MITRAL VALVE REPAIR

(Utilization of Intra-operative Assessment by Transoesophageal Echocardiography)

Thesis
Submitted in Partial Fulfilment for the Requirements of the
Medical Doctorate Degree
in
Cardio-Thoracic Surgery

By
AMRO RAGAB MAHMOUD SERAG
M.B., B. Ch., M.Sc.

Supervisors

Prof. Dr.
Ismail A. Sallam
Professor and Chairman
of Cardio-Thoracic Surgery Dept.
Faculty of Medicine
Ain- Shams University

Prof. Dr.
Mamdouh A. Warda
Professor of Cardiology

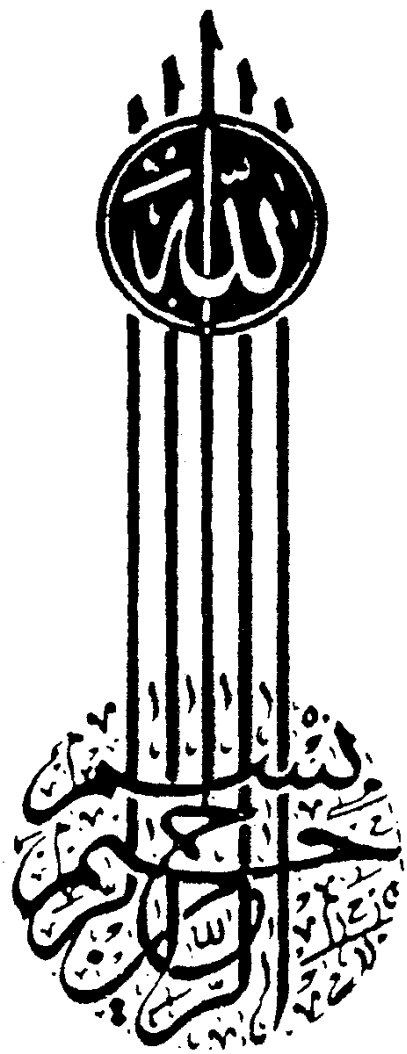
Faculty of Medicine
Tanta University

Prof. Dr.
Hamid M. Al Akshar
Prof. of Cardio-Thoracic Surgery
Faculty of Medicine
Tanta University

