

WHAT SHOULD BE DONE ABOUT TRICUSPID VALVE INSUFFICIENCY IN THE ELDERLY?

Dr Ashish H Shah

Assistant Professor – Department of Internal Medicine/section of cardiology

University of Manitoba

AIMS AND OBJECTIVES

- Anatomy & physiology
- Etiologies leading to TR
- Investigations
- Treatment options
 - Surgical
 - Trans-catheter

ANATOMY & PHYSIOLOGY

- Largest cardiac valve
- Lowest pressure gradient
- Valve follows ventricle
 - ccTGA
 - Mustard repair
 - Fontan circulation
- TR in elderly
 - Most reported valve pathology
 - Very commonly associated with left heart disease

DIFFERENCES: RV

LV

Shape	Complex: triangular (side view) and crescent (cross-section)	Simple: ellipsoid
Location	Anterior (substernal)	Posterior
Semilunar and AV valves	Separated by myocardium	Continuous
AV valve	More apical implantation, tricuspid	More basal implantation, bicuspid
Inflow and outflow tracts	Nearly at right angles	Almost at 180° to each other
Interventricular septum	Right convexity	
Mass	Lower (1/6)	Higher
Volume	Higher	Lower
Papillary muscles	>3	2
Trabeculations	Coarse	Fine
Muscle layers	2	3

