

PLACE

PLATFORM OF LABORATORIES FOR ADVANCES IN CARDIAC EXPERIENCE

ROMA

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di Confindustria

**Auditorium
della Tecnica**

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SCOMPENSO CARDIACO CRONICO: UPDATE 2022



Valvulopatie e insufficienza cardiaca

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Conflicts of interest

- None

Causes of heart failure

Cause	Examples of presentations	Specific investigations
CAD	Myocardial infarction Angina or "angina-equivalent" Arrhythmias	Invasive coronary angiography CT coronary angiography Imaging stress tests (echo, nuclear, CMR)
Hypertension	Heart failure with preserved systolic function Malignant hypertension/acute pulmonary oedema	24 h ambulatory BP Plasma metanephrines, renal artery imaging Renin and aldosterone
Valve disease	Primary valve disease e.g., aortic stenosis Secondary valve disease, e.g. functional regurgitation Congenital valve disease	Echo – transoesophageal/stress

VALVE DISEASE

Primary valve disease e.g., aortic stenosis

Secondary valve disease, e.g. functional regurgitation

Congenital valve disease

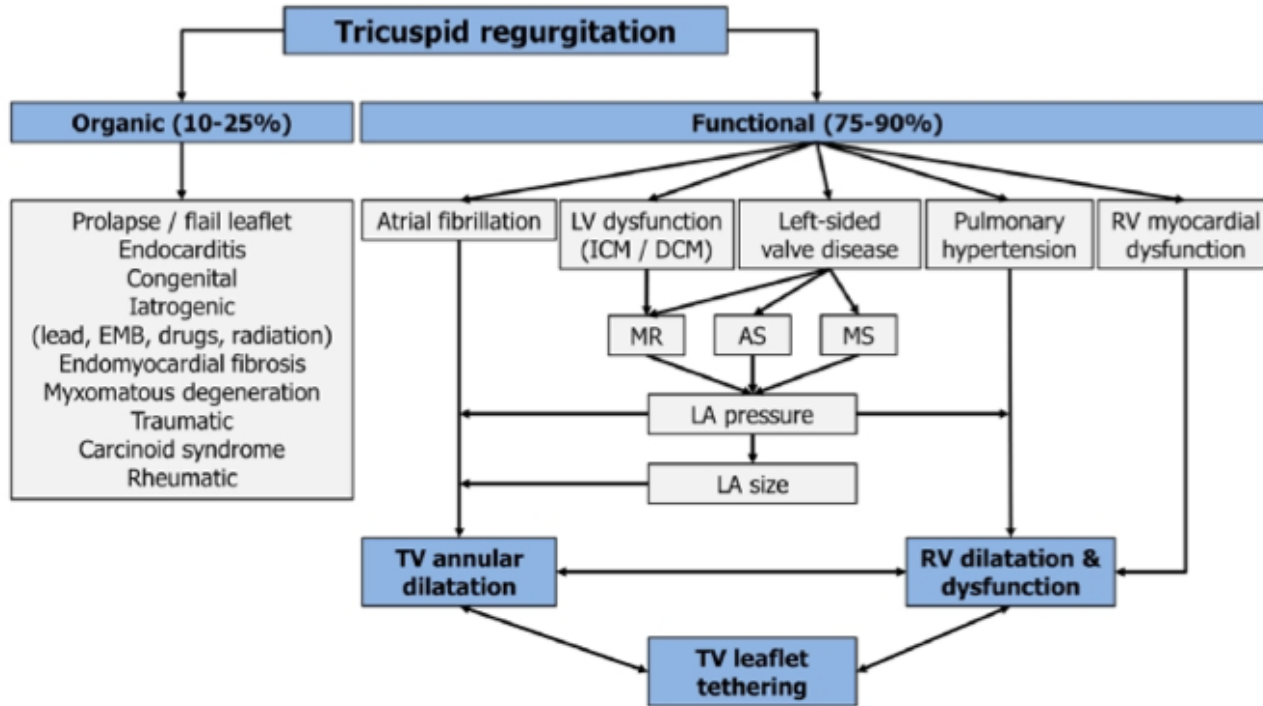
Pericardial disease	Carcinoid	24 h urine 5-HIAA
	Calcification	Chest CT, CMR, right and left heart catheterization
	Infiltrative	
Metabolic	Endocrine disease	TFTs, plasma metanephrines, renin and aldosterone, cortisol
	Nutritional disease (thiamine, vitamin B1 and selenium deficiencies)	Specific plasma nutrients
	Autoimmune disease	ANA, ANCA, rheumatology review
Neuromuscular disease	Friedreich's ataxia	Nerve conduction studies, electromyogram, genetics
	Muscular dystrophy	CK, electromyogram, genetics



