STUDY OF THE OCCURANCE AND RISK FACTORS OF TRICUSPID REGURGITATION AFTER TOTAL CORRECTION OF TETRALOGY OF FALLOT

A Thesis

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By

Mohamed Atia Husseen Ahmed

M.B.,B.Ch., M.Sc. (Surg.)

Supervised by:

Prof. Dr. Mohamed M. F. Bassuny

Professor of Cardio-thoracic surgery
Faculty of Medicine
Ain Shams University

Prof. Dr. Ezz El-Din A. Mostafa

Assis. Professor of Cardio-thoracic Surgery
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
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بسم الله الرحمن الرحيم

"وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون"

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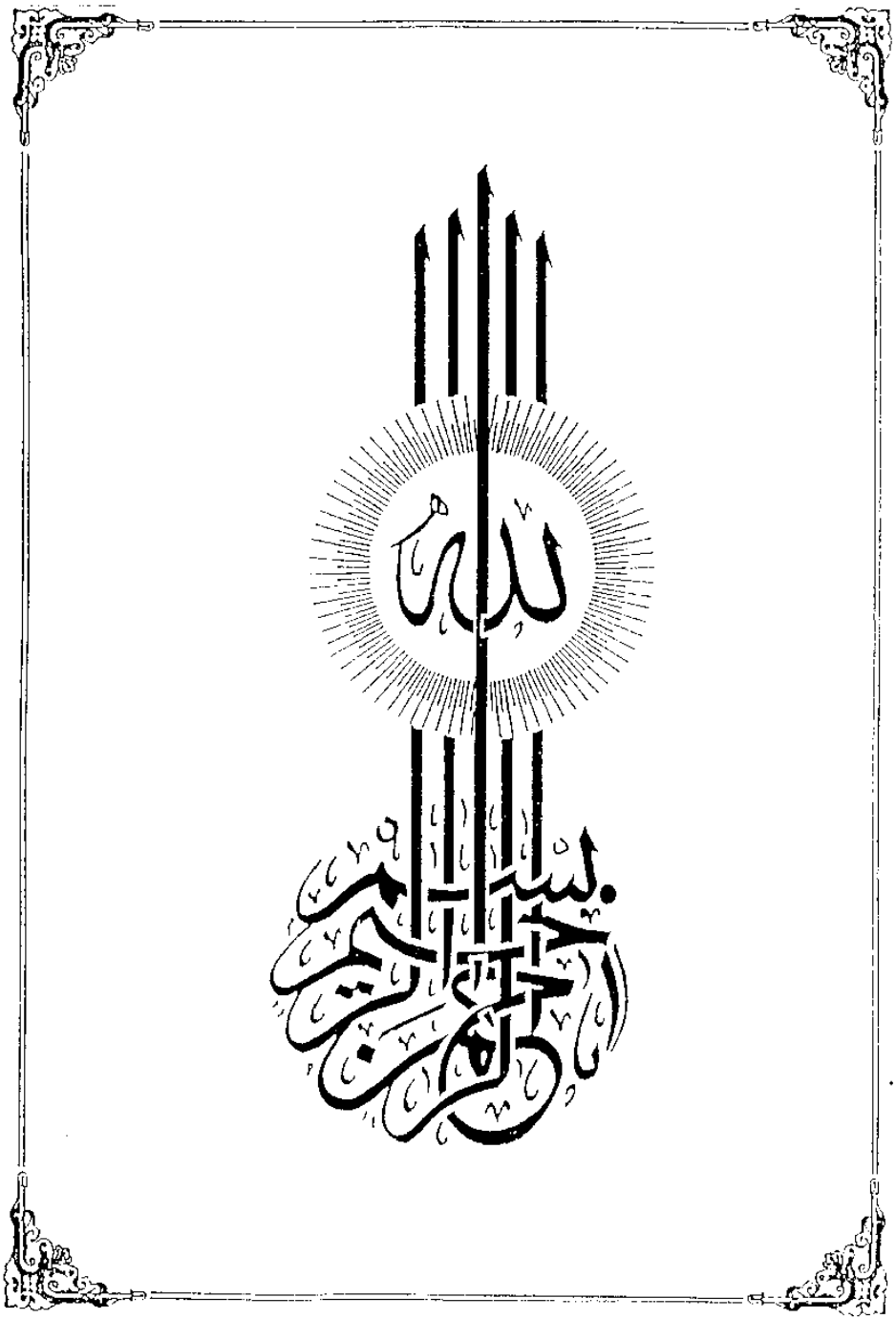

