM

DEPARTMENT OF CARDIOLOGY

ARRHYTHMIAS IN POST SURGICAL TETRALOGY OF FALLOT PATIENTS

A THESIS SUBMITTED FOR THE DEGREE OF

DM CARDIOLOGY

DR. KARTHIK R

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DEPARTMENT OF CARDIOLOGY, SCTIMST, TRIVANDRUM

CERTIFICATE

I hereby certify that the work in this dissertation titled "Arrhythmias in Post-Surgical Tetralogy of Fallot Patients" is a certified record of original research work undertaken by Dr. Karthik R in the Department of Cardiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology in partial fulfilment of requirement for the award of D.M. Cardiology degree.

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I, Dr.Karthik R, hereby declare that the project in this book, titled "Arrhythmias in Post-Surgical Tetralogy of Fallot Patients" was undertaken by me under the supervision of the faculty, Department of Cardiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology.

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CONTENTS

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Dr. Karthik R

ABBREVIATIONS

ToF - Tetralogy of Fallot

NYHA - New York Heart Association

ICR - Intracardiac Repair

TAP - Transannular Patch

RV - Right Ventricle

RVOT - Right Ventricular Outflow Patch

VSD - Ventricular Septal Defect

PA - Pulmonary artery

MR - Mitral regurgitation

PAH - Pulmonary artery hypertension

LA - Left atrium

RA - Right atrium

SD - Standard deviation

IQR - Interquartile range

RBBB - Right Bundle Branch Block

LAD - Left axis regurgitation

QRSd - QRS duration

cQT - Corrected QT interval

PLAX - Parasternal long axis view

PR - Pulmonary regurgitation

TR - Tricuspid regurgitation

EF - Ejection fraction

RVSP - Right ventricular systolic pressure

PASP - Pulmonary artery systolic pressure

CMRI - Cardiac Magnetic Resonance imaging

RVEDVI - Right ventricular End Diastolic Volume Index

RVESVI - Right ventricular End Systolic Volume Index

LGE - Late Gadolinium Enhancement

SYNOPSIS

Background

Tetralogy of Fallot (ToF) is the most common cyanotic congenital heart disease (0.34/1000 live births), with a good outcome after surgical correction. Arrhythmias are a common cause of morbidity and mortality in post-surgical ToF patients.

Aim

To describe the arrhythmic complications in post-surgical ToF patients.

Methods

This is a descriptive single-center study with retrospective case enrolment and cross-sectional follow-up. Patients who underwent surgical correction for ToF from January 1999 to December 2005 were identified by a search of an institutional database. All patients on follow-up were contacted by telephone. Clinical characteristics were noted and an electrocardiogram, 2D echocardiography, and 24-hour Holter study were done and analysed.

Results

A total of 504 patients underwent surgical repair for ToF between January 1999 and December 2005. The median age at the time of surgery was 5(3-9) years and 57.9% were males. The most common surgical technique used was intracardiac repair and transannular patch [363(72.1%)]. 225(45.04%) of patients were on regular follow up. Most patients (83.6%) were asymptomatic (NYHA Functional Class I). The median QRS duration was 130 (120-150) ms and right bundle branch block was noted in 71.1% of patients. Arrhythmias were documented in 25.7% of patients in ECG and on 27.4% of patients on 24-hour Holter and all arrhythmias increased with a longer duration of follow up. Ventricular arrhythmias were the most common form of arrhythmias in ECG and 24-hour Holter (11.4% and 17.6%). Right ventricular dilatation (2D PLAX) and dysfunction on follow-up were independently associated with the development of atrial arrhythmias. The presence of right bundle branch block with left axis deviation (RBBB+LAD) and prolonged PR interval was independently associated with the

development of bradyarrhythmias on follow up. Kaplan Meier analysis of arrhythmias on follow up show an increase in incidence of arrhythmias with longer duration of follow up.

Conclusion

Arrhythmias in post-surgical Tetralogy of Fallot patients were documented in the electrocardiogram and 24-hour Holter in 1/4th of patients with ventricular arrhythmias being more common on follow up. The presence of right ventricular dilatation and dysfunction were independently associated with development of atrial arrhythmias. The incidence of all arrhythmias increased with a longer duration of follow up.

INTRODUCTION

Tetralogy of Fallot (ToF) is the most common type of cyanotic congenital heart disease with an incidence of 0.34 per 1000 live births(1). The first surgical correction for ToF was performed in the year 1954(2). Since then, multiple epidemiological studies have collected evidence regarding the natural history of patients who have undergone surgical correction for ToF and revealed that these patients have a 30-year survival rate of around 90%(3).

Arrhythmias is post-surgical ToF patients are an important cause for morbidity and mortality on long term follow up. On further analysis of the survival curves of these patients, it was noted that late mortality increases postoperatively beyond 25 years from 0.24%/year to 0.94%/yr. The main cause of this late mortality was sudden cardiac death due to sustained ventricular tachycardia or ventricular fibrillation(4).

Arrhythmias in these patients occur due to electrical instability secondary to anatomical modifications after surgery or from mechanical causes such as ventricular dilatation or dysfunction. The fibrous tissue that forms around the surgical scar can form a substrate for reentrant arrhythmias. Local abnormalities in ventricular depolarization and repolarization are also responsible for the genesis of cardiac arrhythmias(5).

In view of the increasing number of patients with surgical correction of ToF surviving into adulthood, the complete understanding of the risk factors for the development of arrhythmias is of paramount importance to identify a subgroup of patients who will require monitoring and further management.

Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST) is a tertiary care cardiac center located in Thiruvananthapuram, Kerala. It caters to patients from Kerala and the border districts of Tamil Nadu. There is a large cohort of ToF patients who have undergone surgical correction in our Institute. We aim to describe the arrhythmic complications in patients with surgical correction of ToF and examine the risk factors that predispose to the development of arrhythmias.

REVIEW OF LITERATURE

Tetralogy of Fallot (ToF) was first described in the year 1888 by Louis Arthur Etienne Fallot. He termed the condition as La Maladie Bleue and noted that the clinical description of this physiology was due to the combination of anatomic malformations, now referred to as tetralogy of Fallot(6). The combination included the presence of a ventricular septal defect, a biventricular connection of the aortic root which overrides the ventricular septum, right ventricular outflow tract obstruction, and right ventricular hypertrophy(7).

ToF is the most common type of cyanotic congenital heart disease with an incidence of 0.34 per 1000 live births(1). Surgical correction of this condition can be done with good outcomes with a survival rate at 30 years being 90%(3).

The surgical technique for the correction of ToF has undergone various improvements since the first ToF surgery in 1955. This is mainly due to the variability of phenotypic presentation of the condition. The different approaches are tailored to patients' anatomy with special consideration given to the right ventricular outflow tract and the related pulmonary valve stenosis.

The most common technique of repair in the initial surgeries was ventricular septal defect closure and transannular right ventricular (RV) outflow patch to relieve the obstruction. However, this is not to be considered as a complete resolution of the disease as it treats the problem of cyanosis, but the patient will require subsequent interventions to treat the surgical sequelae. The most commonly used surgical strategy presently is based on the concept that the pulmonary annulus may be preserved and a mixed lesion of moderate pulmonary stenosis and associated regurgitation has better outcomes than relief of the obstruction and free pulmonary regurgitation. On follow up the transannular patch results in free pulmonary regurgitation and the pulmonary stenosis that remains after the conservative surgical approach leads to RV dilatation and RV hypertrophy respectively(8).

Arrhythmias in post-surgical Tetralogy of Fallot

The first surgical repair for ToF was performed by Dr. D.C.Lillehei in 1954. Around 15 to 20 years later the first cases of sudden cardiac arrest in surgically repaired ToF patients were noted and these were suspected to be due to malignant ventricular arrhythmias(9). Since then, sudden cardiac death has been reported repeatedly as the major cause of death in repaired ToF. Many studies have assessed the risk of sudden cardiac death in TOF and noted it to be between 0-0.8% yearly(10,11). Analysis of survival curves shows that these patients have a late mortality increases postoperatively beyond 25 years from 0.24% per year to 0.94% per year(4).

Mechanisms of Arrhythmias

Arrhythmias occur in post-surgical ToF patients due to multiple reasons. The sequelae of the initial surgery which includes scar formation leads to the development of reentrant circuits(12). The formation of these circuits requires a region of slow conduction that is usually bordered by the electrically unexcitable scar tissue that is pathognomonic of a ventriculotomy scar or patch material(13).

Increasing severity of pulmonary regurgitation results in chronic right ventricular volume overload, right ventricular dilatation and QRS prolongation. Gatzoulis et al studied the mechanoelectrical factors in 178 post-surgical ToF patients and noted that a QRS duration of 180 milliseconds or longer was predictive of life-threatening ventricular tachycardia with a sensitivity of 100% and specificity of 96%(14).

The mechanism for the development of atrial tachycardia is due to hemodynamic factors. In studies that used animal models to reproduce the different hemodynamic conditions following ToF repair, it was noted that those animals with chronic right ventricular(RV) volume overload due to pulmonary valvotomy were significantly more likely to develop sustained atrial arrhythmias(15).

Post-surgical ToF patients who develop atrial tachycardia have been reported to have significantly larger mean right atrial dimensions and volume compared to age-match patients without arrhythmias (16). Assessment of RV diastolic function by tissue doppler imaging has shown that reduced early RV diastolic velocity is significantly reduced in post-surgical ToF patients that develop atrial arrhythmias(17).

Despite the presence of a scar due to the previous atriotomy, Mah et al noted that the most frequently observed atrial tachycardia in these patients is isthmus-dependent atrial flutter and the cavotricuspid isthmus has been identified as the critical area for ablation in most patients(18). They also noted that 10% of patients with atrial arrhythmias were identified as focal atrial tachycardia. Chronic volume overload of the right atrium results in dilatation of the right atrium and in conjunction with an atriotomy incision leads to the development of scarring and fibrosis of the atrium resulting in the formation of micro-reentrant focal tachycardia(19).

Ventricular arrhythmias in post-surgical Tetralogy of Fallot

Patients with a history of surgical repair for ToF have a high ventricular arrhythmia burden. Khairy et al studied 556 post-surgical ToF patients with a mean age of 36.8± 12 years and followed up for 30 years post-surgery. They noted that 43.3% had documented atrial or ventricular arrhythmias. The most common subtype of arrhythmias documented in their study was ventricular tachycardia which was noted in 14.2% of patients. This was followed by intra-atrial re-entrant tachycardia (IART) in 11.5% of patients(20). Nakazawa et al studied arrhythmias late after repair in 512 post-surgical ToF patients with a mean follow-up duration of 11.7 years and noted that the incidence of ventricular arrhythmias was 3.5% with ventricular tachycardia occurring in 0.3% of patients(21). The difference between the incidence of ventricular arrhythmias between these two studies is likely due to the longer duration of follow-up and more advanced age of the patients in the former group.

The incidence of ventricular arrhythmias also depends on the route of surgical repair. Patients who underwent transatrial repair are less likely to develop ventricular arrhythmias. Dietl et al studied the incidence of arrhythmias in 2 groups of patients who underwent transventricular (n=71) or transatrial (n=36) repair. They noted that in the group that underwent transventricular repair, 39.4% of patients had significant ventricular arrhythmias while in the group that underwent transatrial repair only 2.8% of patients had significant ventricular arrhythmias(22).

Sudden cardiac death has been reported in 1.5-5% of patients after surgical repair of ToF and many studies have implicated ventricular arrhythmias as the causative factor(23,24). Garson et al studied 488 post-surgical ToF patients with a mean follow-up period of 6.1 years and noted that 13.5% of patients had ventricular arrhythmias on a routine electrocardiogram. Ventricular arrhythmias on routine electrocardiogram were noted in all patients who died of sudden cardiac death compared to 10% of patients who survived (p=<0.01).

However, the incidence of sudden death depends on the duration of follow-up, with the incidence increasing with increasing duration of follow-up. Nollert et al studied 490 patients with ToF and noted that annual mortality increased from 0.24% per year to 0.94% after 25 years. They noted that the most common cause of death was sudden cardiac death(2.6%). They also found that higher age at surgery, elevated right ventricular systolic pressure postoperatively and preoperative polycythemia were risk factors for sudden cardiac death(4).

Electrocardiographic predictors of ventricular arrhythmias

After surgical repair for ToF, the intraventricular conduction is prolonged and is indicated by the presence of a right bundle branch block. The right bundle branch block(RBBB) occurs commonly due to damage of the proximal right bundle during infundibular resection at the time of surgical repair(25). Incidence of right bundle branch block varies from 60% to 100% in this group of patients(26).

QRS duration has been found to have a significant correlation with the occurrence of ventricular arrhythmias. Gatzoulis et al studied the risk factors for arrhythmia and sudden cardiac death in 793 patients with surgical repair for ToF at a mean time of 21.1 years from surgery and noted that QRS duration was significantly higher in patients who developed ventricular tachycardia and in those who had sudden cardiac death(27).

A QRS duration >180 ms has a 100% sensitivity for sustained ventricular tachycardia and sudden cardiac death, whereas a QRS duration of <180ms has a negative predictive value of 100% for these events(14). A high rate of increase in QRS duration(3.5ms/yr) has also been found to identify patients at risk of ventricular tachycardia and sudden

cardiac death(27). Balaji et al studied whether QRS duration can predict inducible ventricular tachycardia during an electrophysiological study in 135 patients of post-surgical ToF and noted that a QRS duration of >180ms had a high specificity for predicting ventricular tachycardia(28). Pulmonary regurgitation and right ventricular dilatation are associated with a prolonged QRS and these factors are also found to be significantly associated with sudden cardiac death(29).

Fragmented QRS complexes on ECG are associated with right ventricular dysfunction and myocardial fibrosis in post-surgical ToF patients(30,31). Egbe et al studied the role of QRS fragmentation for risk stratification in 465 adults who underwent surgical repair for ToF with a mean follow-up duration of 13.6 years. They noted that 12 % of patients had sudden cardiac death on follow up and the presence of a severe QRS fragmentation (involving ≥5 leads) and this was an independent predictor of all-cause mortality(32).

The corrected QT interval (QTc) is significantly associated with the development of ventricular tachycardia. Berul et al studied the electrocardiographic markers of late sudden death risk in 101 post-operative ToF patients with a mean follow-up duration of 8.3 ± 4.4 years and noted 13.8% of these patients developed ventricular arrhythmias. They compared these patients to a control group of 1000 age and gender-matched subjects. The mean QTc in the control group was 0.42±0.02 seconds and 0.53±0.05 seconds in the ToF VT group which was statistically significant($p<0.01$). However, the authors concluded that when QRS prolongation and QTc were compared, a prolonged QRS duration had more sensitivity and specificity for identifying vulnerability to late-onset ventricular arrhythmias and sudden cardiac death(33).

Supraventricular Arrhythmias

Adults with surgically repaired ToF develop increased right atrial pressure, hypertrophy, and fibrosis secondary to increased right ventricular end-diastolic pressure and chronic right ventricular systolic pressure overload resulting from pulmonary valve regurgitation. These hemodynamic changes in combination with the presence of an atriotomy scar leads to the development of atrial arrhythmias which are commonly re-entrant atrial tachycardias around the atriotomy scar(34).

Roos- Hesselink et al studied 53 patients with a mean age of 23.2 years who had undergone surgical repair of ToF at a mean age of 9.1 years and followed up for a mean duration of 17.5 years. They noted that 22.6 % of patients developed atrial fibrillation or flutter and 11.3 % of patients developed other forms of supraventricular tachycardia. It was also noted that atrial fibrillation or flutter occurred more commonly in patients who were older on follow up (35).

Another study by Harrison et al analyzed the atrial arrhythmias in 242 adults after surgical repair of ToF and noted that 12% of patients had atrial tachycardia. They compared the baseline characteristics and clinical outcomes of the group with atrial tachycardia with the remaining patients (arrhythmia free group). The authors noted that the group with atrial tachycardia had significantly more events (congestive cardiac failure, reoperation, subsequent ventricular tachycardia, stroke, and death) than the arrhythmia free group (69% vs 30%). The event-free survival was significantly lower in the atrial tachycardia group (18± 2 years vs 28 ± 16 years, $p < 0.001$). The atrial tachycardia group had a higher proportion of significant pulmonary regurgitation and mean right atrial volume than controls(36).

A multicenter study by Gatzoulis et al analyzed 793 post-surgical ToF patients with a mean age of 8.2 years and a mean follow-up duration of 21.1 years. They noted that 3.5% of the study population developed atrial flutter or fibrillation. A higher risk of sudden cardiac death and atrial arrhythmias were noted in patients with a greater age at the time of repair. The authors also noted that tricuspid regurgitation was the main risk factor for the development of atrial arrhythmias(27).

Bradyarrhythmias

Post-surgical ToF patients are commonly found to have disturbances in atrioventricular conduction. This disturbance is usually indicated by the presence of a right bundle branch block (RBBB) which is seen in 80% of patients. Other patterns include a combination of right bundle branch block and left axis deviation in 11% of patients and combined right bundle branch block, left axis, and first degree atrioventricular (AV) block in 3% of patients. Most patients with RBBB after ventriculotomy have a benign prognosis(34).

A study by Garson et al analyzed 488 patients with a history of surgical repair for ToF with a mean age of repair of 6.4 years and a mean follow-up duration of 12.4 years. They noted complete right ventricular bundle branch block and left anterior hemiblock in 10.6% of patients. There were no patients with 2^{nd} or 3^{rd} degree AV block on routine electrocardiogram on follow up. In 2% of patients who underwent 24-hour holter on follow up short episodes of type I second degree AV block were noted (37).

A multicenter study conducted by Nakazawa et analyzed 512 patients post-surgical ToF patients with a mean age at surgery 4.4 ± 6 years, mean age after follow up 23.4± 9.3 years, and mean follow-up duration of 11.7±7.2 years. The prevalence of bradyarrhythmias in the study population was 8% and the incidence of 2^{nd} and 3^{rd} degree AV block were around 4% and 3% respectively. On analyzing patients with 3^{rd} degree AV block they noted that majority of these patients had a perimembranous ventricular septal defect. The authors also noted that none of the patients who had perioperative transient complete AV block developed complete heart block on follow up. On follow-up, two patients with 2^{nd} degree AV block progressed to complete heart block on follow up and required pacemaker implantation(21).

Ambulatory Holter Monitoring

Ambulatory ECG (24-hour Holter) Monitoring has allowed for greater detection of supraventricular arrhythmias, ventricular ectopics, and non-sustained ventricular tachycardia. A study analyzing the outcomes of patients after surgical repair of ToF (with specific reference to the treatment of ventricular arrhythmias) in 488 patients with a mean follow-up of 7.3 years, noted that premature ventricular complexes were present in 13.7% of patients on a routine electrocardiogram. Only 97 patients had a 24 hour Holter done which showed ventricular arrhythmias in 73% of these patients. Premature ventricular complexes were noted in 56% of these patients and 6% of patients had ventricular tachycardia(37). The premature ventricular complex (PVC) rate (>10 PVCs per hour) detected on 24 hour Holter was noted in this study as a significant predictor of sudden cardiac death in post-surgical ToF patients and the authors noted that the reduction in PVC rate to <10 PVC per hour reduces the rate of sudden cardiac death(37).

Cullen et al studied the prognostic significance of ventricular arrhythmia after repair of ToF in 86 patients with a follow-up duration of 12 years. Supraventricular arrhythmias were noted in 10.4% of patients. Patients were divided into two groups at the initial assessment based grade of ventricular arrhythmias on a 48 hour Holter (according to Lown criteria). The group that was classified as high grade of ventricular arrhythmias had 34.8% of patients with complex extrasystoles and 8.1% of patients had non-sustained ventricular tachycardia on 48 hour Holter. At the end of follow-up duration, the absolute difference in mortality between the two groups was 1.5% which was not found to be statistically significant(38).

A serial follow-up of adults with repaired tetralogy of Fallot was studied by Waien et al in 151 patients with a mean follow-up duration of 3.2 years. A subgroup of 36 patients was followed up for a mean duration of 6.7 years with 3 yearly 24 hour Holter, exercise ECG and exercise radionuclide angiography. They noted that the overall mortality rate was low and clinically 94% of patients with New York Heart Association (NYHA) Functional Class I. Most patients in this study had no significant arrhythmias and no significant change in the severity of arrhythmias on follow up(39).

Echocardiographic Assessment

After the surgical repair for ToF, one of the most important risk factors that determine both the right and left ventricular performance is pulmonary valve regurgitation(PR) (8). Depending on the severity of PR, there is progressive right ventricular dilatation and dysfunction. The dilatation of the tricuspid annulus due to chronic RV volume overload results in some degree of tricuspid regurgitation. Tricuspid regurgitation and right ventricular dilatation are important risk factors for the development of arrhythmias and sudden cardiac death(27).

The right ventricular dilatation and remodeling are secondary to volume and pressure overload cause alteration in the left ventricular and septal geometry. This along with post-surgical paradoxical septal motion and ventricular dyssynchrony result in left ventricular dysfunction(40).

The echocardiographic assessment of adult post-surgical ToF patients should be focused on the assessment of markers of right ventricular function and severity of pulmonary regurgitation in order to determine the appropriate timing for pulmonary valve replacement(41). The assessment of the RV after ToF surgery with echocardiography should include dimensional measurements to determine the degree of RV dilatation and assessment of RV function.

Tricuspid annular plane systolic excursion (TAPSE) measures the systolic excursion of the RV annular plane toward the apex. It has the advantages of being an easy echocardiographic measurement, can be measured rapidly, and is widely used even if its reliability is controversial(42,43). A TAPSE value of <17 mm is suggestive of RV longitudinal dysfunction in adults. In children, the absolute value of TAPSE must be indexed to the RV longitudinal diameter(TAPSE/RV longitudinal diameter ratio lower than 25% suggests longitudinal dysfunction)(44). Limitations of TAPSE include, in patients with severe RV hypertrophy radial contraction becomes the predominant direction of RV systolic deformation(45) and while measuring the longitudinal deformation, TAPSE may underestimate the real systolic function(8). Secondly, another factor that may reduce the sensitivity of TAPSE in the assessment of systolic function is the fact that TASPE is strongly preload dependent.

Sustained ventricular tachycardia and sudden cardiac death are known to be associated with increasing RV dimensions. Kavey et al studied 38 post-surgical ToF patients with M mode echocardiography and radionuclide ventriculography to assess whether subclinical levels of ventricular dysfunction in these patients is associated with the development of ventricular arrhythmias. They noted that patients that develop ventricular arrhythmias had a significantly more dilated right ventricle and had ventricular dysfunction as assessed by radionuclide ventriculography(46).

Daliento et al studied 66 post-surgical ToF patients who underwent repair by ventriculotomy to assess the prognostic significance of non-invasive clinical diagnostic indices as predictors of ventricular tachycardia and ventricular fibrillation. The mean age of the study population was 11.8 years and the mean duration of follow-up was 16.1 years. They noted that 28.7% of patients developed ventricular arrhythmias (on ECG

or 24 hour Holter monitoring). Non sustained ventricular tachycardia was noted in 10.6% of patients and sustained VT or VF was present in 9% of patients. The authors noted that an increased right ventricular end-diastolic volume (RVEDV) was the most significant marker for malignant ventricular arrhythmias(47).

The use of continuous-wave Doppler is helpful in the measurement of pulmonary gradient and allows the estimation of the severity of pulmonic stenosis. This is however unreliable in conditions where there is a suboptimal alignment of the ultrasound beam with the pulmonary flow, in the presence of pulmonary hypertension and peripheral pulmonary stenosis. Peripheral pulmonary stenosis and pulmonary hypertension lead to a reduction in the anterograde peak gradient which can, in turn, lead to an underestimation in the severity of stenosis. Also, if the velocity of Tricuspid regurgitation exceeds the velocity of pulmonary flow, the severity of pulmonic stenosis can be underestimated. Branch pulmonary artery stenosis is more common than pulmonary hypertension in ToF patients and should be ruled out at the time of pulmonary valve replacement.

AIM AND HYPOTHESIS

AIM:

To describe the arrhythmic complications in post-surgical Tetralogy of Fallot patients.

HYPOTHESIS:

Post-surgical Tetralogy of Fallot patients have a high risk of developing arrhythmias secondary to the formation of pro-arrhythmic substrates (scar tissue) and right ventricular dilatation and dysfunction after surgery.

STUDY OBJECTIVES

PRIMARY OBJECTIVE

To describe the arrhythmic complications in post-surgical Tetralogy of Fallot patients who underwent surgery between 1999 and 2005.

MATERIALS AND METHODS

Design: Retrospective cohort and cross-sectional study

Setting: Tertiary referral center, a university-level hospital (SCTIMST)

Inclusion Criteria:

All Tetralogy of Fallot patients who underwent surgical correction between 1999 to 2005 identified by a search of an institutional database and by a search of databases from the Departments of Cardiac Surgery and Cardiology.

Exclusion Criteria

- Patients not willing to participate in the study
- Arrhythmias documented within 3 months after surgery were excluded

Sample size- Based on previous studies that have reported prevalence of arrhythmia ranging from 10%-34%. Assuming 16 % of post-operative TOF patients develop Arrhythmia. To estimate a 95% CI within +/- 4%, a minimum of **350 patients** are required for the study. Assuming patients lost to follow up since 1999, a sample size of **500 patients** is required.

Methodology

This is a descriptive single-center study with retrospective case enrolment and cross-sectional follow-up. Patients who underwent surgical correction for ToF from January 1999 to December 2005 were identified by a search of an institutional database and by a search of databases from the Departments of Cardiac Surgery and Cardiology. Data were collected by the principal investigator. All patients were contacted by address/phone and recruited for the study by the investigating cardiologist. The patients were recruited by the investigators considering the inclusion and exclusion criteria. The investigating cardiologist educated the patient regarding the proposed study. A consent form, written either in English or in the Malayalam language, was signed by the patient and a witness. An attempt was made through the local governing bodies to contact the patients/ family members who did not respond to the calls or to the letters sent to the address mentioned. Patients who have died subsequently would be identified by records

maintained in the Cardiac Surgery Department with the help of the Medical social worker in the department.

Patients data on follow up such as an electrocardiogram (ECG) and 2D echocardiography (2D echo) within 2 years of enrollment were collected from the institutional database and analyzed. All patients on follow up who were contacted by telephone were advised a routine ECG, 2D ECHO and 24-hour Holter. Patients who were unable to visit the SCTIMST OPD were advised to undergo the investigations at a nearby hospital and email the reports to the investigator. Follow-up ECG was analyzed for PR interval, QRS duration, axis, QRS fragmentation, corrected QTc, presence of RBBB, incomplete RBBB, right ventricular hypertrophy and strain. Data collected from 2D echo on follow up included left ventricular dimensions and ejection fraction, right ventricular dimension (PLAX view), right ventricular systolic function (TAPSE), right ventricular outflow tract gradient, severity of pulmonary regurgitation and tricuspid regurgitation and right ventricular systolic pressure. Data from further imaging (Cardiac MRI) and electrophysiological study (EP study), if present, were also collected and analyzed.

Ventricular arrhythmias were defined as:
- Premature Ventricular complexes (Multiple, Couplets) on ECG
- Premature Ventricular complexes >240/day(>10 PVC/hour) on 24 hour Holter(37)
- Documented Non-sustained ventricular tachycardia(<30sec) on ECG or Holter
- Documented ventricular tachycardia on ECG or Holter

Atrial arrhythmias were defined as:
- Documented atrial tachycardia, atrial flutter, atrial fibrillation on ECG or Holter

Bradyarrhythmias were defined as:
- Documented AV block on ECG or Holter
- Documented Pause >3 sec on Holter

Data Analysis

The data analysis was performed using the SPSS Statistics software for Windows Version 21 by the investigators with the guidance of Prof Sankara Sarma, Department of Biostatistics, SCTIMST. Descriptive statistics for all variable comparisons were performed using appropriate univariate hypothesis tests. Categorical variables were expressed as with-in group percentages and compared for independent samples using either the Pearson's test or Fisher's exact test. Continuous variables were expressed as either mean standard deviation or median depending on the overall variable distribution. Independent sample, single-factor analysis of variance was used for parametric data comparisons, whereas the Mann Whitney *U* test was used for all nonparametric data comparisons.

