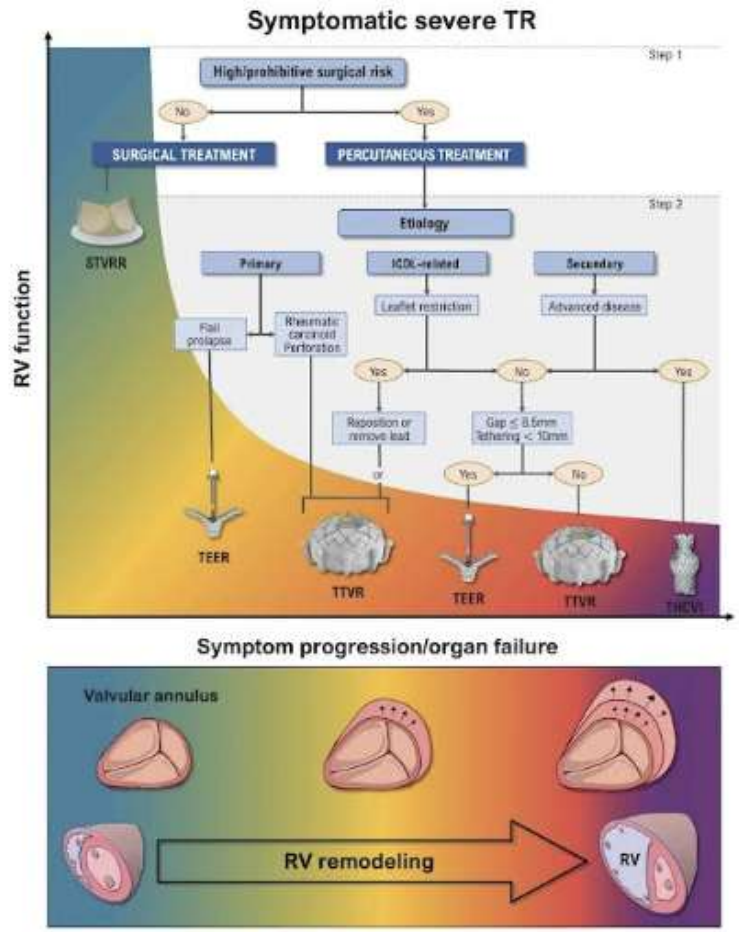
Dr Márcio Montenegro
Instituto Estadual de Cardiologia Aloysio de Castro
Rio de Janeiro - Brasil

TRATAMIENTO PERCUTÁNEO DE LA INSUFICIENCIA TRICUSPÍDEA: INNOVACIONES Y PERSPECTIVAS

LI Jornadas SOLACI
16° Región Cono Sur
7, 8 y 9 de mayo 2025
Montevideo, URUGUAY

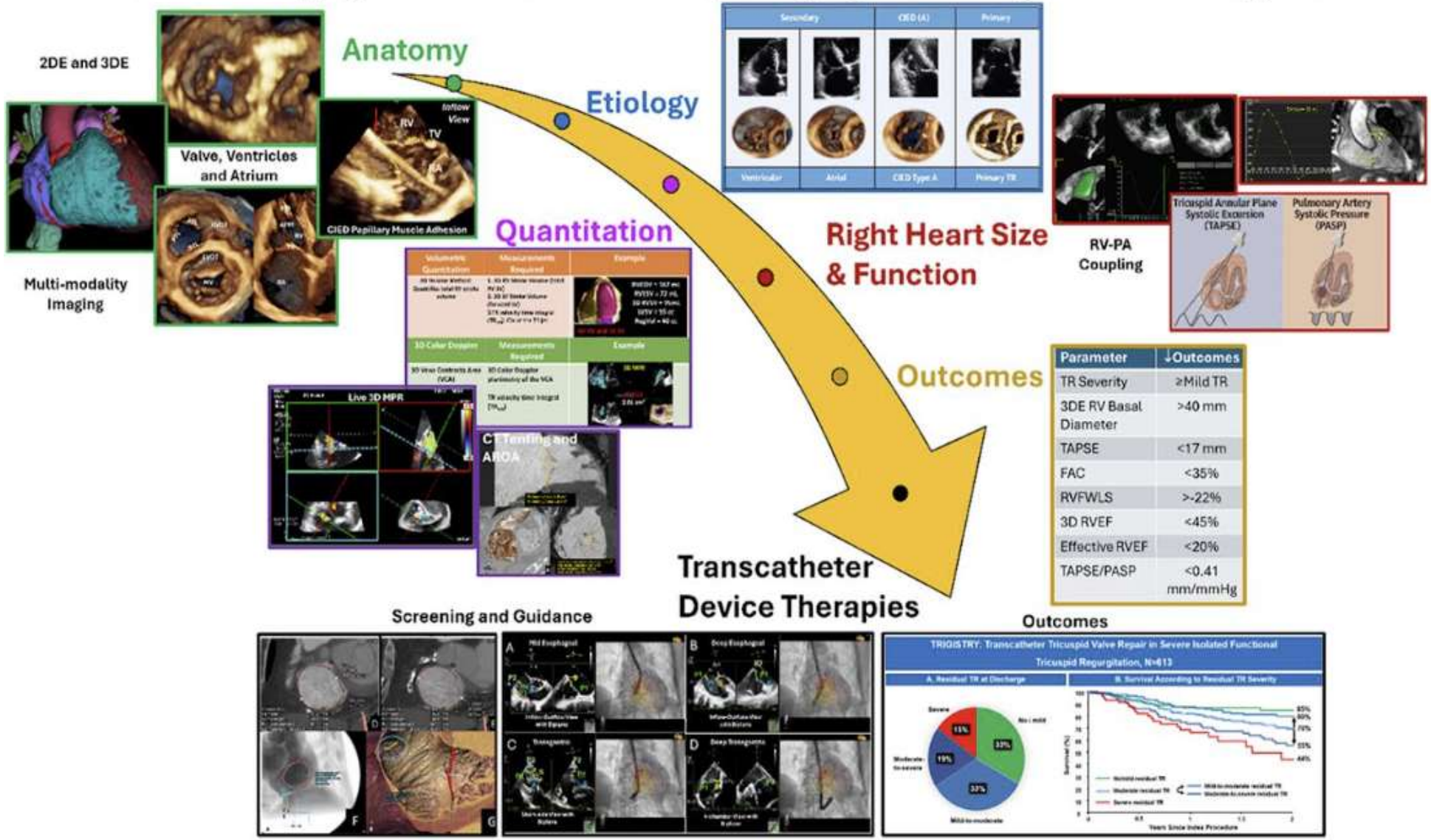
Central Illustration: Advances in Percutaneous Tricuspid Valve Treatment



