

Quello che il cardiologo deve sapere quando pone indicazione agli interventi percutanei sulla mitrale

17° Meeting



CardioLucca

Heart Brings Heart 2023

Lucca, 22-24 Giugno 2023
Centro Congressi Auditorium San Francesco

Anna Sonia Petronio, MD
Direttore S.D. Emodinamica AOUP



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- ✓ **Insufficienza mitralica: epidemiologia e rischio chirurgico**
- ✓ **Principali interventi percutanei**
- ✓ **Riparazione edge-to-edge transcateretere**
- ✓ **Sostituzione transcateretere**
- ✓ **Criteri di inclusione e di esclusione**



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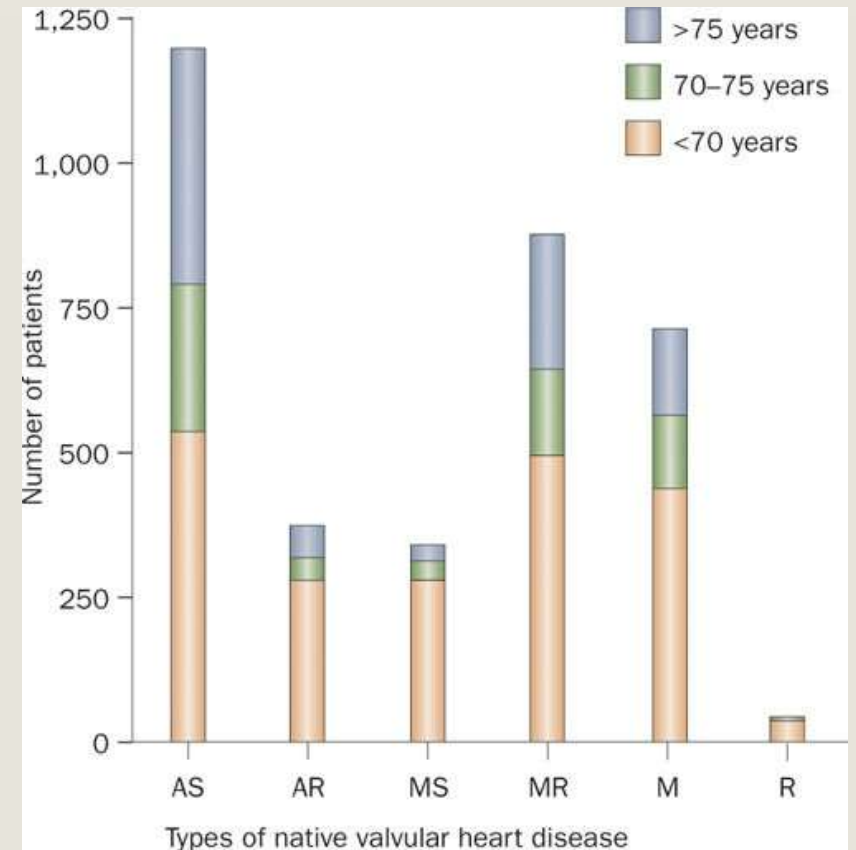
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Insufficienza mitralica: epidemiologia

- La **seconda più comune valvulopatia in Europa** dopo stenosi aortica
- **In US**, si stima una prevalenza **nel 2030** di circa **6 milioni di pazienti**.

INVECCHIAMENTO DELLA POPOLAZIONE -> COMORBIDITA'

lung B. Circulation. 2019 Oct
Nkomo VT. Lancet. 2006 Sep
lung B. Nat Rev Cardiol. 2011 Mar





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Contemporary Presentation and Management of Valvular Heart Disease

The EURObservational Research Programme Valvular Heart Disease II Survey

Bernard lung, MD, Victoria Delgado, MD, PhD, Raphael Rosenhek, MD,

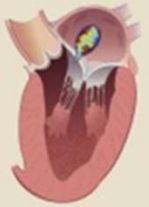


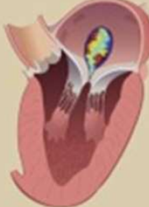
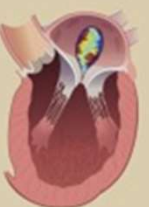

1114 MR patients (21.3%):

Primary MR (PMR) in 746

PRIMARY MR

Secondary MR (SMR) in 368

SECONDARY MR

Carpentier Type I	Carpentier Type II	Carpentier Type IIIa	Carpentier Type IIIb
(normal leaflet motion and position)	(excess leaflet motion)	(restricted leaflet motion in systole and diastole)	(restricted leaflet motion in systole)
 Leaflet Perforation Cleft	 Mitral Valve Prolapse	 Rheumatic Valve Disease Mitral Annular Calcification Drug Induced MR	
 Atrial MR	 Nonischemic Cardiomyopathy		 Ischemic Cardiomyopathy

lung B. Circulation. 2019 Oct

El Sabbagh A. JACC Cardiovasc Imaging. 2018 Apr



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Insufficienza mitralica: rischio chirurgico