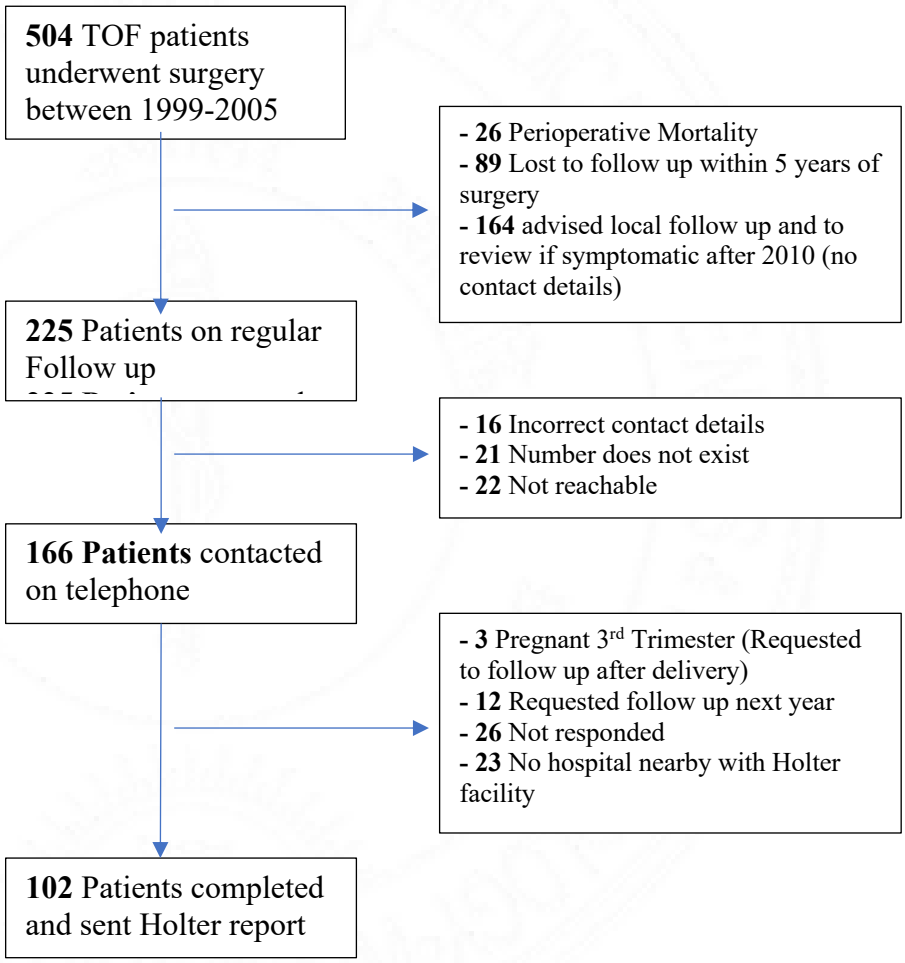
Potential risk factors for outcomes were evaluated using a regression model and multiple regression analysis was performed for outcomes with P values less than 0.1. Kaplan Meier analysis was done to analysed the incidence of arrhythmias in relation to time. The data will be stored in the personal computer of the principal investigator for a period of three years, maintaining confidentiality.

RESULTS

There were a total of 504 patients who underwent surgical repair for Tetralogy of Fallot (ToF) between 1999-2005. 26 patients had perioperative mortality prior to discharge. 89 patients were lost to follow up within 5 years of the surgery. 166 patients were advised local follow up and to review if symptomatic after 2010 (No contact details were available). 225 patients were on regular follow up and had visited the SCTIMST outpatient department within the last 2 years. 166 patients were contacted on the phone and advised to get a 24 hour Holter report. A total of 102 patients completed the 24 hour Holter.

The following figure depicts the number of patients included(Fig 1)

Figure 1



CHARACTERISTICS OF INCLUDED PATIENTS

TABLE 1: Baseline clinical characteristics of patients

Patient Characteristics(n=504)	Observation
Age at Surgery (in yrs) *	**5(3-9)** [0.5-44]
Gender‡	
Males	292(57.9%)
Females	212(42.1%)
Weight (in kg) *	14(10-21)
Pre Op Diagnosis‡	
TOF	504(100%)
Associated defects‡	
Branch PA stenosis	46(9.1%)
Absent PV	12(2.3%)
Pulmonary atresia	7(1.3%)
Disconnected PA	1(0.2%)
Coarctation of Aorta	2(0.3%)
Cyanotic Spells‡	190(37.7%)
BT shunt‡	49(9.7%)
Pre-Op saturation(%)†	83.3±5.8
ECHO(pre-op)	
Ejection Fraction(%)[M Mode] *	71(66-76)
LV dimension	
Diastole(mm) *	24(20-29)
Systole(mm) *	15(12-18)
RV dimension(PLAX)(mm) *	15(13-18)
Post Op Saturation(%)†	96.4±2.7

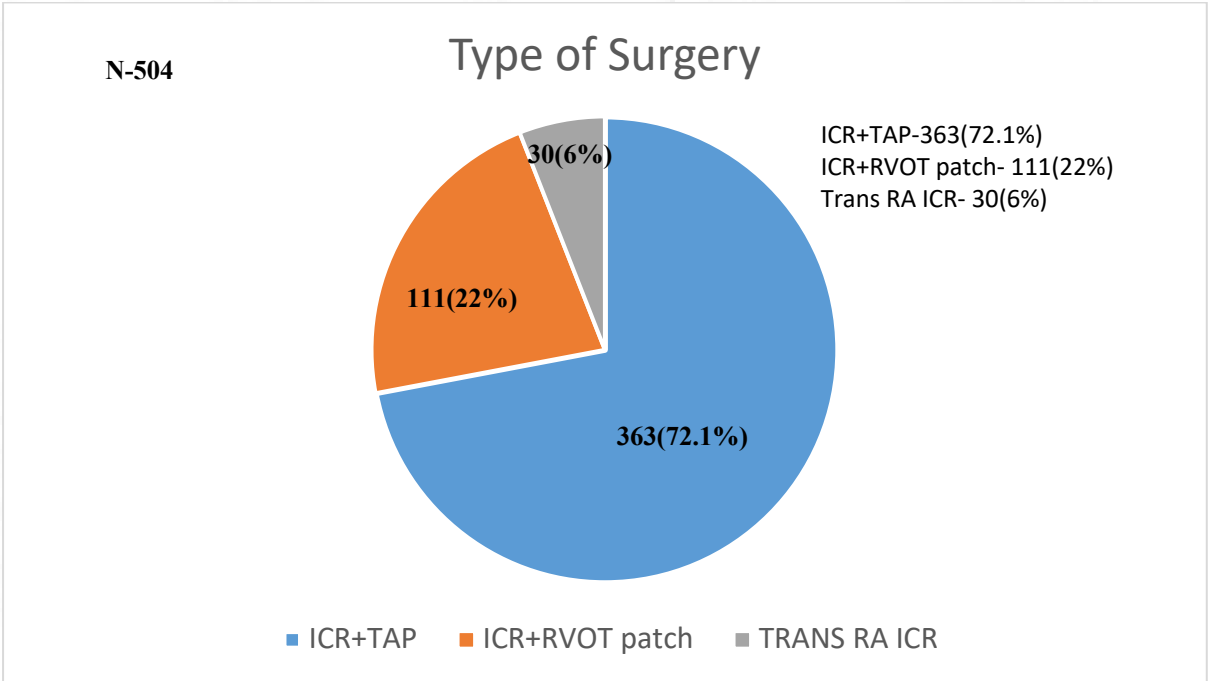
TOF- tetralogy of fallot, PA- pulmonary artery, PV- pulmonary valve, BT shunt- Blalock Taussig shunt, PLAX- parasternal long axis view

*Median(IQR) † Mean(±SD) ǂ Frequency(%)

The baseline clinical characteristics of the patients are given in Table 1. The median age at the time of surgery was 5(3-9) years. The youngest patient to get operated on was 6 months of age and the oldest was 44 years of age. A majority of them were males 293(57.9%). The median weight at the time of surgery was 14 (10-21) kg. All patients were diagnosed with Tetralogy of Fallot and 68(13.5%) had associated defects, the most common being branch pulmonary artery stenosis 46(9.1%). Cyanotic spells were noted in 190(37.7%) and a BT shunt was a prior surgical procedure in 49(9.7%) patients. The mean pre-op saturation was 83.3±5.8 % and the mean post-op saturation was 96.4±2.7 %.

All patients had a pre-op echocardiogram. The median ejection fraction(M Mode) was 71(66-76) %. The median left ventricular dimensions in diastole was 24(20-29) mm and in systole was 15(12-18) mm. The median RV dimension(PLAX) was 15(13-18) mm

FIGURE 1: Surgical Technique



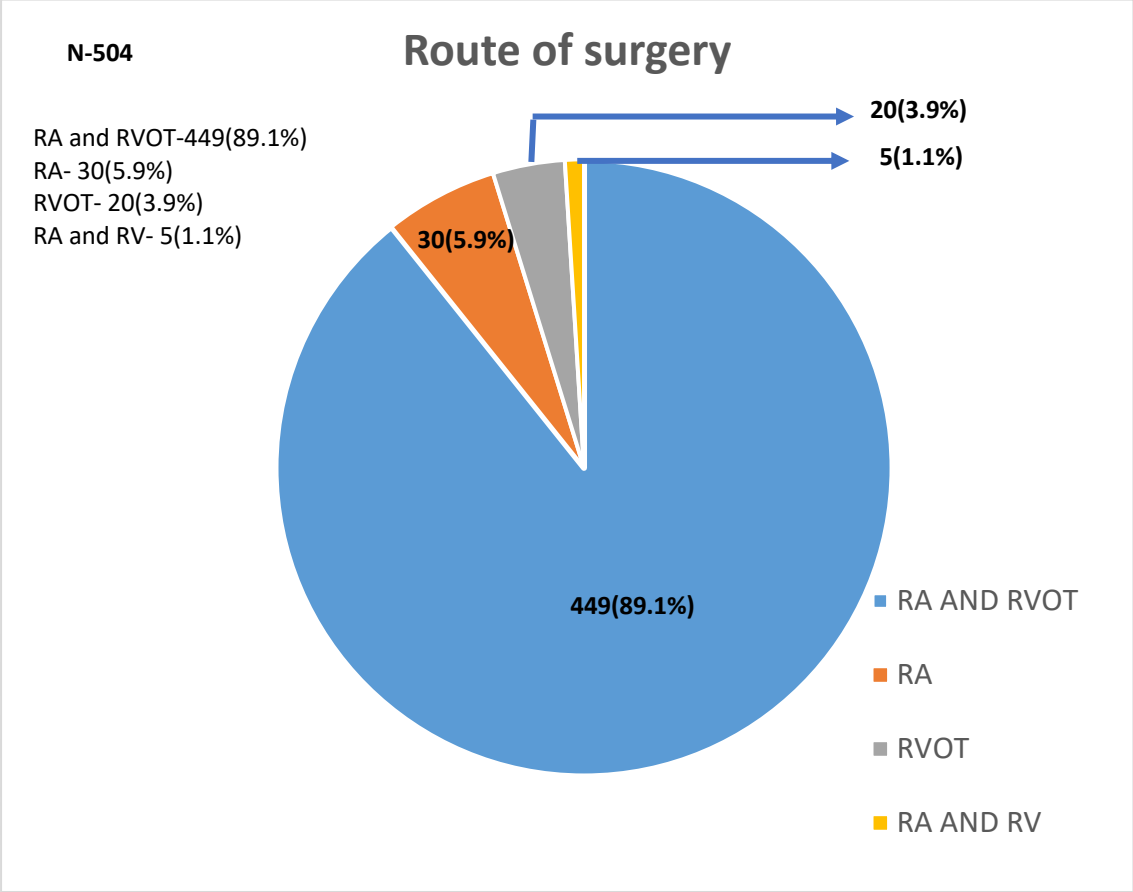
Additional procedures‡ - 59(11.7%)

The surgical techniques used are depicted in Figure 1. The most common surgical technique used was intracardiac repair with a transannular patch (ICR+TAP) in

363(72.1%). This was followed by intracardiac repair with right ventricular outflow tract patch (ICR+RVOT patch) in 111(22%). A trans right atrial intracardiac repair (Trans RA ICR) was done in 30(6%).

The route of surgical repair is depicted in Figure 2. The most common route of repair used was a right atrial incision and right ventricular outflow tract incision (RA and RVOT) in 449(89.1%). This is followed by right atrial incision in 30(5.9%). An RVOT only incision was used in 20(3.9%). A right atrial and right ventricular incision(RA and RV) was used in 5(1.1%) patients.

FIGURE 2: Route of surgical repair



The characteristics of the patients on follow up are shown in Table 2. A total of 225(45.04%) were on regular follow-up with a median follow-up duration of 16(15-18) years. A majority comprised of males 128(56.9%). The median age at follow-up was 22(17-26) years. Most patients were asymptomatic (NYHA functional class I)

188(83.6%). A total of 37(16.4%) patients were symptomatic on follow up with the most common symptom being palpitations 21(9.3%). An electrocardiogram (ECG) was available for all patients on follow up. The median PR interval was 160(140-180) ms and the median QRS duration was 130(120-150) ms. Most patients had a normal axis on ECG 177 (78.6%). A complete right bundle branch block was present in 160(71.1%) patients. Right ventricular hypertrophy was present in 80(35.5%) patients and fragmented QRS complexes were noted in 21(9.3%) patients. The median corrected QT was 447(432-465) ms.

TABLE 2: Characteristics of patients on follow up

Patient Characteristics	Observation
Patients currently on follow up‡	**225(45.04%)**
Follow up duration(years) *	**16(15-18)**
Present Age (in yrs) * (N-225)	**22(17-26)**
	[2-59]
Gender‡ (Follow up) (N-225)	
Male	128(56.9%)
Female	97(43.1%)
NYHA Functional Class (N-225)	
Class I‡	188(83.6%)
Class II‡	34(15.1%)
Class III‡	2(0.8%)
Class IV‡	1(0.4%)
Symptomatic on follow up‡ (n-225)	37(16.4%)
Palpitations‡	21(9.3%)
Dyspnea on exertion‡	11(4.8%)
Syncope‡	5(2.2%)
ECG(On follow up) (n-225)	
PR(ms) *	160(140-180)
QRSd (ms) *	130(120-150)
Axis – Normal ‡	177(78.6%)
Right Axis Deviation ‡	41(18.2%)

Left Axis Deviation ǂ	7(3.1%)
Axis(Measured)[degrees] *	90(60-105)
RBBBǂ	160(71.1%)
iRBBBǂ	45(20.1%)
No RBBBǂ	20(8.8%)
RBBB with Left Axis Deviation	7(3.1%)
RVHǂ	80(35.5%)
RV strainǂ	41(18.2%)
Fragmented QRSǂ	21(9.3%)
QTc(ms) *	447(432-465)

NYHA- New York heart Association, QRSd-QRS duration, RBBB- right bundle branch block, RVH-right ventricular hypertrophy, QTc- Corrected QT interval

*Median(IQR) † Mean(±SD) ǂ Frequency(%)

TABLE 3: Echocardiographic Characteristics of patients on follow up

Patient Characteristics	**Observation**
ECHO (On follow up) (N-225)	
EF(%)[M Mode] *	65(61-71)
LV dimension	
Diastole(mm) *	39(35-43)
Systole(mm) *	24(22-28)
RV dimension (PLAX)(mm) *	28(25-33)
TAPSE(mm)) *	19(17-20)
RVOT peak(mmHg) *	20(14-27)
RVOT mean(mmHg) *	11(8-15)
RVSP(mmHg) *	30(25-35)
Tricuspid Regurgitationǂ	
1	78(34.6%)
2	95(42.2%)
3	38(16.8%)

4	14(6.2%)
Pulmonary Regurgitation‡ 1 2 3 4	 24(10.6%) 70(31.1%) 83(36.8%) 48(21.3%)
Residual VSD‡	20(8.8%)

EF- ejection fraction, PLAX- parasternal long axis, RVOT- right ventricular outflow tract, TAPSE- tricuspid annular plane systolic excursion, RVSP right ventricular systolic pressure, VSD- ventricular septal defect

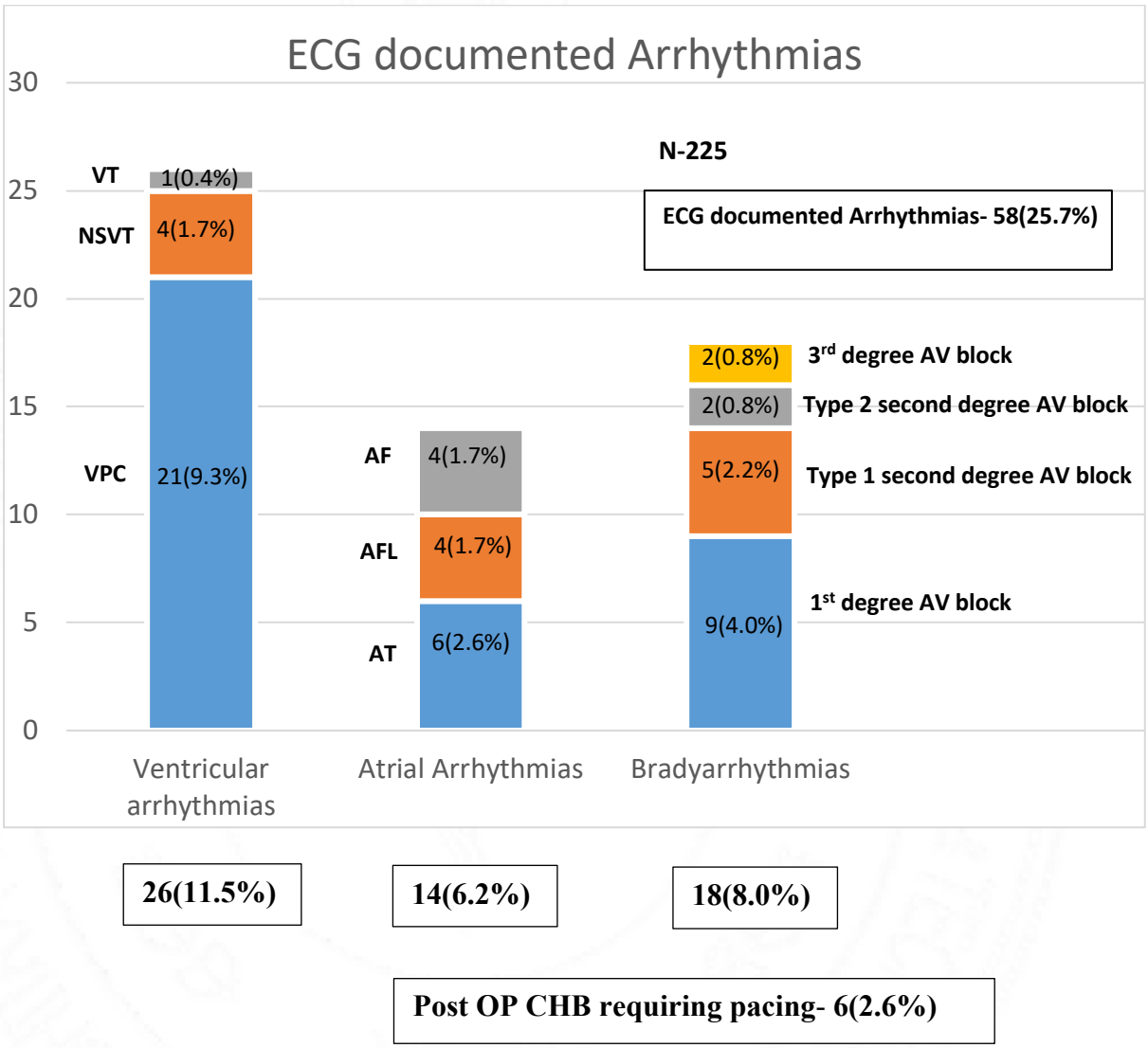
*Median(IQR) † Mean(±SD) ǂ Frequency(%)

All patients had echocardiography done on follow up and details are depicted in Table 3. The median ejection fraction by M mode was 65(61-71) % and median left ventricular diastolic and systolic dimensions were 39(35-43) mm and 24(22-28) mm respectively. The median right ventricular dimension (PLAX) was 28(25-33)mm. The median TAPSE was 19(17-20) mm. Median Right ventricular outflow tract peak and mean gradients were 20(14-27) mmHg and 11(8-15) mmHg. Majority of patients mild or trivial tricuspid regurgitation 173(76.8%). Moderate pulmonary regurgitation was noted in 83(36.8%) patients and severe pulmonary regurgitation was present in 48(21.3%) patients.

Arrhythmias documented on the ECG on follow-up are shown in Figure 3 as a vertical stacked bar chart. A total of 58(25.7%) patients had arrhythmias documented on ECG on follow up. Ventricular arrhythmias were documented in 26(11.5%) patients. These are mainly comprised of ventricular premature complexes (Multiple, Couplets, Trigemini) in 21(9.3%) patients. 4(1.7%) had documented non-sustained ventricular tachycardia (NSVT) on ECG and sustained ventricular tachycardia was documented in 1(0.4%) patient. Atrial arrhythmias were documented in 14(6.2%) patients on follow-up ECG. Atrial tachycardia was noted in 6(2.6%) patients, 4(1.7%) had atrial flutter and atrial fibrillation was noted in 4(1.7%) patients. Bradyarrhythmias were

documented in 18(8%) patients.9(4%) had first degree AV block, 5(2.2%) patients had type 1 second degree AV block, 2(0.8%) patients had type 2 second degree AV block and third-degree AV block was noted in two patients on follow up (Both patients had a pacemaker implanted).

FIGURE 3: ECG documented Arrhythmias



VPC- ventricular premature complex, NSVT- non sustained ventricular tachycardia, VT- ventricular tachycardia, AT- atrial tachycardia, AFL- atrial flutter, AF- atrial fibrillation

A 24-hour Holter was done for 102 patients on follow up. The 24-hour Holter details are shown in Table 4 and the Holter documented arrhythmias are depicted in Figure 4 as a vertical stacked bar chart. The median average heart rate was 68(63-73) beats/min. Ventricular premature complex burden(>10 VPCs/hour) was noted in 14(13.7%) patients. Non sustained ventricular tachycardia runs were noted in 4(3.8%) patients. Arrhythmias were documented in 28(27.4%) patients. Ventricular arrhythmias were noted in 18(17.6%) patients [Ventricular premature complexes >240/day in 14(13.7%) patients and NSVT runs in 4(3.8%) patients]. Atrial arrhythmias were documented in 4(3.9%) patients [Atrial tachycardia in 1(0.9%) and atrial fibrillation in 3(2.9%) patients]. Bradyarrhythmias were noted in 6(5.8%) patients [1st degree AV block in 3(2.9%) patients, Type 1 second degree AV block in 2(1.9%) patients, and type 2 second degree AV block in 1(0.9%) patient

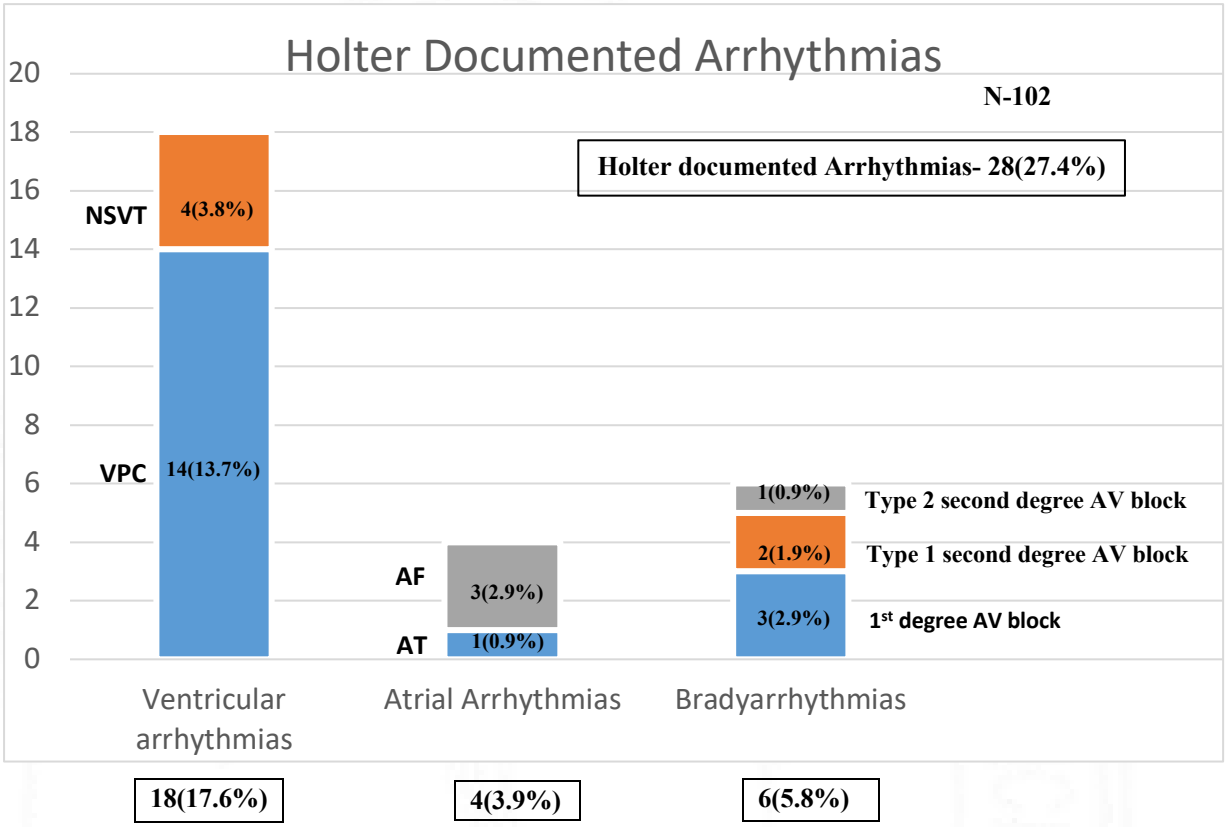
TABLE 4: Holter Details

Holter Details	Observation
Holter (On follow up) (N-102)	
Min HR (beats/min) *	48(43-53)
Max HR (beats/min) *	134(125-142)
Avg HR (beats/min) *	68(63-73)
VPC burden (>10 VPCs per hour)ǂ	14(13.7%)
NSVT runsǂ	4(3.8%)
Pause(sec) †	1.8±0.3

HR- heart rate, VPC- ventricular premature complex, NSVT- non sustained ventricular tachycardia

*Median(IQR) † Mean(±SD) ǂ Frequency(%)

FIGURE 4: Holter Documented Arrhythmias



VPC- ventricular premature complex, NSVT- non sustained ventricular tachycardia, VT- ventricular tachycardia, AT- atrial tachycardia, AFL- atrial flutter, AF- atrial fibrillation

TABLE 5: Medication Details

Medications	**Observation**
Medications‡ (N-225)	**39(17.3%)**
[N-39]	**[N-39]**
Betablocker‡	35(89.7%)
Sotalol‡	3(7.6%)
Amiodarone‡	4(10.2%)
Anticoagulation‡	
- Warfarin	4(10.2%)
- Acitrom	2(5.1%)
Diuretics‡	10(25.6%)
ACE Inhibitor‡	5(12.8%)
Antiplatelet‡	10(25.6%)
Digoxin‡	4(10.2%)
Statin‡	3(7.6%)
NOAC(Dabigatran)‡	2(5.1%)

*Median (IQR) † Mean(±SD) ǂ Frequency(%)

The medication details of patients on follow up are shown in Table 5. Most patients 186(82.6%) were not on any medications on follow up. A total of 39(17.3%) were on medications and the most commonly used medication was beta-blockers.

Cardiac MRI (Cardiac Magnetic Resonance Imaging) was done in all patients who were detected to have severe pulmonary regurgitation (PR) and right ventricular dysfunction/ dilatation on 2D echocardiography. The MRI details are shown in Table 6. A total of 24 patients underwent MRI on follow up. The mean right ventricular end-diastolic volume index (RVEDVI) was 123.8±38.16 ml/m^2 and the mean right ventricular end-

systolic volume index (RVESVI) was 70.9±31.08. The mean left ventricular ejection fraction (LVEF) was 58.4±8.01 % and the mean right ventricular ejection fraction (RVEF) was 45.01±9.04 %. The mean pulmonary regurgitant fraction was 46.2±13.1%. Late Gadolinium Enhancement (LGE) was present in 18 patients (13 at RVOT and 5 at VSD patch). One patient with severe right ventricular dysfunction had a right ventricular apical thrombus detected on MRI.

TABLE 6: Details of Magnetic Resonance Imaging (MRI)

MRI Details	**Observation**
MRI‡(N-225)	**24(10.4%)**
[N-24]	**[N-24]**
RVEDVI(ml/m^2) †	123.8±38.16
RVESVI(ml/m^2) †	70.9±31.08
LVEF(%)†	58.4±8.01
RVEF(%)†	45.01±9.04
PR(Regurgitant fraction)(%) †	46.2±13.1
LGE‡	18(75%)
- RVOT	13(54.16%)
- VSD patch	5(20.8%)
RV thrombus‡	1(4.16%)

RVEDVI- right ventricular end diastolic volume index, RVESVI- right ventricular end systolic volume index, LVEF- left ventricular ejection fraction, RVEF- right ventricular ejection fraction, PR- pulmonary regurgitation, LGE- late gadolinium enhancement,

*Median (IQR) † Mean(±SD) ǂ Frequency(%)

A total of 5(2.1%) patients on follow-up had an electrophysiological study (EP study). The details of the EP study are shown in Table 7. Two patients underwent successful ablation for atrial flutter. One patient underwent a ventricular tachycardia induction study for evaluation of syncope and multiple VPC on Holter. One patient had a 2:1 AV

block documented on ECG at the age of 12 years, underwent an EP study, and was planned for pacemaker implantation at the age of 16 years in view of normal HV interval.

