Comparison of Short Term Outcomes of De Vega Repair Versus Ring Annuloplasty in Cases of Functional Tricuspid Regurgitation

Thesis

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By

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بسم الله الرحمن الرحيم
قالوا
سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم
صدق الله العظيم
سورة البقرة الآية: ٣٢

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Mohammed Abdel-gayed Ibrahim

Contents

List of Abbreviations

Abbrev.	Full-term
2 D	2 dimensional
3 D	3 dimensional
ACC	American College of Cardiology
ACE I	Angiotensin converting enzyme inhibitor
AF	Atrial fibrillation
AHA	American Heart Association
CBC	Complete blood count
CFD	Color flow Doppler
CI	Confidence interval
CMR	Cardiac magnetic resonance
COP	Cardiac output
COPD	Chronic obstructive pulmonary disease
CWD	Continuous wave Doppler
CXR	Chest X-ray
EACTS	European Association of Cardio-Thoracic Surgery
ECG	Electrocardiography
EF	Ejection fraction
EROA	Effective regurgitant orifice area
ESC	European Society of Cardiology
FTR	Functional tricuspid regurgitation
HCV	Hepatitis C virus
HF	Heart failure
HIV	Human immune-deficiency virus
ICU	Intensive care unit
IE	Infective endocarditis
IVC	Inferior vena cava

JVP	:	Jugular venous pressure
LA	:	Left atrium
LAX	:	Long axis view
LV	:	Left ventricle
LVEDD	:	Left ventricle end diastolic diameter
LVESD	:	Left ventricle end systolic diameter
MR	:	Mitral regurgitation
MS	:	Mitral stenosis
MV	:	Mitral valve
NYHA	:	New York Heart Association
PASP	:	Pulmonary artery systolic pressure
PG	:	Pressure gradient
PHT	:	Pulmonary hypertension
PISA	:	Proximal isovolumetric surface area
PWD	:	Pulsed wave Doppler
RA	:	Right atrium
RR	:	Relative risk
RV	:	Right ventricle
R Vol	:	Regurgitant volume
RVSP	:	Right ventricle systolic pressure
SD	:	Standard deviation
SVC	:	Superior vena cava
TA	:	Tricuspid annulus
TAPSE	:	Tricuspid annular plane systolic excursion
TEE	:	Transesophageal echocardiography
TR	:	Tricuspid regurgitation
TTE	:	Transthoracic echocardiography
TV	:	Tricuspid valve
VC	:	Vena contracta

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Introduction

Tricuspid valve (TV) diseases are categorized into organic and functional etiologies. Functional or secondary TV regurgitation (TR) occurs in patients with advanced mitral valve disease and pulmonary hypertension. [1]

Organic TV diseases include rheumatic TV disease, which commonly results in stenosis as well as regurgitation. Degenerative TR is less common. Infective endocarditis is common among IV drug abusers or patients with long-standing central venous lines. Carcinoid syndrome affects the TV resulting in both stenosis and regurgitation. Iatrogenic TR occurs as a result of trans-tricuspid pacing leads and radiotherapy. [2]

In patients with longstanding mitral stenosis and pulmonary hypertension, right ventricular dilatation occurs and consequently TV annulus also dilates. This results in failure of proper coaptation of tricuspid leaflets although they are normal in appearance. This results in functional TR (FTR). [3-4]

Different methods are used for TV repair. The most common are De Vega repair, bicuspidization, annuloplasty with pericardial patch, and ring annuloplasty. TV annuloplasty do not consistently eliminate functional regurgitation, and across time regurgitation increases. Different methods of repair have different outcomes both on the short term and the long term. [5-6]

The TV was once referred to as “the forgotten valve“, and in the past, FTR was overlooked. That was due to lack of the adequate knowledge about the TV structure, function, and optimal method of repair. Also, it was thought that correction of the left-sided valvular pathology sufficiently improves FTR. However, recent studies, and the development of diagnostic tools, echocardiography in particular, have increased the awareness of the importance of this valve. (7)

Residual TR after mitral valve replacement is associated with a 2-fold increase in the risk of incidence of heart failure, and 50% decrease in the 5-year survival. In addition, residual TR is a progressive disease. About 50% of the patients progress by more than 2 grades of TR within 5 years after surgery. In the light of these facts, the importance of proper repair of TV in patients undergoing mitral valve surgery is clear now. (8)

Aim of the Study

The aim of this study is to compare the short term outcomes of De Vega repair versus ring annuloplasty in patients with functional TR.