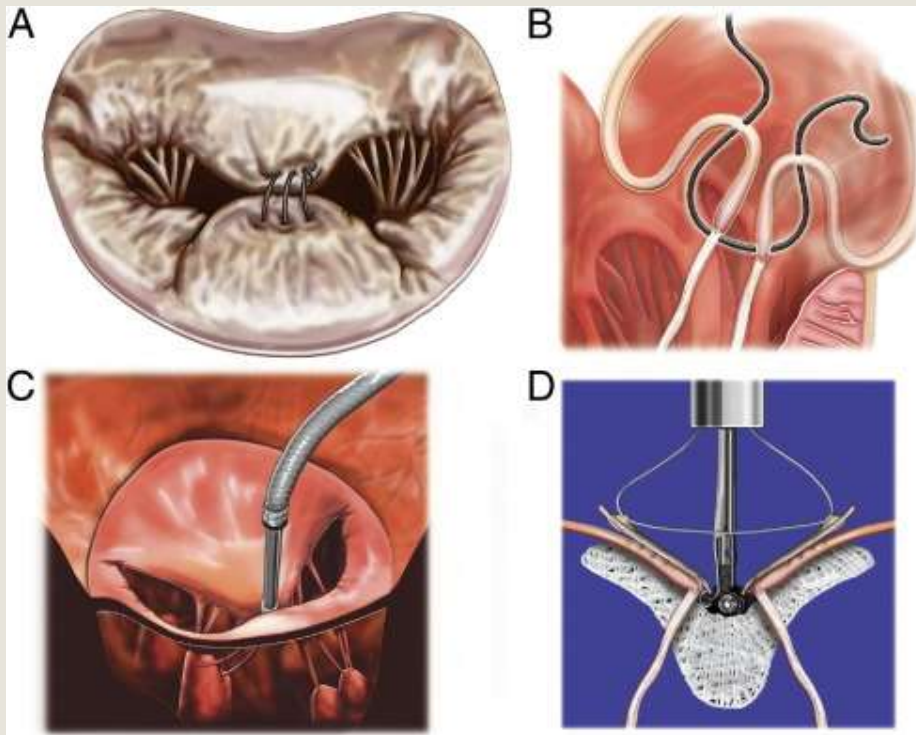
Table 5. Multivariable Prediction of the Risk of In-Hospital Mortality After Mitral Valve Surgery

Variables (1 = yes, 0 = no)	Adjusted OR	Coefficients	Wald χ^2	p Value
Sex (female)	1.38	0.4958	5.74	<0.001
Age (years)				
60–69	1.38	0.3239	1.99	0.158
70–75	2.45	0.8970	16.28	<0.001
76–79	2.40	0.8779	12.91	<0.001
80–95	2.39	0.8707	10.70	0.001
Creatinine ≥ 1.3 mg/dL	1.61	0.4772	8.88	0.003
Prior stroke	1.83	0.6049	9.70	0.002
Diabetes	1.47	0.3859	6.57	0.010
CAD	1.68	0.5187	10.85	0.001
NYHA 4	1.77	0.5690	14.51	<0.001
History of CHF ever	1.54	0.4291	5.74	0.017
Urgent priority	1.66	0.5083	8.95	0.003
Emergent priority	5.63	1.7289	58.56	<0.001
Valve replacement	1.64	0.4964	12.12	0.001
Year 1996–1998	0.87	-0.1414	0.75	0.388
Year 1991–1995	1.20	0.1856	1.34	0.247
Intercept		-4.9470		

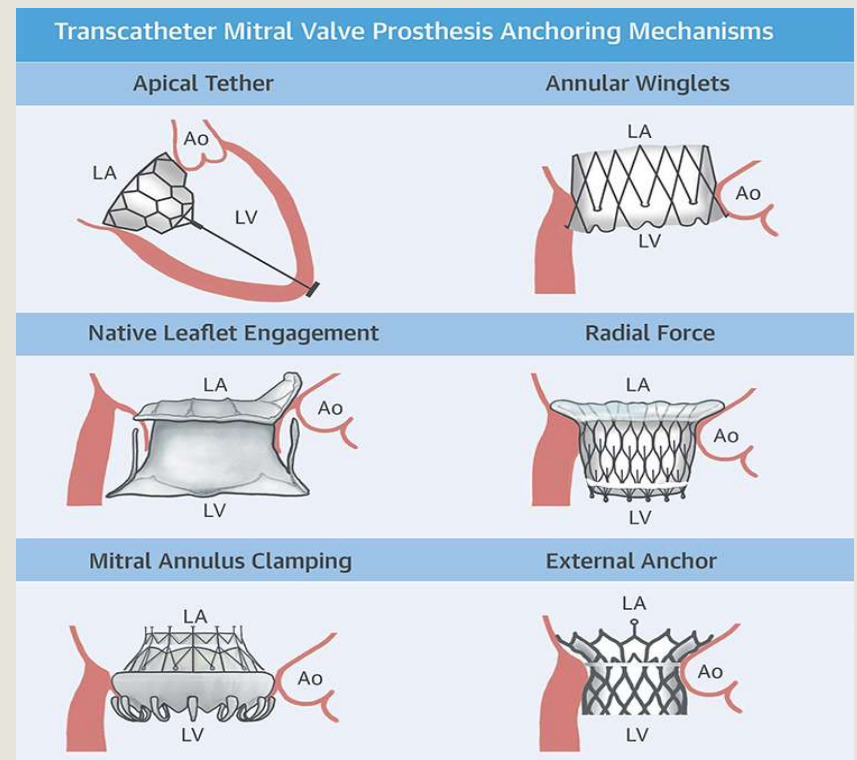
Nowicki ER. Ann Thorac Surg. 2004 Jun



Insufficienza mitralica: interventi percutanei



Transcatheter edge-to-edge repair
Maisano F. J Am Coll Cardiol. 2011 Nov



Transcatheter replacement
Regueiro A. J Am Coll Cardiol. 2017 May



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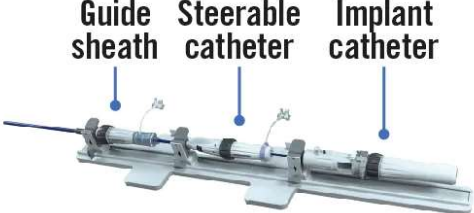