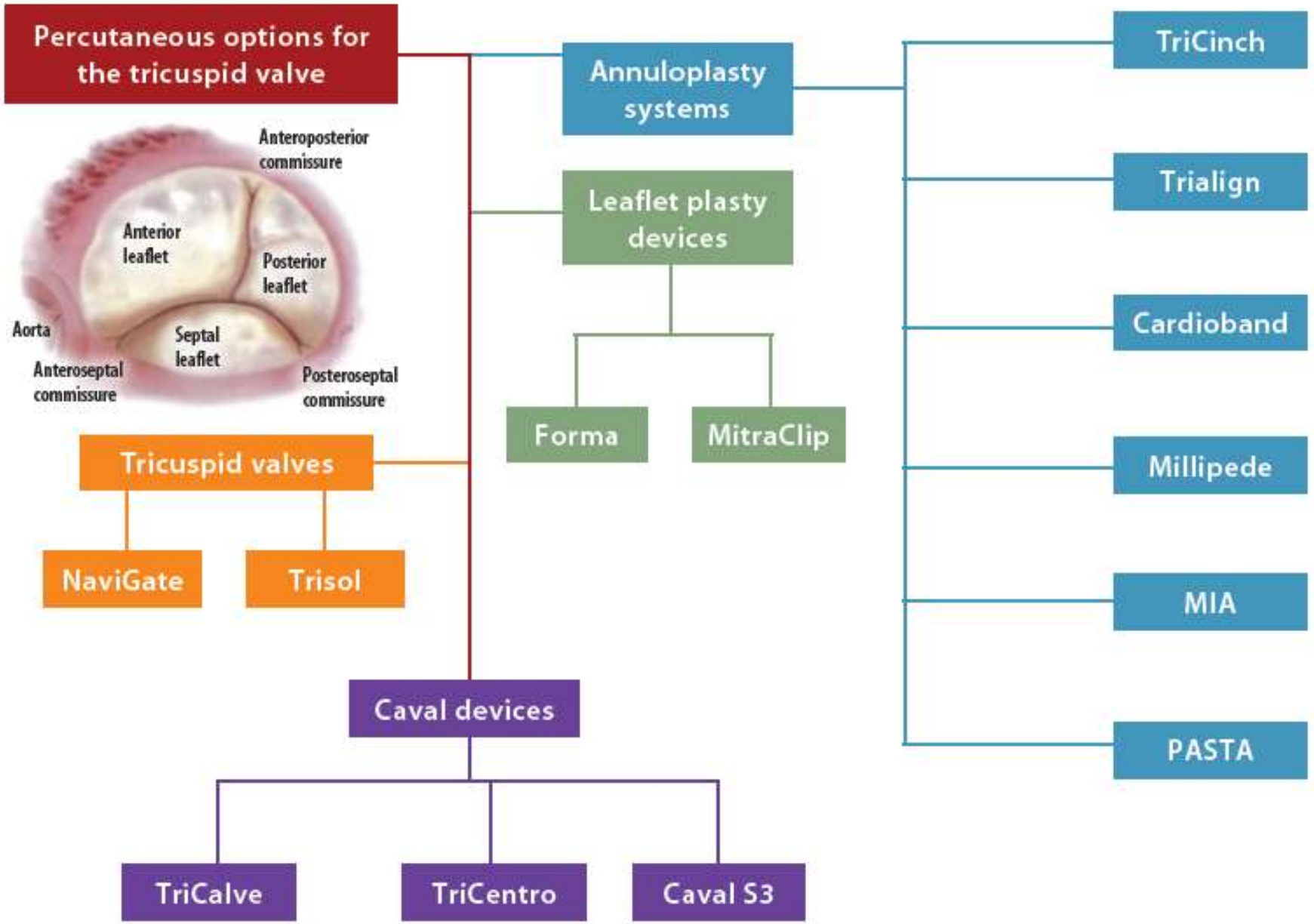
Arq Bras Cardiol: Imagem cardiovasc. 2024;37(4):e20240088

STVRR: surgical tricuspid valve replacement or repair; ICDL: intracardiac device lead; TEER: transcatheter edge-to-edge repair; TTVR: transcatheter tricuspid valve replacement; THCVI: transcatheter heterotopic caval valve implantation; RV: right ventricle; TR: tricuspid regurgitation.

The Role of Imaging in the Evolution of Tricuspid Regurgitation Diagnosis and Management



Tricuspid valve transcatheter interventions



Heterotopic devices

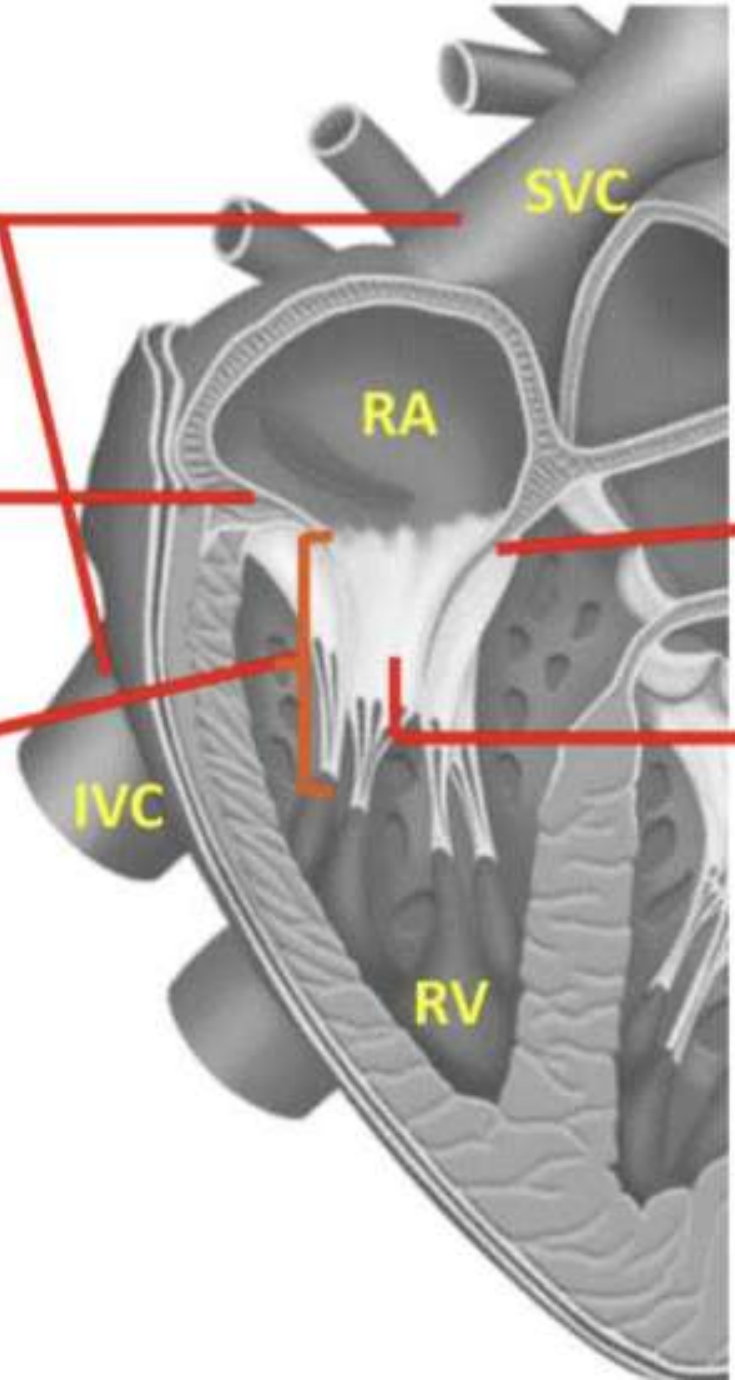
Goal: to reduce the venous congestion and backflow associated with TR for symptomatic improvement

Annulus

Goal: reducing the annular dilation
- Restrictive Annuloplasty
- Direct Annuloplasty