DIFFERENCES: RV

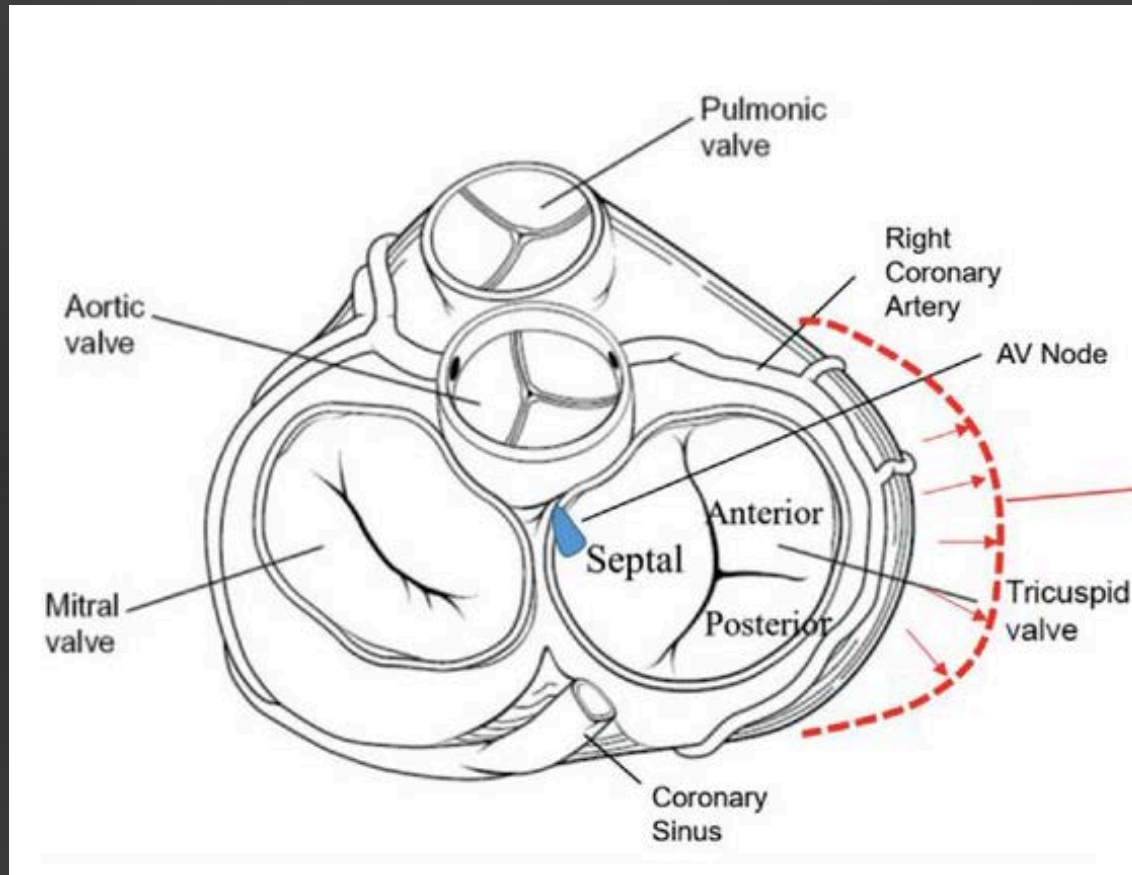
LV

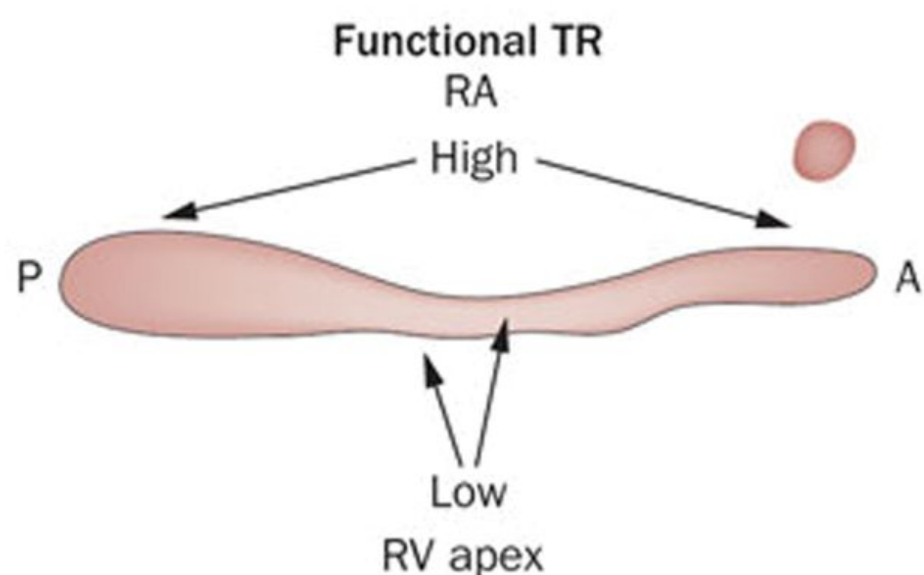
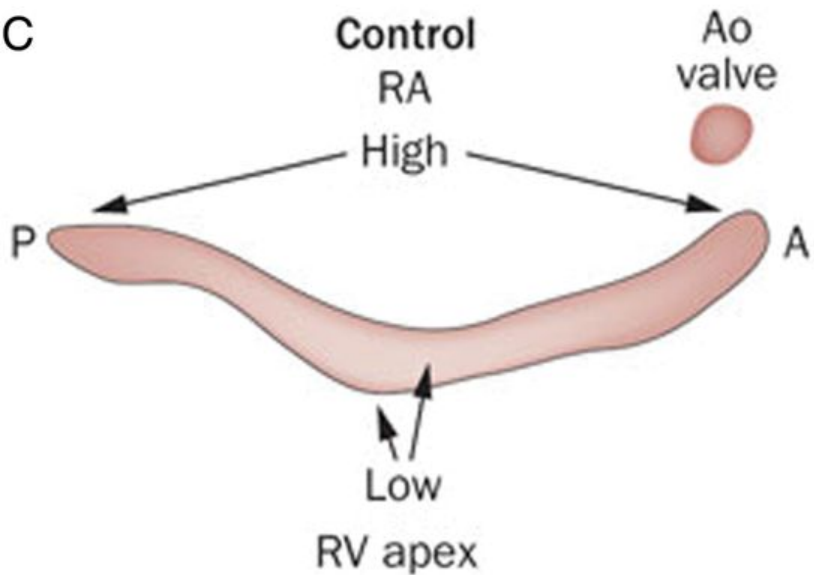
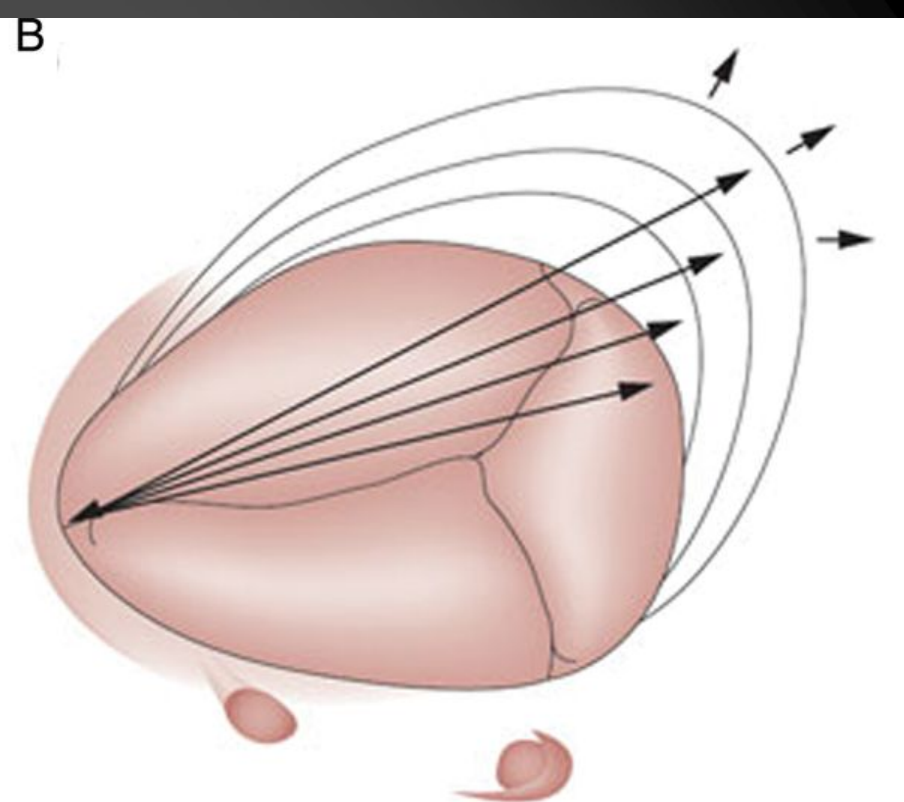
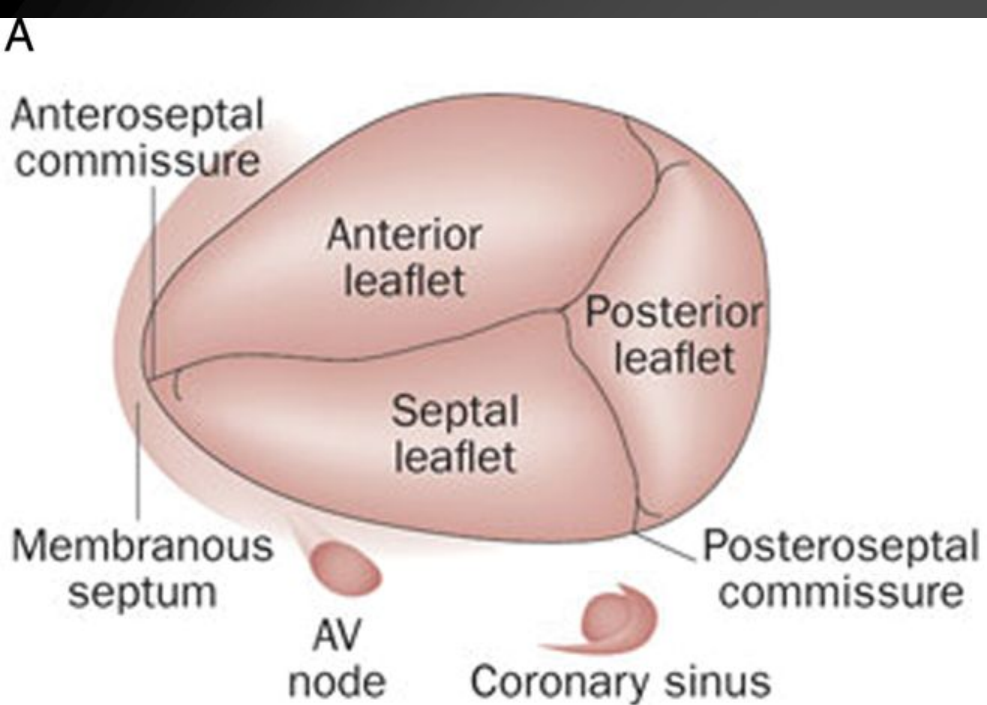
Shape	Complex: triangular (side view) and crescent (cross-section)	Simple: ellipsoid
Location	Anterior (substernal)	Posterior
Semilunar and AV valves	Separated by myocardium	Continuous
AV valve	More apical implantation, tricuspid	More basal implantation, bicuspid
Inflow and outflow tracts	Nearly at right angles	Almost at 180° to each other
Interventricular septum	Right convexity	
Mass	Lower (1/6)	Higher
Volume	Higher	Lower
Papillary muscles	<u>>3</u>	<u>2</u>
Trabeculations	<u>Coarse</u>	<u>Fine</u>
Muscle layers	<u>2</u>	<u>3</u>