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Transcatheter edge-to-edge: devices

	MitraClip (4 th -generation)	PASCAL Precision (2 nd -generation)
Delivery catheter		 <p>Guide sheath Steerable catheter Implant catheter</p>
Available implants	 <p>NT NTW XT XTW</p>	 <p>P10 ACE</p>
Device material	Rigid arms of cobalt-chromium alloy	Flexible arms of nitinol
Central spacer	No	Yes
Optional independent grasping	Yes	Yes
Closure mechanism	Active (locking element)	Passive (nitinol shape memory)
Number of working catheters	2	3
Orientation of hooks/friction elements	Longitudinal	Horizontal
Continuous LA pressure	Yes	Yes
Overall system stability	High	Improved with PASCAL Precision

Hausleiter J.
EuroIntervention
2023 Jan



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Transcatheter edge-to-edge: criteri anatomici

Repair!		Centre experience	
Anatomical suitability for M-TEER		Replacement?	
Non-complex Ideal for M-TEER	Complex Suitable for M-TEER	Very complex Challenging for M-TEER	Criteria favouring replacement M-TEER hard or impossible
<ul style="list-style-type: none"> - Central pathology - No calcification - MVA >4.0 cm² - Posterior leaflet >10 mm - Tenting height <10 mm - Flail gap <10 mm - Flail width <15 mm 	<ul style="list-style-type: none"> - Isolated commissural lesion (A1/P1 or A3/P3) - Annular calcification without leaflet involvement - MVA 3.5-4.0 cm² - Posterior leaflet length 7-10 mm - Tenting height >10 mm - Asymmetric tethering²⁶ - Coaptation reserve <3 mm²⁴ - Leaflet-to-anulus index <1.2²⁵ - Flail width >15 mm - Flail gap >10 mm - Two jets from leaflet indentations 	<ul style="list-style-type: none"> - Commissural lesion with multiple jets - Annular calcification with leaflet involvement - Fibrotic leaflets - Wide jet involving the whole coaptation - MVA 3.0-3.5 cm² - Posterior leaflet length 5-7 mm - Barlow's disease - Cleft - Failed surgical annuloplasty 	<ul style="list-style-type: none"> - Concentric MAC with stenosis - MVA <3.0 cm² - Relevant mitral valve stenosis (mean gradient >5 mmHg) - Posterior leaflet <5 mm - Calcification in the grasping zone - Deep regurgitant cleft - Leaflet perforation - Multiple/wide jets - Rheumatic mitral stenosis



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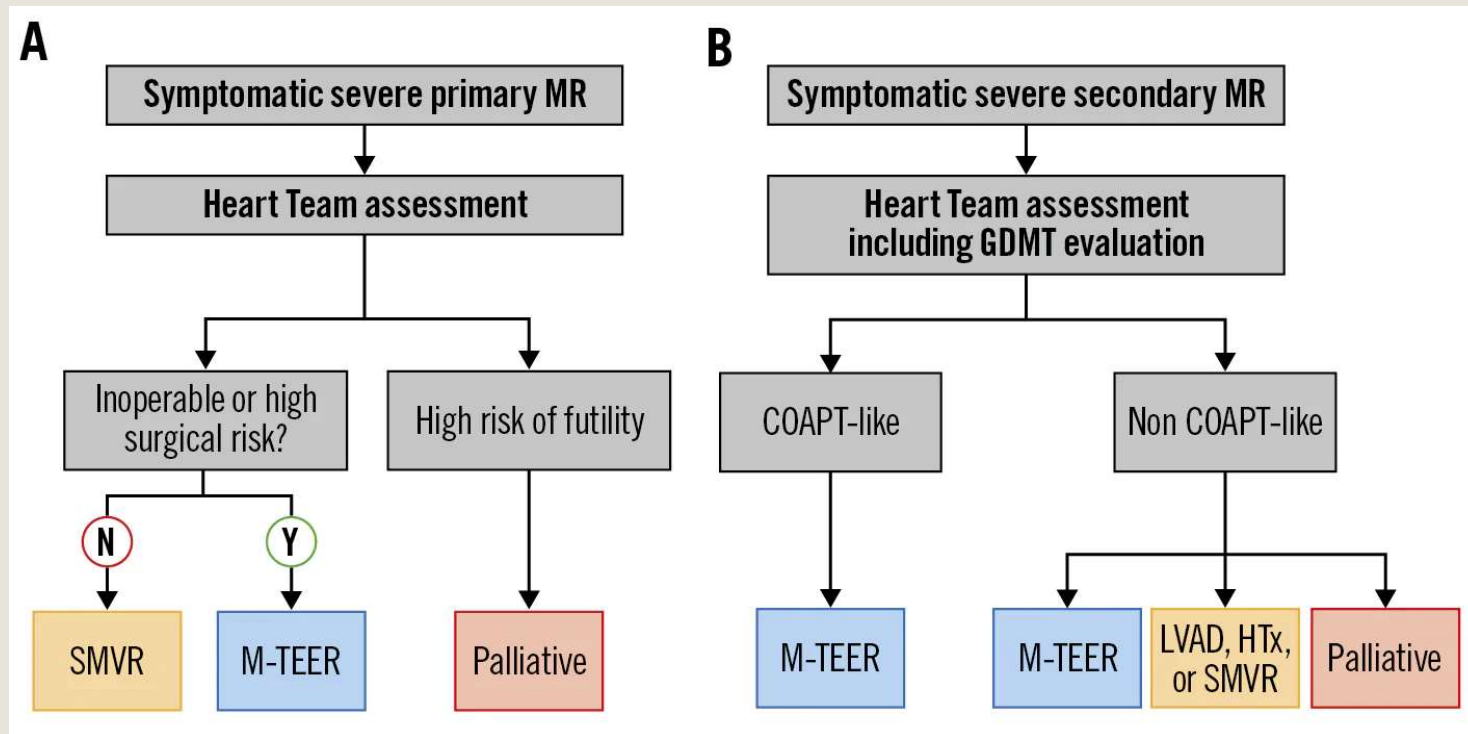
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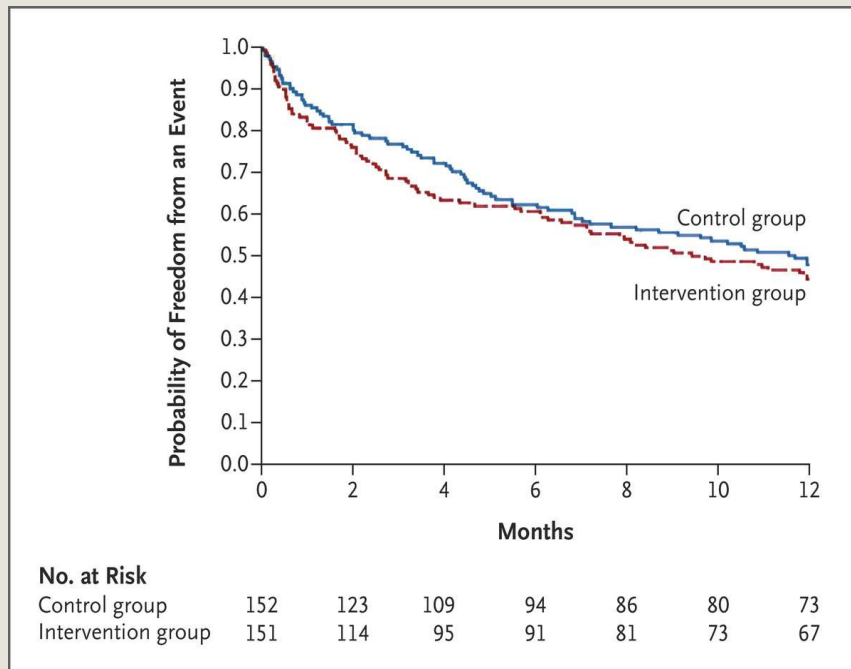
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Transcatheter edge-to-edge: algoritmo decisionale