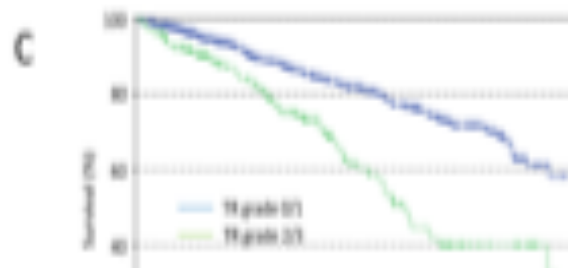
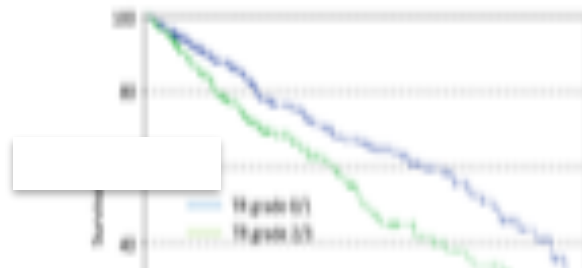
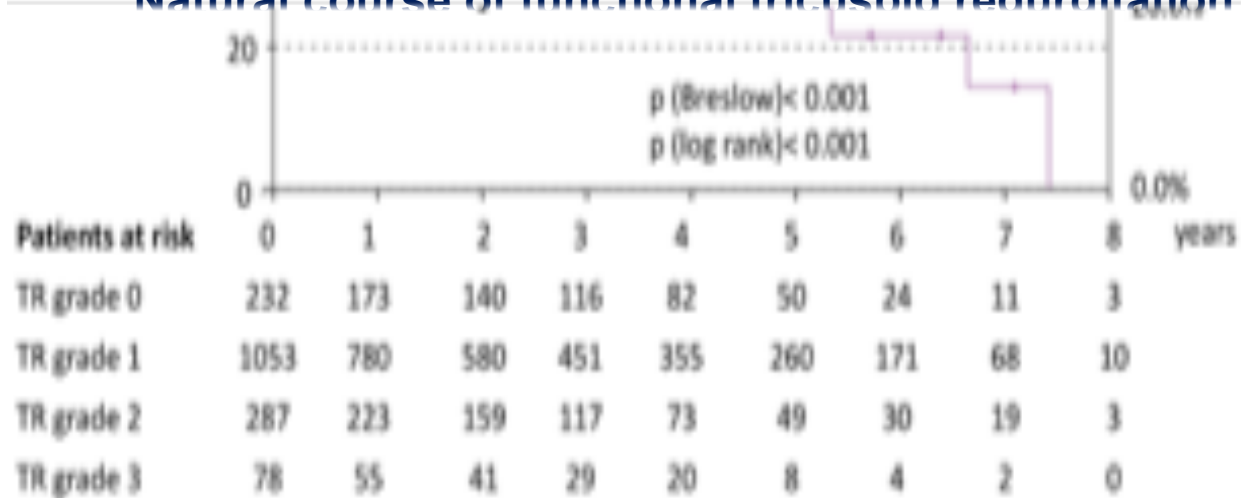
ESC
European Society
of Cardiology

European Heart Journal (2021) **42**, 3599–3726
doi:10.1093/eurheartj/ehab368

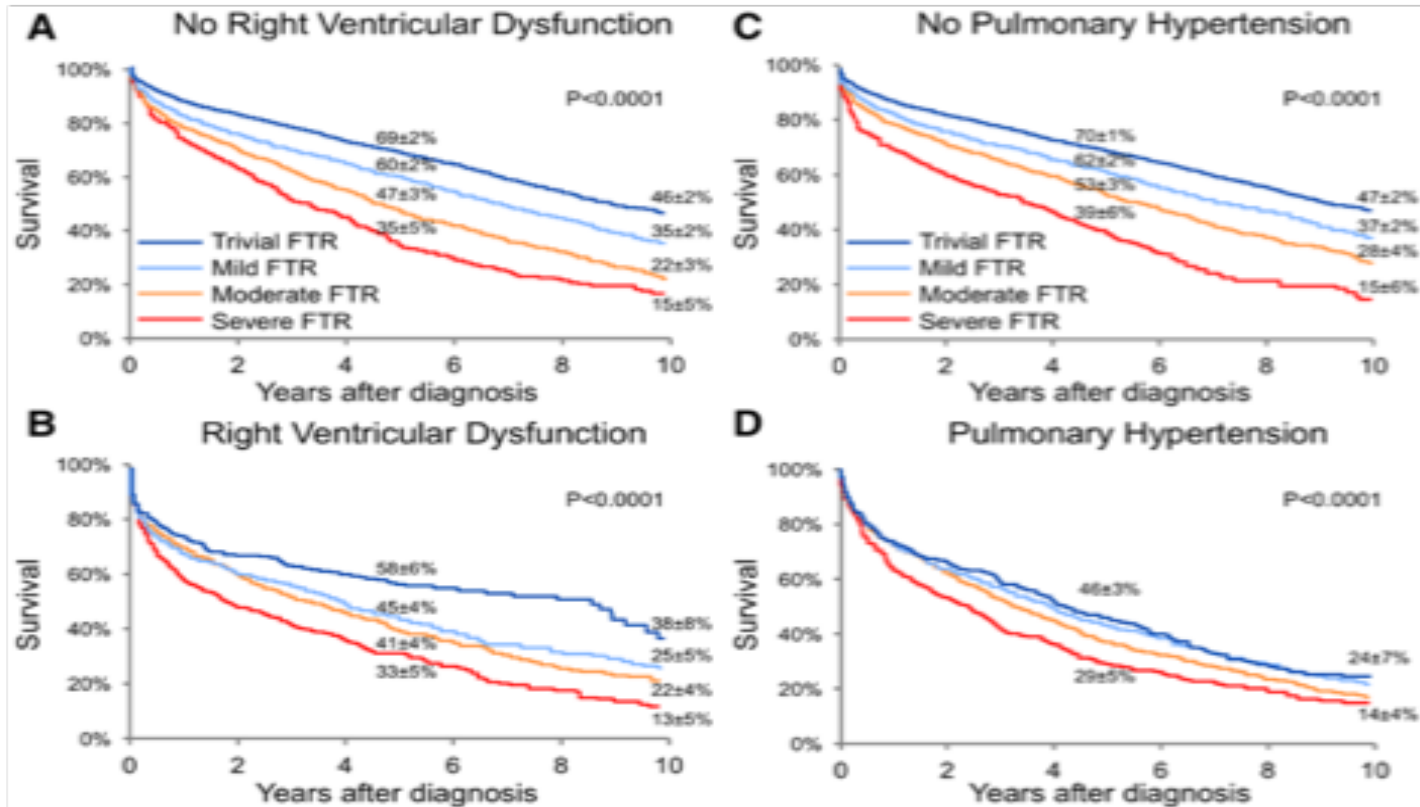
Causes of organic and functional TR.