Tricuspid valve replacement

Goal: implantation of bioprosthetic valve within the tricuspid annulus

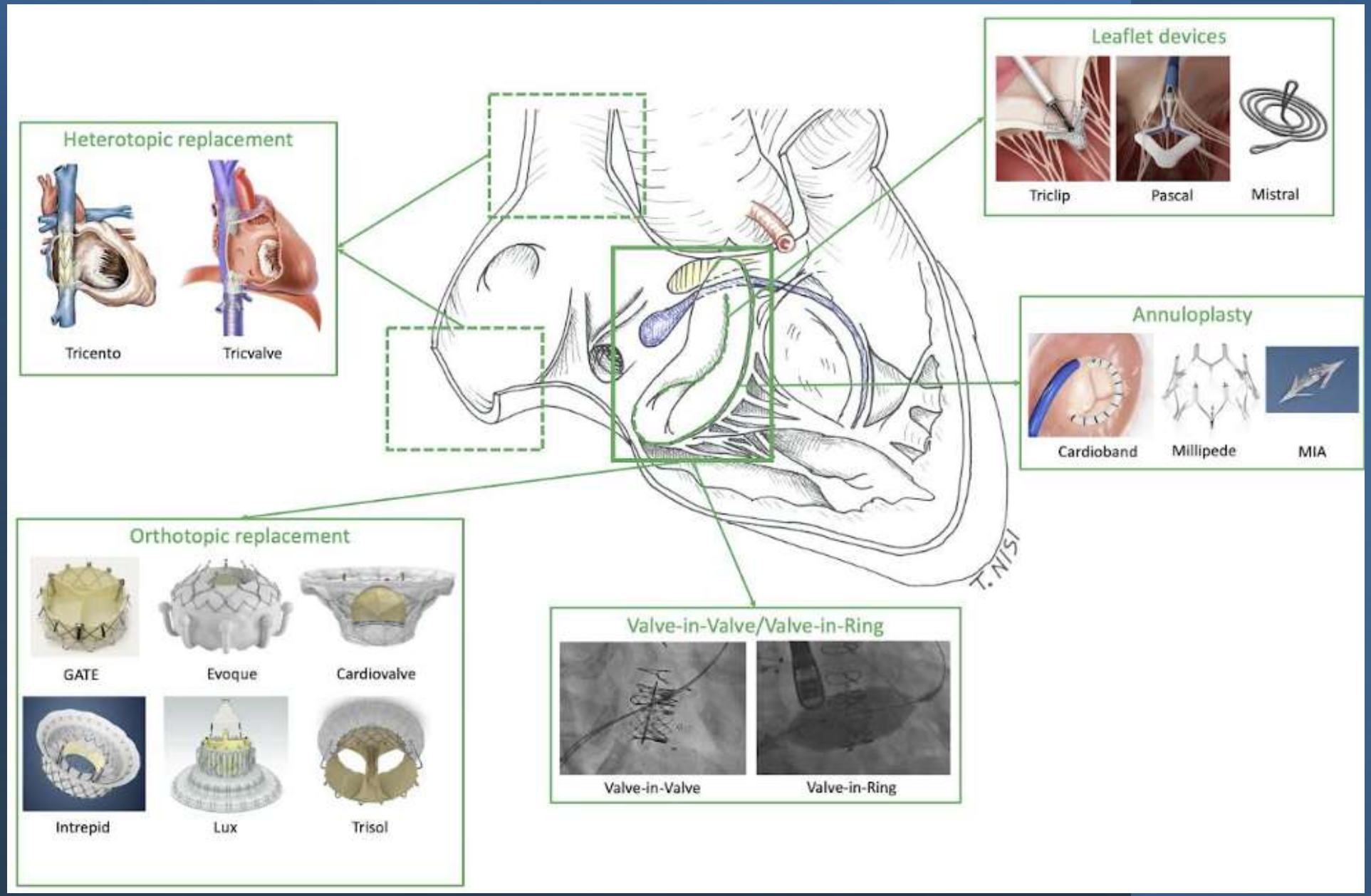


Leaflet

Goal: restoration of coaptation and reduction of regurgitant orifice area.

Coaptation enhancement

Goal: to fill or eliminate the coaptation defect


Heterotopic replacement
Tricento
Tricvalve
Leaflet devices
Triclip
Pascal
Mistral
Annuloplasty
Cardioband
Millipede
MIA
Orthotopic replacement
GATE
Evoque
Cardiovalve
Intrepid
Lux
Trisol
Valve-in-Valve/Valve-in-Ring
Valve-in-Valve
Valve-in-Ring
T. NISI

Transcatheter Tricuspid Valve Therapies Landscape

Transcatheter Edge to Edge Repair

- Devices: TriClip, PASCAL
- Favorable Indications

1. Small leaflet coaptation gap (<7 mm)
2. "True" tricuspid (3 leaflets) morphology
3. Confined prolapse or flail of any leaflet
4. Jet location: Anteroseptal


TriClip


PASCAL

Tricuspid Valve Replacement

- Devices: Evoque, LuxValve, GATE
- Favorable Indications

1. Greater leaflet coaptation gap (>8.5 mm)
2. Valve tethering (more than moderate)
3. Previous Tricuspid Valve Replacement (ViV)
4. Thickened leaflets (heavily calcified)


LuxValve


Evoque


GATE

Annuloplasty

- Devices: Cardioband
- Favorable Indications

1. Dilated tricuspid annulus as the key pathophysiological mechanism
2. Valve tethering preferably mild
3. Jet location: Central


Cardioband

Heterotopic Caval Valve Implantation

- Devices: Tricento, TricValve
- Favorable Indications

1. Venous congestion – significant backflow in caval veins
2. Not suitable for orthotopic valve implantation
3. Appropriate cava anatomy-size


Tricento


TricValve

K Dimitriadis et al *Life* 13:1417; 2023

Real life world experience

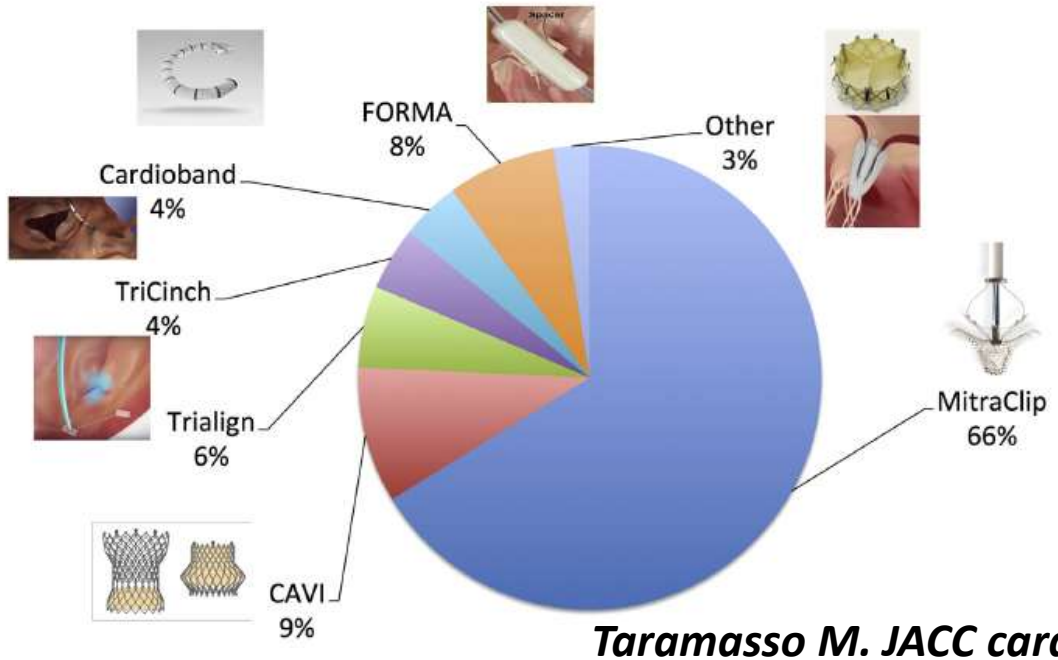
312 patients with severe or greater symptomatic TR underwent TTVI and were included in the registry across 18 centers

The International Multicenter TriValve Registry

Which Patients Are Undergoing Transcatheter Tricuspid Repair?

Outcomes After Current Transcatheter Tricuspid Valve Intervention

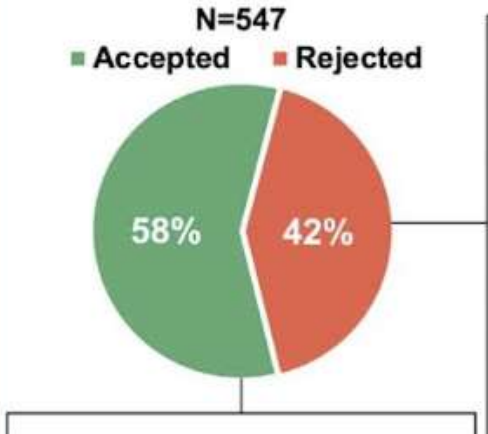
Mid-Term Results From the International TriValve Registry