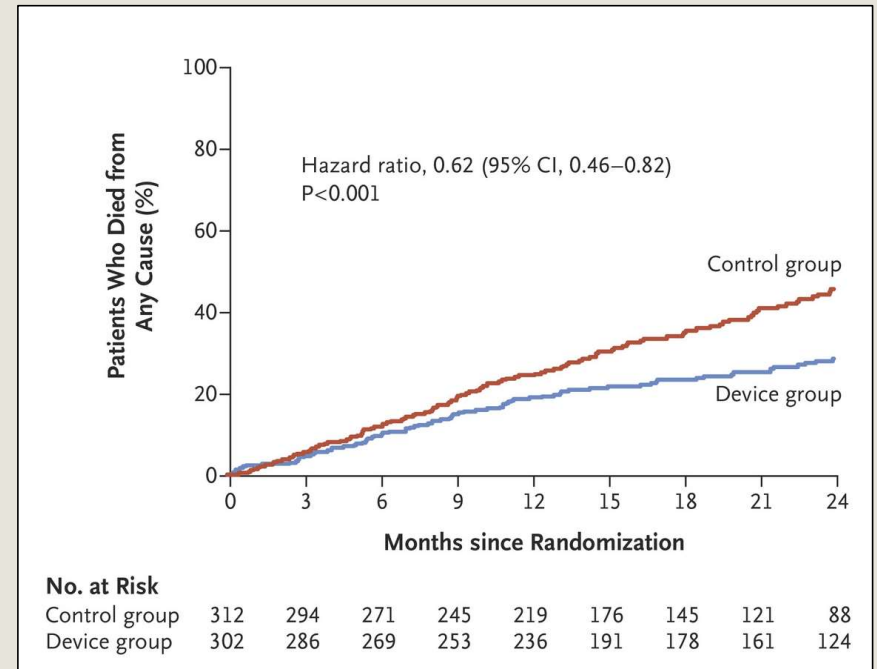


Transcatheter edge-to-edge in SMR: MITRA-FR vs COAPT



MITRA-FR

Obadia JF. *N Engl J Med* 2018 Dec



COAPT

Stone GW. *N Engl J Med* 2018 Dec



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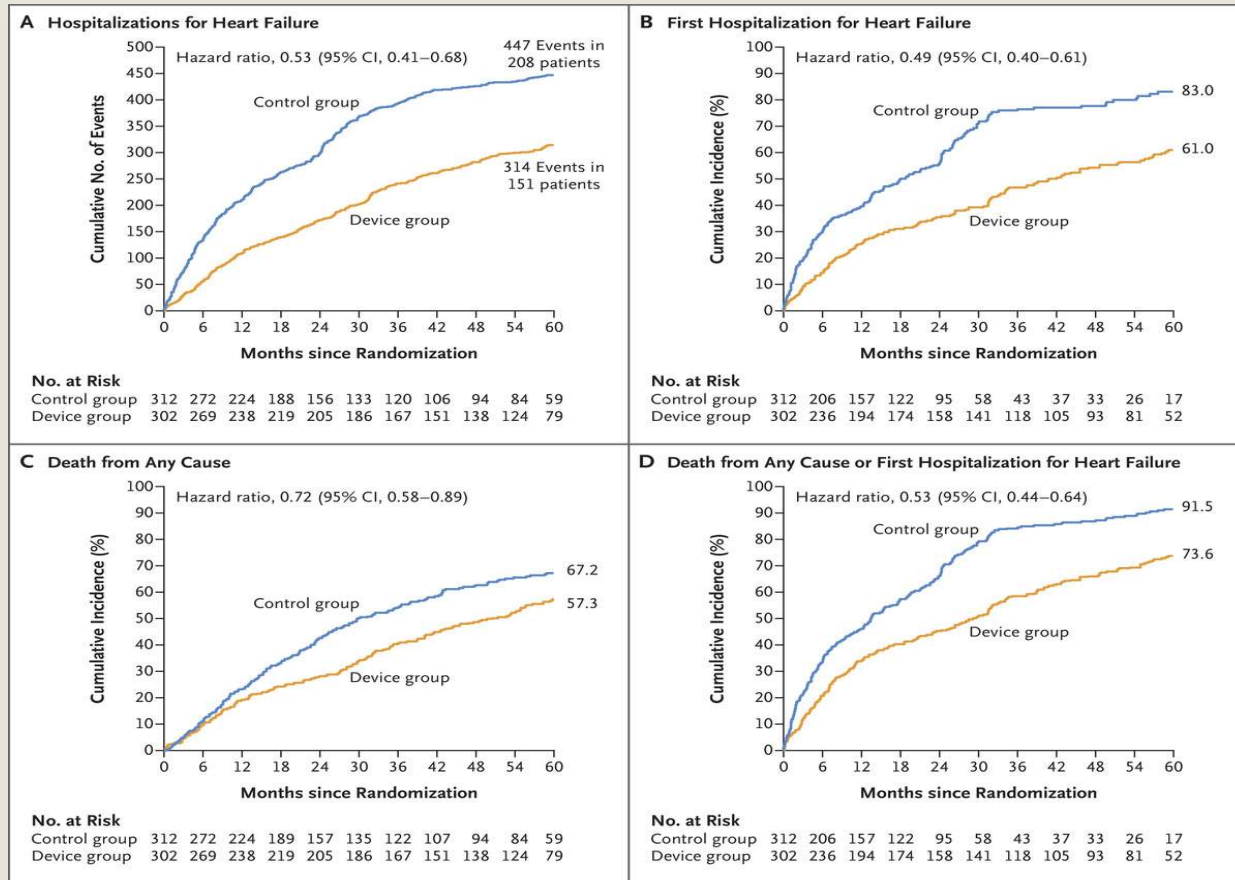
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Transcatheter edge-to-edge in SMR: risultati del COAPT a 5 anni



Stone GW. N Engl J Med 2023 Jun



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Transcatheter edge-to-edge in SMR: criteri COAPT

YES

COAPT criteria

Indication CoR IIa LoE B for M-TEER in SMR

NO

- Severe SMR
- Optimised HF treatments according to 2021 ESC guidelines