TV - ANATOMY

- 3 semi-lunar leaflets
 - Anterior - largest; septal – smallest
 - Annular diameter ~3 – 3.5 cm (~21mm/m²)
- In contrast to the mitral valve
 - Apically displaced valve
 - Each TV leaflet – only 1 papillary muscle
 - The septal portion of the annulus is fixed
 - Dilatation of the annulus @ RV free wall
 - Conduction system is close to the TV
 - High rate post-operative PPM (11.6%).
 - The rate is significantly higher after TVR vs. repair (17.2 vs. 9.5%; $P = 0.0001$).

TRICUSPID VALVE





TR – PRIMARY ETIOLOGIES (~8-10%)

- Degenerative / myxomatous
- Rheumatic heart disease
- Ebstein anomaly
- Endomyocardial fibrosis
- Connective tissue disease, e.g. Marfan
- Leaflet pathology - Perforation, infection
- Carcinoid
- Papillary muscle – chordal - Iatrogenic, tear

TR – SECONDARY ETIOLOGIES

- Volume overload
 - Atrial septal defect, PAPVC, PR, TR
- Pressure overload
 - Pulmonary hypertension
 - Congenital heart defect with/without shunt
- Pacemaker / ICD

TR – SECONDARY ETIOLOGIES

- Volume overload
 - Atrial septal defect, PAPVC, PR, TR
- Pressure overload
 - Pulmonary hypertension
 - 1. Pulmonary arterial hypertension
 - 2. Due to left heart disease
 - 3. Associated with hypoxemia / lung disease
 - 4. Chronic thrombo-embolic disease
 - 5. Miscellaneous, e.g. inflammation
 - Congenital heart defect with/without shunt
- Pacemaker / ICD

COMMON CONDITIONS TO REMEMBER

- Endocarditis
- Blunt chest trauma
- Anorectic drugs
- Endomyocardial biopsy
- Ischemic heart disease
- Pacing / ICD leads
- Pulmonary hypertension
- Congenital heart disease

SIGNS AND SYMPTOMS

- Low cardiac output
 - Dyspnea
 - Fatigue
- Right ventricular dilatation & dysfunction
 - Palpitations
 - Volume overload
 - Pitting edema, congested liver,
 - Elevated JVP

WHICH TR IS CONCERNING?

- Mild TR - 65–85% of the population
 - Mild TR & structurally normal TV / non-dilated RV
 - Normal variant
- Moderate to severe TR
 - Structurally abnormal TV
 - Annular dilatation - leaflet abnormalities

WHAT TO DO?