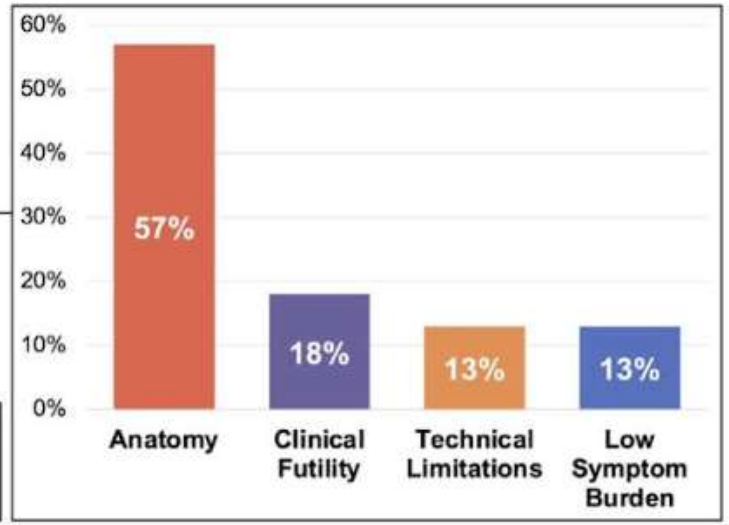
Taramasso M. JACC cardiovascular intervention , 2017 & 2018

Screening for Transcatheter Tricuspid Valve Intervention

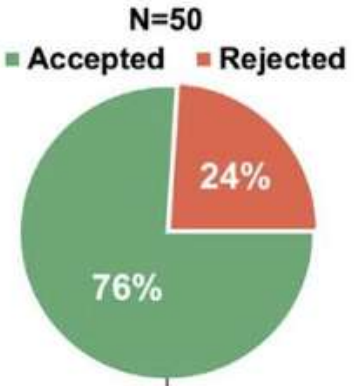
TriSelect Study
Northwestern (Chicago), Bad Oeynhausen, Cologne



- **62%** Transcatheter Edge-to-Edge Repair
- **38%** Transcatheter valve annuloplasty



Montefiore
New York

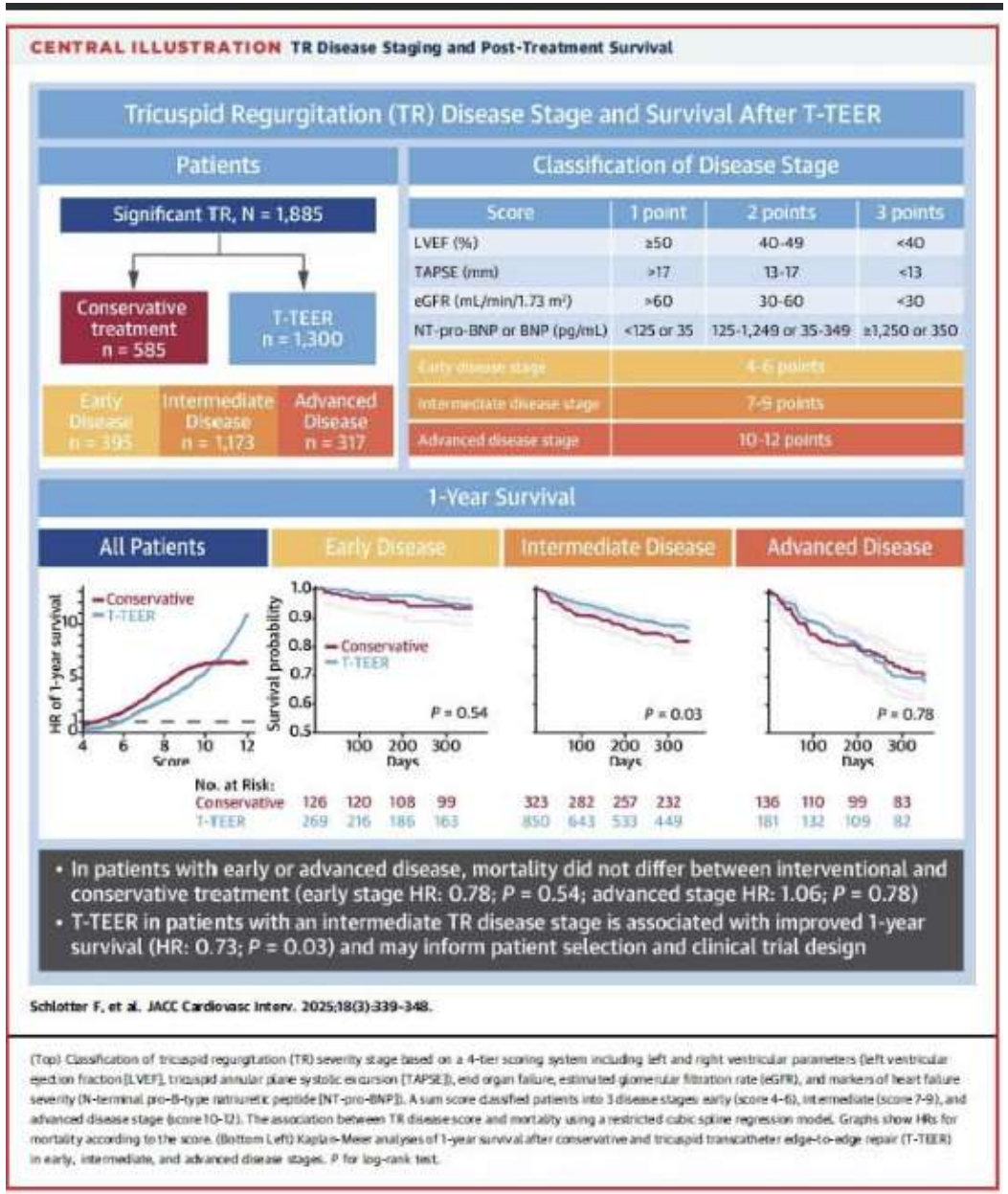


- **50%** TTVR
- **47%** TEER
- **3%** Other (Caval Valve)

Future Innovations and Clinical Needs

- Broad Toolbox of TTVI Therapies (e.g., TTVR)
- Imaging Innovation (e.g., 4D-ICE, AI)
- Earlier Referral & Volume Optimization
- Alternative Permanent Pacing Strategies

TR DISEASE STAGING AND POST-TREATMENT SURVIVAL



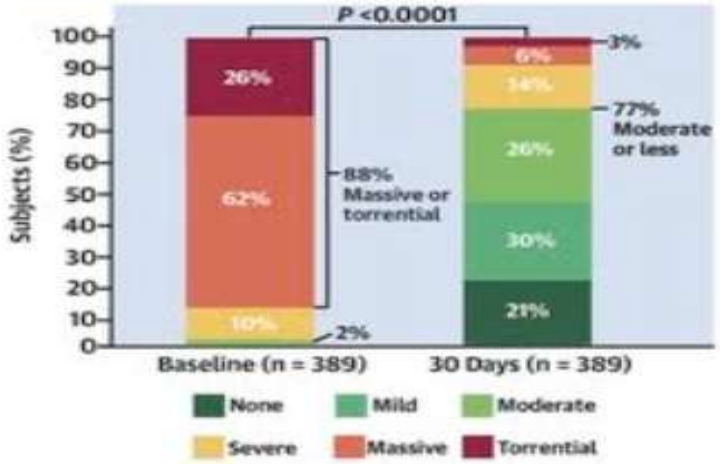
(Top) Classification of tricuspid regurgitation (TR) severity stage based on a 4-tier scoring system including left and right ventricular parameters (left ventricular ejection fraction [LVEF], tricuspid annular plane systolic excursion [TAPSE]), end organ failure, estimated glomerular filtration rate (eGFR), and markers of heart failure severity (N-terminal pro-B-type natriuretic peptide [NT-pro-BNP]). A sum score classified patients into 3 disease stages: early (score 4-6), intermediate (score 7-9), and advanced disease stage (score 10-12). The association between TR disease score and mortality using a restricted cubic spline regression model. Graphs show HRs for mortality according to the score. (Bottom Left) Kaplan-Meier analyses of 1-year survival after conservative and tricuspid transcatheter edge-to-edge repair (T-TEER) in early, intermediate, and advanced disease stages. *P* for log-rank test.