TABLE 7: Details of Electrophysiology Study (EP Study)

EP study ǂ	**5(2.1%)**
Age(yrs)/Sex	**EP study Details**
41/M	1. Atrial flutter- Dual loop reentrant RA flutter - Dominant loop in RA scar and cavotricuspid isthmus- non dominant loop- Successfully Ablated
22/F	2. History of syncope, multiple VPC on Holter- Patient underwent VT induction – No inducible VT- Implantable Loop recorder (ILR) implanted (2011)- Explanted (2014) –ILR showed Runs of sinus tachycardia- Currently on Medical follow up
17/M	3. Atrial tachycardia- 2:1 AV RHYTHM, PP INTERVAL 360,? Atrial tachycardia ,?atrial flutter, terminated by atrial overdrive pacing at 260MS- Currently on medical follow up (No recurrence)
14/F	4. 2:1 AV block- RR interval 1380ms, AA interval 694ms, AH interval 110ms, HV interval -42ms, no preexcitation, occasional AV Wenkebaching with RBBB aberrancy preceded by short cycles- Planned for Pacemaker implantation at 16 years of age.
59/M	5. Atrial Flutter Cycle length- 250ms, scar related small fragmented potential at the tricuspid annulus, dual AV nodal physiology – Successful Ablation done

*Median(IQR) † Mean(±SD) ǂ Frequency(%)

TABLE 8: Re-operation Details

Re-operation Details(N-504)	Observation
PVR‡	8(1.5%)
Surgical closure of residual VSD‡	5(0.9%)
Redo ICR+TAP‡	3(0.5%)

PVR- Pulmonary Valve Replacement, VSD- ventricular septal defect, ICR+TAP- Intracardiac repair + transannular patch

*Median(IQR) † Mean(±SD) ǂ Frequency(%)

A total of 16(3.1%) patients underwent a re-operation on follow up (Details are shown in Table 8). Pulmonary valve replacement was done for 8(1.5%) patients, residual VSD surgical closure 5(0.9%) patients and redo ICR+TAP was done in 3(0.5%) patients.

TABLE 9: Mortality Details

Mortality Details (N-504)	Observation
Perioperative Mortality‡	26(5.1%)
Mortality on follow up‡	6(1.2%)
- Infective Endocarditis- <1 year	5(1.09%)
- Diagnosed as RHD, severe MS, Severe MR acute pulmonary edema on follow up(2010)- Cardiogenic shock	1(0.2%)

*Median (IQR) † Mean(±SD) ǂ Frequency(%)

Mortality details of patients are depicted in Table 9. Perioperative mortality was noted in 26(5.1%) patients. A total of 6 patients expired on follow up with 5 patients expiring due to infective endocarditis within 1 year of surgery. One patient returned 8 years after surgery with acute pulmonary edema and was diagnosed with rheumatic heart disease, severe mitral stenosis, severe mitral regurgitation, and expired due to cardiogenic shock.

TABLE 10: Univariate analysis for association between baseline patient characteristics and arrhythmias

Parameter	Ventricular Arrhythmias (p value)	Atrial Arrhythmias (p value)	Bradyarrhythmias (p value)
Age at Surgery(yrs) *	0.409	**<0.001**	0.811
Sex‡	0.382	0.292	0.957
Weight at surgery(kg) *	0.539	**<0.001**	0.957
BT shunt‡	**0.014**	0.181	0.152
SpO2(Pre op) †	**0.069**	0.479	0.799
Surgical Procedure‡	0.981	0.633	0.282
Route of Surgical Approach‡	0.294	0.595	0.167
SpO2(Post op) †	0.782	0.563	0.432
EF(pre Op) *	0.210	0.374	0.589
LV dimension(Pre Op- Systolic) *	**0.085**	**0.005**	0.740
LV dimension(Pre Op- Diastolic) *	0.159	**0.008**	0.476
RV dimension Pre op [PLAX](mm) *	0.123	**0.05**	0.730

* p value calculated using Mann-Whitney U test
† p value calculated using Unpaired t-test
‡ p value calculated using Chi-square test

Univariate analysis was done to assess the association between baseline patient characteristics and arrhythmias. The presence of a prior BT shunt, Low pre-op saturation, and pre-op left ventricular systolic dimension were found to be significantly associated with the presence of ventricular arrhythmias on follow up. The age at surgery, weight at surgery, pre-op left ventricular systolic and diastolic dimensions, and pre-op right ventricular dimension (PLAX) were found to be significantly associated with the presence of atrial arrhythmias on follow up. Bradyarrhythmias were not significantly associated with any baseline parameter.

TABLE 11: Univariate analysis for association between patient characteristics on follow up and arrhythmias

Parameter	Ventricular Arrhythmias (p value)	Atrial Arrhythmias (p value)	Bradyarrhythmias (p value)
Present Age (in yrs) *	0.923	0.006	0.857
Follow up Duration*	0.214	0.295	**0.018**
ECG(on follow up)			
Rhythm‡	0.550	**<0.001**	0.163
PR(ms) *	0.285	0.835	**<0.001**
QRS duration(ms) *	0.328	0.784	0.252
Presence of RBBB‡	0.739	0.295	0.223
Presence of iRBBB‡	0.768	0.318	0.801
Axis‡	0.494	0.786	0.650
Presence of RBBB+ Left Axis Deviation‡	0.730	0.606	**0.011**
RVH‡	0.667	0.381	0.423
RV strain‡	0.415	0.669	0.466
Fragmented QRS‡	0.566	0.121	0.660
QTc(ms) *	0.889	0.954	0.770
NYHA functional Class‡	**<0.001**	**<0.001**	0.930
Symptoms on follow up‡	**<0.001**	**<0.001**	0.104
ECHO(on follow up)			
EF(%) *	**0.086**	0.621	0.662
LV dimensions(Systolic mm) *	0.526	**0.009**	0.398
LV dimension(Diastolic mm) *	0.879	**0.023**	0.291
RV dimension[PLAX](mm) *	0.540	**<0.001**	0.326
TAPSE(mm) *	0.691	**0.003**	0.644
Severity of TR ‡	0.192	0.160	0.434
Severity of PR ‡	0.312	0.211	0.692
RVOT peak(mmHg) *	0.648	0.317	0.272
RVSP(mmHg) *	0.662	0.980	0.134
MRI(n-24)			
RVEDVI(ml/m2) †	0.784	0.209	0.651
RVESVI(ml/m2) †	0.648	0.870	0.651
LVEF(%) †	0.966	0.869	0.649
RVEF(%) †	0.958	0.171	0.130
PR(RF)(%) †	0.313	0.207	0.269
LGE‡	0.338	0.981	0.115

* p value calculated using Mann-Whitney U test
† p value calculated using Unpaired t-test
‡ p value calculated using Chi-square test

Univariate analysis of patient characteristics on follow-up showed that NYHA functional class, presence of symptoms, left ventricular ejection fraction were

significantly associated with the presence of ventricular arrhythmias on follow up. The presence of atrial arrhythmias on follow up was significantly associated with the presence of non-sinus rhythm, NYHA functional class, presence of symptoms, left ventricular dimensions in systole and diastole, increased right ventricular dimension [PLAX], and a reduced TAPSE. Follow up duration, PR interval, and presence of RBBB and left axis deviation were significantly associated with the presence of bradyarrhythmias on follow up.

TABLE 12: Multiple logistic regression of variables found to be significant in univariate analysis for Ventricular arrhythmias

Parameter	**Ventricular Arrhythmias**	
	Odds ratio(95% CI)	**P value**
Previous BT shunt	2.73(0.74-9.99)	0.12
Pre Op SpO2	0.93(0.83-1.05)	0.28
LV dimension(Diastole)(Pre op)	0.97(0.9-1.04)	0.46
NYHA functional class on follow up	**8.2(2.9-23.29)**	**<0.001**
Symptomatic on follow up	**7.9(2.5-24.6)**	**<0.001**
Ejection fraction on follow up	1.04(0.96-1.12)	0.32

The baseline and follow-up parameters that were found to be significantly associated with ventricular arrhythmias in the univariate analysis were analyzed with multiple logistic regression to see which factors were independently associated with the presence of ventricular arrhythmias follow-up. A higher NYHA functional class on follow up (more symptomatic status) was found to be independently associated with the presence of ventricular arrhythmias on follow up

TABLE 13: Multiple logistic regression of variables found to be significant in univariate analysis for Atrial arrhythmias

Parameter	Atrial Arrhythmias	
	Odds Ratio (95% CI)	**P value**
Present Age(yrs)	1.08(0.87-1.34)	0.47
Age at surgery(yrs)	1.03(0.76-1.39)	0.83
Weight at surgery(kg)	0.93(0.81-1.06)	0.24
RV dimension(pre op)	1.07(0.80-1.42)	0.64
LV dimension-Systolic(Pre Op)	0.89(0.65-1.21)	0.45
LV dimension-Diastolic(Pre Op)	0.93(0.78-1.10)	0.42
RV dimension (Pre Op)	1.03(0.74-1.44)	0.83
NYHA functional class on follow up	9.25(5.8-24.05)	**<0.001**
Symptomatic on Follow up	7.2(2.35-21.3)	**0.012**
TAPSE(mm) on follow up	0.52(0.35-0.77)	**0.001**
RV dimension[PLAX](on Follow up)	1.4(1.15-1.70)	**0.001**

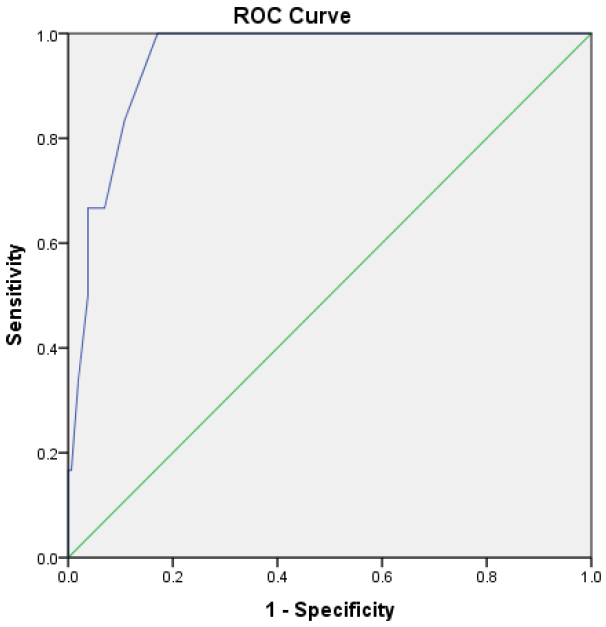
The baseline and follow-up parameters that were found to be significantly associated with atrial arrhythmias in the univariate analysis were analyzed with multiple logistic regression to see which factors were independently associated with the presence of atrial arrhythmias on follow up. A higher NYHA functional class (more symptomatic status), a lower TAPSE (indicating right ventricular dysfunction), and increased right ventricular dimension (PLAX) were found to be independently associated with the presence of atrial arrhythmias on follow-up.

TABLE 14: Multiple logistic regression of variables found to be significant in univariate analysis for Bradyarrhythmias

Parameter	Bradyarrhythmias	
	Odds Ratio (95% CI)	P value
Presence of RBBB+Left axis Deviation	7.32(1.23-23.48)	**0.029**
PR interval(ms)	1.04(1.02-1.31)	**0.001**
Follow up Duration(yrs)	1.39(1.1-1.95)	**0.05**

The baseline and follow-up parameters that were found to be significantly associated with bradyarrhythmias in the univariate analysis were analyzed with multiple logistic regression to see which factors were independently associated with the presence of bradyarrhythmias on follow up. The presence of RBBB with left axis deviation, an increased PR interval, and increased follow-up duration were found to be independently associated with bradyarrhythmias on follow up.

FIGURE 5: ROC curve for estimation of RV dimension (PLAX) cut off for predicting atrial arrhythmias

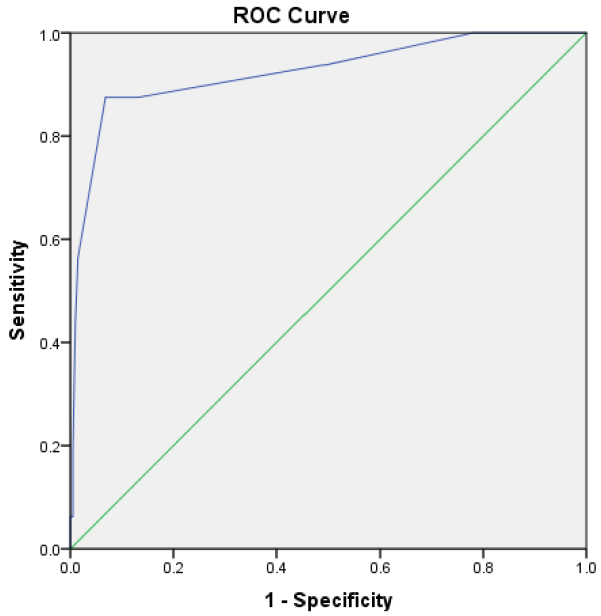


Parameter	AUC
RV dimension on followup(mm)	0.949

Value(mm)	Sensitivity	Specificity
33.5	1.00	0.83

ROC analysis was done to determine the value of the right ventricular(RV) dimension(PLAX) that predicts the occurrence of atrial arrhythmias. A RV dimension(PLAX) greater than 33.5mm predicts the occurrence of atrial arrhythmias with a sensitivity of 100% and specificity of 83% (AUC=0.949).

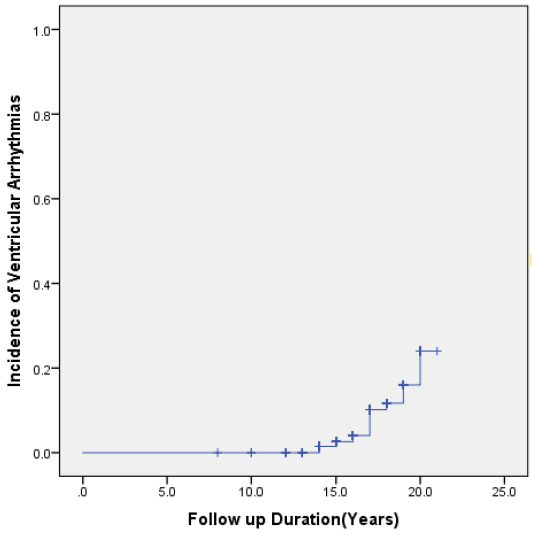
FIGURE 6: ROC curve for estimation of PR interval cut off for predicting bradyarrhythmias



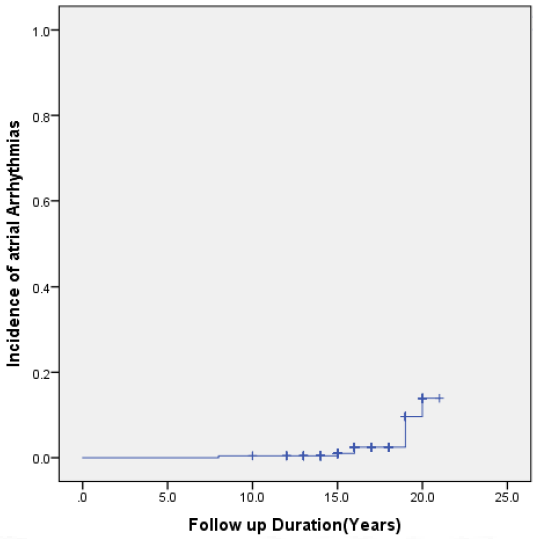
Parameter	AUC	Value(ms)	Sensitivity	Specificity
PR interval on Follow up(ms)	0.924	190	0.87	0.88

ROC analysis was done to determine the value of PR interval that predicts the occurrence of bradyarrhythmias. A PR interval greater than 190ms predicts the occurrence of bradyarrhythmias with a sensitivity of 87% and specificity of 88% (AUC=0.924).

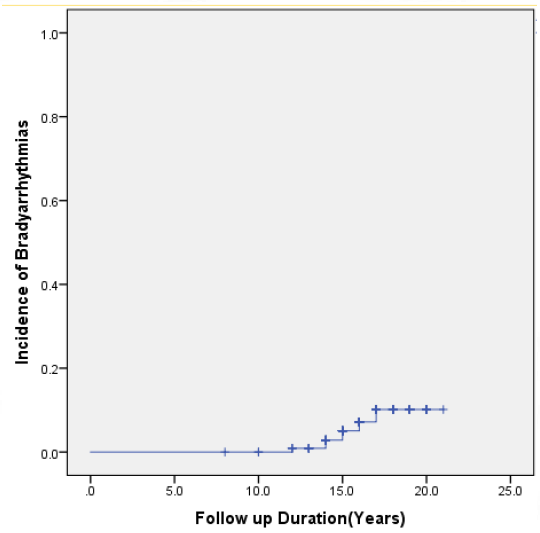
FIGURE 7: Kaplan Meier curves showing the incidence of ventricular arrhythmias(a), atrial arrhythmias(b) and bradyarrhythmias(c) with respect to follow up duration(years)



(a)



(b)



(c)

Kaplan Meier Curve analysis for the incidence of ventricular, atrial and bradyarrhythmias in relation to time are shown in Figure 7.

DISCUSSION

This study was done to assess the arrhythmic complications in patients who had undergone surgical repair for Tetralogy of Fallot (ToF) between 1999-2005. Most patients (83.6%) were asymptomatic (NYHA Functional Class I) on follow up. Arrhythmias were detected in 25.7% of patients on a routine electrocardiogram and in 27.4% of patients on a 24-hour Holter study on follow up. Patients with ventricular arrhythmias were more symptomatic on follow up. A higher right ventricular dimension (PLAX) and right ventricular dysfunction (lower TAPSE) on follow-up were independently associated with the development of atrial arrhythmias. Bradyarrhythmias on follow-up were independently associated with the presence of right bundle branch block (RBBB) with left axis deviation (LAD)[RBBB+LAD], increased PR interval, and increased duration of follow up.

The median age on follow-up of patients included in this study was 22(17-26) years, the median duration of follow-up was 16(15-18) years. This is similar to a multicenter study by Nakazawa et al which showed a mean age on follow-up to be 23.4±9.3 years and mean duration on follow-up was 11.7±7.2 years(21). The majority of patients in our study comprised of males (56.9%). This is in contrast to a study by Khairy et al which noted 54% of the study population to be female(20). Most patients (83.6%) were asymptomatic (NYHA functional class I) on follow up. This is similar to a study by Garson et al, which analyzed the late outcomes and causes of late death in post-operative ToF patients and noted that 81% of patients were in NYHA functional class I(23). Another study by Gatzoulis et al with a mean duration of follow-up of 21.1 years also noted that 81.8% of patients were NYHA functional class 1.

The surgical technique used most commonly in our study was intracardiac repair with a transannular patch (ICR+TAP) and was used in 72.1% of patients. This is similar to the study by Khairy et al where a transannular patch was also the most commonly used surgical technique in 80.4% of patients.

The median QRS duration on routine follow up electrocardiogram in our study was 130(120-150) milliseconds. In the study by Khairy et al, the mean QRS duration was 150±28 milliseconds. Studies have shown that QRS duration in post-operative ToF patients increases with a longer duration of follow up and the rate of increase identifies

patients at risk of developing ventricular arrhythmias(27). This also explains the higher QRS duration in the study by Khairy et al as the duration of follow-up was significantly higher than our study.

Complete right bundle branch block (Complete RBBB) was the most common conduction disturbance noted in our study in 71.1% of patients, incomplete RBBB was present in 20.1% and RBBB with left axis deviation was noted in 3.1% of patients. This is similar to data from previous studies which documented the prevalence of right bundle branch block to ranging from 59% to 100% (48). In a study by Garson et al which analyzed the late complications after surgical repair of ToF, complete RBBB was noted in 88% of patients and RBBB with left axis deviation was noted in 9.2% of patients.

In our study, moderate and severe pulmonary regurgitation was noted in 36.8% and 29.3% of patients respectively. Moderate or severe tricuspid regurgitation was noted in 16.8% and 6.2% of patients respectively. These findings are similar to the study by Khairy et al where moderate or severe pulmonary regurgitation and tricuspid regurgitation were noted in 47.6% and 15.3% of patients respectively.

Cardiac magnetic resonance imaging (CMRI) was done in 10.6% of patients. The mean right ventricular end diastolic volume index (RVEDI) was 123.8 ± 38.16 ml/m^2 and the mean right ventricular end systolic volume index (RVESVI) was 70.9 ± 31.08 ml/m^2. A study by Niezen et al who compared CMRI findings of post-surgical ToF patients with normal control subjects. They performed cardiac MRI in 18 post-operative ToF patients with a follow up of 10 years and noted that the mean RVEDVI was 119 ± 36 ml/m^2 and mean RV end systolic volume index was 57 ± 30 ml/m^2. The right ventricular volumes are higher in our study likely due to the longer duration for follow up (median 16 years vs mean 10 years). The mean right ventricular ejection fraction (RVEF) in our study was 45.01±9.04% and mean left ventricular ejection fraction (LVEF) 58.4±8.01%. The Niezen et al study noted that the RVEF was 54 ± 8% and LVEF was 52 ± 10%(49). The lower RVEF in our study is again likely due to the longer duration of follow up and increased right ventricular volumes on follow up. The mean pulmonary regurgitation fraction in our study was 46.2 ± 13.1%. This is similar to the study by Vleigen et al which analysed CMRI findings to assess the hemodynamic

effects of pulmonary valve replacement (PVR) after repair of ToF. In that study, the mean pulmonary regurgitation fraction was 46 ± 10% (with median duration between initial repair and PVR of 24.2 years)(50).

Arrhythmias were documented in routine electrocardiogram(ECG) in 25.7% of patients and on 27.4% of patients on 24 hour Holter study. The prevalence of arrhythmias documented in our study is higher than the study by Nakazawa et al (10.5% with a mean follow up duration of 11.7 years) and lower than the study by Khairy et al (29.9% with a mean follow up duration of 35 years)(20,21). These results are also similar to other studies which noted that patients were relatively asymptomatic until 10-15 years after surgery followed by a steady increase in atrial and ventricular arrhythmias(27,36).

Ventricular arrhythmias were noted in 11.5% of patients on routine ECG and 17.6% of patients on 24 hour Holter study. Ventricular premature complexes were noted in 9.3% of patients, non-sustained ventricular tachycardia(NSVT) in 1.7% of patients, and sustained VT was documented in 1 patient on follow-up ECG. Nakazawa et al noted ventricular arrhythmias in 3.5% of patients and Khairy et al noted ventricular arrhythmias in 14.6% of patients with 14.2 % having sustained ventricular tachycardia. Gatzoulis et al noted ventricular arrhythmias in 3.9% of patients (ventricular tachycardia). The higher number of ventricular arrhythmias in the Khairy et al study can be attributed to the longer duration of follow-up (20,21,27).

Holter documented ventricular arrhythmias were noted in 17.6% of patients in this study(ventricular premature complexes(13.7%), NSVT in 4(3.8%)). Gatzoulis et al also analyzed 24 hour Holter in post-operative ToF patients and noted ventricular arrhythmias in 3.2% of patients and NSVT was noted in 1 patient(27). The higher number of ventricular arrhythmias documented in our study is likely due to the VPC per hour cut off, >10 per hour used in our study during Holter analysis. This cut-off was based on a previous study by Garson et al which analyzed the outcomes of post-surgical ToF patients with specific reference to the treatment of ventricular arrhythmias(37). Kaplan Meier curve analyzing the incidence of ventricular arrhythmias over time shows that the incidence of ventricular arrhythmias gradually increase from approximately 13 years post-surgery. This is similar to the study by Nakazawa et al which showed that ventricular arrhythmias begin to increase around 10 years post-surgery(21)

Atrial arrhythmias were noted in 6.2% of patients in this study(atrial tachycardia(2.6%), atrial flutter (1.7%), atrial fibrillation (1.7%)). This is similar to the study by Nakazawa et al where 3.9% of patients had atrial arrhythmias (atrial tachycardia(0.9%), atrial flutter (1.5%), atrial fibrillation (1.5%))(21). However, in the study by Khairy et al, the prevalence of atrial arrhythmias was 20%(atrial flutter (11.5%), atrial fibrillation (7.4%))(20). The study by Khairy et al had a longer follow-up duration which can explain the higher prevalence of atrial arrhythmias. Holter documented atrial arrhythmias in our study were noted to be present in 3.9% of patients. This is similar to the study by Gatzoulis et al which noted atrial flutter/fibrillation in 3.1% of patients on routine ECG on follow up and in 6.3% of patients on a 24 hour Holter(27).

Kaplan Meier curve analysis in our study shows that the incidence of atrial arrhythmias increases with a longer duration follow-up. This is similar to the study by Harrison et al which analyzed the atrial arrhythmias after ToF surgical repair and noted a prevalence of atrial tachycardia of 12% and the also showed that the incidence of atrial tachycardia and event rate(cardiac failure, reoperation, ventricular tachycardia stoke, and death), when compared with an arrhythmia free population increased with longer duration of follow up(36).

Right ventricular dilatation (by 2D PLAX) and dysfunction (by TAPSE) were noted to be independently associated with the incidence of atrial arrhythmias. This is similar to the study by Harrison et al which showed increased right ventricular end-diastolic dimension(4 chamber view) was more likely to be present in patients with atrial arrhythmias than in the age-matched comparison group, although the difference was not statistically significant(51±9 vs 45± 7, p=0.08). The same study also noted that right ventricular systolic dysfunction was more likely to be present in patients with atrial arrhythmias than in the age-matched comparison group but this association was not statistically significant(66% vs 53%, p=0.28). The ventricular arrhythmias after ToF surgical repair increases with a longer duration of follow up due to progressive myocardial fibrosis(5). This is also noted with atrial arrhythmias. The substrate for atrial tachycardias is caused by previous surgical incisions at the atriotomy site which undergo fibrosis and result in re-entry around the incisional site(51).

In this study, bradyarrhythmias were noted in 8% of patients(1st degree AV block in 4.0%, Type I second degree AV block in 2.2%, Type II second degree AV block in 0.8%, 3rd degree AV block in 0.8%). This is similar to the findings by Nakazawa et al where the prevalence of bradyarrhythmias was 4.4%. Another study with similar findings was conducted by Nollert et al analyzed the long term survival in patients after TOF repair with a mean duration of follow up of 25.3 years and noted that the prevalence of bradyarrhythmias was 6.7%(1st degree AV block in 5.3%, second degree AV block in 0.8%, 3rd degree AV block in 0.6%)(4). Kaplan Meier curve analyzing the incidence of bradyarrhythmias in relation to the duration of follow up shows that the incidence of bradyarrhythmias increases with a longer duration of follow up which is consistent with other studies(4,21).

The presence of right bundle branch block(RBBB) with left axis deviation(LAD) was found to be independently associated with the presence of bradyarrhythmias on follow up. The presence of RBBB with left axis deviation indicates the involvement of the left anterior fascicle (left anterior hemiblock(LAH)). The incidence of RBBB+LAD in our study was 3.1%. Injury to the right bundle and the left anterior fascicle occurs at the time of surgery(52). Wolff et al analyzed the prognostic value of the presence of RBBB with LAH in post-operative ToF and noted that this pattern is associated with an increased incidence of late complete heart block and sudden death(53). Injury to the HIS bundle can also result in RBBB+LAH(54). Kusevska-Maneva et al analyzed the arrhythmias and conduction abnormalities after surgical repair of ToF and noted that the prevalence of RBBB with LAH was 8.69%(48). Jonsson et al studied the electrocardiographic findings associated with survival in post-operative ToF patients and noted that 8.7% of patients had RBBB with LAH(55). Both of these studies included patients who underwent surgery before 1999. The subsequent improvement in surgical techniques may be responsible for the lesser incidence of RBBB with LAH in our study.

LIMITATIONS

1. This study involved a retrospective analysis of the case records to study the baseline characteristics of patients. The collection of data depended upon the accurate documentation of the anatomical diagnosis, preoperative and postoperative evaluation, the surgical details, and follow up details.

2. It is a single-center study, and the conclusions drawn from our study cannot be generalized to a larger population.

3. There was attrition in the study population to the tune of 54.9% over a median follow up of 16 years. Though every effort was made to contact the patient or their relatives, it is possible that patients lost to follow-up may have died. Patients from neighbouring states were difficult to be contacted either through phone or letters.

4. The unexpected effect of the COVID pandemic hindered regular OPD visits and 24-hour Holter analysis.

CONCLUSIONS

- In Post-Surgical Tetralogy of Fallot patients, arrhythmias were documented on follow up 1/4th of patients either on ECG or 24-hour Holter.

- On follow up most patients were clinically in New York Heart Association functional class I (NYHA FC I).

- Patients with ventricular arrhythmias were more symptomatic on follow up and the incidence of ventricular arrhythmias increased with a longer duration of follow up.

- Patients with atrial arrhythmias were significantly more symptomatic on follow-up and were independently associated with a dilated right ventricle and with right ventricular dysfunction. Incidence of atrial arrhythmias increased with a longer duration of follow up. Increased right ventricular diastolic dimension (PLAX)(>33.5mm) on follow up is predictive of atrial arrhythmias (100% sensitivity and 83% specificity).

- Bradyarrhythmias on follow up were independently associated with the presence of right bundle branch block with left axis deviation (RBBB+LAD) and increased PR interval. Incidence of bradyarrhythmias increased with longer duration of follow up. Increased PR interval on follow up electrocardiogram (>190 ms) is predictive of bradyarrhythmias (sensitivity 87% and specificity of 88%).

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APPENDIX

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
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Institutional Ethics Committee

(IEC Regn No. ECR/189/Inst/KL/2013/RR-16)

SCT/IEC/1350/FEBRUARY-2019 04.06.2019

Dr. Karthik R
Resident
Department of Cardiology
SCTIMST, Thiruvananthapuram

Dear Dr. Karthik,

The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "ARRHYTHMIAS IN POST-SURGICAL TETRALOGY OF FALLOT INDIVIDUALS (IEC/1350)" on 16th February, 2019.