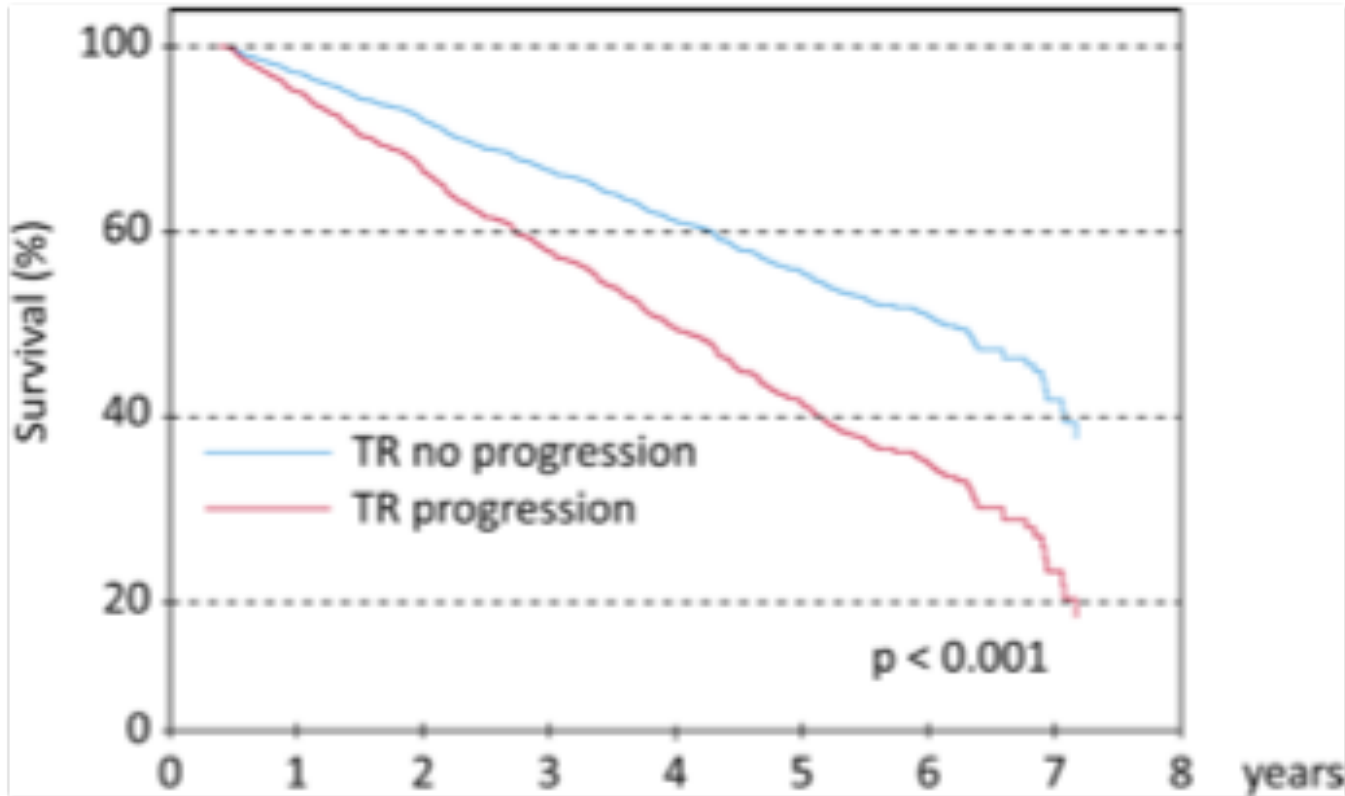
Natural course of functional tricuspid regurgitation



The prognostic role of RV dysfunction and pulmonary hypertension in FTR complicating HFrEF



Natural course of functional tricuspid regurgitation



Echocardiographic assessment of functional tricuspid regurgitation

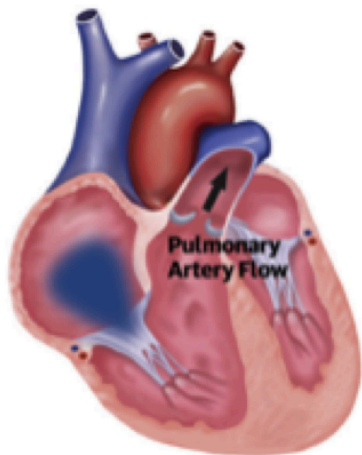
Parameters	Mild	Moderate	Severe
Qualitative			
Tricuspid valve morphology	Normal/abnormal	Normal/abnormal	Abnormal/flail/large coaptation defect
Colour flow TR jet	Small, central	Intermediate	Very large central jet or eccentric wall impinging jet
CW signal of TR jet	Faint/parabolic	Dense/parabolic	Dense/triangular with early peaking (peak < 2 m/s in massive TR)
Semi-quantitative			
VC width (mm)	Not defined	<6.5	>6.5
PISA radius (mm)	≤5	6–9	>9
Hepatic vein flow	Systolic dominance	Systolic blunting	Systolic flow reversal
Tricuspid inflow	Normal	Normal	E wave dominant (≥1 cm/s)
Quantitative			
EROA (mm ²)	Not defined	Not defined	≥40
R Vol (ml)	Not defined	Not defined	≥45
+ RA/RV/IVC dimension			

**Echocardiographic Evaluation of the Tricuspid Valve:
A Quick and Updated Guide**

Imaging all leaflets simultaneously with 2D transthoracic echocardiogram (TTE) is possible in only 5-10% of routine patient