CENTRAL ILLUSTRATION: Transcatheter Tricuspid Valve Repair Safe and Effective in Real-World Population

Real-World Population

- Mean age: 78.9 years
- Mean LVEF 55.8%
- NYHA functional class III/IV: 88%
- Male: 44%
- Prior HF Hospitalization: 40.3%
- Baseline KCCQ score: 44.52

Reduction in TR at 30 Days

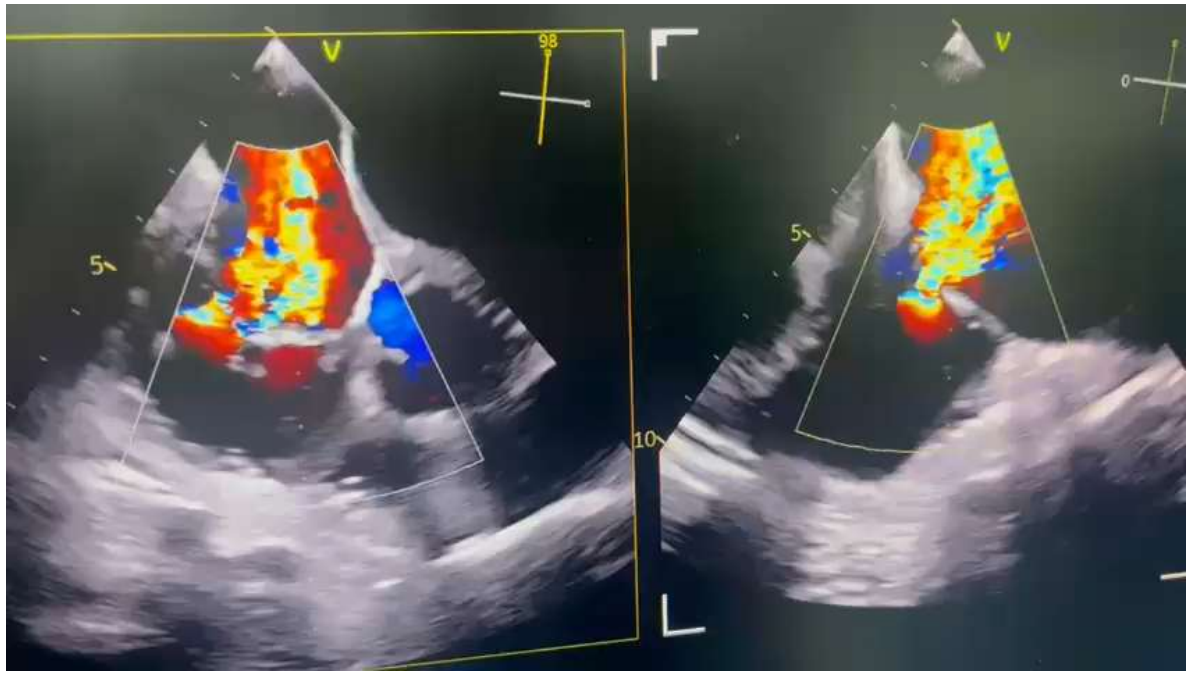


Safety Profile at 30 Days

Major Adverse Event	2.7%
• Cardiovascular mortality	0.8%
• Myocardial infarction	0.0%
• Stroke	0.4%
• New onset renal failure	1.4%
• Endocarditis requiring surgery	0.0%
• Nonelective CV surgery for device-related AE	0.2%

MAEs adjudicated by independent clinical events committee

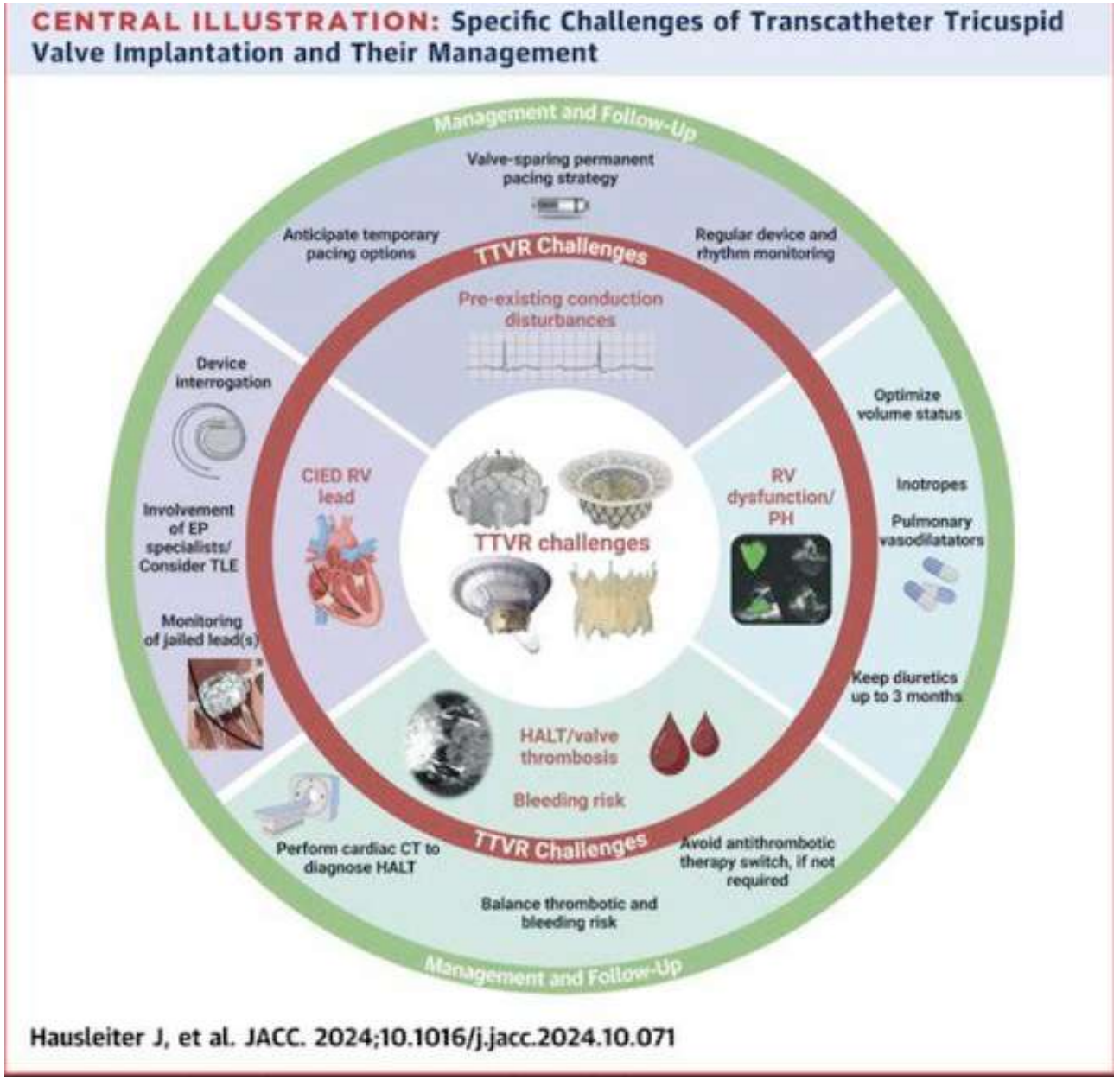
Lurz P, et al. J Am Coll Cardiol. 2023;82(4):281-291.