- NYHA Class II, III or ambulatory IV
- LVEF 20-50%
- LV end-systolic diameter ≤ 70 mm
- At least one HF hospitalisation within the previous year or increased NP levels
- Anatomy judged suitable for M-TEER

- Haemodynamic instability
- Stage D HF
- Moderate or severe RV dysfunction
- Systolic pulmonary pressure >70 mmHg
- COPD requiring oxygen or steroid
- Coronary, aortic or tricuspid valve disease requiring surgery
- Hypertrophic, restrictive or infiltrative cardiomyopathy



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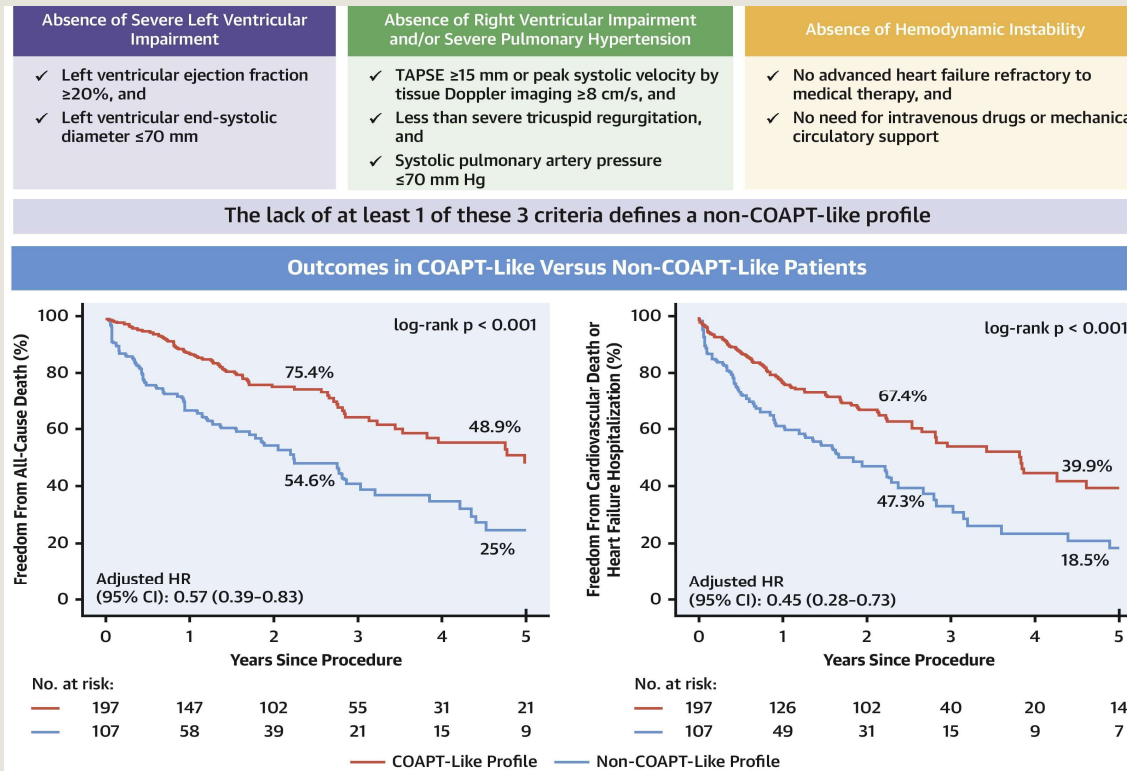
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Transcatheter edge-to-edge in SMR: COAPT-like Profile