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CONTENTS

LIST OF ABBREVIATIONS

ASD	Atrial septal defect
BTS	Blalock-Taussig shunt
CPAP	Continuous positive airway pressure
CPB	Cardiopulmonary bypass
CTR	Cardiothoracic ratio
DC	Defibrillating current
ICU	Intensive care unit
IVC	Inferior vena cava
LAO	Left anterior oblique
LPA	Left pulmonary artery
LSVC	Left superior vena cava
LV	Left ventricle
MBTS	Modified Blalock-Taussig shunt
PDA	Patent ductus arteriosus
PFO	Patent foramen ovale
PS	Pulmonary stenosis
PR	Pulmonary regurgitation
RAO	Right anterior oblique
RPA	Right pulmonary artery
RV	Right ventricle
RVEDD	Right ventricular end-diastolic diameter
RVEF	Right ventricular ejection fraction
RVOT	Right ventricular outflow tract
RVSP	Right ventricular systolic pressure
SIMV	Simultaneous intermittent mandatory ventilation
SVC	Superior vena cava
TOF	Tetralogy of Fallot
TR	Tricuspid regurgitation
VSD	Ventricular septal defect

INTRODUCTION AND AIM OF THE WORK

INTRODUCTION

Tetralogy Of Fallot (TOF) is a common cardiac malformation. Disregarding minor variations in the definition of this defect, it is agreed, in general that two fundamental malformations are present, a large unrestrictive ventricular septal defect (VSD) and severe obstruction to the outfow of the right ventricle (RVOT) ***(Sanchez et al., 1984).***

The position of the VSD in TOF is nearly always constant, it involves the membranous area of the septum just below the aortic valve and is slightly more ventral in its location than the isolated VSD. Occasionally, the defect may extend into the supracristal area of the septum and very rarely it may be supracristal only ***(Hoffman et al., 1981).***

The obstruction to the outflow tract of the right ventricle is due to pulmonary stenosis which is partly or wholly infundibular with or without under development of the outflow tract. This underdevelopment may involve the whole or a portion of the outflow from the infundibular ostium to the branches of the pulmonary arteries ***(Pacifico et al., 1977).***

More than 25 years have elapsed since total repair of TOF was reported by ***Lillehei and Coleagues, 1956*** and demonstrated to be a feasible, low-risk operation by ***Kirklin and associats, 1959*** whatever approach is taken, surgical intervention plays an extremely important role in TOF. The life expectancy without operation is very poor 25 to 30% of patients will die within a year, 40% within 3 years and only 30 to 35% will live longer ***(Sanchez et al., 1984).***

Some infants with TOF appear to be poor candidates for initial total correction. The pulmonary arterial tree is not large enough to accomodate the blood flow required when the systemic and pulmonary circulations are separated by closing the vSD. Controversy exists about the identification of these infants and the best form of palliation to use. Peripheral systemic-pulmonary shunts have been used, but dissatisfaction has been expressed about resultant pulmonary artery strictures, lack of symmetrical pulmonary artery growth and technical difficulties encountered at the time of total correction ***(Tucker et al., 1979).***

Although tricuspid regurgitation (TR) is usually a minor complication after surgical correction of TOF, it becomes serious when it is associated with other pathologic conditions such as

pulmonary regurgitation (PR), residual VSD or depressed right ventricular function and may require reoperation ***(Kobayashi et al., 1991).***

AIM OF THE WORK

The rationale of this study aimed at studying firstly the incidence of TR and its grading after total correction of TOF. Secondly, the relation between the incidence of TR and the different risk factors including the sex, the age, right ventricular function, residual ventricular shunt and residual pulmonary stenosis.