IT ATRIOGENICA – XTW-AS XT-PS

CRÉDITO PARA CLEVERSON ZUKOVSKY

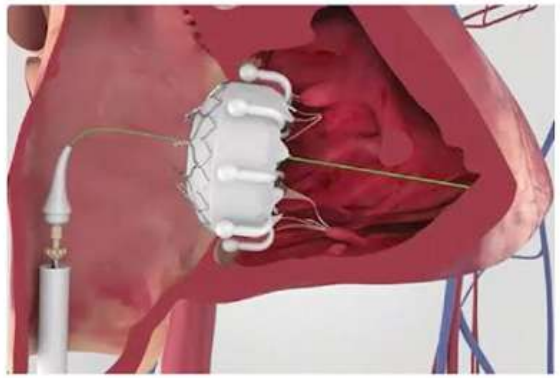
TTVR CHALLENGES

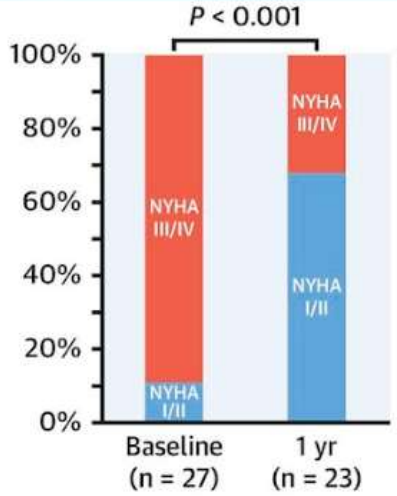


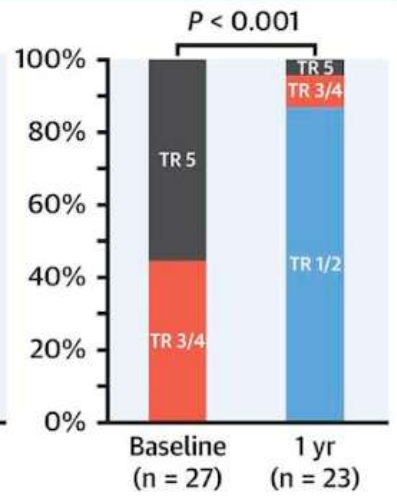
CENTRAL ILLUSTRATION: 1-Year EVOQUE Transfemoral Transcatheter Tricuspid Valve Replacement for Severe Tricuspid Regurgitation

EVOQUE Transfemoral Tricuspid Replacement

1-Year Clinical and Echocardiographic Outcomes







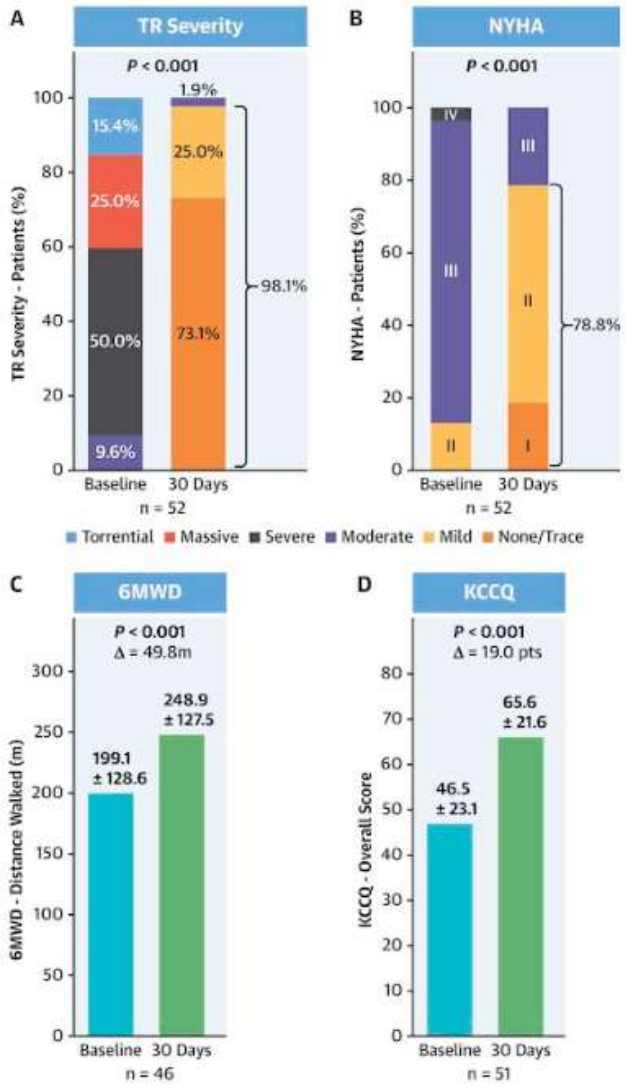
27 patients with severe TR
treated with the EVOQUE system
7 sites (Canada, Europe, U.S.)
May 2019 to July 2020

All-cause mortality: 7%
HF hospitalization: 7%
New pacemaker: 7% within 30 days,
4% beyond 30 days

Sustained improvement in NYHA functional class as well as improvement in TR degree suggesting that the EVOQUE System is a promising treatment option for this population

Webb, J.G. et al. J Am Coll Cardiol Intv. 2022;15(5):481-491.

CENTRAL ILLUSTRATION: 30-Day Results of the TRISCEND Study With the EVOQUE System



Kodali, S. et al. J Am Coll Cardiol Intv. 2022;15(5):471-480.

The Lux Valve PLUS TTVR System

Self-Adaptive Braided Ring

The "self-adaptive leak-proof braided ring" effectively aims to decrease post-procedural perivalvular leaks caused by annular dilation.

Multi-Dimensional Fixation

The "interventricular septal anchoring" technology enhances the traditional concept of radial support force fixation.

Trans-Jugular Delivery

Flexible and retrievable low-profile delivery system allows valve rotation to achieve perfect alignment on the tricuspid annulus.

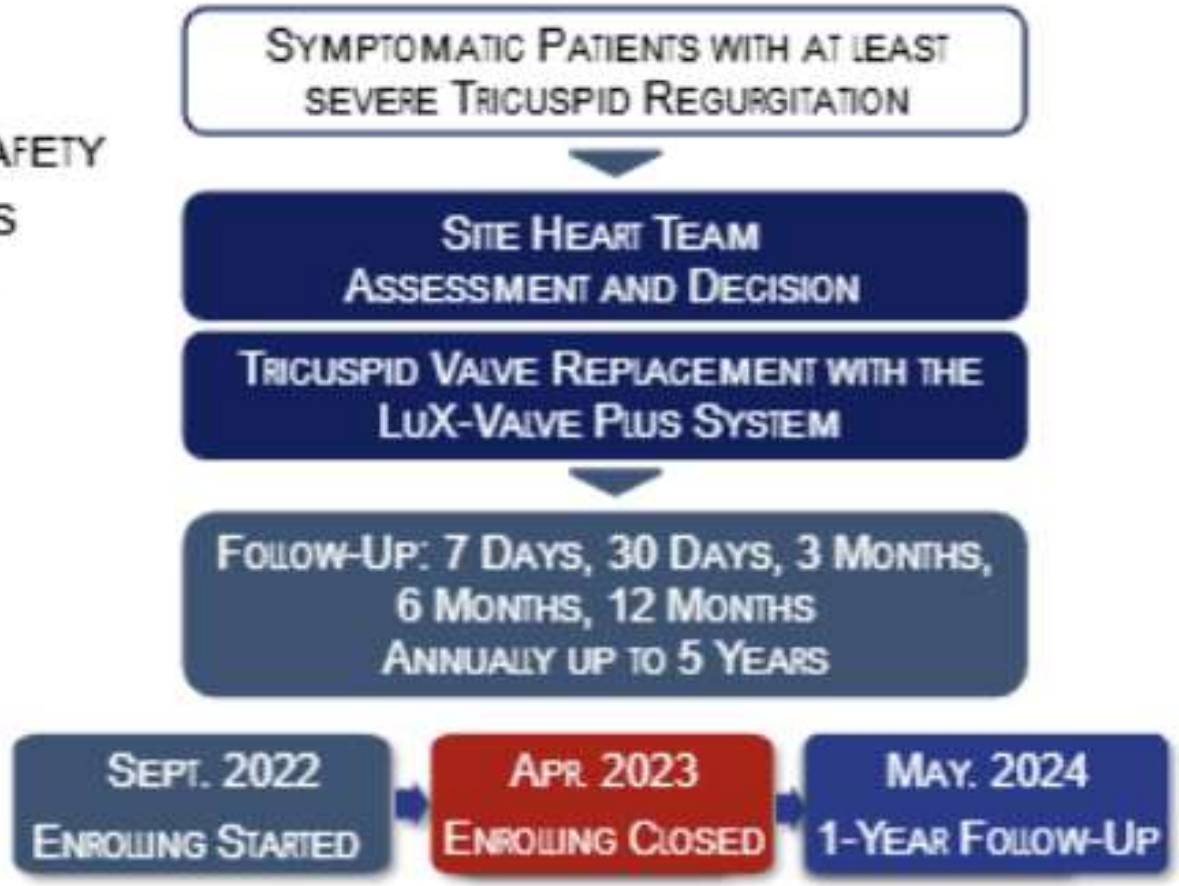
The LuX Valve PLUS Travel II: Study Design