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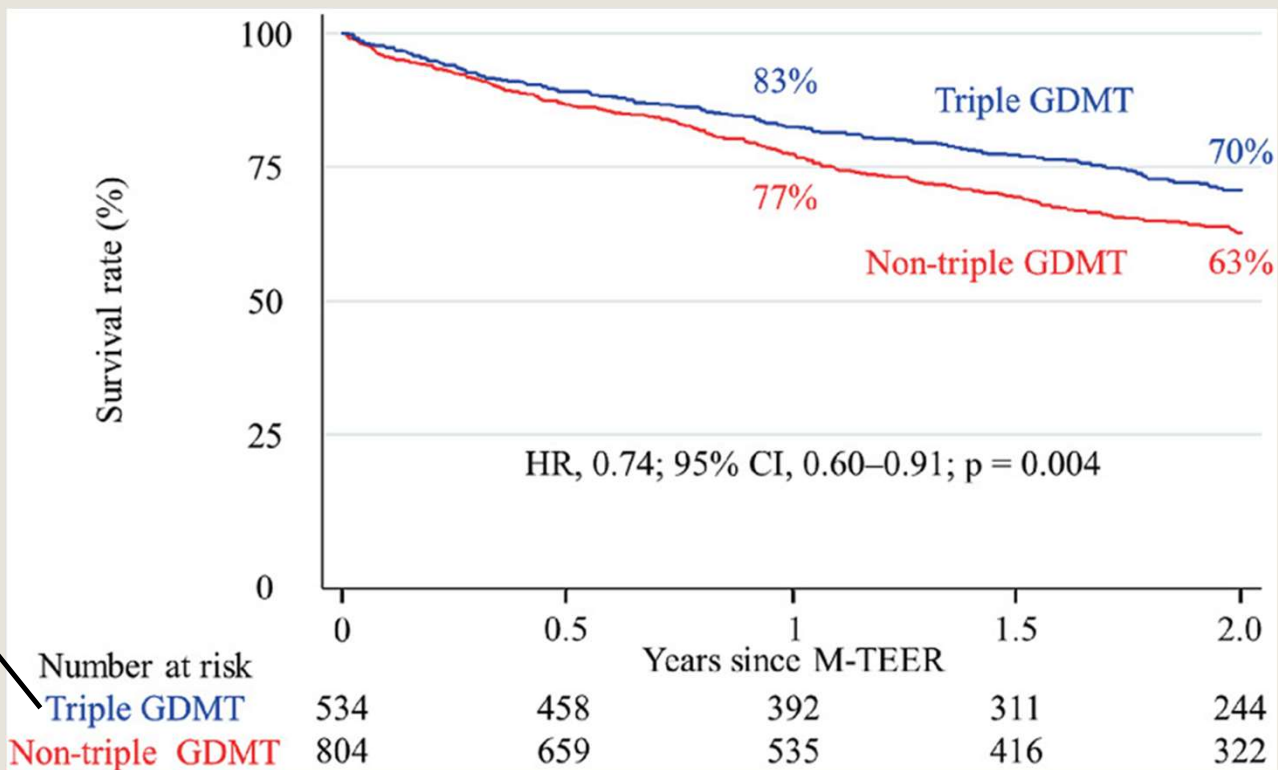
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Transcatheter edge-to-edge in SMR: GDMT e prognosi



Solo il 40%!!

Età avanzata, IRC,
ipotensione,
bradicardia...



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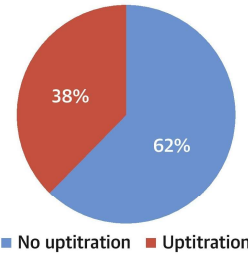
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Transcatheter edge-to-edge in SMR: ottimizzazione della GDMT dopo TEER?

CENTRAL ILLUSTRATION: Prevalence, Predictors, and Impact on Outcomes of Guideline-Directed Medical Therapy Uptitration After Mitral Transcatheter Edge-to-Edge Repair

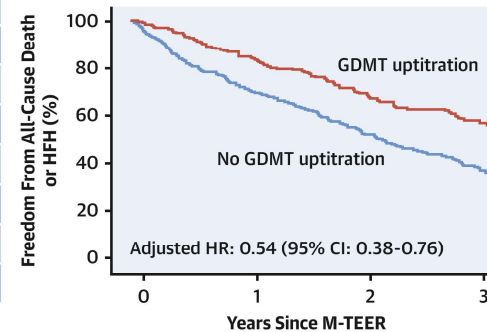
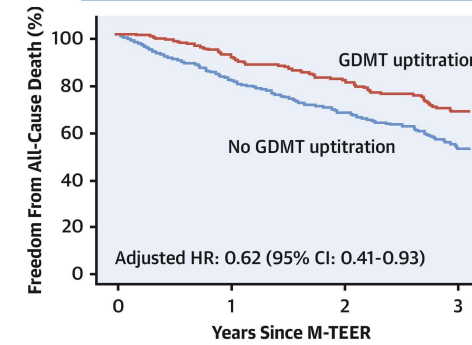
GDMT Uptitration After M-TEER