The following documents were reviewed:

Original submission

1. *Covering Letter addressed to the Chairperson, IEC, SCTIMST dated 28.11.2018 with checklist*
2. *TAC Approval Letter*
3. *IEC Application Form*
4. *Project Proposal*
5. *Proforma*
6. *Patient Information Sheet and Consent Form in English and Malayalam*
7. *CV of Principal Investigator and Co-Principal Investigators*

Revised submission

1. *Covering Letter addressed to the Chairperson, IEC, SCTIMST dated 15.05.2019 with checklist*
2. *TAC Approval Letter*
3. *IEC Application Form*
4. *Project Proposal*
5. *Proforma*
6. *Assent Form*
7. *Patient Information Sheet and Consent Form in English and Malayalam*
8. *CV of Principal Investigator and Co-Principal Investigators*

The following members of the Ethics Committee were present at the meeting held on 16th February, 2019 at G. Parthasarathi Board Room, AMCHSS, SCTIMST

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Dr. R V G Menon	M Tech, PhD	Male	Lay Person (Chairman)	No
2.	Dr. Rema M. N	MD	Female	Basic Medical Scientist	No
3.	Dr. Kala Kesavan. P	MBBS, MD	Female	Basic Medical Scientist	No
4.	Dr. Harikrishna Varma PR	Ph.D(Materials Science)	Male	Medical Technology	Yes
5.	Dr. Christina George	MD Psychiatry	Female	Clinician	No
6.	Dr. S S Giri Sankar	LL.M. Ph.D.	Male	Legal Expert	No
7.	Dr. Aneesh V Pillai	BA. LLB (Hons.), LLM, Ph. D, SET (Law)	Male	Legal Expert	No
8.	Dr. P. Manickam	BSMS, MSc (Epid).,PhD	Male	Health Science Expert/ Social Scientist	No
9.	Mr. Satheesh Chandran	MSW, PGDPM	Male	Lay person/ NGO/ Social Scientist	No
10.	Dr. Harikrishnan S	MD, DM (Cardiology) DNB (Cardiology)	Male	Clinician	Yes
11.	Dr. Mala Ramanathan	PhD	Female	Social Scientist (Member Secretary)	Yes

IEC Decision

The IEC approved the conduct of the study in the present form.

Remarks:
The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,

Mala Ramanathan
Member Secretary, IEC

PROFORMA

Arrhythmias in Post-Surgical Tetralogy of Fallot Patients.

Patient No: **Follow up Date:**
Age: Years Sex: M/F H. No:
Home Town: Contact No:
Height: Weight: BSA:
Diagnosis:
Situs S / I / A Cardiac position D/ L / M
Ventricular function
Pulmonary Regurgitation
Surgery date

Comorbidities:
Current Medications:

CLINICAL FEATURES

- NYHA Class
- Vitals HR BP SpO2
- Palpitations/ Presyncope/ Syncope
- Academics Poor/ Fair/ Good Education Profession
- Married?

ECG Findings:

- Rhythm :
- Heart Rate :
- QRS Duration:
- Axis
- Pre OP ECG:
  - QTc
  - QT dispersion
  - QRS duration

- Post OP ECG
  - QTc
  - QRS duration

Echo Findings:

- Principal diagnosis
- EF
- LV Dimensions
- RV Dimensions EF TAPSE
- Pulmonary regurgitation

- Associated anomalies
  24 Hour Holter(If symptomatic- Palpitations, syncope/presyncope)

Mortality on follow-up? Perioperative Date Time after Sx

Sudden/ Heart failure Others

Data derived from case records

Patient demographics

Primary diagnosis

Operative details: Age at surgery

Surgery details – Technique- Atriotomy/ Transventricular repair

Cardiopulmonary bypass

CPB time Cross clamp time

Additional operative procedures:

Arrhythmias - Within 3 months and after 3 months

- Symptoms: Palpitations/ Presyncope/ Syncope
- Documented ECG during palpitations- SVT- Atrial flutter, fibrillation, atrial tachycardia
- -VT
- ECG details on follow up visits-
  QTc
  QRS duration
- ECHO details on follow up visits

- EF
- LV Dimensions
- RV Dimensions EF TAPSE
- Pulmonary regurgitation
  - Associated anomalies

- **Mortality** on follow-up? Date Time after Sx
  Cause- Sudden/ Heart failure /Others-

Imaging data

Lost to follow up

SREE CHITRA THIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM

PATIENT INFORMATION SHEET

TITLE: Arrhythmias in Post-Surgical Tetralogy of Fallot Patients.

Name of Investigators:
Dr. Karthik R, Dr Dr. K.K.Narayanan Namboodiri, Dr. K. M. Krishnamoorthy

Dear Patient/Parent

We welcome you and thank you for your interest in your/ your childs participation in this research project titled "Arrhythmias in Post-Surgical Tetralogy of Fallot Patients". We hope to include 500 people from this hospital in the study. Before you/your child participate in this study, it is important for you to understand why this research is being carried out. This form will provide you all the relevant details of this research. It will explain the nature, the purpose, the benefits, the risks, the discomforts, the precautions and the information about how this project will be carried out. It is important that you read and understand the contents of the form carefully. This form may contain certain scientific terms and hence, if you have any doubts or if you want more information, you are free to ask the study personnel or the contact person mentioned below before you give your consent and also at any time during the entire course of the project.

What are Arrhythmias in post-surgical Tetralogy of Fallot patients?

Arrhythmias (irregular heart beat) can occur in individuals who have had surgery for Tetralogy of fallot. This can be due to the scar on the heart after the surgery which causes an electrical short circuit in the heart leading to an irregular heartbeat. This can cause palpitations(sensation of a fast heart beats) , presyncope (giddiness, blurring of vision) or syncope(Loss of consciousness).

What does the present study involve?

The records of the previous operation that you/your child has undergone will be collected from the hospital database. You will be contacted by phone/ by mail to visit the hospital on a particular day. You/ yourself along with your child will usually come in to hospital on the day of appointment. A specialist doctor will explain the proposed study design to you and ask you to sign the consent form to confirm that you understand the procedure and agree to go ahead with it. Please ask any questions you want.

Following enrolment into the study, you/your child will undergo the following tests- usually done as part of standard protocol and routine follow up evaluation:

- Electrocardiogram
- Echocardiogram
- Any other test deemed necessary as part of evaluation

How long does it take?

The hospital visit will be a routine consultation, and the tests done will be part of routine follow up. This may take upto 2-3 hours. Please be prepared to be in the hospital OPD during that time.

WHAT ARE THE RESPONSIBILITIES OF PARTICIPANTS?

Your decision to participate/to allow your child to participate in this study is voluntary, your own personal choice. You may choose not to continue at any time, for any reason, without notice.

WHAT ARE THE EXPECTED RISKS FOR THE PARTICIPANTS?

The study involves collection of previous data from case records, and a follow up evaluation to assess the arrhythmias that can occur in post surgical Tetralogy of fallot individuals. There will be no risks for the participants because of participation in the study. They will be managed according to the hospital protocol. No specific intervention will be done.

WHAT ARE THE EXPECTED BENEFITS OF THE RESEARCH TO THE PARTICIPANTS?

The participants are evaluated for any history suggestive of arrhythmia. All patients will undergo a detailed evaluation which can beneficial in assessing their risk for future arrhythmia and can help in deciding early treatment or intervention if required. Data from this study may be helpful is identifying a sub group of patients who underwent surgical correction of tetralogy of fallot who are at an increased risk of morbidity or mortality from arrhythmias. This can help clinicians in guiding their decisions and define the best course of management in these patients

WILL PARTICIPANTS BE COMPENSATED FOR PARTICIPATION IN THIS TRIAL?

You will not be paid for participation in the study.

WILL MINE/MY CHILD'S PARTICIPATION IN THIS STUDY BE KEPT CONFIDENTIAL?

All records of your/your child's study will be kept confidential. Your child's personal identity will not be revealed in any publication or release of results. Study records will be kept indefinitely for analysis and follow-up.

CAN I WITHDRAW FROM THE STUDY AT ANY TIME DURING THE STUDY PERIOD?

Yes, you can. Your decision will not affect your regular medical care.

IF THERE ARE ANY NEW FINDINGS / INFORMATION, WOULD I BE INFORMED?

Yes.

WHAT HAPPENS IN CASE OF A STUDY RELATED INJURY?

There will be no study related injury.

IS THERE ANY ALTERNATIVE TO THE TREATMENT MENTIONED?

Not applicable.

If you have any further questions, please ask: Dr. Karthik R (Principal investigator), Senior Resident, Department of Cardiology (Email: karthikr@sctimst.ac.in Ph No: 9843447652)

For any technical clarifications, please contact Study Independent Contact Person Dr. K .Shivakumar, Ph no:0471-2524593

CONSENT FORM

Title of the study:
Arrhythmias in Post-Surgical Tetralogy of Fallot Patients

Participant's name:
Age (in years):

I_____, son/daughter/husband/wife of
_____ declare that (Please tick boxes)

• I have read the above information provided to me regarding the study. **[ ]**
• I have clarified any doubts that I had. [ ]
• I also understand that my participation in this study is entirely voluntary and that I am free to withdraw permission to continue to participate at any time without affecting my usual treatment or my legal Rights [ ]
• I understand that the study staff and institutional ethics committee members will not need my permission to look at my health records even if I withdraw from the trial. I agree to this access. [ ]
• I understand that my identity will not be revealed in any information released to third parties or in publication of study results. [ ]
• I voluntarily agree to take part in this study [ ]

- I understand that participation in the study means that I am willing to undergo the said procedure as already explained and my health records shall be accessed by the investigators for the purpose of the study. [ ]
- I understand that I do not have to bear any extra expense for the purpose of this study. No financial support will be provided to me for participation in the study. [ ]

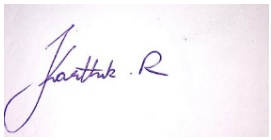
• I have been provided with the contact numbers of the principle investigator, in case I want to know more about the study and participants rights [ ].
• I have received a copy of this signed consent form [ ]

Name:
Signature:
Name of witness:
Signature:
Relation to participant:

Person Obtaining Consent
I attest that the requirements for informed consent for the medical research project described in this form have been satisfied. I have discussed the research project with the participant and explained to him or her
, in nontechnical terms, all of the information contained in this informed consent form, including any risks and adverse reactions that may reasonably be expected to occur. I further certify that I encouraged the participant to ask questions and all questions asked were answered.

Name:
Signature:
Date:
Place:SCTIMST, Thiruvananthapuram

Principal investigator



Dr.Karthik R
Shristy Hostel, Sree Chitra Quarters
Trivandrum
Mobile. 09843447652
Date – 3-12-2018

Study Independent Contact Person
Dr. K Shivakumar
0471-2524593

Informed Consent (Assent form)

Participant's name:

Date of Birth / Age (in years):

I_____ _____,
son/daughter of_____(Please tick
boxes) • declare that

• I have read the above information provide to me regarding
the study: **Arrhythmias in Post-Surgical Tetralogy of Fallot Patients**. And have clarified any doubts that I had. [ ]

• I also understand that my participation in this study is entirely voluntary and that I am free to withdraw permission to continue to participate at any time without affecting my usual treatment or my legal rights [ ]

• I understand that the study staff and institutional ethics committee members will not need my permission to look at my health records even if I withdraw from the trial. I agree to this access [ ]

• I understand that my identity will not be revealed in any information released to third parties or published [ ]

• I voluntarily agree to take part in this study [ ]

• I received a copy of this signed consent form [ ]

Name: Signature :

Signature of the

Father/Mother/Relative: Name of the

Father/Mother/Relative: Date:

I attest that the requirements for informed consent for the medical research project described in this form have been satisfied. I have discussed the research project with the participant and explained to him or her in nontechnical terms all of the information contained in this informed consent form, including any risks and adverse reactions that may reasonably be expected to occur. I further certify that I encouraged the participant to ask questions and that all questions asked were answered.

_____ _____
Name and Signature of Person Obtaining Consent

MASTERCHART

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmhg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)
1	7	1	5	16/07/01	TOF	0	0	16	1	0	2	100	100	70	82	1	0	0	0	1	70	26	19	20	0	0	2	0	0	0	0	0
2	6	2	4	01/10/99	TOF	0	0	14	3	0	2	80	110	70	70	3	0	0	0	1	64	34	21	19	0	0	1	0	0	0	0	0
3	4	1	4	26/07/99	TOF	0	0	16.6	2	0	2	90	90	70	71	1	0	0	0	1	72	16	10	17	0	0	2	0	0	0	0	0
4	16	2	2	17/02/99	TOF	1	0	8.5	1	0	2	103	100	70	75	1	0	0	0	1	73	16	10		0	0	2	0	0	0	0	0
5	2	2	2	10/07/01	TOF	0	0	10.5	1	0	2	93	90	70	80	1	0	0	0	1	75	28	17	14	0	0	2	0	0	0	0	0
6	15	2	8	07/05/99	TOF	0	0	26.7	2	0	2	86	110	80	84	1	0	0	0	1	64	30	21		0	0	2	0	0	0	0	0
7	7	2	3	05/10/99	TOF	0	0	13	1	0	2	94	110	80	87	1	0	0	0	1	55	29	20	14	0	0	1	0	0	0	0	0
8	36	2	14	29/06/99	TOF	0	0	40	1	0	2	80	110	70	87	1	0	0	0	1	70	30	16	25	0	0	2	0	0	0	0	0
9	27	2	6	22/06/99	TOF	0	0	15.7	1	0	2	66	120	80	85	1	0	0	0	1	75	30	19		0	0	2	0	0	0	0	0
10	11	2	2	12/07/99	TOF	0	0	25	1	0	2	86	110	70	85	1	0	0	0	1	70	23	12	17	0	0	2	0	0	0	0	0
11	33	1	6	18/05/99	TOF	1	0	21.5	2	0	2	98	100	70	90	1	0	0	0	1	66	37	26	22	0	0	1	0	0	0	0	0
12	33	2	12	10/08/99	TOF with PDA	0	0	53	2	0	2	78	130	80	87	1	1	0	0	1	75	33	22	17	1	1	2	1	2	0	1	0
13	21	1	3	13/08/99	TOF	1	0	10.5	1	0	2	100	90	70	80	1	0	0	0	1	70	18	9	9	0	0	2	0	0	0	0	0
14	28	1	7	06/09/99	TOF with LPA stenosis	0	0	21	1	0	2	80	110	60	85	4	0	0	0	1	78	35	21	14	0	0	2	0	0	0	0	0
15	53	1	32	07/09/99	TOF with MR	1	0	41	5	0	2	80	110	70	78	4	0	0	0	1	80	51	30	24	0	0	2	0	0	0	0	0
16	8	2	4	02/08/99	TOF	0	0	13	2	0	2	96	100	70	70	4	0	0	0	1	80	25	17	20	0	0	1	0	0	0	0	0
17	23	2	2	28/08/99	TOF	0	0	13.1	1	0	2	70	100	70	82	4	0	0	0	1	75	18	11		0	0	1	0	0	0	0	0
18	26	1	5	02/08/99	TOF	0	0	13	2	0	2	96	100	70	70	4	0	0	0	1	80	25	17	20	0	0	1	0	0	0	0	0
19	5	2	3.5	16/02/99	TOF	0	0	12	1	0	2	96	100	96	85	4	0	0	0	1	70	22	11	15	0	0	1	0	0	0	0	0
20	19	1	4	03/08/99	TOF	0	0	14	1	0	2	86	100	60	90	4	0	0	0	1	68	20	10	19	0	0	1	0	0	0	0	0
21	5	1	4.5	21/09/99	TOF	1	0	13.5	1	0	2	84	110	60	85	1	0	0	0	1	72	27	17	23	0	0	1	0	0	0	0	0
22	34	2	13	06/01/99	TOF	0	0	22.5	1	0	2	84	108	70	65	4	0	0	0	1	70	25	14	13	0	0	1	0	0	0	0	0
23	26	2	5	27/05/99	TOF+LPA stenosis	1	0	14.5	1	0	2	78	106	70	78	1	0	0	0	1	75	13	9		0	0	1	0	0	0	0	0
24	19	1	4	03/09/99	TOF	0	0	47	1	0	2	86	130	70	79	3	0	0	0	1	68	30	18	25	0	0	1	0	0	0	0	0
25	18	2	3	03/09/99	TOF	1	0	18	3	0	2	80	110	70	83	3	0	0	0	1	62	28	19	14	0	0	1	0	0	0	0	0
26	4	2	4	16/02/99	TOF	0	0	12	1	1	2	96	100	96	85	4	0	0	0	1	70	22	11	15	0	0	1	0	0	0	0	0
27	20	2	3	22/02/99	TOF	1	0	9	1	0	2	90	90	70	80	4	0	0	0	1	70	17	10		0	0	1	0	0	0	0	0
28	11	1	11	10/11/99	TOF	0	0	18.5	1	0	2	88	100	80	72	1	0	0	0	1	70	26	16		0	0	1	0	0	0	0	0
29	5	1	4	05/10/99	TOF	0	0	13	1	0	2	94	110	80	87	1	0	0	0	1	55	29	20	14	0	0	1	0	0	0	0	0
30	36	1	14	09/02/99	TOF with LPA stensasis	0	0	47	1	0	2	86	100	70	89	1	0	0	0	1	60	32	20	30	0	0	1	0	0	0	0	0
31	4	2	4	21/06/99	TOF	1	0	14	3	0	2	90	110	70	84	3	0	0	0	1	70	21	12		0	0	1	0	0	0	0	0
32	27	1	6	28/06/01	TOF	1	0	21	2	0	2	102	110	60	83	4	0	0	0	1	75	20	11		0	0	1	0	0	0	0	0
33	10	2	2.5	22/02/99	TOF	1	0	9	1	0	2	90	90	70	80	4	0	0	0	1	70	17	10		0	0	1	0	0	0	0	0
34	10	2	3	12/07/01	TOF with LPA stenosis	0	0	11	1	0	2	102	110	60	83	1	0	0	0	1	60	18	13	18	0	0	1	0	0	0	0	0
35	40	1	19	02/03/99	TOF	0	0	43	1	0	2	111	110	70	88	1	1	0	0	1	65	29	11		0	0	1	1	2	0	1	0
36	32	1	11	05/06/01	TOF	0	0	21	1	0	2	100	110	70	71	1	0	0	0	1	70	34	20	30	0	0	1	0	0	0	0	0
37	27	1	6	01/10/99	TOF	1	0	25.5	3	0	2	80	110	70	70	3	0	0	0	1	64	34	21	19	0	0	1	0	0	0	0	0
38	13	1	3	11/01/00	TOF	0	0	8.5	1	0	2	120	90	70	89	1	0	0	0	1	65	16	9	12	0	0	1	0	0	0	0	0
39	23	1	2	25/03/99	TOF	0	0	12.5	1	0	2	100	100	70	89	1	0	0	0	0					0	0	1	0	0	0	0	0
40	20	1	1	26/03/99	TOF	0	0	4.3	1	0	2	90	100	70	83	1	0	0	0	1	70	21	12	20	0	0	1	0	0	0	0	0
41	5	1	3	29/12/99	TOF	1	0	10.5	2	0	2	80	90	70	88	1	0	0	0	1	80	14	8	12	0	0	1	0	0	0	0	0
42	21	1	3	11/05/99	TOF	0	0	14.2	1	0	2	90	110	60	84	1	0	0	0	1	70	21	12	14	0	0	1	0	0	0	0	0
43	14	1	4	11/01/00	TOF	1	0	12.5	2	0	2	90	90	50	90	2	0	0	0	1	70	24	16	15	0	0	1	0	0	0	0	0
44	13	2	5	29/12/99	TOF	1	0	10	2	0	2	80	90	70	88	1	0	0	0	1	80	14	8	12	0	0	1	0	0	0	0	0
45	22	1	3	01/07/99	TOF	1	0	12.6	2	0	2	130	100	70	76	1	0	0	0	1	70	18	10	7	0	0	1	0	0	0	0	0
46	39	2	18	16/04/99	TOF with LPA stenosis	1	0	47	1	0	2	80	120	70	80	1	0	0	0	1	62	41	36	27	0	0	1	0	0	0	0	0
47	10	1	9	05/05/02	TOF	0	0	20	1	0	2	88	110	60	88	1	0	0	0	1	71	28	15	15	0	0	1	0	0	0	0	0
48	22	1	3	03/02/99	TOF	1	0	14	1	0	2	84	120	80	70	3	0	0	0	1	75	24	15	16	0	0	1	0	0	0	0	0
49	25	2	3	09/06/99	TOF	1	0	12	1	0	2	90	110	70	75	1	0	0	0	1	70	13	8	14	0	0	1	0	0	0	0	0
50	31	1	6	21/05/01	TOF	1	0	12.5	3	0	2	100	100	80	79	3	0	0	0	1	75	21	12	18	0	0	1	0	0	0	0	0
51	20	2	2.5	07/12/99	TOF		0	10.5	1	0	2	90	90	70	80	1	0	0	0	1	77	19	11		0	0	1	0	0	0	0	0
52	40	1	18	22/11/99	TOF	1	0	36	1	0	2	80	110	60	80	1	0	0	0	0					0	0	1	0	0	0	0	0
53	9	2	3.5	04/07/01	TOF	1	0	14	1	0	2	100	90	60	82	1	0	0	0	1	62	31	21	17	0	0	1	0	0	0	0	0
54	14	1	14	21/04/99	TOF		0	48.5	2	0	2	86	130	70	98	1	0	0	0	1	51	32	24	15	0	0	1	0	0	0	0	0
55	9	2	9	16/11/99	TOF	0	0	22	1	0	2	86	100	60	68	1	0	0	0	1	75	23	16	23	0	0	1	0	0	0	0	0
56	20	1	3	29/05/01	TOF	1	0	12	3	0	2	90	90	60	80	1	0	0	0	1	61	33	27		0	0	1	0	0	0	0	0
57	32	1	11	31/05/99	TOF	1	0	15	1	0	2	90	100	70	86	1	0	0	0	1	74	24	14	18	0	0	1	0	0	0	0	0
58	4	1	4	13/04/99	TOF	1	1	17	1	0	2	100	100	70	75	1	0	0	0	1	70	24	12	11	0	0	1	0	0	0	0	0
59	21	2	1.5	23/02/99	TOF	1	0	6.5	1	0	2	124	90	60	80	1	0	0	0	0					0	0	1	0	0	0	0	0
60	23	2	2.5	15/02/99	TOF	1	0	10	4	0	2	106	90	70	80	1	0	0	0	1	65	22	14	10	0	0	1	0	0	0	0	0
61	23	2	0.5	09/03/99	TOF		0	3	1	0	2	100	100	60	83	1	0	0	0	1	70	20	14	21	0	0	1	0	0	0	0	0
62	25	2	5	05/03/99	TOF	0	0	13	2	0	2	94	110	70	88	1	0	0	0	1	71	25	16	24	0	0	1	0	0	0	0	0
63	32	1	11	12/05/99	TOF		0	16.5	2	0	2	88	100	70	90	1	0	0	0	1	65	29	20	24	0	0	1	0	0	0	0	0
64	3	1	3	30/03/01	TOF	1	0	9.7	1	0	2	100	90	60	82	1	0	0	0	1	65	19	13	19	0	0	1	0	0	0	0	0
65	21	2	3	16/10/99	TOF	1	0	13.1	1	0	2	110	70	90	74	1	0	0	0	1	70	22	15	16	0	0	1	0	0	0	0	0
66	27	2	7	10/05/99	TOF		0	14.5	3	0	2	100	90	72	80	1	0	0	0	1	70	29	19	21	0	0	1	0	0	0	0	0
67	29	2	6	18/05/99	TOF	1	0	21.5	2	0	2	98	100	70	90	1	0	0	0	1	66	37	26	22	0	0	1	0	0	0	0	0
68	23	2	10	09/02/99	TOF, ASD	0	0	25	1	0	2	90	100	80	80	3	0	0	0	1	70	30	20	19	0	0	1	0	0	0	0	0
69	20	1	3	06/06/01	TOF	0	0	12	2	0	2	100	110	70	87	1	0	0	0	1	80	24	12	15	0	0	1	0	0	0	0	0
70	18	1	6	21/05/01	TOF	1	0	12.5	3	0	2	100	100	80	79	3	0	0	0	1	75	21	12	18	0	0	1	0	0	0	0	0
71	24	1	12	20/06/01	TOF	1	0	28	1	0	2	90	110	80	92	1	0	0	0	1	65	28	19	16	0	0	1	0	0	0	0	0
72	18	1	3.5	14/06/01	TOF	0	0	16	2	0	2	90	110	70	80	1	0	0	0	1	78	20	12	16	0	0	1	0	0	0	0	0
73	6	1	6	05/10/99	TOF	0	0	16	2	0	2	94	110	80	87	1	0	0	0	1	55	29	20	14	0	0	1	0	0	0	0	0
74	15	2	16	12/01/00	TOF	0	0	36	2	0	2	90	110	80	84	1	0	0	0	1	65	31	24	20	0	0	1	0	0	0	0	0
75	2	1	2	02/11/99	TOF	0	1	11	1	1	2	110	100	60	74	1	0	0	0	1	70	24	14	12		0		0	0	0	0	0

Sl no	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	lrbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
1																5															
2		1		140	100		1	50	90	1	0	0	0		420	19	63	62	39					1							
3																4															
4		1		160	130			60								11															
5																4															
6																4															
7																3															
8		1		120	80	0		60								12															
9		1		140	140	1		90	45	1	0	1	1	2	400	20	78	36	19	27	40	18	3	1					1		
10																5															
11		1		160	110			50	60	1	0	0	0		410	20	60	42	30	32		26	2	1							
12	AT	1		180	140	1		60	90	1	0	0	0		432	20	68	44	27	39		18		4					1		
13																2															
14		1		160	80		1	50	100	1	1	0	0		492	16	68	44	48	33		22		2							
15		1		120	80		1	50	30	1	0	0	0		410	20	58	39	27	24		15	2	4							
16		1		140	100		1	70	45	1	0	0	0		420	20															
17		1		120	130	1		40	90	1	1	0	1	3	447	20	67	35	22	30		16	3	3	17	10	38				
18		1		140	150	1		70	45	1	1	0	1	4	400	20													1		
19		1		120	80	0		50	45	1	0	0	0		420	20	63	34	23	23		16		4					1		
20																4															
21																4															
22																8															
23																2															
24																10															
25																3															
26		1		120	80	0																									
27																5	78	31	21			18		2							
28																3															
29																4															
30		1		120	80	0		50	90	1	0	0	0		432	16	50	39	34	31				4					1		
31																5															
32		1		140	120		1	70	20	1	0	0	0		475	13	60	55	40	27			2	2			24				
33																4	78	31	21			18		2							
34																5															
35	AT	1		160	140	1		80								4													1		
36																7															
37		1		120	100	0		50	100	1	0	0	0		447	19	63	62	39				2	1					1		
38																5															
39		1		140	130	1		40	75	1	1	0	0		400	19	78	40	27					2	35	20					
40																3															
41																3															
42																8															
43																7															
44																3															
45																12	71	49	30	28				2							
46		1		120	80	0		60	15	1	11	0	1	2	416	19	72	43	24					1		8			1		
47																5															
48																3															
49																4															
50																6															
51																4															
52																8															
53																9															
54																10															
55																10															
56																6															
57																9															
58																3															
59		1		140	80	0		50	90	1	0	0	1	4	432	20	60	26	17	24			3	3	28				1		
60		1		120	100			50	75	1	1	0	0		462	20	75	36	21	21	75	19		3					1		
61																5															
62		1		120	80	0		50	45	1	0	0	0		432	19	60	37	22					2	25				1		
63																3													1		
64																3															
65		1		160	130		1	50	-70	3	1	0	0		492	16	70	37	20	23		23	2	3	42		33				
66																6													1	1	2
67		1		140	110		1	50	30	1	0	0	1	3	400	20	60	42	30	32		26		1							
68																5															
69		1		120	160	1		80	90	1	0	1	0		432	20	65	47	31			22	3	3	21	12	41				
70																8															
71																10															
72																3															
73																8															
74																5															
75																															

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	48	132	56	0	0	0	0	1.8															0	0	0						
																							0	0	0						
																							0	0	0						
Normal	47	104	62	0	0	0	0	1.7															0	0	0				1		Medical for AT, PVR done # 23 Perimount magna
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	36	153	52	0	0	0	0	2.2															0	0	0						
Normal	42	128	66	0	0	0	0	1.6															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	1		perioperative,cardiogenic shock				
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	45	125	61	0	0		0	1.5	1	75	38.1	60	49.7	25									0	0	0				1		TR 3+, Small residual VSD
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	43	156	62	0	2	0	0	1.9															0	0	0						Medical follow up for AT
																							0	0	0						
Normal	53	140	68	0	0	0	0	1.6															0	0	0				1		1.5mm Residual VSD
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	51	145	61	0	0	0	0	2															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	52	148	68	0	0	0		1.9															0	0	0						
Normal	40	128	58	0	0	0	0	1.71															0	0	0						
																							0	0	0						
normal	46	126	60	0	0	0	0	1.8															0	0	0						
Normal	54	135	63	0	0	0	0	1.5															0	0	0						PA stenosis
																							0	0	0						
																							0	0	0						MAPCA embolisation
Paced rhythm, APC	51	115	66	0	3	0		1.17															0	0	0						Post Op CHB, S/p VVI ,
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							1	0	1		PERIOP				