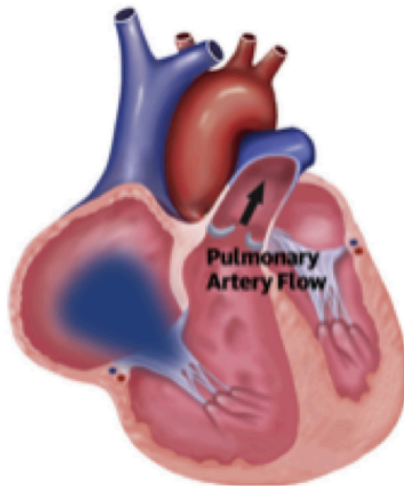
Simultaneous leaflet visualization using 3D TTE can be achieved in 85-90% of patients at experienced centers

3D volume sets allow more for reproducible serial measurements that are more consistent with CMR, but require further standardization of measurements prior to routine use



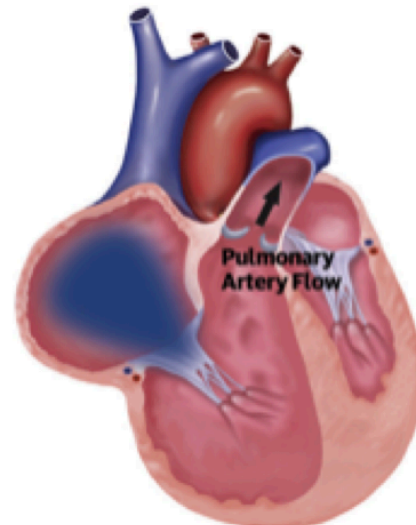
TRVol <30mL
TRF <30%

Low Risk



TRVol 30-44 mL (aHR 1.46)
TRF 30-49% (aHR 1.21)

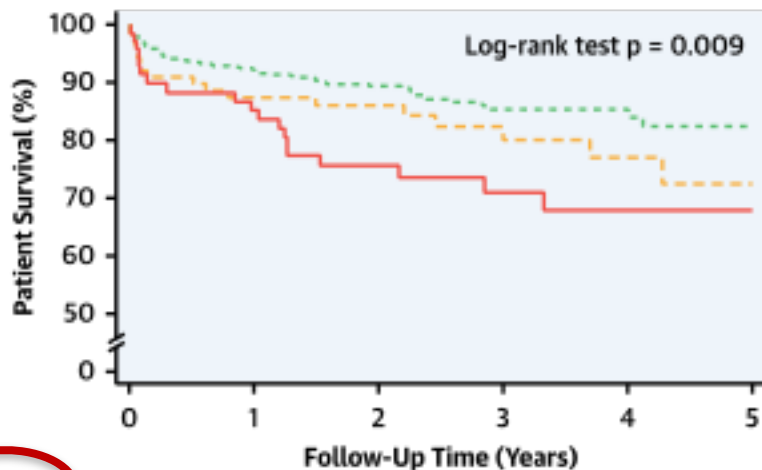
Intermediate Risk



TRVol ≥45 mL (aHR 2.26)
TRF ≥50% (aHR 2.60)

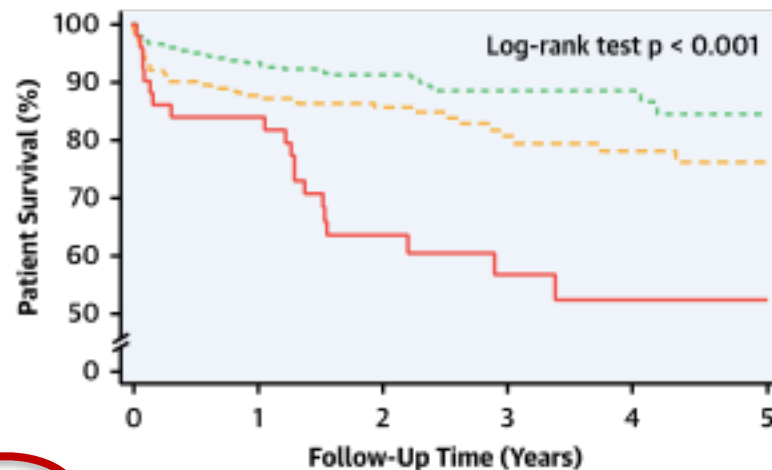
High Risk

Natural History of Functional Tricuspid Regurgitation Quantified by Cardiovascular Magnetic Resonance



TRV (ml)

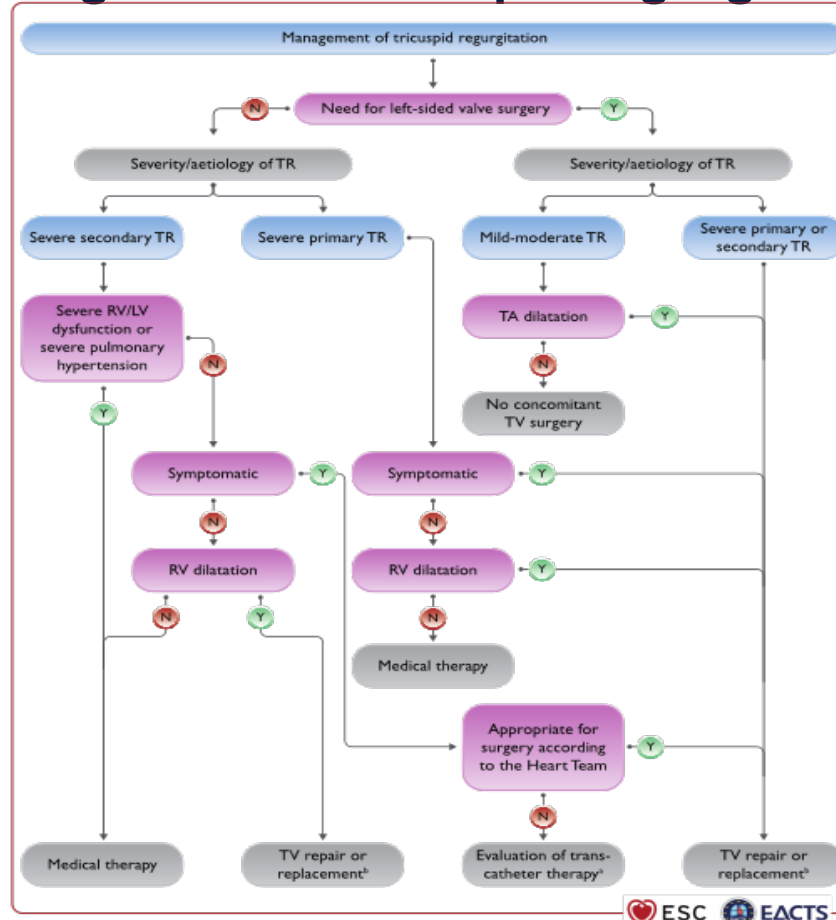
— <30	384	350	257	108	60	45
- - - 30-44	88	74	54	35	21	14
— ≥45	75	54	38	25	20	15