Predictors of GDMT Uptitration

Variables*	OR (95% CI)	P Value
NT-proBNP	1.16 (0.56-2.41)	0.695
Systolic pulmonary artery pressure	0.99 (0.97-1.02)	0.513
Previous myocardial infarction	0.81 (0.38-1.75)	0.593
Mean arterial blood pressure	1.00 (0.98-1.02)	0.868
Glomerular filtration rate	1.01 (0.99-1.02)	0.280
MR reduction of at least 3 grades	1.71 (1.08-2.71)	0.022
NYHA improvement (≥ 1 class)	0.66 (0.35-1.25)	0.200

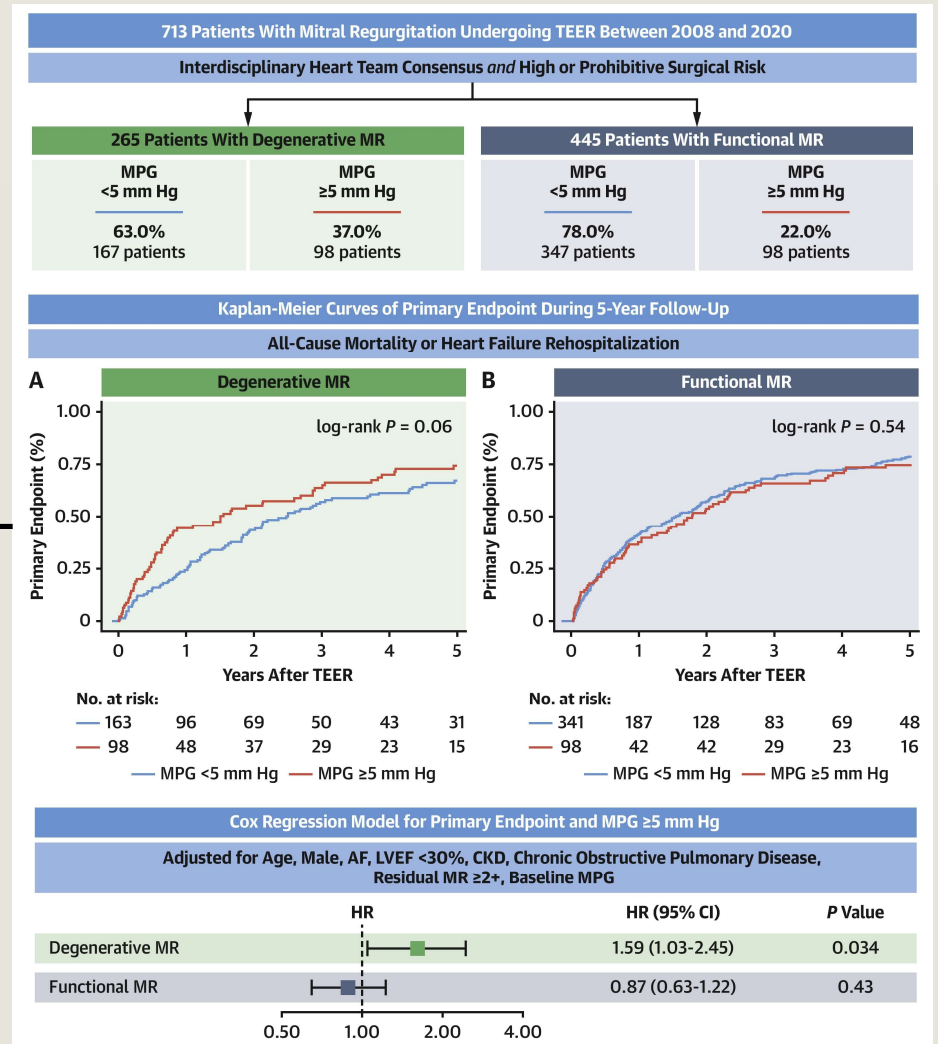
Association Between GDMT Uptitration and Outcomes





