Retrospective Study of the Outcome of Mitral Valve Replacement with or without Tricuspid Valve Repair in Ain Shams University

Thesis

Submitted for Partial Fulfillment of Master degree in Cardio-thoracic Surgery

By

Ahmed Mohamed Abd Elmegeed El-Feky

M. B. B. ch. Misr University for Science and Technology

Under Supervision of

Prof. Dr. Mohsen Mohamed Abd Elkarem Fadala

Professor of Cardio-thoracic Surgery

Faculty of Medicine-Ain Shams University

Prof. Dr. Osama Abass Abd Elhameed

Assistant Professor of Cardio-thoracic Surgery

Faculty of Medicine-Ain Shams University

Dr. Ramy Mohamed Reda Khorshid

Lecturer of Cardio-thoracic Surgery

Faculty of Medicine-Ain Shams University

Faculty of Medicine

Ain Shams University

2018

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH,** *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Mohsen Mohamed Abd Elkarem Fadala,** *Professor of Cardio-thoracic Surgery Faculty of Medicine-Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Prof. Dr. Osama Abass Abd Elhameed,** *Assistant Professor of Cardio-thoracic Surgery Faculty of Medicine-Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to **Dr. Ramy Mohamed Reda Khorshid,** *Lecturer of Cardio-thoracic Surgery Faculty of Medicine-Ain Shams University, for his great help, active participation and guidance.*

Ahmed Mohamed Abd Elmegeed El-Feky

List of Contents

List of Tables

List of Tables Cont...

List of Figures

List of Figures Cont...

List of Figures Cont...

Fig. No.	Title	Page No.

List of Abbreviations

Abb.	Full term
AF	Atrial Fibrillation
AKIN	Acute Kidney Injury Network
AKI	Acute Kidney Injury
ALI	Acute Lung Injury
ARDS	Acute Respiratory Distress Syndrome
ARF	Acute Renal Failure
ATN	Acute Tubular Necrosis
AVR	Aortic valve replacement
BMI	Body mass index
BSA	Body surface area
CABG	Coronary Artery Bypass Graft
CBC	Complete Blood Count
CCS	Canadian Cardiovascular Society
CDC	Centers for Disease Control
CHF	Congestive Heart Failure
CO	Cardiac output
CPAP	Continuous positive airway pressure
CPB	Cardiopulmonary bypass
CSA-AKI	Cardiac surgery-associated acute kidney injury
CT	Cardiac Tamponade
CV	Cardio Vascular
DM	Diabetes Mellitus
DSWI	Deep sternal wound infection
ECC	Extracorporeal circulation
ECG	Electrocardiogram
EDD	End-diastolic diameter
EF	Ejection fraction

List of Abbreviations Cont...

Abb.	Full term
ESD	End- systolic diameter
FiO_2	Fractional inspired oxygen
FMR	Functional mitral regurgitation
FTR	Functional tricuspid regurgitation
GFR	Glomular Filtraion Rate
ICU	Intensive care unit
IMR	Ischemic mitral regurgitation
INR	International Normalized Ratio
IV	Intra Venous
IVC	Inferior Vena Cava
LV	Left Ventricle
LVOT	Left Ventricular Outflow Tract
MA	Mitral Area
MI	Myocardial Infarction
MR	Mitral Regurge
MS	Mitral Stenosis
MVR	Mitral valve replacement
NPWT	Negative Pressure Wound Therapy
NYHA	New York Heart Association
PE	Pericardial Effusion
PEEP	Positive end-expiratory pressure
PVE	Prosthetic Valve Endocarditis
RA	Right Atrium
RIND	Reversible Ischemic Neurological Deficit
RV	Right Ventricle
SCr	Serum Creatinine
SIRS	Systemic Inflammatory Response Syndrome

List of Abbreviations Cont...

Abb.	Full term
SVP	Sub-valvular Apparatus
TA	Tricuspid Annulus
TR	Tricuspid Regurge
TV	Tricuspid Valve
TVr	Tricuspid Valve Repair
WBC	White Blood Cells
XCL	Aortic Cross Clamp

Introduction

The history of mitral valve surgery runs parallel to the development of heart surgery, as at the turn of the last century rheumatic fever was an epidemic disease that led to late cardiac valve lesions, mostly to mitral stenosis [1, 2]

Albert Starr and Miles Lowell Edwards developed a silastic ball contained within a wire cage arising from the valve housing in 1961. [3]

Tilting discs valves was introduced by Jura Wada in 1966 and by C. Walt Lillehei and Robert Kaster in 1967. [3]

The Medtronic-Hall tilting disc valve introduced in 1977 was the most commonly used valve until it was taken off of the market. [4]

The most commonly used mechanical valve in the world today is the St. Jude mechanical bileaflet valve first introduced in 1977[5] (Fig. 1)

Figure (1): St. Jude mechanical valve.

Driven by the problem of thrombogenicity of mechanical valves, work on bioprosthetic valves yielded the Carpentier and Hancock porcine xenografts in 1969 [5, 6] and Marian Ionescu introduced a glutaraldehyde-fixed bovine pericardial valve in 1971 [7] (Fig. 2)

Figure (2): Tissue mitral valve.

The first mitral valve replacement (MVR) involved implantation of a Starr-Edwards prosthetic valve following complete excision of the mitral leaflets, chordae tendinae and the heads of the papillary muscles.[8] Initial experience with MVR was complicated by an increased incidence of low cardiac output syndrome and associated morbidity and mortality. [8] Subsequently, several strategies were implemented to improve postoperative outcomes, including sub-valvular apparatus preservation (SVP). [9]

More than 90 percent of patients who undergo mitral valve replacement should experience a functional improvement in outcome with significant resolution of heart failure symptoms. [10,11]

Predictors of poor outcome include advanced patient age, poor functional class, coronary artery disease, re-operative status and emergency operations. (11)

Common causes of early operative mortality include stroke, myocardial infarction, respiratory failure, multisystem organ failure and infection.in addition,late causes include thromboemboli, stroke and hemorrhage due to anticoagulation.(12)

The outcome of mitral valve replacement has improved dramatically with adoption of chordal sparing techniques and preservation of ventriculo-annular continuity.(12)

The most common cause of death following MVR is cardiac failure. Preservation of the subvalvular apparatus maintains LV function,and thus improves survival. Repair is not always feasible or successful, particularly with rheumatic valve disease in young patients and severely disorganized valves. A claim against preservation of the anterior leaflet was that only undersized valve prosthesis could be implanted. Another argument against preservation of the anterior leaflet is that it might cause obstruction of the LVOT. (13)

Tricuspid regurgitation (TR) accompanying severe left-sided valve disease occurs on a functional basis, secondary to pulmonary hypertension and tricuspid annular dilatation. In the context of endemic left-sided rheumatic heart disease, non-recognition of organic disease of the tricuspid valve may