TRF (%)

— <30	325	303	219	87	44	34
- - - 30-49	166	137	109	67	48	33
— ≥50	56	38	21	14	9	7

Management of tricuspid regurgitation



Management of tricuspid regurgitation

9.3 Medical therapy

Diuretics are useful in the presence of heart failure symptoms but are of limited long-term efficacy.

Indications and timing of tricuspid valve surgery

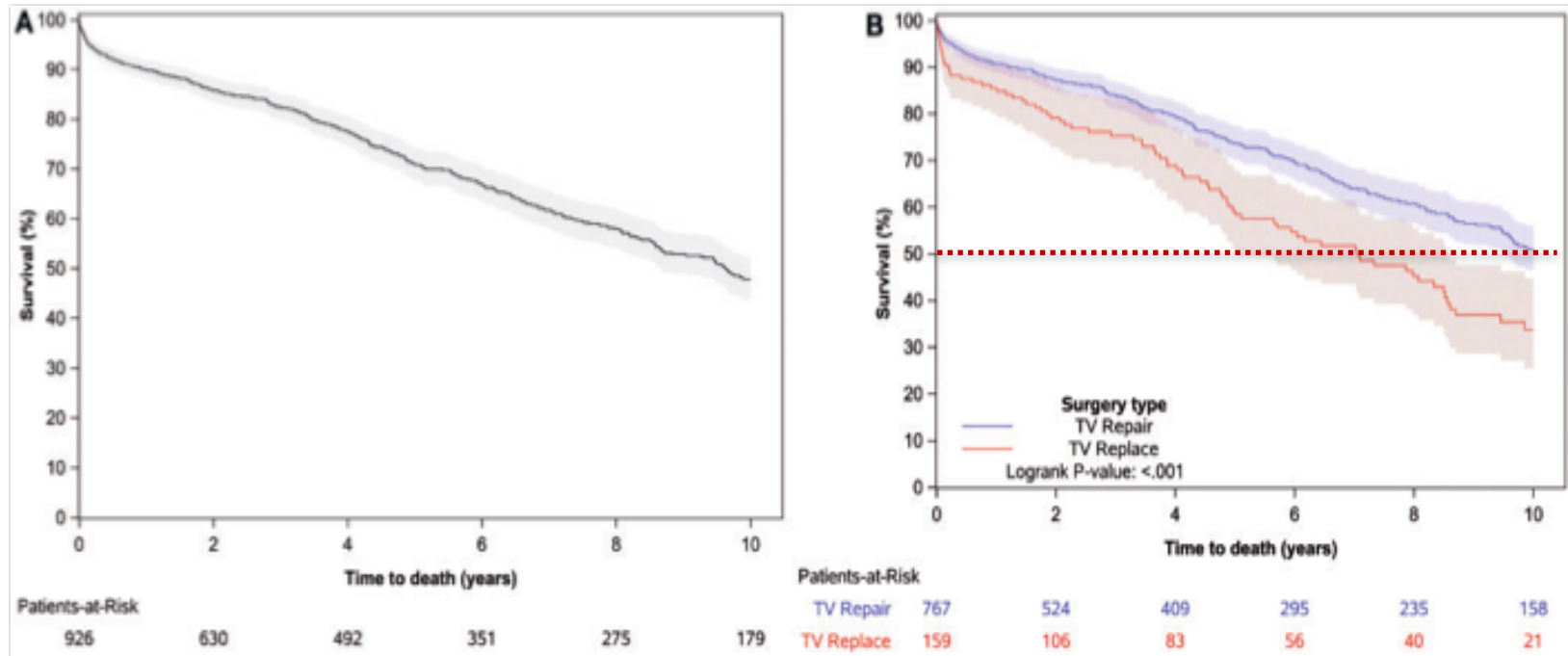
When another cardiac operation is considered (valve surgery, CABG or MAZE procedure)

When the FTR is severe, particularly if $ERO \geq 40 \text{ mm}^2$

When the patient is symptomatic from the TR (congestion)