- Traditional teaching
 - Conservative management
 - Applies to mild TR
- Functional TR – treat the underlying cause
- TR results in further RV dilatation
- Irreversible RV dilation – dysfunction
- increasing TV interventions ~ last 5-7 years

INVESTIGATIONS

- X-ray chest
- ECG
- Echocardiography
- CMR
- Catheterization

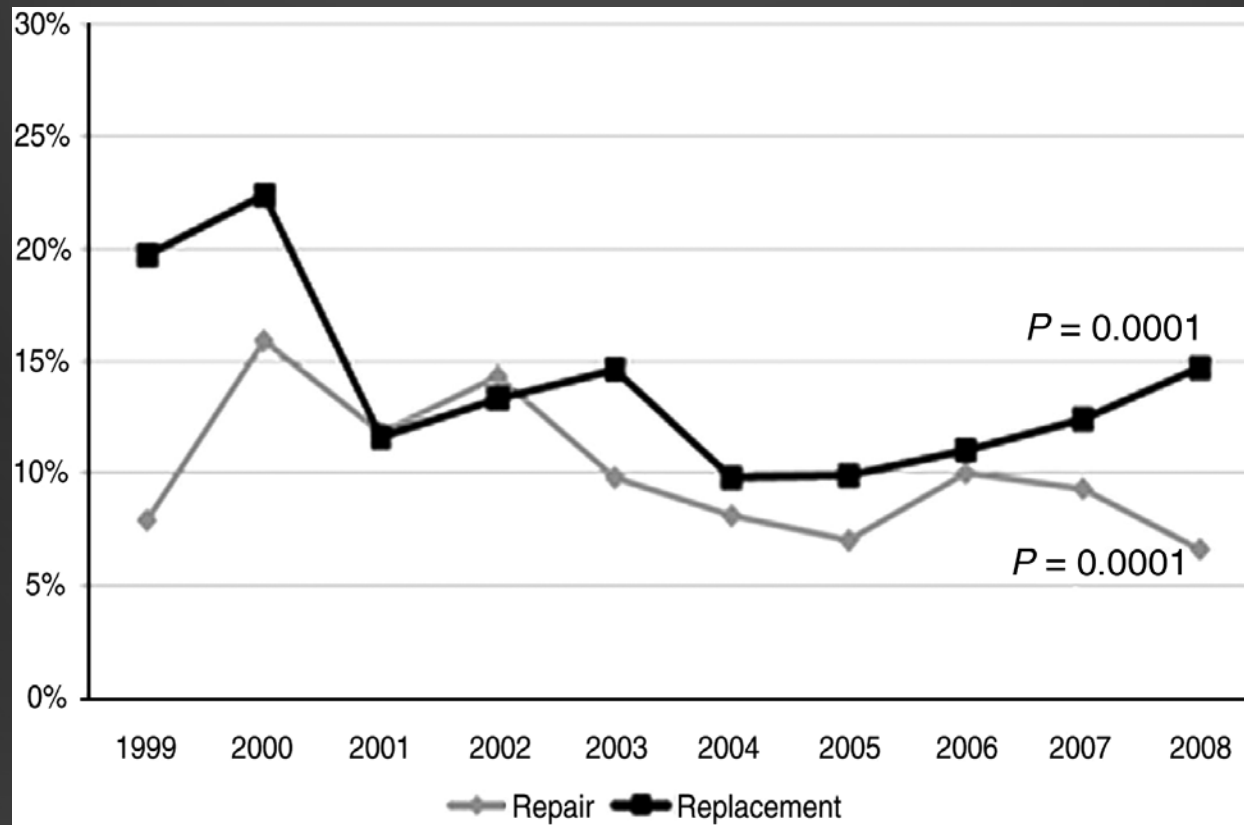
TREATMENT OPTIONS

- Treatment the cause – secondary TR
- Surgical options
 - Replacement vs. repair
- Trans-catheter interventions

SURGICAL OPTIONS

- ~ 20–30% of patients undergoing MVR
 - Improving mortality post TVre / TVR
 - Concurrent TV repair – improved outcomes
 - Reduced HF symptoms, admission and death
- Guideline support fixing TR @ the time of left sided cardiac surgery
- Earlier TR fix - Improved outcomes*
 - NYHA II vs. NYHA III/IV
 - NYHA III vs. NYHA IV