Chapter one
Surgical Anatomy of the Tricuspid Valve

The tricuspid valve is situated at the base of the heart, separating the right atrium from the right ventricle. The TV is the most anterior of all heart valves and its orientation is nearly vertical. Based on autopsy, normal tricuspid valve orifice diameter of an adult is approximately 20 mm/m^2 and the orifice area is approximately 5.6 cm^2, which is larger than that of the mitral valve. The TV is a complex apparatus, similar to the mitral valve, which consists of annulus, leaflets, chordae, papillary muscles, and RV wall. The function of the valve depends on the harmony between these structures.(9)

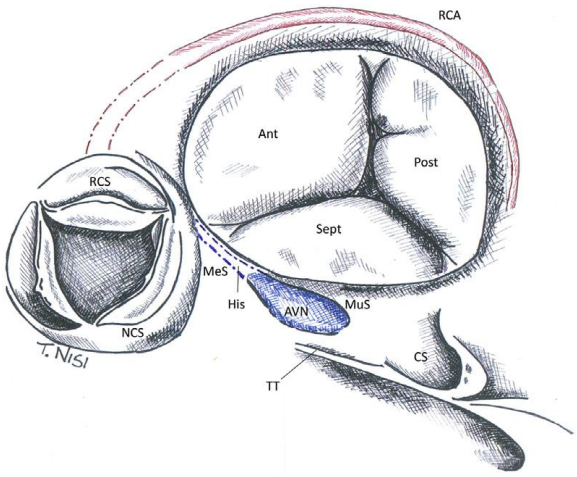

Figure (1): Schematic representation of the surgical view of the tricuspid valve from the RA. Ant, anterior leaflet; AVN, AV node; CS, coronary sinus ostium; His, bundle of His; MeS, septum membranosum; MuS, muscular portion of the AV septum; NCS, noncoronary sinus of the aorta; Post, posterior leaflet; RCS, right coronary sinus of the aorta; Sept, septal leaflet; TT, tendon of Todaro.

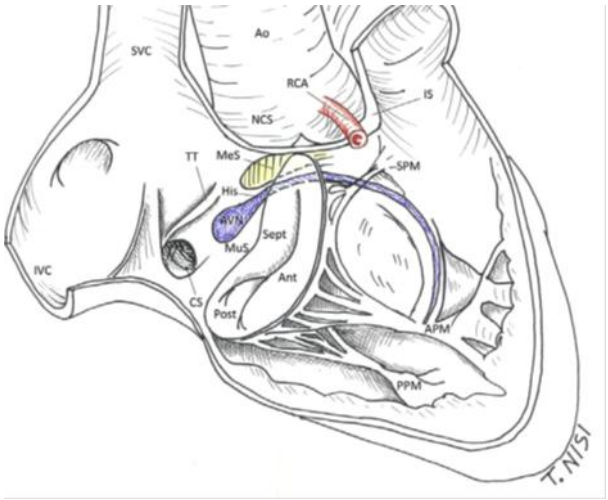

Figure (2): Schematic representation of the RA, tricuspid valve and RV. Ant, anterior leaflet; Ao, aorta; APM, anterior papillary muscles; AVN, AV node; CS, coronary sinus ostium; His, bundle of His; IS, infundibular septum; IVC, inferior vena cava; MeS, septum membranosum; MuS, muscular portion of the AV septum; NCS, noncoronary sinus of the aorta; Post, posterior leaflet; PPM, posterior papillary muscle; Sept, septal leaflet; SPM, septal papillary muscle; SVC, superior vena cava; TT, tendon of Todaro.

Tricupid valve Annulus (TA):

The TV annulus (TA) is more a landmark rather than an actual fibrous ring. It is indistinct especially at the septal region. Normally, the attachement of the septal leaflet of TV is more apically placed than that of anterior leaflet of mitral valve, and this distance is normally less than 8 mm/m^2. In patients with Ebstien's anomaly, this distance is increased.(10)

The absence of true fibrous annulus explains the large changes which occurs normally in the tricuspid orifice shape and area during the cardiac cycle and also explains its easy dilation in pathological conditions.(9)