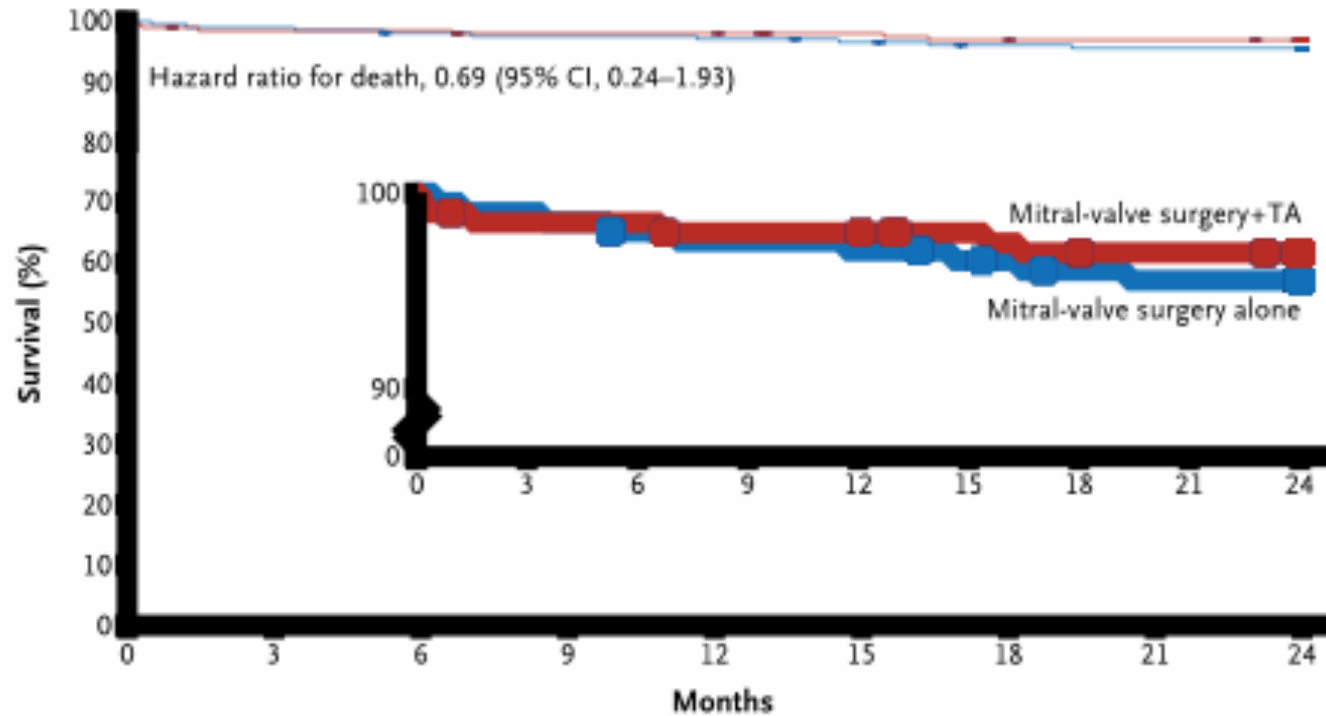
When the comorbid conditions are not overwhelming and life expectancy is of at least several years.

Outcomes of tricuspid valve surgery in patients with functional tricuspid regurgitation



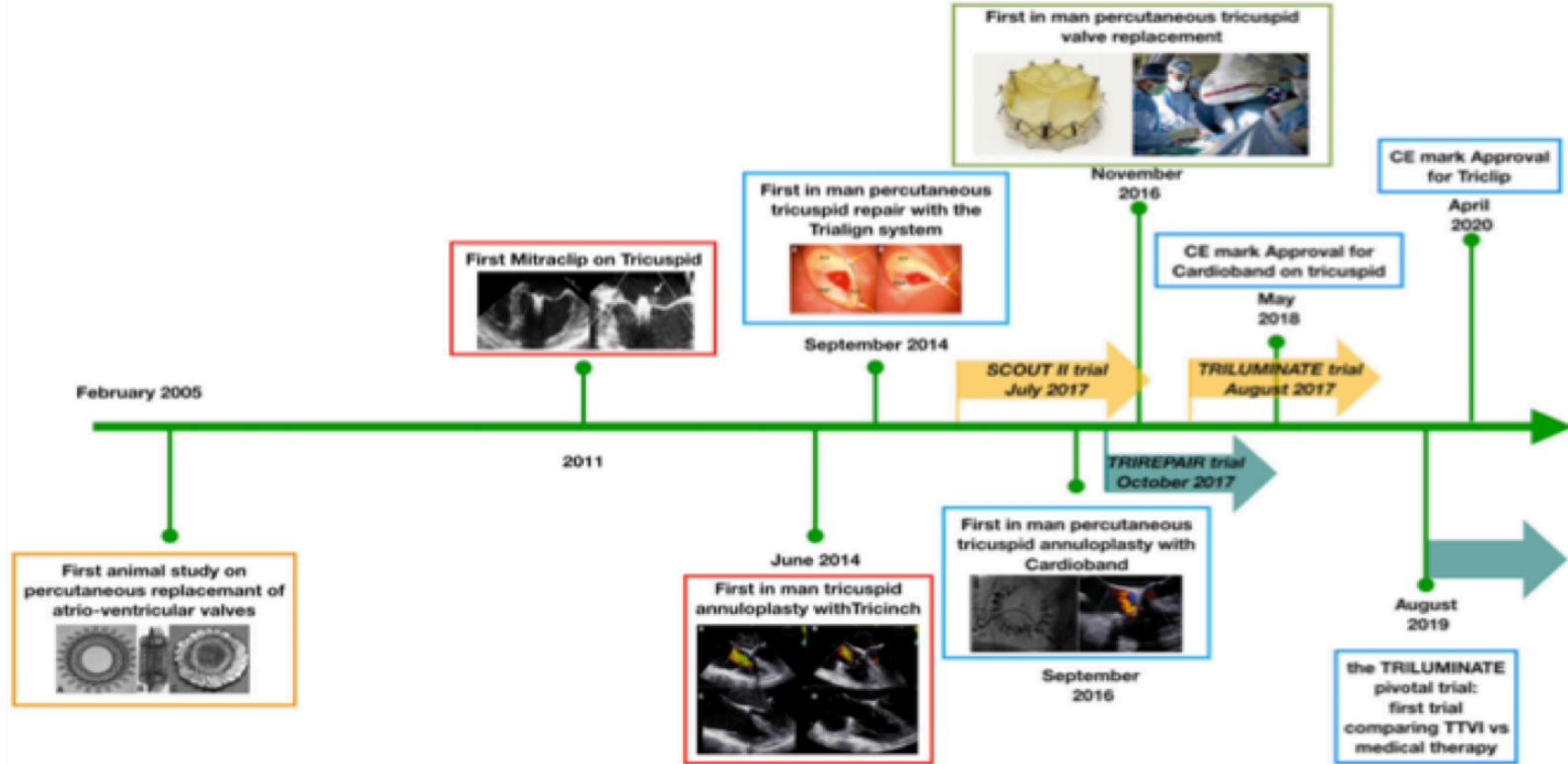
Pahwa S et Al. European Journal of Cardio-Thoracic Surgery 59 (2021) 577–585