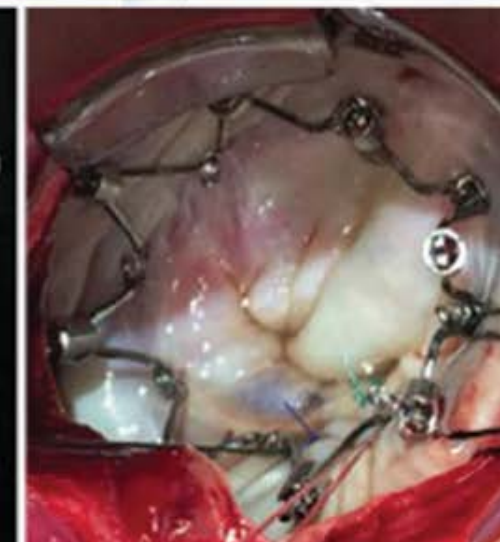
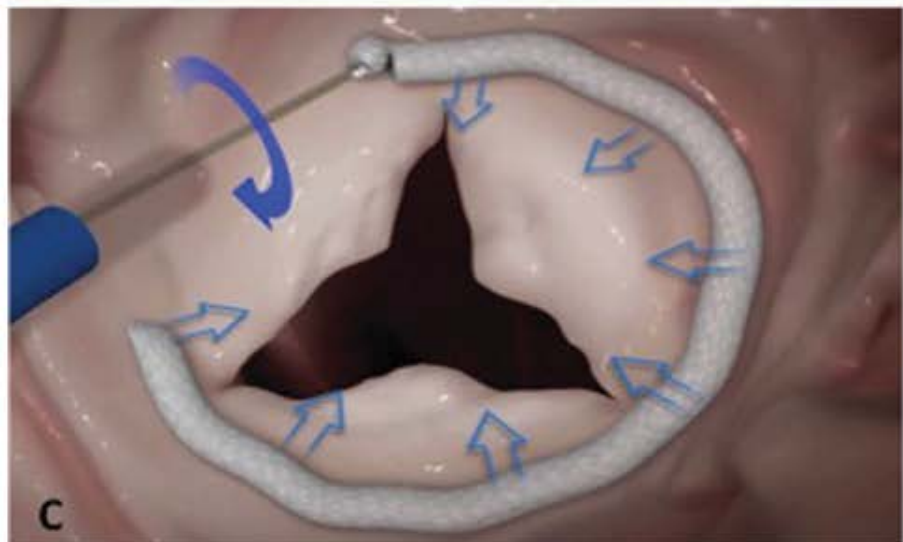
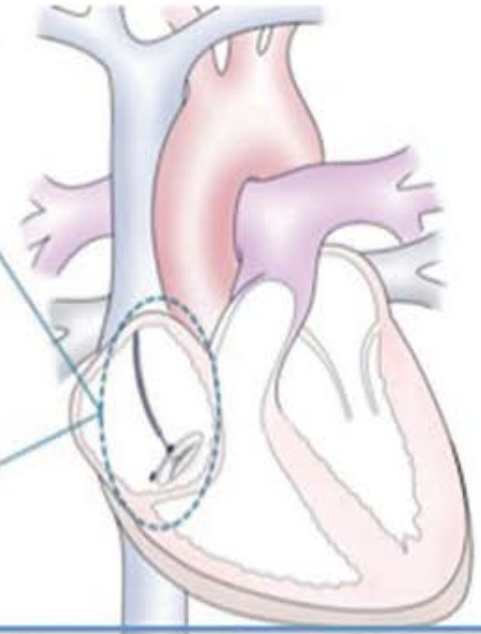
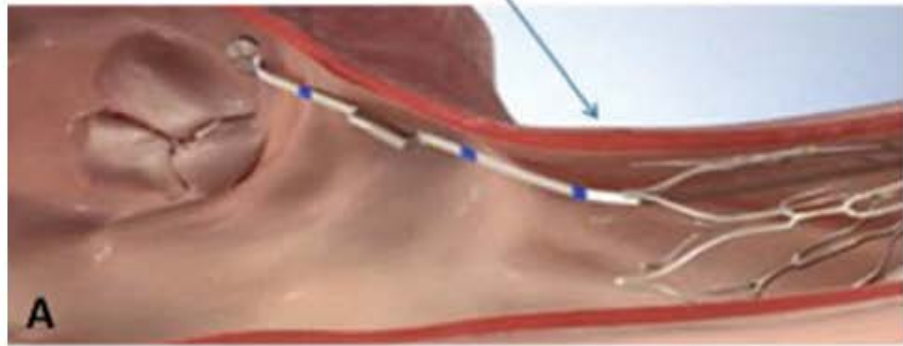
MORTALITY - TVRE VS. TVR