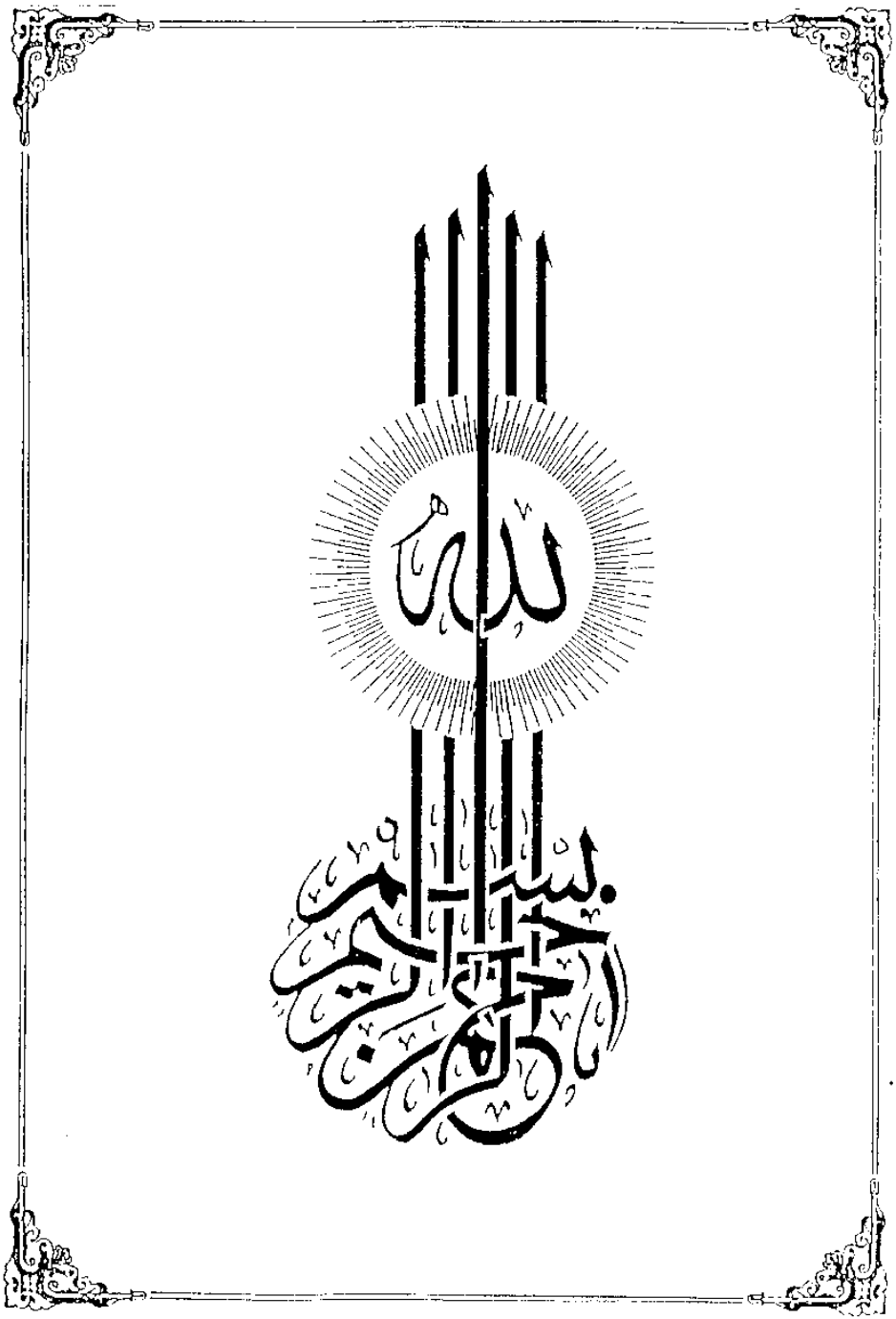
Mr.
Francis C. Wells
Consultant Cardio-Thoracic Surgeon
Papworth Hospital
England

Ain- Shams University

1996



وقل ربّ زدنی علماً



Acknowledgments

First, I should thank "**GOD**" who helped me all through to achieve this work.

I would like to express my profound and sincere gratitude to **Prof. Dr. Ismail A. Sallam**, *Minister of Health and Population*, and *Professor of Cardio-Thoracic Surgery - Faculty of Medicine - Ain Shams University* who enlightened the way to complete this work with his precious advice, endless help and fatherly attitude.

I wish also to express my deep appreciation to **Prof. Dr. Mamdouh A. Warda**, *Professor of Cardiology - Faculty of Medicine -Tanta University*, who kindly supervised and generously helped me all the way to the end of this study.

I wish to extend my sincere thanks to **Prof. Dr. Hamid M. Al-Akshar**, *Professor of Cardio-Thoracic Surgery - Faculty of Medicine - Tanta University* for his valuable guidance and encouragement.

I owe a deep gratitude to **Mr. Francis C. Wells**, *Consultant Cardio-Thoracic Surgeon - Papworth Hospital - England* for his constructive criticism , continuous guidance and who contributed his valuable time and effort in the supervision of this study.

I am also deeply indebted to **Dr. Efthimios Anagnostou** *Staff Grade Cardiologist - Northern General Hospital - Sheffield - England* for his genuine care and inexhaustible help throughout the whole work.

Many thanks to all staff members in the Echocardiography section-Cardiology Departments - Northern General Hospital and Papworth Hospital - England who were willing enough to help me in this work.

