



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

*Thesis*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سُبْحَانَكَ لَا عِلْمَ لَنَا  
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ  
الْعَلِيمُ الْعَظِيمُ

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## *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 <sub>2</sub> .....	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

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*List of Abbreviations Cont...*

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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 <sup>(1, 2)</sup>

Albert Starr and Miles Lowell Edwards developed a silastic ball contained within a wire cage arising from the valve housing in 1961. <sup>(3)</sup>

Tilting discs valves was introduced by Jura Wada in 1966 and by C. Walt Lillehei and Robert Kaster in 1967. <sup>(3)</sup>

The Medtronic-Hall tilting disc valve introduced in 1977 was the most commonly used valve until it was taken off of the market. <sup>(4)</sup>

The most commonly used mechanical valve in the world today is the St. Jude mechanical bileaflet valve first introduced in 1977<sup>(5)</sup> (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 <sup>(5, 6)</sup> and Marian Ionescu introduced a glutaraldehyde-fixed bovine pericardial valve in 1971 <sup>(7)</sup> (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.<sup>(8)</sup> Initial experience with MVR was complicated by an increased incidence of low cardiac output syndrome and associated morbidity and mortality.<sup>(8)</sup> Subsequently, several strategies were implemented to improve postoperative outcomes, including sub-valvular apparatus preservation (SVP).<sup>(9)</sup>

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.<sup>(10,11)</sup>

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

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.<sup>(12)</sup>

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

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.<sup>(13)</sup>

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