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmHg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on fallow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrhythmia)	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	Irbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
76	18	1	3.5	09/11/99	TOF	0	0	12	1	0	2	90	100	80	90	1	0	0	0	1	70	21	14	15	0	0	1	0	0	0	0	0																10															
77	11	1	11	17/03/99	TOF	1	0	30	1	0	2	90	120	70	87	1	0	0	0	1	65	43	29	24	0	0	1	0	0	0	0	0																3															
78	24	2	5	05/03/99	TOF	0	0	13	2	0	2	94	110	70	88	1	0	0	0	1	71	25	16	24	0	0	1	0	0	0	0	0		1		120	80			50	75	1	0	0	0		416	19	60	37	22					2	25						
79	3	2	4	15/06/99	TOF	0	0	11.5	1	0	2	88	100	70	87	1	0	0	0	1	70	24	15	14	0	0	1	0	0	0	0	0																5															
80	21	2	3	22/06/01	TOF	1	0	7.5	1	0	2	102	100	60	79	1	0	0	0	1	70	21	16	18	0	0	1	0	0	0	0	0		1		160	130	1		40	90	1	0	0	0		462	20	62	42	28	35			2	3	16	10	30				
81	4	2	4	04/07/01	TOF	1	0	14	1	0	2	100	90	60	82	1	0	0	0	1	62	31	21	17	0	0	1	0	0	0	0	0																8															
82	15	1	15	18/10/99	TOF	0	0	35	2	0	2	60	120	70	90	1	0	0	0	1	70	36	22	20	0	0	1	0	0	0	0	0																9															
83	19	1	4	17/02/99	TOF	0	0	16.3	1	0	2	86	110	70	89	1	0	0	0	1	70	25	17	19	0	0	1	0	0	0	0	0																10															
84	23	1	23	02/03/99	TOF	0	0	46	1	0	2	96	130	70	80	1	0	0	0	1	80	31	19	31	0	0	1	0	0	0	0	0																5															
85	27	2	5	29/12/99	TOF	1	0	10	2	0	2	80	90	70	88	1	0	0	0	1	80	14	8	12	0	0	1	0	0	0	0	0		1		160	130	1		70	105	1	1	0	0		447	19	75	38	22	16			1	2	21	12	19		1		
86	21	1	6	21/04/01	TOF	1	1	12	1	0	2	100	100	70	85	1	0	0	0	1	70	28	17	11	0	0	1	1	2	0	1	0	AT	1		140	130	1		50	105	1	0	1	0		432	19	64	38	25	35		13	2	4	30	16			1		
87	9	1	9	16/11/99	TOF	0	0	22	1	0	2	86	100	60	68	1	0	0	0	1	75	23	16	23	0	0	1	0	0	0	0	0																5															
88	26	1	6	17/11/99	TOF	0	0	14	1	0	2	96	100	60	90	1	0	0	0	1	70	21	13	17	0	0	2	1	1	1	0	0	VPC+	1		140	160	1		120	30	1	1	1	0		433	20	73	50	29	37			3	4	26	16	26		1	1	1
89	2	1	2.5	21/01/00	TOF	0	0	14	1	0	2	90	110	70	79	1	0	0	0	1	75	16	9	10	0	0	1	0	0	0	0	0																3															
90	21	2	21	11/02/99	TOF	0	0	53	1	0	2	76	110	70	91	1	0	0	0	1	70	35	22	25	0	0	1	0	0	0	0	0																5															
91	16	2	2.5	18/10/99	TOF	1	1	14	1	0	2	92	90	60	88	1	0	0	0	1	67	19	13	9	0	0	1	0	0	0	0	0		1		140	130	1		80								10															
92	40	1	18	02/11/99	TOF	1	0	36	1	0	2	7	100	70	85	1	0	0	0	1	80	17	14	18	0	0	1	0	0	0	0	0																3															
93	18	1	4	09/03/99	TOF	0	0	16	1	0	2	110	106	60	88	1	0	0	0	1	65	21	15	18	0	0	1	0	0	0	0	0																4															
94	8	1	8	17/06/99	TOF	1	1	24	1	0	2	90	110	70	71	1	0	0	0	1	60	22	16	22	0	0	1	0	0	0	0	0																8															
95	16	2	2.5	18/10/99	TOF	1	1	14	1	0	2	92	90	60	88	1	0	0	0	1	67	19	13	9	0	0	1	0	0	0	0	0																10															
96	22	2	2.5	28/07/99	TOF	1	0	16	1	0	2	103	100	60	80	1	0	0	0	1	70	23	13	15	0	0	1	0	0	0	0	0		1		120	120	1		40	45	1	1	0	0		432	21	60	42	30	28		16	2	3					1		
97	13	1	13	18/01/99	TOF	1	0	15	1	0	2	86	110	66	80	1	0	0	0	1	65	23	13	14	0	0	1	0	0	0	0	0																5															
98	11	1	12	08/02/99	TOF	1	0	21	1	0	2	88	110	80	77	1	0	0	0	1	60	24	16	22	0	0	1	0	0	0	0	0																6															
99	24	1	4	20/01/99	TOF	1	1	14	1	0	2	96	106	60	92	1	0	0	0	1	63	33	20	18	0	0	1	0	0	0	0	0		1		140	130	1		50	130	2	0	1	0		441	19	64	51	32	35		16	2	4	33		14		1		
100	12	2	13	16/03/01	TOF	0	0	48	2	0	2	80	120	70	82	1	0	0	0	1	70	30	16	24	0	0	1	0	0	0	0	0																3															
101	24	2	4	13/04/99	TOF	1	1	17	1	0	2	100	100	70	75	1	0	0	0	1	70	24	12	11	0	0	1	0	0	0	0	0		1		160	140	1		60	75	1	1	0	0		416	18	62	46	30	27			1	1	16						
102	21	1	3	04/03/99	TOF	1	1	10.5	1	0	2	120	110	68	83	1	0	0	0	1	75	26	16	14	0	0	1	0	0	0	0	0		1		140	120	1		50	75	1	1	1	0		490	18	60	40	28	32		19		2							
103	10	2	5	08/02/99	TOF	0	0	14	1	0	2	100	100	70	79	1	0	0	0	1	75	15	9	10	0	0	1	0	0	0	0	0																5															
104	7	1	7	28/05/99	TOF	0	0	19	1	0	2	96	100	70	74	1	0	0	0	1	70	25	16	15	0	0	1	0	0	0	0	0																8															
105	7	1	7.5	22/10/99	TOF	1	1	16	1	0	2	80	110	70	88	1	0	0	0	1	80	32	19	18	0	0	1	0	0	0	0	0																10															
106	4	1	4.5	13/08/99	TOF	1	1	11.5	1	0	2	100	100	70	83	1	0	0	0	1	70	33	20	11	0	0	1	0	0	0	0	0																3															
107	36	2	20	12/03/99	TOF	0	0	45	1	0	2	88	120	70	89	1	0	0	0	1	75	27	16	28	0	0	1	0	0	0	0	0																4															
108	22	2	2	10/05/99	TOF	0	0	9.5	2	0	2	98	100	70	70	1	0	0	0	1	82	17	9	11	0	0	1	0	0	0	0	0		1		120	130	1		50	75	1	0	0	0		447	20	67	44	28	21			2	1	8		26		1		
109	22	2	5	08/02/99	TOF	0	0	14	1	0	2	100	100	70	79	1	0	0	0	1	75	15	9	10	0	0	1	0	0	0	0	0																5															
110	7	1	7	02/06/99	TOF,ASD	0	0	19	1	0	2	103	100	70	74	1	0	0	0	1	75	25	16	14	0	0	1	0	0	0	0	0																3															
111	16	1	14	17/12/99	TOF	0	0	26	1	0	2	96	69	60	89	1	0	0	0	1	61	25	17	19	0	0	1	0	0	0	0	0																2															
112	8	2	8	18/08/99	TOF	1	0	14	2	0	2	86	110	70	88	1	0	0	0	1	80	19	11	12	0	0	1	0	0	0	0	0																6															
113	14	1	14	07/06/99	TOF	0	0	33	1	0	2	90	110	70	72	1	0	0	0	1	74	28	20	23	0	0	1	0	0	0	0	0																10															
114	21	1	6	21/04/01	TOF	1	1	12	1	0	2	100	100	70	85	1	0	0	0	1	70	28	17	11	0	0	1	0	0	0	0	0		1		120	130	1		50	105	1	0	1	0		432	19	64	38	25	35		13	2	4	30	16					
115	7	2	7	11/01/00	TOF	0	0	15	2	0	2	104	100	70	80	1	0	0	0	1	65	26	15	14	0	0	1	0	0	0	0	0																8															
116	36	1	11	02/03/99	TOF	0	0	21	3	0	2	100	100	70	92	3	0	0	0	1	70	23	18	15	0	0	1	0	0	0	0	0		1		120	130	1		50	165	3	0	0	0		447	20	70	35	21			21	1	3	40		66		1		
117	36	1	11	27/06/01	TOF, PA STENOSIS	1	0	22	1	0	2	80	110	70	87	1	0	0	0	1	75	26	17	17	0	0	1	0	0	0	0	0																8									4	15						
118	26	1	7.5	30/09/99	TOF	1	1	15	3	0	2	84	120	80	87	3	0	0	0	1	80	20	13	12	0	0	1	0	0	0	0	0		1		160	130	1		50	90	1	1	1	0		462	20	58	31	22	21		16	3	3			33				
119	9	1	9	30/06/00	TOF	1	0	21.5	3	0	2	86	100	60	75	3	0	0	0	1	60	30	22	24	0	0	1	0	0	0	0	0																7									3							
120	33	2	9	04/05/02	TOF	0	0	20	1	0	2	88	110	60	88	1	0	0	0	1	71	28	15	15	0	0	1	0	0	0	0	0																4															
121	21	1	3	21/08/01	TOF	0	0	13	1	0	2	110	100	70	90	1	0	0	0	1	77	19	11	16	0	0	1	0	0	0	0	0		1		140	120		1	40	-30	3	1	1	0		432	18	61	42	28			12	3	4	10	4	52				
122	7	2	7	01/10/01	TOF	1	0	18	1	0	2	92	110	80	81	1	0	0	0	1	80	24	15	19	0	0	1	0	0	0	0	0																4									3	59						
123	23	1	5.5	30/11/99	TOF	0	0	16	1	0	2	90	100	60	92	1	0	0	0	1	65	32	21	23	0	0	1	0	0	0	0	0																11															
124	17	1	4	28/09/99	TOF	0	1	9	1	0	2	100	110	70	85	1	0	0	0	1	73	20	13	14	0	0	1	1	1	1	0	0	VPC	1		160	150	1		60	90	1	1	0	0		462	19	65	36	21			22		2	36	21			1	1	1
125	25	2	9	25/10/99	TOF	1	1	16	1	0	2	80	100	80	85	1	0	0	0	1	76	27	21	19	0	0	1	0	0	0	0	0					120	1		50	60	1	0	0	0		447	19	68	37	23	21		19	2	2	8	4	27				
126	27	2	6.5	30/12/99	TOF	1	0	13.8	1	1	2	88	80	60	90	1	0	0	0	0					0	0	1	0	0	0	0	0																															
127	27	2	9	15/12/99	TOF	0	0	26	1	0	2	90	90	60	84	1	0	0	0	1	80	26	19	21	0	0	1	0	0	0	0	0		1		120	130	1		60	75	1	0	0	0		432	17	65	37	24	22			2	3	20	12					
128	3	1	3	21/12/01	TOF	0	0	13	1	1	2	70	90	60	70	1	0	0	0	1	75	17	12	14		0		0	0	0	0	0																															
129	7	1	7	06/11/01	TOF,LPA STENOSIS	0	1	22	1	0	2	80	104	80	90	1	0	0	0	1	75	28	20	16	0	0	1	0	0	0	0	0																5															
130	41	1	28	25/02/02	TOF	0	0	53	2	0	2	80	10	70	91	1	0	0	0	1	70	44	33	31	1	1	1	1	2	0	1	0	ATRIAL FLUTTER WITH	2			130	1		40	120	2	0	0	0		460	19	67	55	34	50		13	4	2			18		1		
131	17	1	3	16/12/99	TOF,LPA STENOSIS	1	1	11.5	1	0	2	104	110	70	88	1	0	0	0	1	75	27	16	23	0	0	1	1	1	1	0	0	VPC	1		120	160	1		50	30	1	1	0	0		462	17	58	43	30	41		19	1	2	13						
132	19	1	2.5	13/07/01	TOF,ASD,LSVC	1	0	9.2	2	0	2	100	96	76	85	1	0	0	0	1	80	20	11	14	0	0	1	0	0	0	0	0		1		100	130	1		50	100	1	1	0	0		432	18	60	45	30			19	2	2	20	10	32				
133	12	1	12	12/11/01	TOF ABSENT PV	0	0	25	1	0	2	76	110	70	88	1	0	0	0	1	75	25	15	18	0	0	1	0	0	0	0	0																7									3	32						
134	25	2	4	30/10/01	TOF,PDA	0	0	16	1	0	2	102	120	60	86	1	0	0	0	1	80	34	15	16	0	0	1	0	0	0	0	0		1		120	120	1		60	120	2	0	0	0		456	19	63	45	30			20		2		6					
135	27	2	7	28/05/99	TOF	0	0	15.7	1	0	2	96	100	68	88	1	0	0	0	1	70	32	21	11	0	0	1	0	0	0	0	0		1		120	130	1		60	45	1	0	0	0		410	20	78	36	19	21				2	14						
136	36	1	11	01/11/01	TOF	1	0	21	2	0	1	88	110	60	71	1	0	0	0	1	76	21	10	12	0	0	1	0	0	0	0	0		1		160	140	1		80	75	1	0	0	0		420	15	61	34	23					1	12						
137	20	1	3.5	23/11/99	TOF,PFO	0	0	14	1	0	2	84	100	70	82	1	0	0	0	1	74	19	11	14	0	0	1	0	0	0	0	0		1		140	130	1		60	90	1	0	0	0		432	16	65	37	24	38		20		2	13	8					
138	26	2	11	24/11/99	TOF	1	0	4.5	1	0	2	100	110	70	89	1	0	0	0	1	74	19	10	14	0	0	1	0	0	0	0	0		1		160	150	1		40	45	1	0	0	0		462	20	76	36	19	37				2							
139	19	2	2	07/11/01	TOF	1	0	8	1	0	2	120	100	60	85	1	0	0	0	1	80	22	14	10	0	0	1	0	0	0	0	0		1		160	130	1		60	75	1	0	0	0		440	17	64	32	21					3	9	4			1		
140	23	1	6	12/10/99	TOF	0	0	18	1	0	2	90	100	70	90	1	0	0	0	1	78	26	20	21	0	0	1	0	0	0	0	0																11															
141	22	1	9	20/12/01	TOF	1	0	20	1	0	2	90	110	70	89	1	0	0	0	1	76	31	20	12	0	0	1	0	0	0	0	0		1		160	130	1		60	105	1	0	0	0		432	19	62	39	26					0	8						
142	8	1	8	19/11/99	TOF	1	1	24	1	0	2	90	110	70	72	1	0	0	0	1	66	18	12	17	0	0	1	0	0	0	0	0																3															
143	42	2	23	21/03/00	TOF	0	0	49	1	0	2	88	110	70	75	1	0	0	0	1	75	33	22	21	1	1	2	1	1	1	0	0	NSVT DOCUMENTED	1		140	120		1	40	90	1	1	0	0		460	20	67	40	25	32			2	2	12		35		1		
144	19	1	3.5	11/07/01	TOF,PDA	1	0	15	1	0	2	78	120	70	80	1	0	0	0	1	76	28	19	16	0	0	1	0	0	0	0	0																8															
145	21	1	4	07/05/01	TOF	1	0	11.5	1	0	2	100	90	60	88	1	0	0	0	1	80	21	11	16	0	0	1	0	0	0	0	0																9															
146	19	2	2.5	31/12/01	TOF	1	1	12	1	0	2	116	110	60	82	1	0	0	0	1	78	20	13	17	0	0	1	0	0	0	0	0		1		110	110		1	40	75	1	1	0	0		450	18	65	36	23	32		18		4							
147	3	1	3.5	08/11/01	TOF	1	0	10	2	0	2	100	100	60	70	1	0	0	0	1	80	24	14	12	0	0	1	0	0	0	0	0																3															
148	1	2	1	24/12/01	TOF	0	0		1	1	2	78	110	80	92	1	0	0	0	1	68	39	24	26		0		0	0	0	0	0																															

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	52	142	68	0	0	0		1.86															0	0	0						
Normal	64	147	74	0	0	0		2.1	1	146	87	62	40	70									0	0	0						AT medically managed- on metoprolol 50mg ,MRI NOTED
																							0	0	0						
VPC	58	136	70	15	0	0		2.3	1	193	116	56	39	68	VSD patch	RV							0	0	0						PVR #23 LIVANOVA+ TV REPAIR(DEVEGA'S
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
NORMAL	43	123	65	0	0	0		2.6															0	0	0						
																							0	0	0						
																							0	0	0						
Normal	52	133	63	0	0	0	0	1.5															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	38	152	71	0	0	0		1.92															0	0	0						
																							0	0	0						
																							0	0	0						Coronary AV fistula- Medical follow up
																							0	0	0				1		Residual VSD >2:1-advised surgery
																							0	0	0						
																							0	0	0						
									1	146	87	56	40	70									0	0	0						MRI NOTED SEVERE NARROWING OF LPA NARROWING
																							0	0	0						
Normal	40	138	66	0	0	0		1.9															0	0	0						BPV DONE IN 2000 FOR SEVERE RVOT GRADIENT 90MMHG-
																							0	0	0						
																							0	0	0						
																							0	0	0				1		RESIDUAL VSD
																							0	0	0						
																							0	0	0						
																							0	0	0				1		RESIDUAL VSD ADVISED RE DO
																							0	0	0						
VPC	45	132	59	0	0	0		1.8															0	0	0						Medicallt managed -On metoprolol 25mg
																							0	0	0						
																							1	0	1		periop-cardiogenic shock				
																							0	0	0						
																							1	0	1						PERIOPERATIVE MORTAUTY DUE TO CARDIAC
																							0	0	0						
Normal	40	145	56	0	0	0	0	1.6									1	9/2014- Dual loop reentrant RA flutter - Dominant loop in RA scar					0	0	0				1		
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	52	148	70	0	0	0	0	1.8															0	0	0						
																							0	0	0						
									1							no							0	0	0						
																							0	0	0						
Normal	52	154	70	0	0	0	0	1.8															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmhg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)
149	26	1	6.5	30/12/99	TOF	1	0	13.8	1	0	2	88	80	60	90	1	0	0	0	0					0	0	1	1	1	0	0	0
150	7	2	7.5	29/11/99	TOF	0	0	16.5	1	0	2	110	100	70	80	1	0	0	0	1	63	25	19	14	0	0	1	0	0	0	0	0
151	18	2	8	21/05/01	TOF	1	0	20	1	0	2	80	100	70	74	1	0	0	0	1	80	26	19	19	0	0	1	0	0	0	0	0
152	37	1	23	02/08/01	TOF	0	0	40	1	0	2	78	110	80	92	1	0	0	0	1	68	39	24	26	0	0	1	0	0	0	0	0
153	36	1	18	25/05/01	TOF	0	0	42.5	1	0	2	90	120	90	83	1	1	0	0	1	76	26	16		0	0		1	2	0	1	0
154	26	1	14	19/11/99	TOF	0	0	27.3	1	0	2	64	120	90	88	1	0	0	0	1	62	31	22	24	0	0	1	0	0	0	0	0
155	25	2	6	16/12/99	TOF	0	0	14.3	1	0	2	76	100	70	82	1	0	0	0	1	78	25	18	14	0	0	1	0	0	0	0	0
156	40	1	27	15/12/01	TOF	1	0	54	1	0	2	90	130	80	64	1	0	0	0	1	55	34	25	22	0	0	1	1	2	0	1	0
157	22	1	5	19/09/01	TOF	1	1	12	1	0	2	80	90	60	83	1	0	0	0	1	71	17	11	14	0	0	1	0	0	0	0	0
158	15	1	15	28/03/01	TOF	0	0	49	2	0	2	70	110	70	89	1	0	0	0	1	70	33	21	34	0	0	1	0	0	0	0	0
159	0.5	2	0.5	01/12/01	TOF	0	0		1	1	2	78	110	80	92	1	0	0	0	1	68	39	24	26		0		0	0	0	0	0
160	39	1	5	27/10/01	TOF	1	0	12	2	0	2	88	100	60	84	1	0	0	0	1	78	24	16	15	0	0	1	0	0	0	0	0
161	4	2	4	13/07/01	TOF,ASD	0	0	10.5	1	1	2	100	100	70	82	1										0		0	0	0	0	0
162	1	1	1.5	29/10/01	TOF	0	0	7.5	1	0	2	100	90	70	85	1	0	0	0	1	66	17	11	14	0	0	1	0	0	0	0	0
163	25	2	5	13/10/99	TOF,PDA	0	0	14.5	1	0	2	96	100	50	87	3	0	0	0	1	65	33	23	16	0	0	1	0	0	0	0	0
164	29	2	9	20/12/01	TOF	1	0	20	1	0	2	90	110	70	89	1	0	0	0	1	76	31	20	12	0	0	1	0	0	0	0	0
165	11	2	11	03/10/01	TOF	1	0	31.8	1	0	2	88	120	80	81	2	0	0	0	1	64	33	22	22	0	0	1	0	0	0	0	0
166	29	1	4	30/11/99	TOF	0	0	14.5	1	0	2	100	90	70	81	1	0	0	0	1	70	24	18	12	0	0	1	0	0	0	0	0
167	4	1	5	18/04/01	TOF	1	0	12	2	0	2	92	100	70	80	1	0	0	0	1	73	27	18	10	0	0	1	0	0	0	0	0
168	19	1	2	18/08/01	TOF,PFO	0	0	10	1	0	2	110	90	50	90	1	0	0	0	1	75	25	16	17	0	0	1	1	1	1	0	0
169	9	2	9	05/05/02	TOF	0	0	20	1	0	2	88	110	60	88	1	0	0	0	1	71	28	15	15	0	0	1	0	0	0	0	0
170	34	2	17	31/10/01	TOF,LPA STENOSIS	0	0	37	1	0	2	92	120	70	90	1	0	0	0	1	65	27	17	16	0	0	1	0	0	0	0	0
171	5	2	5	30/01/02	TOF	0	0	14	1	1																0		0	0	0	0	0
172	4	2	4.5	02/05/02	TOF	0	0	12	1	1	2	76	110	60	85	1	0	0	0							0		0	0	0	0	0
173	23	1	3	04/09/01	TOF,PDA	0	0	12.5	1	0	2	120	100	70	80	1	0	0	0	1	79	20	11	22	0	0	1	0	0	0	0	0
174	36	2	22	04/03/02	TOF	0	0	59	1	0	2	80	120	80	89	1	0	0	0	1	66	43	28	25	1	1	2	1	2	0	1	0
175	4	1	4	02/04/02	TOF	0	0	11	1	0	2	90	90	60	91	1	0	0	0	1	75	30	20	10	0	0	1	0	0	0	0	0
176	8	1	8	10/01/02	TOF	0	0	15.5	1	0	2	92	110	70	89	1	0	0	0	1	65	30	20	21	0	0	1	1	1	1	0	0
177	22	2	5	10/07/01	TOF	1	1	17.5	1	0	2	92	100	60	85	1	0	0	0	1	75	32	16	10	0	0	1	0	0	0	0	0
178	27	2	9	24/10/01	TOF	0	0	22	3	0	2	84	110	80	91	3	0	0	0	1	80	23	11	14	0	0	1	0	0	0	0	0
179	23	1	8	31/01/02	TOF	0	0	17	1	0	2	100	100	70	90	1	0	0	0	1	68	19	13	16	0	0	1	0	0	0	0	0
180	9	2	9	04/05/02	TOF	0	0	20	1	0	2	88	110	60	88	1	0	0	0	1	71	28	15	15	0	0	1	0	0	0	0	0
181	18	1	4.5	19/04/02	TOF	0	0	11	1	0	2	96	100	70	82	1	0	0	0	1	55	18	13	16	0	0	1	0	0	0	0	0
182	22	2	5	27/10/01	TOF	1	0	12	2	0	2	88	100	60	84	1	0	0	0	1	78	24	16	15	0	0	1	0	0	0	0	0
183	26	1	26	07/03/02	TOF	1	1	48	1	1	2	94	110	80	80											0		0	0	0	0	0
184	16	2	5	06/02/02	TOF,LPA STENOSIS	0	0	11	3	0	2	98	90	60	80	3	0	0	0	1	80	23	13	11	0	0	1	0	0	0	0	0
185	6	2	6	05/05/02	TOF	1	0	16	1	0	2	84	100	70	74	1	0	0	0	1	73	17	11	7	0	0	1	0	0	0	0	0
186	20	1	3	21/08/01	TOF	0	0	13	1	0	2	110	100	70	90	1	0	0	0	1	77	19	11	16	0	0	1	0	0	0	0	0
187	4	2	4	31/01/02	TOF,PDA	1	0	14.3	1	0	2	100	100	70	89	1	0	0	0	1	75	21	13	13	0	0	1	0	0	0	0	0
188	27	1	12	05/04/02	TOF	0	0	22	2	0	2	100	110	70	88	1	0	0	0	1	70	29	21	15	0	0	1	0	0	0	0	0
189	20	1	5.5	22/11/01	TOF	1	1	15	1	0	2	92	110	60	83	1	0	0	0	1	80	26	15	14	1	1	3	0	0	0	0	0
190	23	2	7	11/03/02	TOF	0	0	13.5	3	0	2	100	110	80	90	1	0	0	0	1	80	19	10	11	0	0	1	0	0	0	0	0
191	20	1	2.5	28/09/01	TOF,LPA STENOSIS	1	0	12.5	1	0	2	102	96	70	83	1	0	0	0	1	78	20	12	15	0	0	1	0	0	0	0	0
192	20	2	2.5	21/01/02	TOF,PDA	1	1	8.8	1	0	2	100	90	70	87	1	0	0	0	1	75	15	10	12	0	0	1	0	0	0	0	0
193	24	2	11	28/02/02	TOF	0	0	24	3	0	2	80	120	80	84	3	0	0	0	1	65	31	20	11	0	0	1	0	0	0	0	0
194	18	1	2	16/01/02	TOF	0	0	10	3	0	2	100	100	70	85	3	0	0	0	1	82	14	8	8	0	0	1	1	3	0	0	1
195	19	2	5	29/04/02	TOF	1	0	12.5	2	0	2	104	120	90	80	1	0	0	0	1	77	25	15	14	0	0	1	1	3	0	0	1
196	42	2	26	22/01/02	TOF	1	0	30	1	0	2	74	100	70	90	1	0	0	0	1	54	36	27	24	1	1	2	1	1	1	0	0
197	26	1	26	01/06/02	TOF		1	48	1	1	2	94	110	80	80	1	1	0	0	1	70	25	18	20		0		0	0	0	0	0
198	26	2	6	20/05/02	TOF	1	0	14	1	0	2	90	110	80	90	1	0	0	0	1	65	18	10	13	0	0	1	0	0	0	0	0
199	25	2	6	04/07/02	TOF	1	0	16	2	0	2	100	110	70	78	1	0	0	0	1	70	23	13	19	0	0	1	0	0	0	0	0
200	16	1	3	19/05/02	TOF	1	0	11	1	0	2	100	90	60	80	1	0	0	0	1	65	20	15	23	0	0	1	0	0	0	0	0
201	23	1	6.5	08/07/02	TOF	0	0	17.7	2	0	2	110	104	70	90	1	0	0	0	1	80	29	17	15	0	0	1	0	0	0	0	0
202	16	1	16	26/06/02	TOF	1	0	40.5	1	0	2	86	120	70	88	1	0	0	0	1	36	24	60	21	0	0	1	0	0	0	0	0
203	17	2	2	09/04/02	TOF	1	0	8.5	1	0	2	100	110	60	85	1	0	0	0	1	74	18	11	14	0	0	1	0	0	0	0	0
204	25	2	9	31/05/02	TOF	0	0	15	2	0	2	88	110	70	90	1	0	0	0	1	70	22	14	19	0	0	1	0	0	0	0	0
205	23	2	5.5	28/05/02	TOF	0	0	11	1	0	2	104	100	70	75	1	0	0	0	1	67	22	15	16	0	0	1	0	0	0	0	0
206	4	2	4	16/05/02	TOF	0	0	12.5	1	1	2	96	100	78	75	1	0	0	0	1	78	22	12	16		0		0	0	0	0	0
207	31	1	12	03/07/02	TOF,PFO	0	0	37	3	0	2	88	110	90	90	3	0	0	0	1	80	36	20	22	0	0	1	0	0	0	0	0
208	24	1	8	12/07/02	TOF	1	1	17	1	0	2	100	100	70	84	1	0	0	0	1	82	28	13	13	1	2	2	0	0	0	0	0
209	29	2	20	21/06/02	TOF	0	0	61	2	0	2	88	130	80	91	1	0	0	0	1	65	35	24	21	0	0	1	0	0	0	0	0
210	29	2	11	09/05/02	TOF	0	0	32	3	0	2	90	100	80	81	3	0	0	0	1	78	36	20	22	0	0	1	0	0	0	0	0
211	21	1	5	24/04/02	TOF	1	0	13.7	1	0	2	90	100	60	83	1	0	0	0	1	80	27	16	18	1	1	2	0	0	0	0	0
212	29	1	12	11/04/02	TOF	1	0	24.5	1	0	2	70	90	70	90	1	0	0	0	1	78	27	17	17	0	0	1	0	0	0	0	0
213	8	1	8	11/06/02	TOF	1	1	22.5	1	0	2	88	100	60	85	1	0	0	0	1	70	20	15	15	0	0	1	0	0	0	0	0
214	6	2	6	13/06/02	TOF,PFO	0	0	16.5	1	0	2	96	100	78	75	1	0	0	0	1	78	22	12	16	0	0	1	0	0	0	0	0
215	24	2	6	17/05/02	TOF,ABSENT PV	0	0	13	2	0	2	88	110	60	92	3	0	0	0	1	60	43	29	30	0	0	1	0	3	0	0	1
216	16	1	2	18/05/02	TOF	0	0	10	2	0	2	130	90	60	88	1	0	0	0	1	60	20	14	12	0	0	1	0	0	0	0	0
217	26	1	11	20/06/02	TOF	0	0	20	1	0	2	90	110	80	85	1	0	0	0	1	75	22	15	16	0	0	1	0	0	0	0	0
218	20	1	4	29/06/02	TOF,PDA	0	0	18	2	0	2	150	110	70	86	1	0	0	0	1	73	28	15	16	0	0	1	0	0	0	0	0
219	15	1	2	29/06/02	TOF	1	0	12	1	0	2	102	100	60	85	1	0	0	0	1	76	21	12	21	0	0	1	0	0	0	0	0
220	20	1	3.5	20/04/02	TOF	1	0	11	1	0	2	90	100	60	91	1	0	0	0	1	75	21	13	15	0	0	1	0	0	0	0	0
221	21	2	6	01/04/02	TOF,PDA	0	0	14.8	3	0	2	90	90	60	89	1	0	0	0	1	70	25	15	20	0	0	1	0	0	0	0	0
222	32	1	18	15/04/02	TOF	0	0	43	1	0	2	90	90	70	75	1	0	0	0	1	76	28	17	10	0	0	1	0	0	0	0	0