Concomitant Tricuspid Repair in Patients with Degenerative Mitral Regurgitation and moderate or less-than-moderate

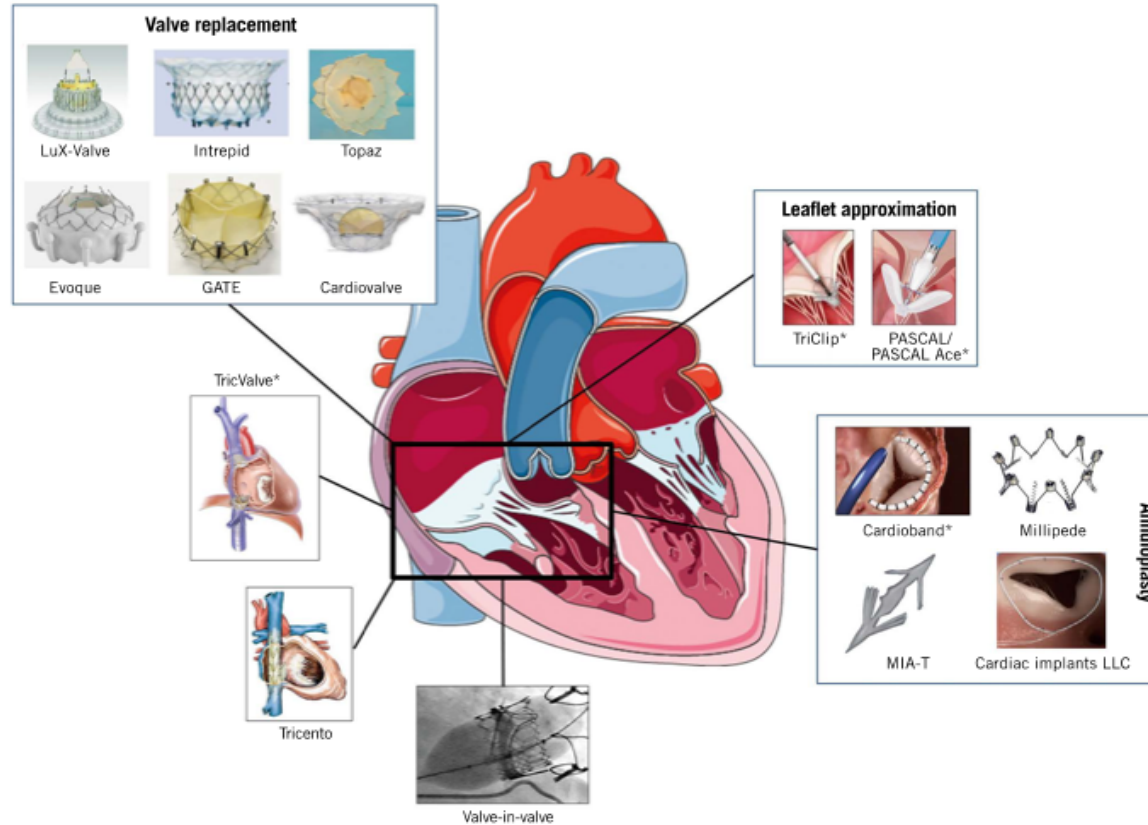


Gammie JS et Al. NEJM, November 13, 2021.