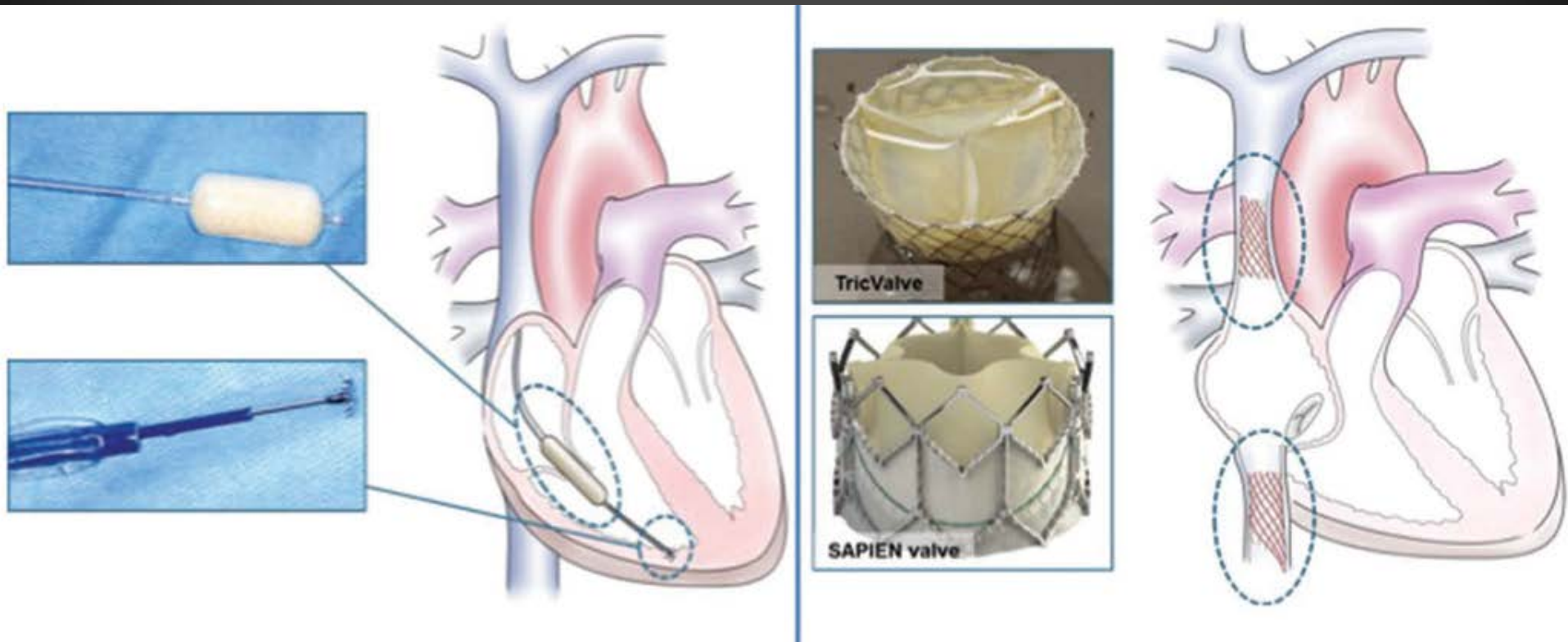
TRANS-CATHETER INTERVENTIONS

- Emerging trans-catheter technologies
- Surgical concept – minimally invasive
- Early stage
- Tricuspid clip (Mitralclip equivalent)
 - Usually in patients not suitable for surgical repair
- Promising results
- Long-term results awaited

TRANS-CATHETER INTERVENTIONS



TRANS-CATHETER INTERVENTIONS



SUMMARY

- Commonly observed valve pathology
- Predominantly secondary etiology
- High degree of suspicion
- Thorough investigations
- Treat the underlying cause + TV
- Earlier intervention – better outcomes

Thank you