PRIMARY OBJECTIVE:

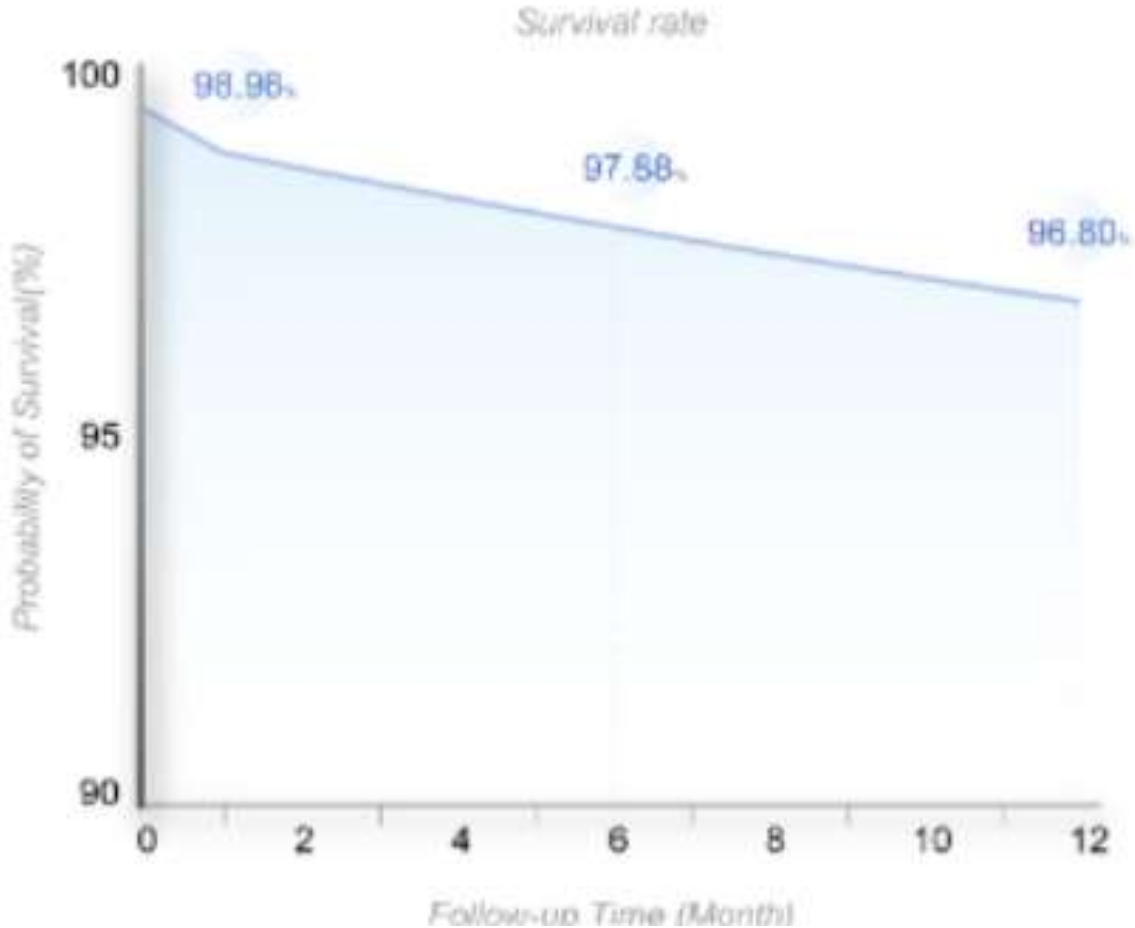
To evaluate the acute and long-term safety and performance of the LuX-Valve Plus system in patients with at least severe tricuspid regurgitation

TRIAL OVERSIGHT

- Echocardiographic core lab
- Clinical events committee
- Data safety monitoring board



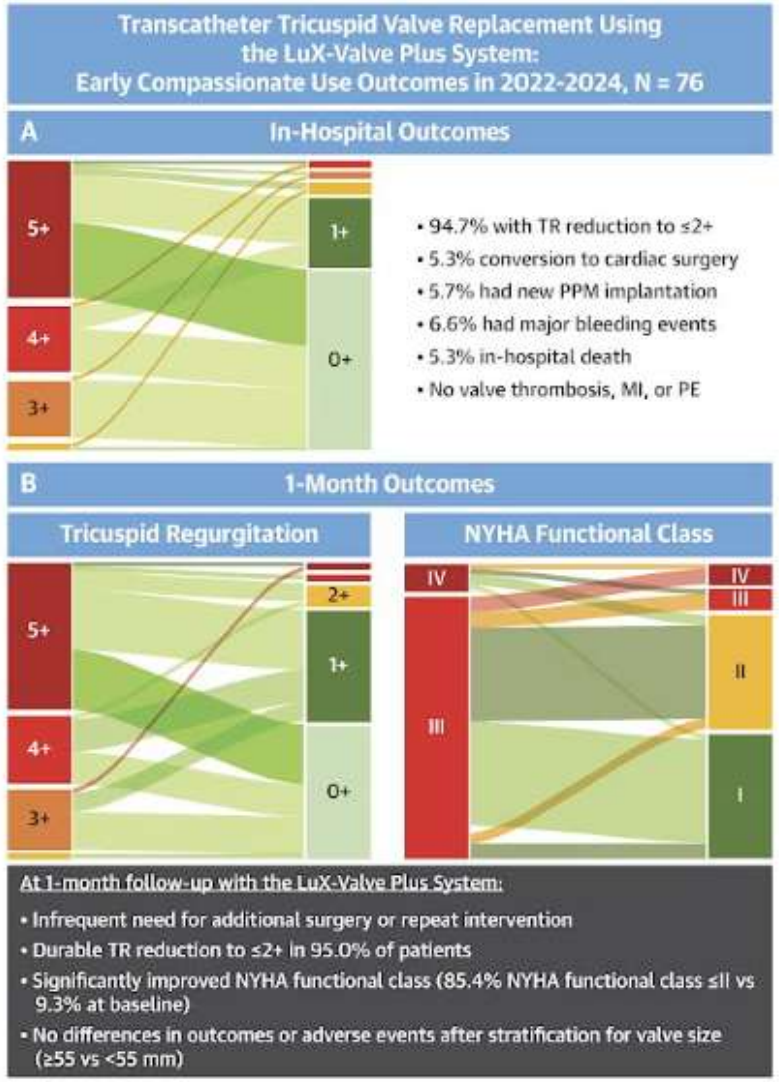
1-Year Cumulative All-Cause Mortality



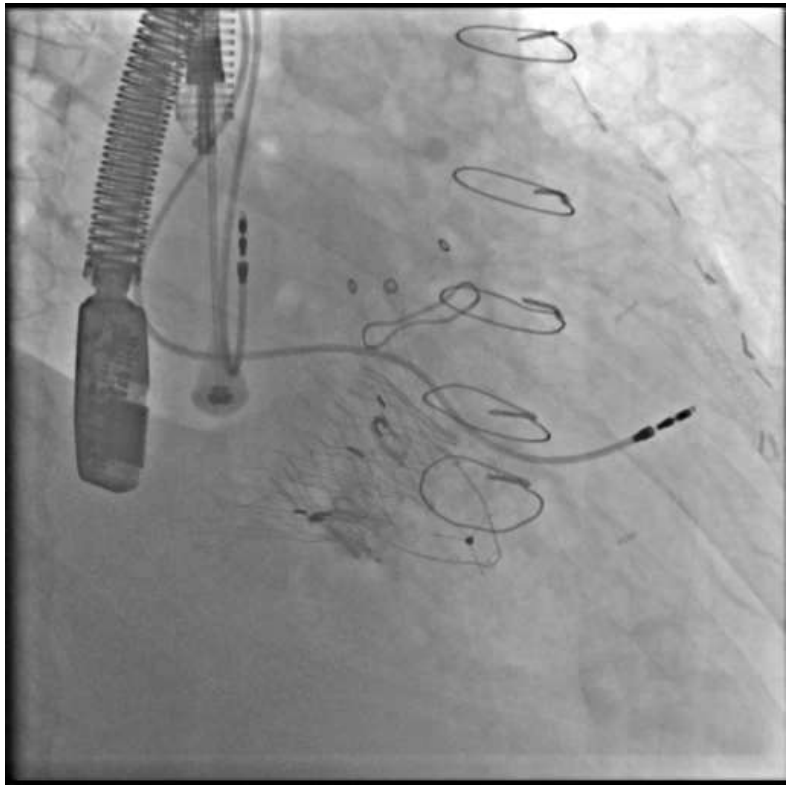
All-cause mortality: 4.17%

- 1-patient died of a suspected cerebral infarction
- 1-patient died of a lung infection by COVID-19
- 2-patients complications related to falling