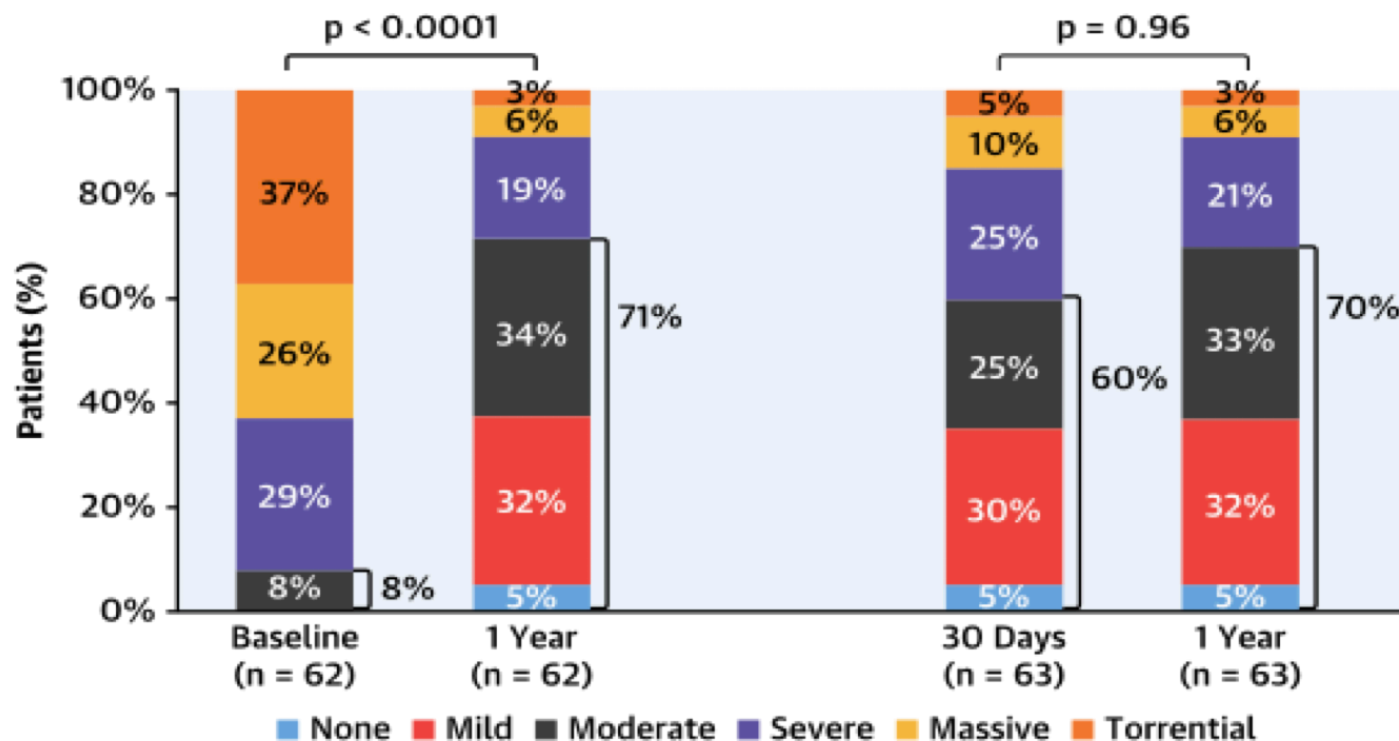
Developmental timeline of percutaneous tricuspid valve interventions



Transcatheter tricuspid systems approved or under clinical evaluation



Transcatheter Edge-to-Edge Repair for Treatment of Tricuspid Regurgitation -TRILUMINATE Study





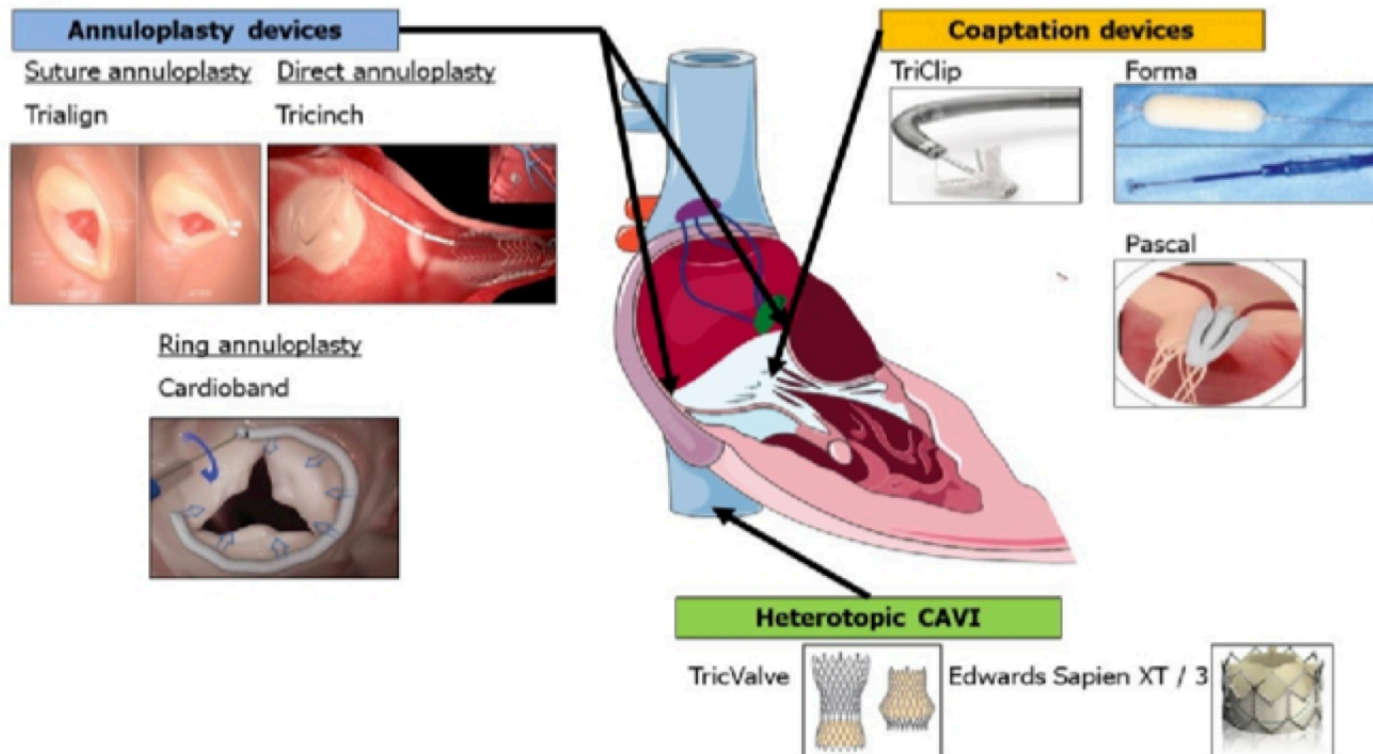
Clinical implications of functional tricuspid regurgitation in heart failure

FTR plays an important pathophysiologic and prognostic role in HFrEF

FTR evaluation needs to be better standardized

FTR grade should be included in individualized risk score

FTR represents a potential therapeutic target in HFrEF, in search of definite treatment options



Functional tricuspid regurgitation development