Sl no	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	Irbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
149		1		120	150	1		80	60	1	1	1	0		476	19	70	40	25	30		22		2					1	1	1
150																4															
151																12															
152																10															
153	AT	2	AF		120	1		40	30	1	0	0	1		465	19	48	59	44			15	2	2	14		36		1	1	2
154																8															
155		1		130	150	1		60	90	1	1	1	0		462	18	78	39	21			19		3	190	74					
156	Atrial FLUTTER WITH VARIABLE	2		130	120	1		40	75	1	0	0	0			15	71	40	25				1	4			23				
157		1		160	120		1	60	105	2	0	0	0		439	17	68	37	23					3	32	16					
158																4															
159																															
160		1		160	140	1		60	110	2	0	0	0		425	18	64	45	29			24	2	3	23		26				
161																															
162																8															
163		1		140	100		1	50	30	1	0	0	0		462	18	62	44	30	31		25	1	2			19				
164		1		160	130	1		60	60	1	0	0	0		458	19	62	39	26					0	8						
165																6															
166				150	130	1		40	75	1	0	0	0		432	18	65	45	38					2							
167																6															
168	VPC	1		240	150	1		90	115	2	1	0	0		447	18	55	37	27				1	3					1	1	1
169																5															
170		1		160	120		1	40	-70	3	0	0	0		462	18	68	38	24				2	4	30		28		1		
171																															
172																															
173		1		160	110		1	40	90	1	0	0	0		416	18	64	46	31	33		16	1	3							
174	AF	1	AF		130	1		60	90	1	0	0	1			16	64	52	34	41			3	4	22	9	63		1	1	2
175																3															
176	VPC															5															
177		1														11								2	22						
178																8															
179		1		160	100		1	40	105	2	0	0	0		462	16	75	39	22					3	21	11					
180																4															
181																10								2	32						
182		1		160	140	1		60	75	1	1	1	0		410	18	64	45	29			24		3	23						
183																															
184																10															
185																5															
186		1		140	120		1	40	90	1	0	0	0		425	18	61	42	28	33		12	2	4	10	4	26		1		
187																															
188		1		140	130	1		60	60	1	1	0	0		492	12	77	46	24					3	18						
189																3															
190																10								2	20						
191		1		200	160	1		60	105	2	0	0	0		447	19	76	44	25			18	1	3	18						
192		1		160	140	1		60	90	1	1	1	0		410	15	59	34	24	33		25	1	3	19						
193																3															
194	sinus	1		140	130	1		60	75	1	0	0	1		340	17	68	50	31					2	12						
195	1st AV block	1		240	120		1	40	80	1	0	0	0		491	14	59	34	23				2	2	36		47		1	1	3
196	,1st degree av	1		400	130	1		60	75	1	0	0	0		492	17	56	40	21	35			3	3			27		1	1	1
197																															
198		1		180	140	1		60	105	1	0	0	0		428	14	71	34	21	32			2	4	20		34				
199		1		140	120		1	40	75	1	0	0	0		514	16	53	44	32	30			3	2	25	17					
200																14	66	41	26			20		3	20						
201		1		140	140	1		40	115	2	1	0	0		440	17	77	47	25	34		22	2	1	18	10	30				
202																3															
203		1		140	150	1		80	105	2	0	0	0		491	18	64	34	21				1	2	32	18			1		
204																8								2	28						
205		1		160	140	1		60	90	1	0	0	0		462	15	66	39	25	29			2	3			26				
206																															
207																15	64	38	21					4					1		
208		1		160	120	1		40	105	1	0	0	0		425	17	65	39	27	34				3					1		
209																10															
210		1		169	130		1	60	75	1	0	0	0		476	15	64	38	21				2	4			30		1		
211																17	75	37	21					3							
212																17	62	34	25					3	28						
213																3															
214																5															
215	1st AV Block	1		220	140	1		60	-60	3	0	0	0		439	17	61	44	30			24	1	4	35						
216		1		140	160	1		60	75	1	1	0	0		462	15	74	51	32					2	15	9					
217		1		180	140	1		60	90	1	0	0	0		428	15	55	34	25					3	24						
218		1		160	150	1		60	105	1	0	0	0		439	16	77	41	22					3	28	13			1		
219		1		140	140	1										12								2	15						
220		1		180	150	1		60	105	1	0	0	0		470	16	60	44	30	34			2	3					1		
221																8								4	15						
222		1		140	140	1		80	75	1	1	0	0		465	18	69	48	27				1	2	20		38				

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
VPC	58	145	63	5	0	0	0	1.5															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
AF	56	136	72	0	0	0	0	2.8	1	148	57.6	38.7	39	46									0	0	0						PV replacement with #27 PM mitral valve
																							0	0	0						
																							0	0	0						s/p ICR WITH 25MM PULM HOMOGRAFT
																							0	0	0					Amiodarone 200 bd	Planned DC version
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
VPC	46	136	62	6	0	0		2.1															0	0	0						vpc MEDICALLY MANAGED
																							0	0	0						
NORMAL	69	102	74	0	0	0		1.7	1	90.9	29	61	67	46	0								0	0	0						
																							1	0	1		PERIOP MORTALITY				
																							1	0	1		PERIOP MORTALITY				
																							0	0	0						
AF	70	124	96	0	0	0		3.6															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						Cath done in view of PDAsmall)- no shunt-Medical f/u
																							1	0	1		PERIOP MORTALITY MODS				
																							0	0	0						
																							0	0	0						
NORMAL	40	153	70	0	0	0		1.9															0	0	0						
																							0	0	0						Residual VSD-Cath done-No sig shunt, LPA stenosis-
																							0	0	0				1		RESIDUAL VSD
																							0	0	0				1		RESIDUAL VSD- RE DO SURGERY
																							0	0	0				1		RESIDUAL VSD
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
1st AV block	40	148	68	0	0	0		1.8															0	0	0						
OCC vpc	55	93	63	3	0	0		1.74															0	0	0						Medically managed
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	46	142	70	0	0	0		1.9															0	0	0						
																							0	0	0						
																							0	0	0						
																							1	0	1		PERIOP MORTALITY				
Normal	52	137	63	0	0	0	0	1.5															0	0	0						
NORMAL	54	129	64	0	0	0		1.5															0	0	0						
																							0	0	0						
Normal	56	115	62	0	0	0	0	2															0	0	0				1		Residual VSD- Advised review
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						MODERATE AR
																							0	0	0						
																							0	0	0						
Normal	52	146	68	0	0	0	0	1.9															0	0	0						
																							0	0	0						
Normal	43	123	73	0	0	0	0	2.1															0	0	0						
																							0	0	0						
																							0	0	0						

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmhg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	Irbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
223	24	1	24	12/06/02	TOF	1	0	34	1	0	2	82	110	70	86	1	0	0	0	1	55	27	19	24	0	0	1	0	0	0	0	0																3															
224	7	2	7	19/04/02	TOF	1	0	15	1	0	2	104	120	90	82	1	0	0	0	1	64	23	16	18	0	0	1	0	0	0	0	0																5															
225	23	1	6	21/05/02	TOF	0	0	15	2	0	2	100	100	80	85	1	0	0	0	1	76	23	14	15	0	0	1	0	0	0	0	0		1		140	140	1		60	60	1	1	0	0		410	17	62	32	21			21	1	2	25		14				
226	18	1	2.5	22/05/02	TOF	0	0	9.4	2	0	2	100	110	80	89	1	0	0	0	1	74	28	16	15	0	0	1	0	0	0	0	0		1		160	160	1		40	115	2	1	0	0		427	16	74	48	27	25			2	2	19	9	28				
227	16	2	4	15/03/02	TOF	0	0	15	1	0	2	100	110	70	75	4	0	0	0	1	70	17	11	12	0	0	1	0	0	0	0	0		1		140	140	1		60	90	1	0	0	0		490	16	70	33	20	27			3	3	18	7	35				
228	21	2	21	10/11/02	TOF	1	0	45.8	1	1	2	90	110	80	65	1	0	0	0	1	74	31	18	21		0		0	0	0	0	0																															
229	25	2	8	17/09/02	TOF,ABSENT PV	0	0	21.5	1	0	2	80	100	60	91	1	0	0	0	1	71	24	17	20	0	0	1	0	0	0	0	0		1		140	140	1		40	15	2	0	0	0		465	18	66	35	23	27		18		3	30	15					
230	18	1	8	27/08/02	TOF	0	0	19	1	0	2	96	100	80	86	1	0	0	0	1	65	23	19	22	1	1	2	1	1	1	0	0	Hemodynamically unstable VT ?RBBB MORPHOLOGY-	2	BIGEMIMY	180	180	1		80								6	55	36	26	20		19		4	30				1		
231	47	1	18	06/06/02	TOF	1	0	48	1	0	2	80	120	80	70	1	0	0	0	1	65	40	30	23	1	2	2	0	0	0	0	0		1		180	120		1	40	90	1	1	1	0		492	15	67	43	27			15		3					1		
232	25	2	15	07/08/02	TOF,PDA	1	0	29	1	0	2	64	100	70	88	3	0	0	0	1	60	21	15	16	0	0	1	0	0	0	0	0																8										30					
233	27	1	7	02/08/02	TOF	0	0	18	3	0	2	86	86	70	88	3	0	0	0	1	74	24	14	13	0	0	1	0	0	0	0	0																8													1		
234	33	1	12	14/11/02	TOF	0	0	26	1	0	2	82	100	60	82	1	0	0	0	1	60	23	19	20	0	0	1	0	0	0	0	0		1		160	160	1		60	90	1	1	0	0		447	15	80	46	24					1	12						
235	26	1	26	06/03/02	TOF	1	1	48	1	1	2	94	110	80	80	1	0	0	0							0		0	0	0	0	0																															
236	27	1	12	09/09/02	TOF	0	0	26	2	0	2	90	100	70	89	1	0	0	0	1	66	29	21	23	1	1	1	1	2	0	1	0	AT	1		160	150	1		60	75	1	0	0	0		433	16	66	35	23	34		18		4	20				1	1	2
237	20	1	5	03/09/02	TOF	0	0	15.5	1	0	2	110	100	60	85	1	0	0	0	1	68	30	22	14	0	0	1	0	0	0	0	0																16	57	45	31	34		19		3	19						
238	18	1	5	24/06/02	TOF	1	0	15.2	2	0	2	98	100	60	89	1	0	0	0	1	57	26	20	17	0	0	1	0	0	0	0	0																8						19		2							
239	22	2	6	21/09/02	TOF,PDA	1	1	14.5	1	0	2	110	100	80	89	1	0	0	0	1	55	31	24	15	1	1,3	2	1	1	1	0	0	VPC(3%), RBBB	1	OCC VPC RBBB	160	100	0		40	75	1	0	0	0		462	17	70	40	25	24		17	2	4			20		1		
240	18	1	18	19/09/02	TOF	0	0	44	2	1	2	86	100	80	78	1	0	0	0							0		0	0	0	0	0																															
241	26	1	9	20/09/02	TOF	0	0	18.8	1	0	2	88	100	80	90	1	0	0	0	1	75	33	18	17	0	0	2	1	0	3	0	1	1ST AVB	1		220	130	1		40	30	1	0	0	0		439	17	60	37	25	34		21	2	4	60		30				
242	6	2	6	23/07/02	TOF	0	0	15	2	0	2	86	110	70	88	3	0	0	0	1	75	18	10	14	0	0	1	0	0	0	0	0																2															
243	20	2	7	19/11/02	TOF	0	0	14.5	2	0	2	102	100	70	90	1	0	0	0	1	68	25	16	14	0	0	1	0	0	0	0	0		1		140	110		1	40	30	1	0	0	0		447	18	80	38	17			18	2	1	23		41				
244	8	2	8	28/07/02	TOF,ASD	1	0	23	2	0	2	98	110	70	90	1	0	0	0	1	78	20	12	18	0	0	1	0	0	0	0	0																4															
245	4	1	4	02/09/02	TOF	0	0	11.6	1	0	2	86	110	70	92	1	0	0	0	1	64	34	23	21	0	0	1	0	0	0	0	0																5															
246	22	1	22	17/09/02	TOF	0	0	50	2	0	2	84	120	80	93	1	0	0	0	1	63	38	25	18	0	0	1	0	0	0	0	0																3															
247	12	2	12	20/11/02	TOF	0	0	23.5	1	0	2	86	100	70	73	1	0	0	0	1	60	20	14	18	0	0	1	0	0	0	0	0																5															
248	18	1	2	19/10/02	TOF	0	0	7	1	0	3	120	100	70	75	1	0	0	0	1	75	18	10	12	0	0	1	0	0	0	0	0		1		140	120		1	40	90	1	0	0	0		439	16	61	34	21	23		16		3	18						
249	14	1	4	10/10/02	TOF, PA	1	1	11	1	0	2	90	90	70	80	1	0	0	0	1	71	26	16	18	0	0	1	1	1	1	0	0	VPC	1		120	160	1		40	105	1	0	0	0		428	15	78	36	19	23		20		4	18		35				
250	16	2	3	22/11/02	TOF,ASD,PDA	1	0	9.5	1	0	2	100	90	60	91	1	0	0	0	1	74	21	13	18	0	0	1	0	0	0	0	0		1		140	120		1	40	75	1	0	1	0		462	17	60	37	25	27		19	1	3	20				1		
251	6	1	6	09/10/02	TOF	0	0	13.4	2	0	2	66	100	70	75	3	0	0	0	1	80	20	10	12	0	0	1	0	0	0	0	0																6															
252	7	1	7	27/01/03	TOF	1	0	19	1	0	2	86	100	60	72	1	0	0	0	1	75	19	11	21	0	0	1	0	0	0	0	0																3															
253	24	1	5	07/10/02	TOF	0	0	15	1	0	2	110	100	70	82	1	0	0	0	1	85	16	9	8	0	0	1	0	0	0	0	0																3															
254	14	1	14	26/10/02	TOF	0	0	33	1	1	2	100	100	70	78	1	0	0	0							0		0	0	0	0	0																															
255	2	1	2	01/11/02	TOF	1	0	10	2	0	3	120	100	60	90	1	0	0	0	1	78	19	10	11	0	0	1	0	0	0	0	0																4															
256	19	1	2.5	26/12/02	TOF,PDA	0	0	9.5	1	0	2	88	100	70	90	1	0	0	0	1	60	33	22	23	1	2	2	1	3	0	0	0		1		220	140	1		60	115	2	1	0	0		410	17	59	49	33	31		19	2	1	25	9	41		1	1	3
257	25	1	27	07/01/03	TOF	0	0	37	1	0	2	75	110	70	92	1	0	0	0	1	78	29	13	21		0		0	0	0	0	0																															
258	18	1	4	23/09/02	TOF	0	0	13	1	0	2	96	100	60	80	1	0	0	0	1	72	23	16	17	0	0	1	0	0	0	0	0		1		180	140	1		60	120	2	1	1	0		456	17	80	34	15	27		22	2	3	18		20				
259	21	1	5	13/11/02	TOF	0	0	13.4	1	0	2	82	110	80	82	1	0	0	0	1	75	20	11	15	0	0	1	0	3	0	0	0																8															
260	21	1	4	24/10/02	TOF	0	0	15.5	2	0	2	88	110	70	93	1	0	0	0	1	80	35	21	17	0	0	1	1	1	1	0	0	VPC	1		160	140	1		40	60	1	1	0	0		441	16	66	41	26	28		16		1	20						
261	17	2	2	04/01/03	TOF,PDA	0	0	9	3	0	2	92	110	70	84	3	0	0	0	1	70	17	12	13	0	0	1	0	0	0	0	0		1		140	150	1		60	90	1	1	0	0		479	17	70	40	25	33		23	3	3	20		33				
262	3	2	3.5	01/10/02	TOF	1	0	9.5	2	0	2	85	100	60	78	1	0	0	0	1	65	19	14	16	0	0	1	0	0	0	0	0																3															
263	19	1	3	11/12/02	TOF	0	0	12.5	2	0	2	92	110	70	94	1	0	0	0	1	62	30	24	10	1	1	2	1	1	1	0	0	VPC- RVOT	1		140	160	1		60	105	1	1	0	0		456	17	58	38	27	32		19	2	3	27	11			1	1	1
264	17	2	5	27/09/02	TOF	0	0	14	1	0	2	96	90	60	80	1	0	0	0	1	72	26	17	13	0	0	1	0	0	0	0	0																10															
265	24	1	7	16/10/02	TOF	0	0	16	1	0	2	90	100	60	90	1	0	0	0	1	60	18	12	24	0	0	1	0	0	0	0	0																7															
266	23	1	8	03/02/03	TOF	0	0	14.5	1	0	2	70	110	70	89	1	0	0	0	1	80	23	10	19	0	0	1	0	0	0	0	0		1		140	130	1		40	90	1	0	0	1		465	16	65	33	23	33		19		3	21	14			1		
267	21	1	5	03/02/03	TOF	0	0	14	1	0	2	82	110	70	85	1	0	0	0	1	70	26	17	15	0	0	1	0	0	0	0	0																14	54	36	26	28		18		2	15	7					
268	17	2	2	18/01/03	TOF,PDA	1	0	7	1	0	2	124	96	70	90	1	0	0	0	1	74	17	10	9	1	1	1	0	0	0	0	0		1		120	130	1		40	75	1	0	0	0		432	17	40	36	31	14		16	4	3			25		1	1	2
269	26	1	9	20/09/02	TOF	0	0	18.8	1	0	2	88	100	80	90	1	0	0	0	1	75	33	18	17	0	0	2	0	0	0	0	0		1		200	130	1		40	30	1	0	0	0		462	17	60	37	25	34		21	2	4	60		30				
270	18	1	3	21/01/03	TOF	0	0	14	3	0	2	114	100	60	86	3	0	0	0	1	65	28	16	14	0	0	1	1	3	0	0	1	TYPE 2A AVB	1		440	140	1		40	180	2	1	0	0		416	15	63	37	24	27		17		2	23	14			1	1	3
271	1	2	1	16/01/03	TOF,ASD,PDA	1	0	5.9	1	1	2	100	100	70	65	1	0	0	0							0		0	0	0	0	0																															
272	17	1	1.5	28/01/03	TOF	0	0	10	3	0	2	112	100	60	90	3	0	0	0	1	61	21	14	13	0	0	1	0	0	0	0	0		1		140	140	1		60	60	1	0	0	0		432	16	78	45	23	28		17	3	2	15		40				
273	20	2	2.5	21/11/02	TOF,PDA	1	1	8.8	1	0	2	100	90	70	88	1	0	0	0	1	78	21	13	14	1	4	1	0	0	0	0	0		1		200	140	1		60	80	1	0	0	0		441	16	59	34	24	33		25	1	3	19				1		
274	20	1	13	12/12/02	TOF	1	1	34.5	1	0	2	106	90	60	88	1	0	0	0	1	75	23	16	13	0	0	1	0	0	0	0	0		1														7															
275	17	1	1.5	18/03/03	TOF,PDA	0	0	5.6	1	0	2	110	80	60	80	1	0	0	0	1	70	16	9	10	0	0	1	0	0	0	0	0		1		160	140	1		60	90	1	1	1	0		485	16	76	37	21	25		14	1	1	25	12	28		1		
276	21	1	5.5	16/12/02	TOF	1	0	12.5	3	0	3	90	100	60	90	3	0	0	0	1	60	20	14	12	0	0	1	0	0	0	0	0		1		140	100	0		40	75	1	0	0	0		410	17	50	37	28			19		2	18	8					
277	12	1	13	13/03/03	TOF	0	0	35.5	1	0	2	74	110	70	85	1	0	0	0	1	70	24	14	12	0	0	1	0	0	0	0	0																10															
278	3	1	3.5	13/03/03	TOF	1	1	10	1	0	2	100	100	60	90	1	0	0	0	1	80	31	19	13	0	0	1	0	0	0	0	0																10															
279	21	2	21	04/12/02	TOF	1	0	45.8	1	1	3	90	100	80	65	1	0	0	0							0		0	0	0	0	0																															
280	3	1	3	10/01/03	TOF	0	0	10	2	0	2	102	110	70	86	1	0	0	0	1	61	25	18	14	0	0	1	0	0	0	0	0																3															
281	17	1	2.5	27/02/03	TOF	0	0	10	1	0	2	98	90	60	88	1	0	0	0	1	70	23	17	14	0	0	1	0	0	0	0	0		1		160	110		1	60	115	2	0	0	0		456	17	70	39	24	26		19		3	24						
282	24	2	10	09/06/03	TOF,PDA	1	0	19.3	1	0	2	92	100	70	82	1	0	0	0	1	78	24	13	13	0	0	1	0	0	0	0	0		1		160	140	1		60	45	1	0	0	0		479	16	65	33	23	25		25	1	2	13	8	25				
283	27	2	27	28/03/03	TOF	0	0	48.5	2	0	2	90	110	80	91	1	0	0	0	1	75	36	21	29	0	0	1	0	0	0	0	0																3															
284	7	2	7	24/03/03	TOF	0	0	13.4	1	0	2	94	110	60	84	1	0	0	0	1	65	21	15	14	0	0	1	0	0	0	0	0																3															
285	25	1	12	26/05/03	TOF	1	1	21.5	2	0	2	84	110	80	85	1	0	0	0	1	72	38	25	24	0	0	1	0	0	0	0	0		1														5															
286	16	2	3.5	14/12/02	TOF	1	1	10.9	1	0	2	100	100	70	85	1	0	0	0	1	85	13	7	14	0	0	1	0	0	0	0	0																13															
287	19	1	4.5	06/02/03	TOF	0	0	14.6	2	0	2	116	110	70	88	1	0	0	0	1	65	25	17	19	0	0	1	0	0	0	0	0		1		160	180	1		60	60	1	1	0	1	3	485	15	57	40	28	41		23	2	3	18		32				
288	23	2	8	15/03/03	TOF	1	1	15	1	0	2	90	100	70	84	1	0	0	0	1	60	18	12	14	1	1	2	1	1	1	0	0	VPC	1		160	140	1		60	90	1	0	0	0		447	17	52	33	24	27		18		4					1	1	1
289	13	1	2	21/03/03	TOF	0	0	8.7	1	0	3	122	90	60	75	1	0	0	0	1	75	21	14	7	0	0	1	0	0	0	0	0																8															
290	1	2	1	27/03/03	TOF	1	0	9.5	1	1	2	116	90	60	78	1	0	0	0							0		0	0	0	0	0																															
291	26	1	7	21/02/03	TOF	0	0	13.1	2	0	2	112	90	60	86	3	0	0	0	1	70	22	13	18	0	0	1	0	0	0	0	0		1		200	160	1		40	30	1	0	0	0		462	17	70	36	22	24		20	3	1	15	7	32				
292	18	1	4	21/03/03	TOF	0	0	15.8	3	0	2	94	90	70	80	3	0	0	0	1	70	32	22	14	0	0	1	0	0	0	0	0																7															
293	20	1	4	20/03/03	TOF	0	0	10.5	2	0	2	100	90	60	85	1	0	0	0	1	52	19	15	17	1	2	2	1	1	1	0	0	VPC	1		140	150	1		40	135	2	1	1	1	2	456	16	67	33	25	26		21	3	4	9						
294	20	2	5	10/06/03	TOF,PDA	1	0	16	2	0	2	80	100	70	80	1	0	0	0	1	75	24	15	16	0	0	1	0	0	0	0	0		1		140	140	1		60	120	2	0	0	0		476	15	74	40	23	26		20	2	3	13	7	23				

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							1	0	1			PERIOP MORTAUTY-RV			
																							0	0	0					
VPC, bigemini	64	153	89	3	0	0																	0	0	0					sotalol 40mg 1-0-1	
Normal	62	122	80	0	0	0		1.4	1	147	73	62	50	50									0	0	0					
																							0	0	0					PA CONFLUENCE STENOSIS-PLASTY DONE 2006
Normal	59	137	76	0	0	0		1.9															0	0	0					
																							0	0	0					
																							1	0	1			PERIOP MORTAUTY- MODS			
AT RUNS	42	130	69	0	0	0		1.76															0	0	0					AT- MEDICALLY MANAGED
																							0	0	0					INTELLECTUAL DISABILITY
																							0	0	0					
Normal	45	140	76	3	0	0		1.8									1		NOR	AVW-300MS,1:1	VA BLOCK AT	TRIPLE EXTRA-	0	0	0					metolar xe 25mg OD	ILR IMPLANTED-2011,EXPLANTED-2014, RECORDED ONLY
																							1	0	1			PERIOP MORTAUTY- UNABLE			
																							0	0	0					FUNGAL ENDOCARDITIS-CANDIDA(2003), MOD AR ON
																							0	0	0					
																							0	0	0				1		SMALL RESIDUAL VSD, MEDICAL FOLLOW UP
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
Normal	52	131	80	0	0	0		1.8															0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							1	0	1			PERIOP MORTAUTY-			
																							0	0	0					
1st AV block	42	146	66	0	0	0	0	2.3	1	169	131	38	50	50	RVOT								0	0	0					PVR #23 PM 29-8-2018
																							1	1	0	26/06/03	POST OP INFECTIVE ENDOCARDITIS- 26-6-				
																							0	0	0					
																							0	0	0					PPI VVI-POST OP CHB
																							0	0	0					
																							0	0	0					
																							0	0	0					
VPC+	58	110	80	11	0	0		1.9															0	0	0					VPC- MEDICALLY MANAGED
																							0	0	0					
																							0	0	0					
Normal	40	148	72	0	0	0		1.5															0	0	0					
																							0	0	0					
APC	52	134	65	0	3	0		2.3															0	0	0					APC-MEDICALLY MANAGED
																							0	0	0					
Intermittent	44	142	60	0	0	0		1.9															0	0	0					AVB- MEDICAL FOLLOW UP
																							1	0	1			PERIOP MORTAUTY- RV			
																							0	0	0				1		SMALL RESIDUAL VSD
NORMAL	45	131	75	0	0	0		1.96															0	0	0					
																							0	0	0					
NORMAL	43	134	71	0	0	0		1.6	1	174	128	56	40	50									0	0	0					PVR#23 HANCOCK +TV REPAIR FOR SEV OR MOD
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							1	0	1			PERIOP MORATUTY-SEPSIS,			
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
																							0	0	0					
MULTIPLE	44	119	68	6	0	0		1.53	1	85	39	61	55	39	RVOT								0	0	0					MEDICAL FOLLOW UP FOR VPC
																							0	0	0					
																							1	0	1			PERIOP MORTAUTY- RV			
																							0	0	0					
																							0	0	0					
									1	130	74	51	43	60	patch and								0	0	0					
																							0	0	0					