CENTRAL ILLUSTRATION: LuX-Valve Plus For Transcatheter Tricuspid Valve Replacement

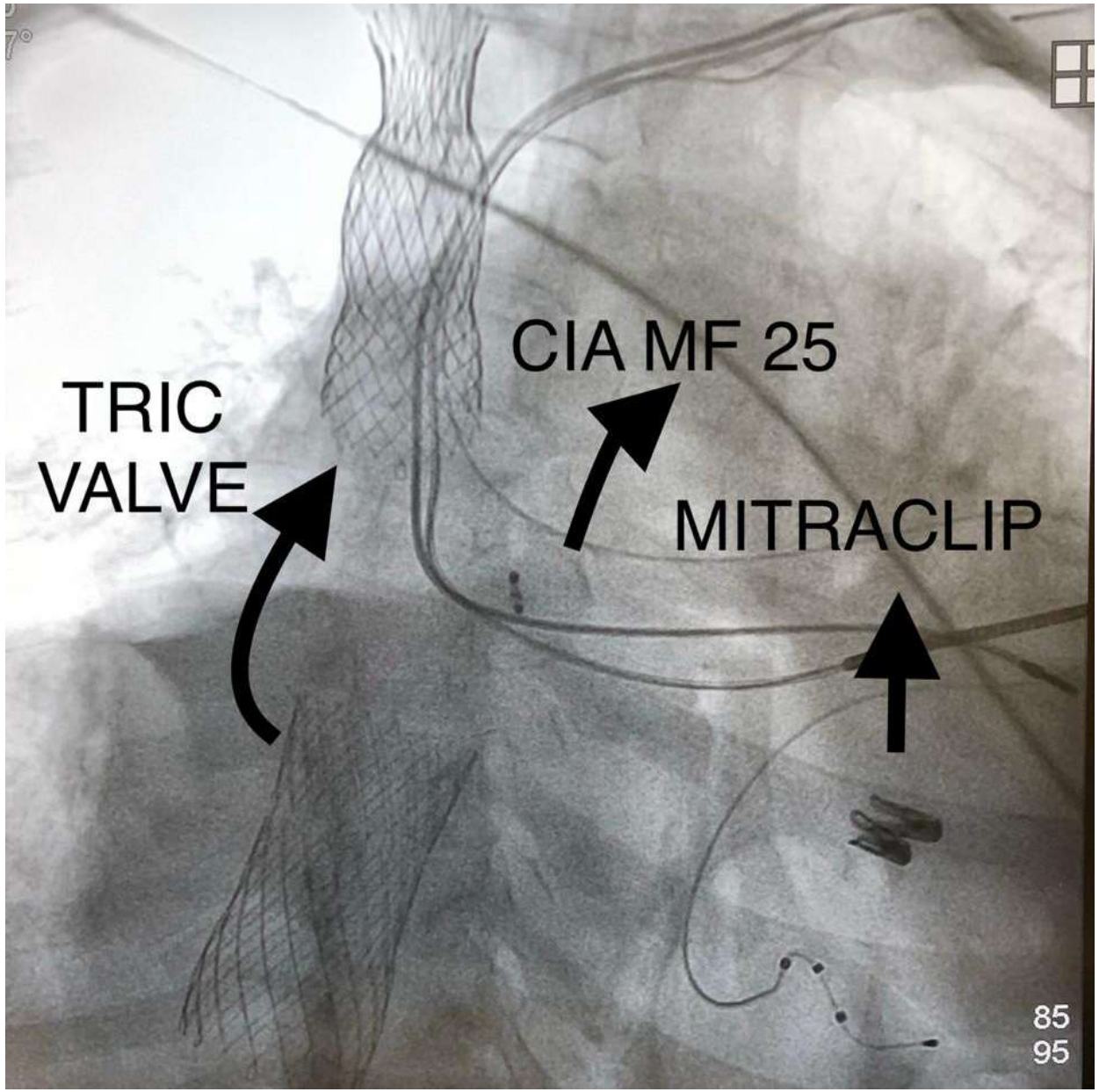


Stolz L, et al. JACC Cardiovasc Interv. 2024;17(16):1936-1945.



LUX VALVE CASE 9 – CLEVERSON ZUKOVSKI

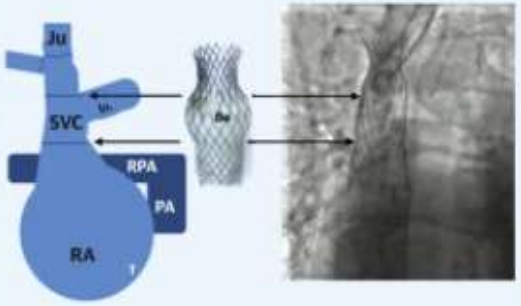
PRIMEIRA TRICVALVE NO BRASIL



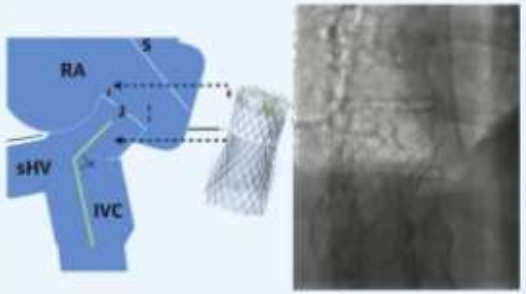
CENTRAL ILLUSTRATION: 6-Month Outcomes of the TricValve System for Severe TR: TRICUS EURO Study (N = 35)

Device & Procedure

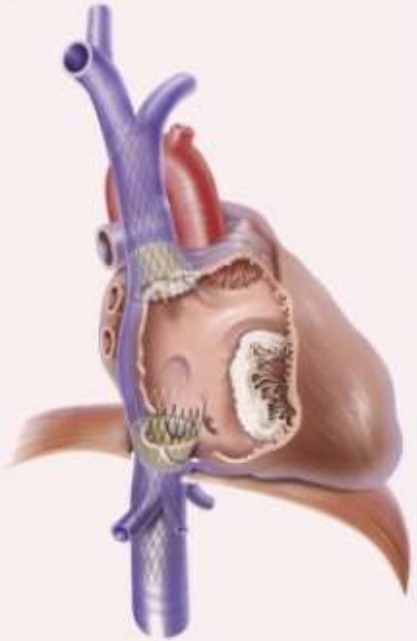
SVC



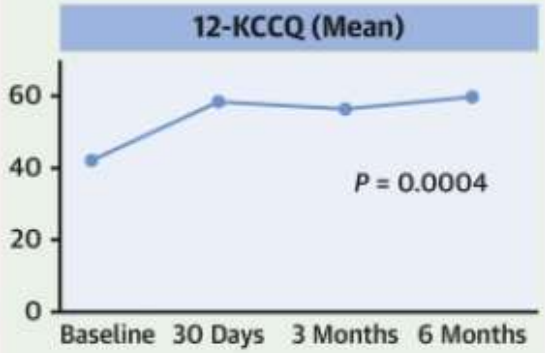
IVC



- 97% Technical success
- 0% 6-month cardiac death
- Persistent functional improvement



Functional



Estévez-Loureiro R, et al. J Am Coll Cardiol Intv. 2022;15(13):1366-1377.

MUCHAS GRACIAS POR SÚ ATENCIÓN!