CONTENTS

Abbreviations:

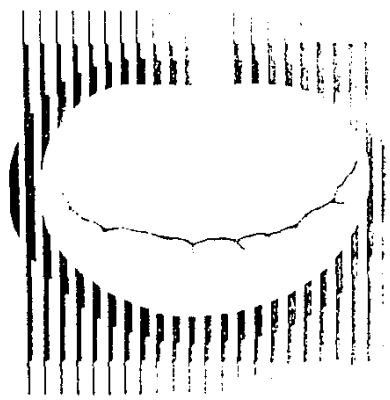
AL	Anterior Leaflet
AML	Anterior Mitral Leaflet
ASD	Atrial Septal Defect
ATPase	adenosine triphosphatase
AVR	Aortic Valve Replacement
CABG	Coronary Artery Bypass Grafting
CE ring	Carpentier-Edwards ring
CO	Cardiac Output
CPB	Cardiopulmonary Bypass
CVVH	Continuous Veno-Venous Haemofilteration
EDD	End Diastolic Dimension
EDDI	End Diastolic Dimension Index
EDV	End Diastolic Volume
EDVI	End Diastolic Volume Index
EF	Ejection Fraction
ePTFE	extruded polytetraflourethylene
ESD	End Systolic Dimension
ESDI	End Systolic Dimension Index
ESS	End Systolic wall Stress
ESV	End Systolic Volume
ESVI	End Systolic Volume Index
FN	False Negative
FP	False Positive
GIT	gastrointestinal
GTXP	Gluteraldhyd-tanned xenograft pericardial
LA	Left Atrium
LV	Left Ventricular
LVOT	Left Ventricular Outflow Tract
MLC-PMA-D	Mitral Leaflet Coaptation-Posterior Mitral Annulus-Distance
MPS	Mitral Plication Suture
MR	Mitral regurgitation
MVR	Mitral Valve Replacement
NYHA	New York Heart Association classification
PCWv	Pulmonary Capillary Wedge v wave
PL	Posterior Leaflet
PM	Papillary Muscle

PVF	Pulmonary Venous Flow
RA	Right Atrium
SAM	Systolic Anterior Motion
SF	Shortening Fraction
S-MLC-D	Septum-Mitral Leaflet Coaptation Distance
S-PMA-D	Septum-Posterior Mitral Annulus-Distance
SV	Stroke Volume
SVI	Stroke Volume Index
TOE	Transoesophageal Echocardiography
TTE	Transthoracic Echocardiography
Vcf	Velocity of circumferential fibre shortening
VTI	Velocity Time Integral

Tables:

Figures:

REVIEW OF LITERATURE



SURGICAL ANATOMY OF THE MITRAL VALVE

Operative surgery concerns itself with the production of therapeutically desirable changes in the anatomy of the body. The introduction of surgery to any special region of the body places its anatomy in a new perspective. Certain anatomical features are of little interest to the surgeon. On the other hand, structures which appear quite insignificant to the pure anatomist frequently are of primary importance to the surgeon. Specifically, he wants to know the substantiality of an individual tissue in order to be able to use it with confidence. Second, since the surgeon must avoid injury to essential structures , he needs recognisable landmarks which indicate their presence or proximity. Finally, the anatomy as encountered by the surgeon is living and , as such, in motion. He must consider the physical strains and stresses of functional movement as related to the particular anatomy involved as well as the influence of his surgical interference upon them **(Zimmerman and Bailey,1962)**.

Fibrous skeleton of the heart:

The collagenous structures to be described are situated at the base of the heart where the four functional apertures of the two ventricles crowd together in a single place during the development of the heart {Fig. 1}. This framework is firmly anchored to the free edge of the ventricular myocardium similar to the attachment of a tendon to muscle, whereas its contact with the atrial myocardium is rather tenuous. At the outflow aspect of the ventricles the collagenous tissue of the skeleton becomes continuous with the predominantly elastic tissue of the large arteries at their origins.

Right Fibrous Trigone :

The keystone of the true fibrous skeleton is the right trigone or central body of the heart. It forms a dense junction between the mitral, tricuspid and aortic annuli (non coronary cusp) and the membranous septum {Fig. 2}. Viewed from above it measures roughly 10 mm. in length by 5 mm. in width. It feels cartilaginous to palpation. Being anchored securely to the free edge of the muscular ventricular septum, it welds together the two hollow muscular chambers at the region of tangential contact between the right