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmHg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	Irbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Halter	Halter documented arrhythmia(any)	Halter documented arrhythmia(type)
295	18	2	10	24/02/03	TOF	0	0	21	1	0	2	90	100	80	87	1	0	0	0	1	75	24	13	22	0	0	1	0	0	0	0	0																	7															
296	15	1	1.5	05/06/03	TOF	0	0	9.5	1	0	2	102	100	80	78	1	0	0	0	1	80	18	11	10	0	0	1	0	0	0	0	0																	14	75	39	22	25		18		2	16				1		
297	21	1	3.5	22/02/03	TOF	0	0	14.8	1	0	2	120	110	70	85	1	0	0	0	1	60	31	23	14	0	0	1	0	0	0	0	0		1		140	110	0		40	90	1	0	0	0		425	16	73	50	28	28		19		1	15						
298	34	1	19	08/04/03	TOF	1	0	43	2	0	2	84	110	70	80	1	0	0	0	1	75	35	22	22	0	0	1	1	3	0	0	1	Type 2A AVB	1		200	150	1		60	30	1	1	1	0		462	15	73	41	38	28		20		3	55						
299	17	1	2.5	30/12/02	TOF	0	0	12	1	0	2	100	100	60	85	1	0	0	0	1	75	24	16	14	1	4	1	0	0	0	0	0		1		180	140	1		80	115	2	1	1	1	4	490	15	63	42	28	21		20	1	4			23		1		
300	14	1	14	07/12/02	TOF	1	0	30	3	0	2	74	110	70	84	3	0	0	0	1	72	32	22	10	0	0	1	0	0	0	0	0																4															
301	18	1	3	04/02/03	TOF	0	0	10.6	2	0	2	108	100	70	88	1	0	0	0	1	75	24	15	16	0	0	1	0	0	0	0	0		1		140	160	1		40	60	1	1	1	0		406	17	59	44	30	30		16	3	2	8		38				
302	18	2	19	19/02/03	TOF	1	0	35	1	0	2	88	110	70	75	1	0	0	0	1	70	26	18	27	0	0	1	0	0	0	0	0		1														4															
303	22	1	6	04/02/03	TOF	1	0	15.4	1	0	2	80	110	70	80	1	0	0	0	1	78	22	14	15	0	0	1	0	0	0	0	0																3															
304	9	1	9	18/02/03	TOF	0	0	20.5	3	0	2	92	100	70	78	3	0	0	0	1	75	32	18	14	0	0	1	0	0	0	0	0																4															
305	11	2	2.5	15/05/03	TOF	1	1	8.6	1	0	2	88	110	70	86	1	0	0	0	1	70	14	7	14	0	0	1	0	0	0	0	0																4															
306	19	2	4	19/05/03	TOF,PDA	1	0	12.6	1	0	3	80	110	70	76	1	0	0	0	1	58	17	12	14	0	0	1	0	0	0	0	0		1		200	150	1		60	90	1	0	0	0		441	14	78	44	24	26		17	2	2	27	13	28		1		
307	37	1	25	05/08/03	TOF	0	0	36.5	1	0	2	80	110	70	76	1	0	0	0	1	65	35	19	25	1	2	1	1	2	0	1	0	AF	2			130	1		60								8													1	1	2
308	13	2	4	10/07/03	TOF,PDA	0	0	14.5	1	0	2	100	100	80	90	1	0	0	0	1	69	32	22	20	0	0	1	0	0	0	0	0		1														10															
309	17	1	3.5	27/05/03	TOF	1	1	12	1	0	2	90	94	60	85	1	0	0	0	1	78	18	10	17	0	0	1	0	0	0	0	0		1		160	150	1		40	105	1	1	0	0		405	17	67	28	16	25		21		3	49				1		
310	15	1	1	01/08/03	TOF	1	0	8.5	2	0	2	100	100	70	75	1	0	0	0	1	80	16	8	14	0	0	1	0	0	0	0	0																5															
311	16	1	2	14/04/03	TOF	0	0	9.5	1	0	2	120	90	70	84	1	0	0	0	1	75	24	15	19	0	0	1	0	0	0	0	0																4															
312	17	1	2	25/06/03	TOF	0	0	11	1	0	2	100	100	70	89	1	0	0	0	1	75	21	12	16	0	0	1	0	0	0	0	0		1		160	140	1		60	75	1	0	0	0		432	16	71	40	24	28				2	12						
313	19	2	10	30/07/03	TOF,PDA	0	0	22	2	0	2	100	110	70	94	1	0	0	0	1	70	25	12	22	0	0	1	0	0	0	0	0																8															
314	19	2	3	06/05/03	TOF,PDA	1	0	10.5	1	0	2	90	100	60	80	1	0	0	0	1	80	23	12	14	1	0	2	0	0	0	0	0		1		160	110	0		40	60	1	0	0	0		441	17	70	42	26	28			2	4	50		78		1		
315	40	2	15	21/04/03	TOF	1	0	41	1	0	2	76	110	70	86	1	0	0	0	1	75	26	19	15	1	2	2	0	0	0	0	0		1		160	110		1	40	90	1	0	0	0		427	17	68	35	23	32		20		3	21	8			1		
316	13	2	13	12/03/02	TOF	1	0	24	1	0	2	106	90	60	78	1	0	0	0	1	65	33	17	11		0		0	0	0	0	0																3															
317	19	1	19	04/08/03	TOF, SEV AR	1	0	38	6	0	2	80	134	78	89	1	0	0	0	1	63	60	39	29	0	0	1	0	0	0	0	0		1														5															
318	1.5	1	1.5	31/07/03	TOF,PDA	0	0	6.4	1	1	2	120	100	70	75	1	0	0	0	1	78	16	9	8		0		0	0	0	0	0																															
319	1.5	2	1.5	10/05/03	TOF	0	0	8	1	1	2	110	80	60	82	1	0	0	0	1	70	16	10	15		0		0	0	0	0	0																															
320	16	1	14	09/04/03	TOF	0	0	45	1	0	2	80	100	70	80	1	0	0	0	1	60	29	24	25	0	0	1	0	0	0	0	0																4															
321	16	1	2	02/08/03	TOF	0	0	7	1	0	2	112	110	70	83	1	0	0	0	1	57	19	15	10	0	0	1	0	0	0	0	0		1		160	160	1		60	105	1	1	0	1	5	405	15	64	33	22				3	2	20		30		1		
322	19	2	6	05/05/03	TOF	1	0	12.5	2	0	2	88	100	70	90	1	0	0	0	1	85	21	12	18	0	0	1	0	0	0	0	0		1		160	150	1		40	115	2	0	0	0		439	14	66	43	27	29				2	14						
323	18	2	2.5	25/04/03	TOF	0	0	8.5	1	0	2	86	110	70	86	1	0	0	0	1	80	18	8	14	0	0	1	1	3	0	0	1	1ST AVB	1	1ST AVB	260	140	1		40	45	1	1	1	0		476	16	75	33	19	23			4	3	43		40				
324	28	1	12	03/06/03	TOF, ABSENT PV	0	0	20	1	0	2	80	100	70	83	1	0	0	0	1	78	32	19	26	0	0	1	0	0	0	0	0		1		160	130	1		40	90	1	0	0	0		452	16	65	39	25	34			2	4			16				
325	18	2	4	24/07/03	TOF	0	0	16.5	1	0	2	112	110	70	90	1	0	0	0	1	76	33	21	18	0	0	1	0	0	0	0	0		1														8								3							
326	3	1	2	30/04/03	TOF	0	0	9	2	0	2	100	90	60	84	1	0	0	0	1	60	21	17	15	0	0	1	0	0	0	0	0																5															
327	16	1	14	09/04/03	TOF	0	0	35	1	0	2	96	100	80	86	1	0	0	0	1	65	29	24	25	0	0	1	0	0	0	0	0																3															
328	17	2	1.5	24/06/03	TOF	1	0	6.8	2	0	2	96	100	60	85	1	0	0	0	1	70	16	9	15	1	1	2	1	1	0	0	0		1		200	160	1		40	115	2	1	1	0		456	16	76	33	21	20			2	4	34		20		1	1	1
329	18	1	3.5	27/06/03	TOF	0	0	11.3	2	0	2	100	100	60	78	1	0	0	0	1	70	28	20	14	0	0	1	0	0	0	0	0		1		140	160	1		60	115	2	1	1	1	3	465	16	60	33	24	29			4	3	22		62		1		
330	15	2	1.5	04/08/03	TOF,ASD,PDA	0	0	7.5	1	0	2	126	90	60	90	1	0	0	0	1	70	19	13	10	0	0	1	0	0	0	0	0		1		140	100		1	40	90	1	0	0	0		433	17	75	38	21	28				2							
331	18	1	2	14/07/03	TOF	0	0	11.6	2	0	2	96	90	60	87	1	0	0	0	1	65	33	17	12	0	0	1	0	0	0	0	0		1		160	150	1		40	60	1	1	1	1	3	420	16	66	43	28	30			2	2	30	16	39		1		
332	33	1	22	04/07/03	TOF	0	0	35	2	0	2	86	90	70	74	1	0	0	0	1	59	26	18	16	0	0	1	0	0	0	0	0		1		160	120		1	40	105	1	0	0	0		441	14	77	40	22	26			1	2	18				1		
333	24	2	10	19/09/03	TOF	1	0	21.5	1	0	2	80	100	60	80	1	0	0	0	1	69	31	18	16	0	0	1	0	0	0	0	0		1		160	160	1		40	75	1	0	0	0		465	15	63	31	25	33		25	2	3			25				
334	18	2	3.5	29/09/03	TOF	0	0	14.1	1	0	2	88	100	70	85	1	0	0	0	1	78	29	15	11	0	0	1	0	0	0	0	0		1		140	150	1		60	75	1	0	0	0		485	15	60	32	22	24			3	2	15	6	28				
335	15	2	3	08/07/03	TOF	0	0	10.4	3	0	2	100	100	70	81	3	0	0	0	1	82	31	18	19	0	0	1	0	0	0	0	0																3															
336	21	1	5	25/08/03	TOF,PDA	0	0	15.5	1	0	2	100	110	70	88	1	0	0	0	1	32	20	75	16	0	0	1	0	0	0	0	0																10															
337	6	2	5	05/12/03	TOF,PDA	0	0	15	1	0	2	88	108	70	89	1	0	0	0	1	57	20	15	20	0	0	1	0	0	0	0	0		1														8								3	27						
338	32	1	9	26/09/03	TOF	0	0	23	1	0	2	104	110	80	87	1	0	0	0	1	80	21	14	23	0	0	1	0	0	0	0	0		1		160	150	1		40	90	1	0	0	0		447	16	65	42	28	25			2	4	9						
339	21	1	6	23/06/03	TOF,PDA	1	0	15	1	0	3	90	100	70	90	1	0	0	0	1	72	17	10	12	0	0	1	0	0	0	0	0		1		140	160	1		50	115	2	1	1	0		465	17	61	35	24	26				2	70	35					
340	6	1	6	03/09/03	TOF,PDA	0	0	16	1	0	2	95	110	70	91	2	0	0	0	1	79	22	14	21	0	0	1	0	0	0	0	0																10															
341	13	2	13	14/07/03	TOF	1	0	24	1	0	2	106	90	60	90	1	0	0	0	1	70	43	28	10		0		0	0	0	0	0																5															
342	3	2	3	12/09/03	TOF,PDA	0	0	10.5	1	0	2	110	100	70	80	1	0	0	0	1	70	25	15	12	0	0	1	0	0	0	0	0																3															
343	16	2	2	14/08/03	TOF	0	0	10.5	3	0	2	100	100	70	85	3	0	0	0	1	87	17	8	8	0	0	1	0	0	0	0	0		1		160	140	1		40	60	1	0	0	0		479	17	61	30	20	25			2	2			26				
344	16	2	2	23/06/03	TOF	0	0	10.7	1	0	2	100	90	60	87	1	0	0	0	1	80	24	14	15	0	0	1	0	0	0	0	0		1		160	150	1		60	90	1	0	0	0		439	16	57	38	27	28			3	2	20	10	30		1		
345	20	1	5	30/06/03	TOF	0	0	14	3	0	2	86	110	70	86	3	0	0	0	1	65	26	17	17	0	0	1	1	3	0	0	0		1		140	160	1		40								9	72	41	24	29				3	27				1	1	3
346	19	1	3.5	09/10/03	TOF	0	0	13.5	1	0	2	96	90	70	88	1	0	0	0	1	75	23	12	12	1	2	2	1	1	0	0	0		1		200	150	1		80	90	1	1	1	1	3	465	17	60	49	29	46		19		3	69	38			1	1	1
347	15	2	4	30/09/03	TOF	1	1	12.4	1	0	2	88	100	70	92	1	0	0	0	1	70	26	18	16	0	0	1	0	0	0	0	0		1		160	130	1		40								3															
348	33	1	35	02/09/03	TOF	0	0	52.5	1	0	2	90	130	90	90	1	0	0	0	1	60	39	25	26	0	0	1	0	0	0	0	0		1														3															
349	18	1	6	09/07/03	TOF	0	0	15	1	0	2	88	120	70	85	1	0	0	0	1	75	29	18	17	0	0	1	0	0	0	0	0		1		140	120	0	0	40	90	1	0	0	0		441	14	75	42	25	26			2	2	12		10				
350	3	1	3	15/10/03	TOF	0	0	8.5	1	1	2	90	100	70	84	1	0	0	0							0		0	0	0	0	0																															
351	11	1	11	22/12/03	TOF,ABSENT PV	0	0	23	1	0	2	84	110	70	80	1	0	0	0	1	70	50	34	24	0	0	1	0	0	0	0	0		1														3															
352	23	2	8	23/12/03	TOF,ABSENT PV	0	0	24	1	0	2	88	110	70	85	1	0	0	0	1	88	33	14	21	0	0	1	0	0	0	0	0		1		140	120		1	40	60	1	0	0	0		462	15	57	40	27	40			1	3	24	11	42		1		
353	17	1	4.5	04/09/03	TOF	1	1	9	1	0	2	100	110	70	80	1	0	0	0	1	75	22	14	12	0	0	1	0	0	0	0	0		1		200	160	1		40	115	2	1	1	0		465	16	65	36	21	30		22		3	36	21					
354	25	1	11	20/08/03	TOF	0	0	22.8	1	0	2	90	100	80	81	1	0	0	0	1	72	28	17	15	0	0	1	0	0	0	0	0		1		180	130	1		40	30	1	1	0	0		456	16	75	46	26	28		18	1	2	15		26		1		
355	24	1	9	16/12/03	TOF,PDA	0	0	20	2	0	2	80	100	70	88	3	0	0	0	1	80	32	19	13	1	2	1	0	0	0	0	0		1		160	140	1		60	60	1	1	0	0		447	15	65	36	21	28		20		2	12						
356	1	1	1.5	07/10/03	TOF	1	0	12	1	0	2	88	80	50	88	1	0	0	0	1	70	23	13	13	0	0	1	0	0	0	0	0																1															
357	17	2	5	07/10/03	TOF,LPA STENOSIS	1	0	12.5	1	0	2	90	100	80	65	1	0	0	0	1	60	21	18	19	0	0	1	0	0	0	0	0																3															
358	42	1	26	12/11/03	TOF	0	0	65	2	0	2	90	110	70	91	1	0	0	0	1	70	53	35	17	0	0	1	0	0	0	0	0		1		140	150	0		40	30	1	0	0	0		432	16	63	49	32	28		16	1	3			32		1		
359	24	1	8	01/11/03	TOF	0	0	16.4	1	0	2	100	100	80	85	1	0	0	0	1	75	21	11	16	0	0	1	0	0	0	0	0		1		160	140	1		60	115	2	1	1	0		405	13	60	45	31	29		22	1	4	40		40				
360	28	1	8.5	30/10/03	TOF,ABSENT PV	0	0	19.5	1	0	2	100	100	70	91	1	0	0	0	1	70	24	11	13	0	0	1	0	0	0	0	0		1		140	100		1	40	90	1	0	0	0		462	17	61	49	32	29		15		2	34	15					
361	18	2	18	31/12/03	TOF	1	0	44	1	0	2	78	110	80	76	1	0	0	0	1	74	28	18	23	0	0	1	0	0	0	0	0																4															
362	18	1	6	17/11/03	TOF	1	0	17	1	0	2	84	100	70	90	1	0	0	0	1	64	37	27	25	0	0	1	0	0	0	0	0		1		140	100	0		40	90	1	0	0	0		470	15	78	40	22	25		20		2	18	10					
363	17	2	9	13/09/03	TOF	0	0	18	1	0	2	84	110	70	88	1	0	0	0	1	73	26	17	9	0	0	1	0	0	0	0	0		1														9															
364	14	1	4	15/11/03	TOF	0	0	11	2	0	2	84	100	80	89	1	0	0	0	1	68	23	15	16	0	0	1	0	0	0	0	0		1														7															
365	15	1		23/10/03			0		2	0																0		0	0	0	0	0																5															
366	14	1	2	24/09/03	TOF	1	0	7	1	0	2	110	90	70	73	1	0	0	0	1	65	18	12	22	0	0	1	0	0	0	0	0		1														7															
367	1.5	2	1.5	21/11/03	TOF,MILD EBSTEINS	0	0	7.1	1	1	2	110	90	60	82	1	0	0	0							0		0	0	0	0	0																															
368	14	2	9	07/11/03	TOF	1	1	21	2	0	2	90	110	70	80	1	0	0	0	1	70	16	9	16	1	2	2	1	2	0	1	0	AF															3															
369	6	2	6	06/11/03	TOF	1	0	12.5	1	0	2	90	90	60	82	1	0	0	0	1	70	30	21	20	0	0	1	0	0	0	0	0																3															

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0						
Normal	46	132	61	0	0	0	0	1.8															0	0	0						
																							0	0	0						
																							0	0	0						
NORMAL	61	141	83	0	0	0		1.2	1	122	73	65	41	45	RVOT								0	0	0						PLANNED FOR ELECTIVE PVR
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	48	143	64	0	0	0	0	1.9															0	0	0						
AF	64	156	92	0	0	0		2.6															0	0	0				1		RESIDUAL VSD AND SEVERE PAH ADVISED SURGERY, LOST
																							0	0	0						
NORMAL	39	86	60	3	0	1	1	1.8															0	0	0						MPA STENOSIS ON MEDICAL F/U
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	46	148	62	0	0	0	0	2	1	97	49	56	50	31	RVOT								0	0	0						SEVERE LPA STENOSIS, S/P LPA STENTING 10/2017, FC II
Normal	39	141	59	0	0	0	0	1.5															0	0	0						
																							1	1	0	13/10/03	POST OP IE- FUNGAL-13-10-2003				
																							0	0	0						
																							1	0	1			PERIOP MORTALITY-			
																							1	0	1			PERIOP MORTALITY-MODS			
																							0	0	0				1		RESIDUAL VSD, ADVISED CATH-LOST TO F/U
Normal	37	127	69	0	0	0	0	1.7															0	0	0						
																							0	0	0						
																							0	0	0						
									1	64.7	36.9	48	43	30	RVOT								0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0				1		RESIDUAL VSD- ADVISED Cath lost to follow up
VPC	58	148	63	10	0	0	0	1.9															0	0	0						Medical follow up -on Metoprolol 25mg
Normal	52	138	60	0	0		0	2.1															0	0	0						
																							0	0	0						
NORMAL	41	119	66	0	0	0		1.6															0	0	0						
Normal	42	138	68	0	0	0	0	1.72															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						MEDICAL FOLLOW UP FOR RVOT GRADIENT
																							0	0	0						
																							1	1	0	Mar-04	EXPIRED IE- FUNGAL- 8 MONTHS AFTER SX				
																							0	0	0						
																							0	0	0						
Normal	54	138	71	0	0	0	0	1.5															0	0	0						
INTERMITTENT CHB	54	91	64	0	0	0		1.9															0	0	0						EPICARDIAL VVI PACEMAKER IMPLANTED 2003
NSVT, 1st AV block,	38	161	64	10	0	1	4	2.45	1	141	95	56	32	40									0	0	0						Planned for PVR,repeat holter after PVR +/-EP study
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	1		PERIOP MORTALITY- CARDIOGENIC SHOCK				
																							0	0	0						
Normal	58	140	66	0	0	0	0	1.9															0	0	0						
																							0	0	0						
Normal	48	142	70	0	0	0	0	2.1															0	0	0						
																							0	0	0						
																							0	0	0						Diagnosed as Tay Sachs disease -2004- no follow up
																							0	0	0						
Normal	52	140	66	0	0	0	0	1.7															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							1	0	1			PERIOP MORTALITY-MODS			
																							1	1	0	09/06/10	MORTALITY 2010- NOTED TO Have RHD sev				
																							0	0	0						

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmhg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	lrbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
370	14	2	14	19/11/03	TOF	0	0	49	1	0	2	84	110	80	91	1	0	0	0	1	72	35	21	18	0	0	1	0	0	0	0	0		1														3															
371	17	2	4.5	01/12/03	TOF	0	0	13.2	1	0	2	90	100	70	86	1	0	0	0	1	80	25	15	21	0	0	1	0	0	0	0	0		1		160	180	1		60	105	1	0	0	0		433	15	74	39	22	26		16	2	2	11		25				
372	14	1	2.5	10/12/03	TOF,PDA	0	0	9.4	2	0	2	100	110	70	89	1	0	0	0	1	70	21	16	20	0	0	1	0	0	0	0	0		1		160	150	1		60	115	2	1	0	1	5	405	17	59	34	23	31		16	2	2	20		35				
373	14	2	1	31/10/03	TOF	1	0	6.5	1	0	2	130	90	60	82	3	1	0	0	1	65	21	18	21	1	1	2	0	0	0	0	0		1		160	100		1	40	45	1	0	0	0		462	13	74	37	21	23		17		2	52				1		
374	19	2	4	25/02/04	TOF,LPA STENOSIS	0	0	10	1	0	2	78	100	70	84	1	0	0	0	1	75	20	12	20	1	2	2	0	0	0	0	0		1		160	150	1		40	90	1	1	1	1	2	476	17	74	37	22	40		23	2	4	41		72		1		
375	35	1	34	04/12/03	TOF	0	0	68.5	2	0	2	69	140	90	90	1	0	0	0	1	65	33	21	31	1	0	2	0	0	0	0	0																5															
376	6	2	6	12/09/03	TOF,PDA	0	0	16	1	0	2	88	110	70	89	3	0	0	0	1	75	21	15	17	0	0	1	0	0	0	0	0																4															
377	4	2	4	10/11/03	TOF	0	0	11.5	1	0	2	84	100	70	85											0		0	0	0	0	0																5															
378	19	1	5	18/08/03	TOF,PDA	0	0	15.2	1	0	2	86	110	70	91	1	0	0	0	1	66	24	16	15	1	1	1	1	1	1	0	0	VPC+- RVOT	1		160	120		1	40	90	1	0	0	0		416	14	68	41	22	28		19	3	3	10		55		1	1	1
379	22	2	9	12/01/04	TOF	1	0	18	1	0	2	102	100	70	85	1	0	0	0	1	65	25	19	22	0	0	1	0	0	0	0	0																10															
380	15	2	15	03/12/03	TOF,COA	0	0	42	2	1	2	90	150	90	88	1	0	0	0	1	67	28	18	21		0		0	0	0	0	0																															
381	2	1	2	25/10/03	TOF	1	0	10.5	1	0	2	100	90	60	88	1	0	0	0	1	72	21	14	26	0	0	1	0	0	0	0	0																3															
382	18	2	11	08/12/03	TOF,PDA	0	0	21.8	2	0	2	80	110	70	82	1	0	0	0	1	58	36	25	21	0	0	1	0	0	0	0	0																8															
383	22	2	22	06/01/04	TOF	0	0	36	1	0	2	90	110	70	86	1	0	0	0	1	67	30	21	21	0	0	1	0	0	0	0	0																3															
384	32	1	10	07/01/04	TOF	0	0	14.5	2	0	2	80	100	65	86	1	0	0	0	1	60	27	18	10	0	0	1	0	0	0	0	0		1		140	130	1		40	75	1	0	0	0		432	14	77	47	25	26		20	2	1	22	11	31				
385	20	2	6	21/01/04	TOF	0	0	17	2	0	2	88	100	70	85	1	0	0	0	1	70	32	20	23	0	0	1	0	0	0	0	0		1		160	150	1		40	105	1	0	0	0		447	13	65	32	23	26		19		2	7						
386	17	1	1.5	16/02/04	TOF	1	0	9	2	0	2	80	100	60	88	1	0	0	0	1	88	15	7	8	1	2	2	0	0	0	0	0		1		140	130	1		60	135	2	1	0	0		441	17	67	34	27	21		20	1	4	28						
387	31	1	13	31/01/04	TOF	0	0	57	1	0	2	82	120	70	88	1	0	0	0	1	68	32	22	14	0	0	1	0	0	0	0	0																5															
388	7	1	1.5	12/05/04	TOF	1	0	8	1	0	2	80	100	60	79	1	0	0	0	1	65	24	16	6	0	0	1	0	0	0	0	0																10															
389	2	2	2	21/01/04	TOF	0	0	7.4	1	0	2	120	100	70	89	1	0	0	0	1	80	17	9	11	0	0	1	0	0	0	0	0		1														3															
390	20	1	5	16/03/04	TOF,PDA	0	0	15	1	0	2	90	100	60	85	1	0	0	0	1	78	26	16	18	0	0	1	0	0	0	0	0		1		120	130	1		40	90	1	1	0	0		439	14	61	35	26	25		20		3	15	9					
391	17	2	2.5	25/03/04	TOF	0	0	12	1	0	2	100	100	60	88	1	0	0	0	1	75	19	11	11	0	0	1	0	0	0	0	0		1		140	130	1		40	115	2	0	1	0		485	16	62	39	26	23		20		3	13				1		
392	19	1	19	22/01/04	TOF	1	0	49	1	0	2	90	110	70	86	1	0	0	0	1	70	32	20	25	0	0	1	0	0	0	0	0																2															
393	17	1	8	24/01/04	TOF	1	1	21	2	0	2	78	110	60	86	1	0	0	0	1	75	20	13	15	1	1	1	1	2	0	1	0	AT, AF	1		140	180	1		120	135	2	1	0	0		465	8	62	43	37	40		12		4	58				1		
394	14	1	4	18/05/04	TOF	0	0	13	1	0	2	94	100	70	80	1	0	0	0	1	70	18	13	24	0	0	1	0	0	0	0	0																5															
395	18	2	4	15/04/04	TOF	0	0	10	1	0	2	100	100	60	89	1	0	0	0	1	70	20	13	16	0	0	1	0	0	0	0	0		1		120	110		1	40	100	1	0	0	0		454	16	84	41	20	34		17	1	1	23	13	26		1		
396	2	1	2	12/03/04	TOF	0	0	10	1	0	2	80	90	60	92	1	0	0	0	1	80	15	8	11	0	0	1	0	0	0	0	0		1		140	160	1		40	90	1	1	1	1	3	439	15	85	30	16	33		18		3	22						
397	38	1	22	27/01/04	TOF	0	0	52.4	2	0	2	76	120	70	87	1	0	0	0	1	84	35	19	26	0	0	1	1	3	0	0	1	TYPE 2A AV	1		200	150	1		40	30	1	1	0	0		416	16	65	50	36	32		18		2	10				1		
398	16	2	1	29/03/04	TOF	0	0	7	1	0	2	100	90	60	90	1	0	0	0	1	81	18	10	12	0	0	1	0	0	0	0	0		1		120	110		1	40	90	1	0	0	0		441	16	68	28	13	32		16	1	4	29		16				
399	26	2	9	13/05/04	TOF,LPA STENOSIS,OSASD	1	1	19	1	0	2	90	100	60	90	1	0	0	0	1	80	18	7	21	0	0	1	0	0	0	0	0		1														3															
400	19	1	4	24/06/04	TOF,PDA	1	0	11	1	0	2	78	90	60	82	1	0	0	0	1	83	21	12	10	0	0	1	1	3	0	0	1	1ST AVB	1		260	130	1		40	135	2	1	1	0		462	14	71	37	21	30		19	2	3	10	4	33				
401	2	1	2	02/04/04	TOF	1	0	7	2	0	2	132	100	70	70	1	0	0	0	1	60	30	23	21		0		0	0	0	0	0																3															
402	39	2	13	09/07/04	TOF	0	0	38	2	0	2	76	120	70	80	1	0	0	0	1	64	30	17	17	1	1	2	0	0	0	0	0		1		120	110	0		40	30	1	0	0	0		439	13	70	34	20	26		20		3	12						
403	19	2	4	12/07/04	TOF	0	0	12.5	1	0	2	100	100	70	83	1	0	0	0	1	65	21	14	13	0	0	1	0	1	0	0	0		1		160	130	1		60	115	2	0	1	0		462	15	74	40	22	40		18	2	2	14		42		1	1	1
404	59	2	44	10/06/04	TOF,PFO	0	0	54	2	0	2	55	120	80	85	1	0	0	0	1	70	35	25	23	0	0	1	1	3	0	0	1	CHB, S/P PPI	2	RV PACED	200	130	0		60	-70	3	0	0	0		432	16	68	39	24	28		18		2	10						
405	37	1	35	16/04/04	TOF	0	0	45	2	0	2	70	130	80	90	1	0	0	0	1	80	38	20	20	0	0	1	0	0	0	0	0																1															
406	23	1	16	28/05/04	TOF	1	0	34.5	1	0	2	90	100	70	80	1	0	0	0	1	72	28	16	21	0	0	1	0	0	0	0	0																8															
407	3	1	3.5	05/07/04	TOF	0	0	12	2	0	2	92	110	70	90	1	0	0	0	1	70	23	15	16	0	0	1	0	0	0	0	0																3															
408	15	1	2	07/07/04	TOF	0	0	12	1	0	2	90	100	70	86	1	0	0	0	1	70	20	14	16	0	0	1	0	0	0	0	0		1														10													1		
409	16	1	2	04/09/04	TOF	0	0	10	1	0	2	100	100	70	85	1	0	0	0	1	80	23	13	10	0	0	1	0	0	0	0	0		1		160	110		1	40	75	1	0	0	0		410	16	60	38	25	34		19	2	3	17	11	35		1		
410	17	2	4.5	13/07/04	TOF,PA,PDA,ASD	1	0	12	1	0	2	90	100	60	85	1	0	0	0	1	70	29	19	24	0	0	1	0	1	0	0	0		1		120	150	1		40	-90	3	0	1	0		491	16	66	32	21	28		19	2	2	14		32		1	1	1
411	5	1	8	17/03/04	TOF	0	0	13	1	0	2	88	110	70	80	1	0	0	0	1	60	21	15	21	0	0	1	0	0	0	0	0																3															
412	3	1	3	19/07/04	TOF	0	0	82	1	0	2	100	90	60	82	1	0	0	0	1	55	19	15	13	0	0	1	0	0	0	0	0																2															
413	16	1	3	01/06/04	TOF	0	0	13	1	0	2	104	100	70	80	1	0	0	0	1	57	22	16	16	0	0	1	0	0	0	0	0																8															
414	12	2	12	21/07/04	TOF	0	0	21	1	0	2	84	100	70	82	1	0	0	0	1	80	18	10	13	0	0	1	0	0	0	0	0																8											50				
415	22	1	4	20/07/04	TOF, PA (ACQ)	1	1	12	1	0	2	80	90	60	85	1	0	0	0	1	70	28	14	16	0	0	1	0	0	0	0	0		1		160	110		1	40	135	2	0	0	0		465	14	68	37	23	28		20		3	32	16					
416	1.5	1	1.5	18/08/04	TOF,PDA	1	0	9	1	1	2	104	90	60	90	1	0	0	0	1	84	22	11	20		0		0	0	0	0	0																															
417	32	1	19	24/08/04	TOF, DYSPLASTIC PV	0	0	42.5	1	0	2	86	110	70	90	1	0	0	0	1	52	45	32	27	0	0	1	0	0	0	0	0		1		120	110		1	60	90	1	0	0	0		471	13	74	40	23	26		18		1	15						
418	16	1	1.5	03/08/04	TOF,PA	1	1	10	1	0	2	100	90	70	88	1	0	0	0	1	70	33	22	21	0	0	1	0	0	0	0	0		1		120	160	1		60	90	1	0	0	0		454	14	65	33	22	32		18	2	3	30	10	31				
419	17	1	2.5	27/07/04	TOF, PA	1	1	11	1	0	2	90	90	70	80	1	0	0	0	1	71	26	16	18	0	0	1	0	0	0	0	0		1		120	160	1		40	115	2	1	1	0		462	15	78	36	19	23		20	3	4	18		35				
420	16	2	2	11/08/04	TOF	1	0	11	1	0	2	106	90	50	82	1	0	0	0	1	76	21	12	15	1	1	2	1	1	1	0	0	VPCS	1		200	120		1	40	60	1	0	0	0		447	19	65	41	26	29		20		2	30				1	1	1
421	33	1	10	24/09/04	TOF	0	0	21	1	0	2	90	100	70	90	1	0	0	0	1	63	29	20	14	0	0	1	0	1	0	0	0		1		160	160	1		60	45	1	1	0	0		465	14	68	40	24	34		18	1	3	17		36		1	1	1
422	25	2	10	10/06/04	TOF	0	0	31.2	1	0	2	130	100	60	83	1	0	0	0	1	73	26	15	16	0	0	1	1	1	1	0	0	VPCS	1		160	110	0		40	90	1	0	0	0		433	14	60	33	22	20		17		3	10		16		1		
423	14	2	3	08/09/04	TOF	0	0	10	1	0	2	100	100	80	88	1	0	0	0	1	77	32	19	22	0	0	1	0	0	0	0	0																6															
424	11	1	2	09/08/04	TOF,PDA	0	0	10	2	0	2	100	90	70	90	1	0	0	0	1	70	22	14	15	0	0	1	0	0	0	0	0																10															
425	4	1	3	31/08/04	TOF	1	0	9.5	1	0	2	90	100	80	60	1	0	0	0	1	77	15	9	19	0	0	1	0	0	0	0	0																3															
426	27	2	13	02/08/04	TOF	0	0	34	1	0	2	86	110	70	82	1	0	0	0	1	70	25	17	16	0	0	1	0	0	0	0	0		1		200	150	1		40	115	2	0	0	0		486	16	61	42	29	35		20		4	14				1		
427	1	1	1.5	23/08/04	TOF,PFO	1	0	9	1	0	2	78	90	60	90	1	0	0	0	1	75	22	14	13	0	0	1	0	0	0	0	0																4															
428	14	2	14	13/09/04	TOF	0	0	27	1	0	2	90	110	70	84	1	0	0	0	1	64	27	17	20	0	0	1	0	0	0	0	0																3															
429	16	2	1.5	10/06/04	TOF	1	0	6	1	0	2	106	80	46	56	1	0	0	0	1	76	17	10	12	0	0	1	0	0	0	0	0		1		160	150	1		40	75	1	1	0	0		456	16	69	28	16	26		18	2	4	17		35		1		
430	15	1	2.5	28/07/04	TOF	1	0	11	1	0	2	108	100	60	90	1	0	0	0	1	65	22	14	19	0	0	1	0	0	0	0	0		1		160	110		1	40	105	1	0	0	0		420	15	63	39	24	29		18	2	2	10		31		1		
431	15	1	2	05/08/04	TOF	0	0	9	1	0	2	100	90	60	86	1	0	0	0	1	70	19	10	6	0	0	1	1	3	0	0	1	TYPE 2A AV	1		200	150	1		60	115	2	1	1	0		432	14	73	35	20	26		18	3	2	17	10	38				
432	9	1	3.5	28/07/04	TOF	1	1	10	4	0	2	106	100	60	60	1	0	0	0	1	55	26	18	20		0		0	0	0	0	0																6															
433	21	1	7	24/06/04	TOF	0	0	16	1	0	2	78	90	60	86	1	0	0	0	1	78	30	17	18	0	0	1	0	0	0	0	0		1		120	140	1		40	75	1	1	0	0		441	14	67	35	22	24		19	3	2	15		46		1		
434	2	2	2	27/10/04	TOF	0	0	5	2	1	2	120	80	60	84	1	0	0	0	1	60	13	8	17		0		0	0	0	0	0																															
435	15	2	2	12/10/04	TOF	0	0	10	1	0	2	100	80	60	63	1	0	0	0	1	70	17	10	15	0	0	1	0	0	0	0	0		1		160	130	1		60	75	1	0	0	0		478	14	60	27	20	38		17		3	16		27		1		
436	12	2	4	12/11/04	TOF,ASD	0	0	14	2	0	2	80	100	60	86	1	0	0	0	1	80	27	19	20	0	0	1	0	0	0	0	0																10															
437	16	1	1.5	01/11/04	TOF	0	0	8	2	0	2	88	90	60	80	1	0	0	0	1	76	22	14	17	0	0	1	1	1	1	0	0	VPCS	1		120	160	1		40	30	1	0	0	0		425	15	57	41	29	28		18	3	2	12		29		1		
438	14	1	3	04/10/04	TOF	1	1	10	1	0	2	120	90	60	90	1	0	0	0	1	70	24	15	16	0	0	1	0	0	0	0	0		1		180	150	1		40	135	2	1	1	0		490	14	60	30	20	25		17	2	3	16						
439	16	2	2	30/10/04	TOF	1	0	9	1	0	2	88	90	60	85	1	0	0	0	1	74	16	10	8	1	0	1	0	0	0	0	0		1		160	130	1		40	75	1	1	0	1	2	462	15	75	31	18	35		21		3	21		27				
440	12	1	2	29/09/04	TOF	0	0	9	1	0	2	90	100	70	90	1	0	0	0	1	56	22	15	14	0	0	1	0	0	0	0	0																10															
441	3	2	3	08/10/04	TOF	0	0	13	1	1	2	130	90	60	82	1	0	0	0	1	70	24	15	17		0		0	0	0	0	0																															
442	2	1	2	10/11/04	TOF	1	0	6.5	4	1	2	100	80	60	72	1	0	0	0	1	70	20	13	15		0		0	0	0	0	0																															
443	17	1	1.5	11/10/04	TOF	1	0	8	1	0	2	78	100	70	80	1	0	0	0	1	70	24	15	17	0	0	1	0	0	0	0	0		1		120	120		1	20	60	1	0	0	0		432	15	65	29	19	23		16	1	3	8	5	18		1		
444	17	1	9	30/09/04	TOF	1	0	7	1	0	2	110	90	60	80	1	0	0	0	1	60	28	19	15	0	0	1	0	0	0	0	0		1		160	140	1		60	105	1	0	0	0		476	15	67	34	22	37		19		4	20		34				