REVIEW OF LITERATURE

TRICUSPID VALVE CONSIDERATIONS

Anatomy of the tricuspid valve

Four anatomic elements constitute the tricuspid valve, the tricuspid veil, the tricuspid annulus, the chordae tendinae and the papillary muscles. (Fig. 1).

The tricuspid veil

When viewed from its atrial aspect the tricuspid valve orifice is roughly triangular with anterior, posterior and septal sides. The leaflets of the tricuspid valve fall into the right ventricle like a curtain. Many indentations of variable length are observed in their free edges. Some of these have fan-shaped chordae inserting into them, and may be distinguished as commissures ***(Carpentier and Perier, 1991).***

The commissures

1. The anteroseptal commissure

The basal attachment of the tricuspid valve reaches its highest level at the membranous interventiruclar septum, where the anterior and septal walls of the right ventricle join. At this point, a deep indentation is seen in the leaflet tissue. This area is easily identified and marks the commissure between the anterior and septal leaflets. At this site there is a

fan shaped short chorda which has ribbonlike branches. It arises either directly from the septal band of the crista supraventricularis or from a small papillary muscle on that band ***(Carpentier and Perier, 1991).***

2. The anteroposterior commissure

This commissure forms a deep indentation in the leaflet tissue between the anterior and posterior leaflets. Usually this commissure is well delineated by a fan-shaped chorda and is located roughly at the acute margin of the right ventricle. The anterior papillary muscle, which is usually the largest and has the moderator band attached to it, usually points toward this commissure ***(Carpentier and Perier, 1991).***

3. The posteroseptal commissure

This commissure, which is a deep indentation in the leaflet tissue at the junction of the posterior and septal walls of the right ventricle has three landmarks:

1. A fan shaped chorda.

2. A papillary muscle on the posterior wall of the ventricle.

3. A fold in the tissue of the septal leaflet. ***(Carpentier and Perier, 1991).***

Tricuspid valve leaflets

The distal zone of the tricuspid leaflet is rough and thick on palpation. This area is neither as rough nor as thick as that on the mitral valve leaflet, and does not extend into the commissural areas.

The basal zone of the tricuspid leaflet extends 2-3 mm into the leaflet from the annulus. The basal chordae insert into the ventricular aspect of the leaflet in this area. The clear zones of the tricuspid leaflets receive some chordal insertions on their ventricular aspect ***(Carpentier and Perier, 1991).***

1. The anterior leaflet

It is the largest of the three. Usually it is semicricular, but it may be quadrangular. On its free edge close to the anteroseptal commissure a notch can be observed. Sometimes it is large enough to suggest a commissure, however, the chordae that insert into the notch arise from the septal band of the crista supraventricularis and are almost invariably rough-zone chordae ***(Kirklin and Barratt-Boyes, 1993).***

2. The posterior leaflet

It lies between the anteroposterior and the posteroseptal commissures. The leaflet has several indentations in its free

edge that give it a scalloped appearance. It is usually the smallest of the three leaflets and its chordae originate from the posterior and anterior papillary muscles ***(Kirklin and Barratt-Boyes, 1993).***

3. The septal leaflet

It lies between the posterosptal and anteroseptal commissures. Part of its basal attachment is to the posterior wall of the right ventricle but most is to the septal wall. Near the midpoint of the leaflet its attachment angles. The angle marks the transition from the posterior wall to the septal wall of the ventricle. As a result of this angle, the septal leaflet appears to have a fold in its substance ***(Carpentier and Perier, 1991).***

Of major surgical importance is the proximity of the conduction system to the septal leaflet and its anteroseptal commissure. The membranous septum usually lies beneath the septal leaflet inferior to the anteroseptal commissure, but the attachments at the septal and anterior leaflets are variable so that parts of either may attach to the membranous septum. The bundle of His penetrates the right trigone beneath the interventricular component of the membranous septum, usually about 5 mm inferior to the commissure, to run along the crest of