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RT)	LGE	MRI details	EPS	EPS Details	SACT	Amitagrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0						
																							0	0	0						
																							0	0	0						
NORMAL	63	125	91	0	0	0		1.22															0	0	0				1		
NORMAL	57	142	81	0	0	0		1.8	1	141	103	43.3	26.3	41	RVOT								0	0	0						KEPT ON CLOSE MEDICAL FOLLOW UP
																							1	1	0	31/10/04	POST OP IE 2004- DEHISCIENCE OF vsd				
																							0	0	0						NO FOLLOW UP
																							0	0	0						BACKED OUT- LAD FROM RCA
VPC+	51	125	80	0.6	0	0		1.4															0	0	0						Medical follow up
																							0	0	0						
																							1	0	1			PERIOP MORTALITY-			
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
									1	166	91	64	45	45	RVOT and								0	0	0						REDO TAP- 2006 ,pvr # 23 LIVANOVA 9/29
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	53	130	65	0	0	0	0	1.6															0	0	0						
																							0	0	0						
NORMAL	36	93	51	0	0	0		1.96									1	2:1 AV RHTYHM, PP INTERVAL 360, 7					0	0	0				1		RESIDUAL VSD - SX DONE 2004
																							0	0	0						
Normal	52	138	73	0	0	0	0	2.1															0	0	0						
																							0	0	0						
NORMAL	37	98	52	0	0	0		1.86															0	0	0						
									1	100.5	51.5	61.3	48.2	50	RVOT,TV,VS								0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
NSVT +	50	122	77	0	0	1		1.6															0	0	0						advised review
																							0	0	0						
																							1	1	0		POST OP IE- VSD PATCH DEHISCIENCE- CONS				SEPSIS
																							0	0	0						
																							0	0	0						
Normal	54	138	64	0	0	0	0	1.9															0	0	0						
Normal	52	128	70	0	0	0	0	1.6															0	0	0						
VPC	56	130	70	0	0	0	0	2.1															0	0	0						Medical follow up
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							1	0	1			periop mortality- cardiogenic			
																							0	0	0						
																							0	0	0						
																							0	0	0						
VPCS+	48	121	71	8.7	0	0		1.9															0	0	0						ON MEDICAL FOLLOW UP- 25MG METOPROLOL
VPCS+	52	120	77	4	0	0	0	1.7															0	0	0						On medical follow up- 25MG METOPROLOL
NORMAL	40	164	76	0	0	0		1.5															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
NORMAL	57	130	85	0	0	0		1.08	1	140	68	42	51	58	RVOT								0	0	0						ADVISED PVR
																							0	0	0						
																							0	0	0						
NORMAL	55	111	78	0	0	0		1.3															0	0	0						
Normal	48	123	64	0	0	0		1.5															0	0	0						
																							0	0	0						
																							0	0	0						
NORMAL	45	137	68	0	0	0		1.5															0	0	0						
																							1	0	1			PERIOP MORTALITY-			
NORMAL	52	120	77	0	0	0		1.56															0	0	0						
																							0	0	0						
NORMAL	47	146	82	0	0	0		1.48															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							1	0	1			PERIOP MORTALITY-			
																							1	0	1			PERIOP MORTALITY-			
Normal	44	130	67	0	0	0	0	1.6															0	0	0						
																							0	0	0						

Sl no	AGE(Years)	SEX	Age at surgery	Surgery Date	Pre Op Diagnosis	Cyanotic spells	BT SHUNT	Weight(kg) at surgery	Operative Procedure	Peri-op mortality	NYHA Class	HR(/min)	BP(mmHg) systolic	BP(mmhg) Diastolic	SpO2(%)	Route of approach	Palpitations	Presyncope	Syncope	ECHO (pre Op)	EF(Pre Op)	LV dimension (Pre Op) diastolic	LV dimension (Pre Op) systolic	RV dimensions (Pre Op)	Symptoms on follow up	Symptoms details	NYHA (on follow up)	ECG documented arrhythmia(any)	ECG documented arrhythmia(Type)	ECG documented arrhythmia(Ventricular)	ECG documented arrhythmia(atrial)	ECG documented arrhythmia(bradyarrthymia)
445	14	2	2	13/11/04	TOF	0	0	7	1	0	2	98	90	60	82	1	0	0	0	1	76	25	13	11	0	0	1	0	0	0	0	0
446	13	2	13	13/12/04	TOF,PDA	0	0	44	1	0	2	88	112	60	82	1	0	0	0	1	70	23	13	12	0	0	1	0	0	0	0	0
447	36	2	16	31/12/04	TOF,ASD	0	0	43	2	0	2	88	110	80	84	1	0	0	0	1	68	27	17	19	0	0	1	0	0	0	0	0
448	2	2	2.5	06/12/04	TOF,PA	1	0	8	4	0	2	120	90	60	70	1	0	0	0	1	60	15	8	11	0	0		0	0	0	0	0
449	16	1	2.5	13/12/04	TOF	0	0	12	1	0	2	88	90	60	86	1	0	0	0	1	66	17	10	14	0	0	1	0	0	0	0	0
450	19	1	5	17/12/04	TOF	1	0	12	1	0	2	110	90	60	76	1	0	0	0	1	60	21	17	20	0	0	1	0	0	0	0	0
451	12	2	6	11/12/04	TOF	0	0	12	1	0	2	100	100	60	88	1	0	0	0	1	59	21	15	20	0	0	1	0	0	0	0	0
452	22	1	6	01/12/01	TOF	1	0	13.5	2	0	2	80	100	70	91	1	0	0	0	1	68	18	12	7	0	0	1	0	0	0	0	0
453	13	1	13	04/02/04	TOF	1	0	32.3	2	0	2	90	110	70	82	1	0	0	0	1	75	27	18	23	0	0	1	0	0	0	0	0
454	18	1	2	19/10/02	TOF	0	0	7	1	0	3	120	100	70	75	1	0	0	0	1	75	18	10	12	0	0	1	0	1	0	0	0
455	18	1	3.5	05/01/05	TOF	0	0	9	2	0	2	110	70	90	80	1	0	0	0	1	70	24	17	24	0	0	1	0	0	0	0	0
456	16	2	1	06/01/05	TOF	0	0	9	1	0	2	100	80	110	84	1	0	0	0	1	67	28	18	7	0	0	1	0	0	0	0	0
457	4.5	1	4.5	10/11/05	TOF	0	0	14	4	1	2	90	100	70	74	1				1	72	24	15			0		0	0	0	0	0
458	25	1	9	11/01/05	TOF	0	0	18	1	0	2	62	110	70	78	1	0	0	0	1	60	25	18	20	0	0	1	0	0	0	0	0
459	21	1	5	14/01/05	TOF,PDA	0	0	14	1	0	2	67	110	70	80	1	0	0	0	1	75	23	15	11	0	0	1	0	0	0	0	0
460	34	2	14	20/01/05	TOF, VAL PS	0	0	41	2	0	2	84	110	80	88	1	0	0	0	1	78	21	13	16	0	0	1	0	0	0	0	0
461	23	1	8	17/01/05	TOF	1	1	16	1	0	2	90	110	70	82	1	0	0	0	1	80	30	18	17	0	0	1	0	0	0	0	0
462	17	1	1.5	01/02/05	TOF,PDA	0	0	11	1	0	2	100	90	60	86	1	0	0	0	1	70	22	14	12	0	0	1	0	0	0	0	0
463	16	2	0.5	07/02/05	TOF	1	0	5.5	2	0	2	106	90	70	87	1	0	0	0	1	79	20	11	18	0	0	1	0	0	0	0	0
464	20	1	5	04/02/05	TOF	0	0	17	2	0	2	90	90	60	89	1	0	0	0	1	74	25	13	18	0	0	1	0	0	0	0	0
465	17	2	1.5	11/02/05	TOF,PDA	0	0	11	1	0	2	86	100	70	80	1	0	0	0	1	70	18	11	14	0	0	1	0	0	0	0	0
466	17	1	2	13/02/05	TOF,PDA	0	0	12	1	0	2	90	90	60	88	1	0	0	0	1	66	17	11	11	0	0	1	0	0	0	0	0
467	18	2	3	16/02/05	TOF,PDA	0	0	13	1	0	2	100	100	70	90	1	0	0	0	1	70	20	14	19	0	0	2	0	0	0	0	0
468	21	1	5	18/02/05	TOF	0	0	15	1	0	2	90	110	70	80	1	0	0	0	1	65	23	18	13	0	0	1	0	0	0	0	0
469	17	2	2	23/02/05	TOF	0	0	10	1	0	2	100	100	70	74	1	0	0	0	1	70	21	15	18	0	0	1	0	0	0	0	0
470	19	1	3.5	24/02/05	TOF,ABSENT PV	0	0	14	1	0	2	110	100	70	80	1	0	0	0	1	70	22	15	15	0	0	1	0	0	0	0	0
471	33	1	17	01/03/05	TOF	1	0	45	4	0	2	110	110	70	72	1	0	0	0	1	63	29	19	18	0	0	1	0	0	0	0	0
472	36	2	17	11/03/05	TOF	0	0	36	1	0	2	60	100	60	70	1	0	0	0	1	60	23	16	19	0	0	1	0	0	0	0	0
473	16	1	1	15/03/05	TOF	1	0	7	4	0	2	110	100	70	74	1	0	0	0	1	53	17	13	15	0	0	1	0	0	0	0	0
474	17	1	1.5	17/03/05	TOF	0	0	10	2	0	2	100	100	60	85	1	0	0	0	1	70	20	10	11	0	0	1	1	3	0	0	1
475	20	1	3	18/03/05	TOF	0	0	11	2	0	2	110	110	70	80	1	0	0	0	1	76	28	16	23	0	0	1	0	0	0	0	0
476	18	1	2	30/03/05	TOF	0	0	8	1	0	2	100	90	60	79	1	0	0	0	1	71	21	13	18	0	0	1	0	0	0	0	0
477	19	1	4	12/04/05	TOF	0	0	11	1	0	2	90	110	70	76	1	0	0	0	1	75	24	17	18	0	0	1	0	0	0	0	0
478	39	2	23	13/04/05	TOF,RIGHT ARCH	0	0	40	1	0	2	90	100	60	89	1	0	0	0	1	78	27	14	32	0	0	1	1	3	0	0	1
479	18	1	3	16/04/05	TOF	0	0	10	1	0	2	70	110	70	70	1	0	0	0	1	65	23	14	17	0	0	1	1	3	0	0	1
480	16	2	1.5	18/04/05	TOF	0	0	7	1	0	2	100	90	70	70	1	0	0	0	1	70	26	13	13	0	0	1	0	0	0	0	0
481	35	1	19	19/04/05	TOF	0	0	38	1	0	2	96	110	60	88	1	0	0	0	1	64	29	20	19	1	1	1	1	1	1	0	0
482	17	2	1.5	20/04/05	TOF	0	0	8	1	0	2	90	110	90	86	1	0	0	0	1	66	19	12	15	0	0	1	0	0	0	0	0
483	28	2	12	28/04/05	TOF	0	0	30	1	0	2	100	110	70	80	1	0	0	0	1	70	28	14	17	0	0	1	0	0	0	0	0
484	16	2	1	30/04/05	TOF,PA	0	0	8	1	0	2	110	100	60	74	1	0	0	0	1	75	15	8	14	0	0	1	0	0	0	0	0
485	22	2	6	04/04/05	TOF	0	0	16	2	0	2	100	90	60	82	1	0	0	0	1	66	32	22	10	0	0	1	1	3	0	0	1
486	17	1	2	06/05/05	TOF	1	0	8	2	0	2	100	100	60	72	1	0	0	0	1	68	25	16	18	0	0	1	0	0	0	0	0
487	28	2	12	11/05/05	TOF	1	0	29	2	0	2	70	100	70	80	1	0	0	0	1	80	22	12	18	0	0	1	0	0	0	0	0
488	18	1	4	19/05/05	TOF	0	0	12	1	0	2	100	100	60	78	1	0	0	0	1	80	26	16	20	0	0	1	0	0	0	0	0
489	17	1	1.5	19/05/05	TOF	0	0	8	1	0	2	110	90	60	80	1	0	0	0	1	70	25	16	19	0	0	1	0	0	0	0	0
490	16	2	0.5	24/05/05	TOF	0	0	4	1	0	2	90	100	60	89	1	0	0	0	1	60	13	8	13	0	0	1	1	3	0	0	1
491	2	1	2	06/06/05	TOF,RIGHT ARCH	1	0	8	1	1	2	100	90	70	74	1										0		0	0	0	0	0
492	39	2	22	07/06/05	TOF	0	0	65	1	0	2	90	110	70	84	1	0	0	0	1	79	30	18	30	0	0	1	0	0	0	0	0
493	16	2	1	07/06/05	TOF	0	0	5	1	0	2	110	100	70	85	3	0	0	0	1	65	15	10	11	0	0	1	0	0	0	0	0
494	21	2	6	13/06/05	TOF	0	0	8.5	1	0	2	90	100	70	76	1	0	0	0	1	70	14	8	10	0	0	1	0	0	0	0	0
495	17	1	2	17/06/05	TOF, DISCONNECTED PA	1	0	6.5	7	0	2	90	90	60	88	1	0	0	0	1	81	25	16	14	0	0	1	0	0	0	0	0
496	67	1	36	17/06/05	TOF	0	0	56	1	0	2	76	130	70	91	1	0	0	0	1	60	37	26	27	1	1	2	1	2	0	1	0
497	21	1	5.5	21/06/05	TOF	1	0	15	1	0	2	90	100	60	78	1	0	0	0	1	65	23	17	17	0	0	1	0	0	0	0	0
498	16	1	1	30/06/05	TOF	0	0	7	1	0	2	100	110	60	86	1	0	0	0	1	59	18	13	10	0	0	1	0	0	0	0	0
499	18	1	3	06/06/05	TOF	0	0	10	1	0	2	90	100	60	86	1	0	0	0	1	70	17	10	9	0	0	1	0	0	0	0	0
500	20	1	4	08/07/05	TOF	0	0	13	1	0	2	90	100	80	86	1	0	0	0	1	74	21	12	18	0	0	1	0	0	0	0	0
501	16	2	1.5	13/07/05	TOF	0	0	6.5	2	0	2	110	90	60	83	1	0	0	0	1	70	24	16	14	0	0	1	0	0	0	0	0
502	17	1	2.5	21/06/05	TOF	0	0	8	1	0	2	90	100	70	70	1	0	0	0	1	61	25	17	15	0	0	1	0	0	0	0	0
503	19	1	3.5	22/07/05	TOF	0	0	10	2	0	2	110	100	70	78	1	0	0	0	1	75	24	14	10	0	0	1	0	0	0	0	0
504	27	1	12	25/07/05	TOF,PDA	0	0	26	1	0	2	90	90	60	78	1	0	0	0	1	78	31	16	15	0	0	1	0	0	0	0	0

Sl no	Details	Rhythm	Details	PR	QRS Duration (follow up)	RBBB	Irbbb	Peak T to T end (follow up)	Axis-Exact	axis	RVH	RV strain	Fragmented QRS	fragmented QRS leads	QTc	Follow up Duration(Years)	EF (follow up)	LV dimension(follow up) diastolic	LV dimension(follow up) systolic	RV dimensions(follow up)	RVEF (follow up)	TAPSE (follow up)	TR	PR	RVOT peak	RVOT mean	RVSP	Other	Holter	Holter documented arrhythmia(any)	Holter documented arrhythmia(type)
445		1		120	110	0		40	60	1	0	0	0		465	15	68	28	17	23		15	1	3	31	13					
446																3															
447																6											20				
448																3															
449		1		200	110		1	40	75	1	0	0	0		468	14	74	32	18	26		18		2	26	14			1		
450		1		120	160	1		40	75	1	1	1	0		479	15	69	46	29	32		20	1	4	21		22				
451																3															
452		1		120	140	1		60	90	1	1	0	0		485	13	57	46	32			18	1	2	13		19				
453																2															
454																1											18		1	1	1
455		1		160	130	1		40	10	1	0	0	0		465	14	69	44	29	28		18	1	1	24						
456		1		120	130	1		60	105	1	0	0	0		456	13	71	41	25	24		18	2	2	27		34				
457																															
458		1		160	120		1	60	30	1	0	0	0		453	15	54	45	32	28		20		3	18						
459		1		140	110	0		60	90	1	0	0	0		444	12	80	47	24	26		18		2	47	24					
460		1		160	130	1		40	135	2	0	0	0		465	15	63	38	25			18	1	4	11		26				
461																3															
462		1		120	120	0	1	80	60	1	0	0	0		447	15	77	42	23			18	2	4	45	23	34				
463		1		120	140	1		80	90	1	1	0	0		438	14	71	41	25	23		18		3	24	10					
464																5															
465		1		140	160	1		80	75	1	1	1	0		485	14	70	32	20			23		2	27	14			1		
466		1		160	120		1	60	105	1	0	0	0		459	13	60	40	27					2	21	13					
467		1		140	140	1		40	70	1	0	0	0		405	13	62	34	26			14		4	15	8					
468		1		140	140	1		40	90	1	1	0	0		441	14	55	24	12			17	3	3	24	12					
469		1		140	100		1	60	60	1	0	0	0		416	12	82	40	20	24		17		2	22	14					
470		1		140	130	1		80	90	1	0	0	0		410	15	59	45	31	26		22	2	3	20	8	30				
471		1		160	160	1		60	115	2	1	0	0		426	14	66	36	23	24		25	2	2							
472		1		120	100		1	40	30	1	0	0	0		456	12	66	33	21			17		2	10	6	29				
473																4															
474	1ST AV BLOCK	1		240	160	1		80	135	2	1	0	0		462	15	61	40	27	23		20	2	3	47						
475																5															
476		1		160	100	0		40	105	1	0	0	0		460	15	67	33	21	28		16	1	3	25	13			1		
477		1														2															
478	1ST AV BLOCK	1		240	140	1		60	15	1	0	0	0		438	12	79	36	19			20	2	2	28		28				
479	TYPE 2A AV	1		200	180	1		80	75	1	1	0	0		463	14	76	31	21			18	2	2	16		23				
480		1		120	100		1	40	90	1	0	0	0		441	14	66	38	25	25		38		3	17		38				
481	VE-RVOT	1		180	100		1	40	30	1	0	0	0		476	14	67	41	28			18	1	4	24				1		
482																13	72	37	22			18		3	26	15	37				
483																5															
484		1		160	140	1		80	90	1	0	0	0		485	15	65	34	26			16		1	10	5	32				
485	1ST AV BLOCK	1		240	120		1	60	105	1	0	0	0		479	12	60	32	18			19		3	38	17	43				
486		1		180	160	1		80	120	2	1	1	0		410	10	60	36	25	26		18	2	3	23	35					
487		1		180	130		1	40	90	1	0	0	0		435	13	68	44	27	34		18	1	3	15	10	15		1		
488		1														2															
489		1														2															
490	2:1 AV BLOCK	1		160	120	1		60	-70	3	0	0	0		490	15	64	29	19	16		16	1	1	13	8			1	1	3
491																															
492																3															
493		1		160	160	1		60	75	1	0	0	0		454	13	65	32	21	28		16		2	12						
494																6															
495																3															
496	ATRIAL FLUTTER(TYPIC	2														3													1	1	3
497																6															
498																6															
499		1		120	150	1		60	105	1	0	0	0		441	13	71	40	24			18		3	10						
500																3															
501		1		140	130	1		60	90	1	0	0	0		432	10	65	29	19			16		2	8		21				
502		1		160	160	1		60	75	1	0	0	0		470	14	69	45	28			29	2	4	18		29				
503																6															
504																6															

Holter Details	Min HR	Max HR	Avg HR	VPC BURDEN(%)	APC BURDEN(%)	NSVT	NSVT RUNS	PAUSE	MRI	RVEDVI	RVESVI	LVEF	RVEF	PR(RF)	LGE	MRI details	EPS	EPS Details	SACT	Antegrade study	RETROGRADE STUDY	VT INDUCTION	Mortality	Mortality(Excluding periop)	Mortality(perioperative)	Mortality date	Mortality Details	MORTALITY DETAILS	Residual VSD	Medications	Other
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0				1		RESIDUAL VSD- LOST TO FOLLOW UP
Normal	48	132	66	0	0	0	0	1.5															0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
VE, NSVT	52	147	75	37	0	1	2140	1.7															0	0	0						advised review
																							0	0	0						
																							0	0	0						
																							1	0	1			PERIOP MORTALITY-			
																							0	0	0						
																							0	0	0						
									1	69.1	29.5	61	57	38	na								0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						READMITTED IN 2018- SEVERE INFUNDIBULAR PS- REDO
																							0	0	0						
Normal	45	128	63	0	0	0		1.4															0	0	0						
																							0	0	0						
																							0	0	0						
									1	132	67	51.9	49	41	RVOT								0	0	0						
																							0	0	0						
									1	52.5	27.1	51	50	24	RVOT,VSD								0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
Normal	53	125	70	0	0	0		1.8															0	0	0						
																							0	0	0						
									1	118	81	52	31		VSD								0	0	0						
																							0	0	0						
																							0	0	0						BRANCH PA STENOSIS
VPC	48	136	68	9.1	0	0	0	2.1															0	0	0					Metolar XR 25mg OD	
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
normal	60	150	83	0	0	0	0	1.8															0	0	0						
																							0	0	0						
																							0	0	0						
2:1 AV BLOCK	34	67	43	0	0	0	0	2.2									1	RR 1380, AA 694, AH 110, HV-42, NO					0	0	0				1		RESIDUAL VSD- REOPERATED, MEDCIAL FOLLOW UP FOR
																							1	0	1			PERIOPERATIVE MORTALITY-			
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
INTEMITTENT WENCHEBACHING	46	132	70	0	0	0	0	2.1									1	ATRIAL FLUTTER CL-250, SCAR RELATED SMAL;L FRAGMENTED					0	0	0						Medical follow up
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						
																							0	0	0						

Plagiarism Checker X - Report

Originality Assessment

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