Transcatheter edge-to-edge: Il mito del gradiente

**NO VALORE PROGNOSTICO
 NELLE FORME SECONDARIE**

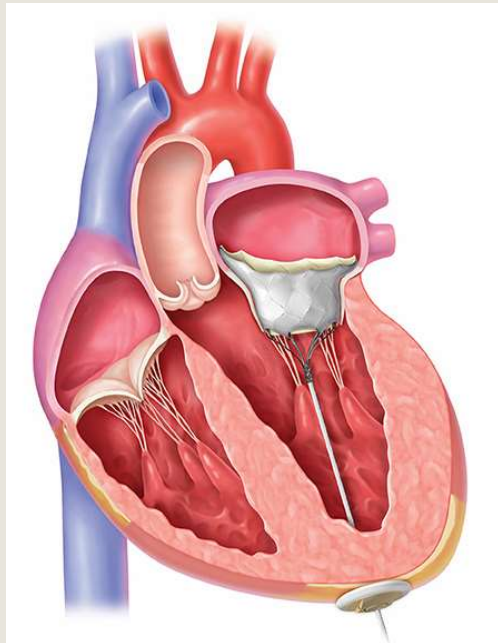




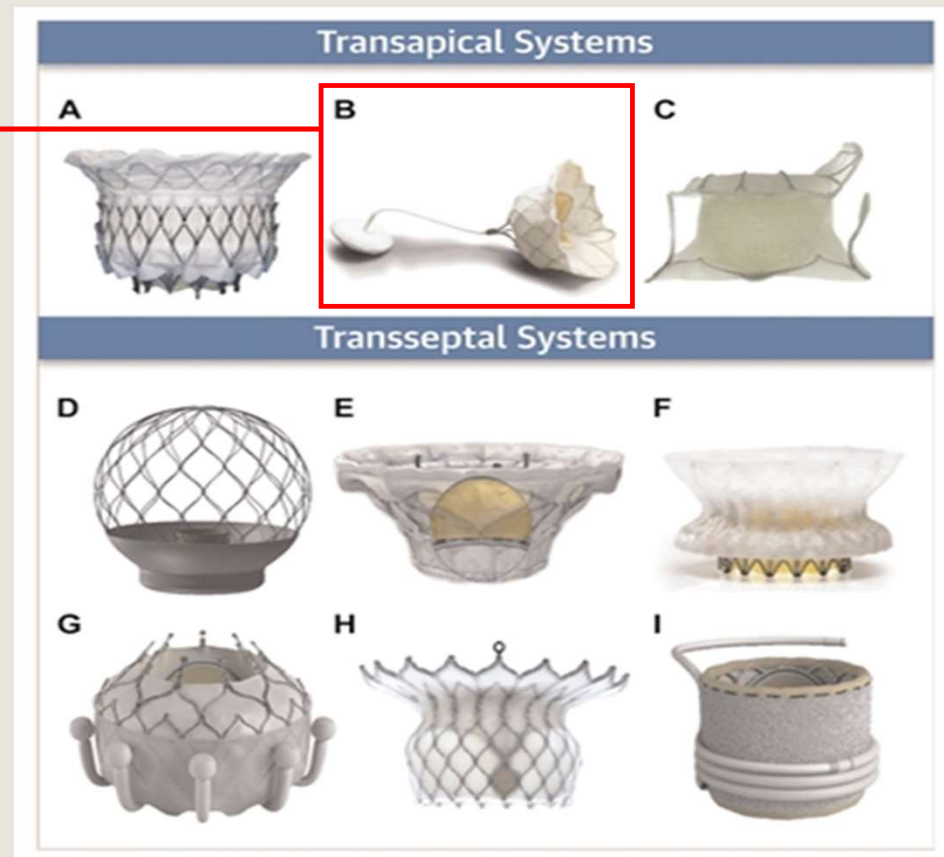
Transcatheter replacement: devices

Hensey M. JACC Cardiovasc Interv 2021 Mar

TENDYNE

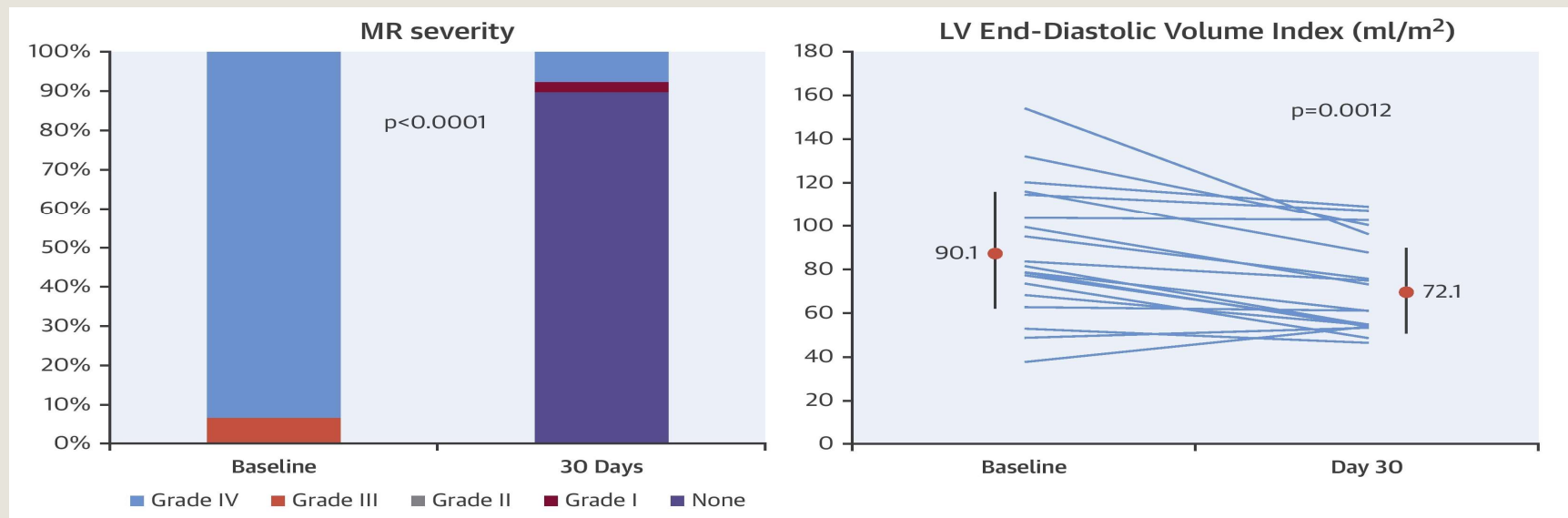


Dahle G. Front Cardiovasc Med. 2020





Transcatheter replacement: risultati iniziali con Tendyne



“A mitral prosthesis was **successfully implanted** in 28 of the 30 patients (**93.3%**). In these 28 patients, the **residual MR** (valvular or paravalvular) was **grade 0 in all but 1 patient** and there was **no LVOT obstruction** (peak gradient all < 5 mm Hg)”



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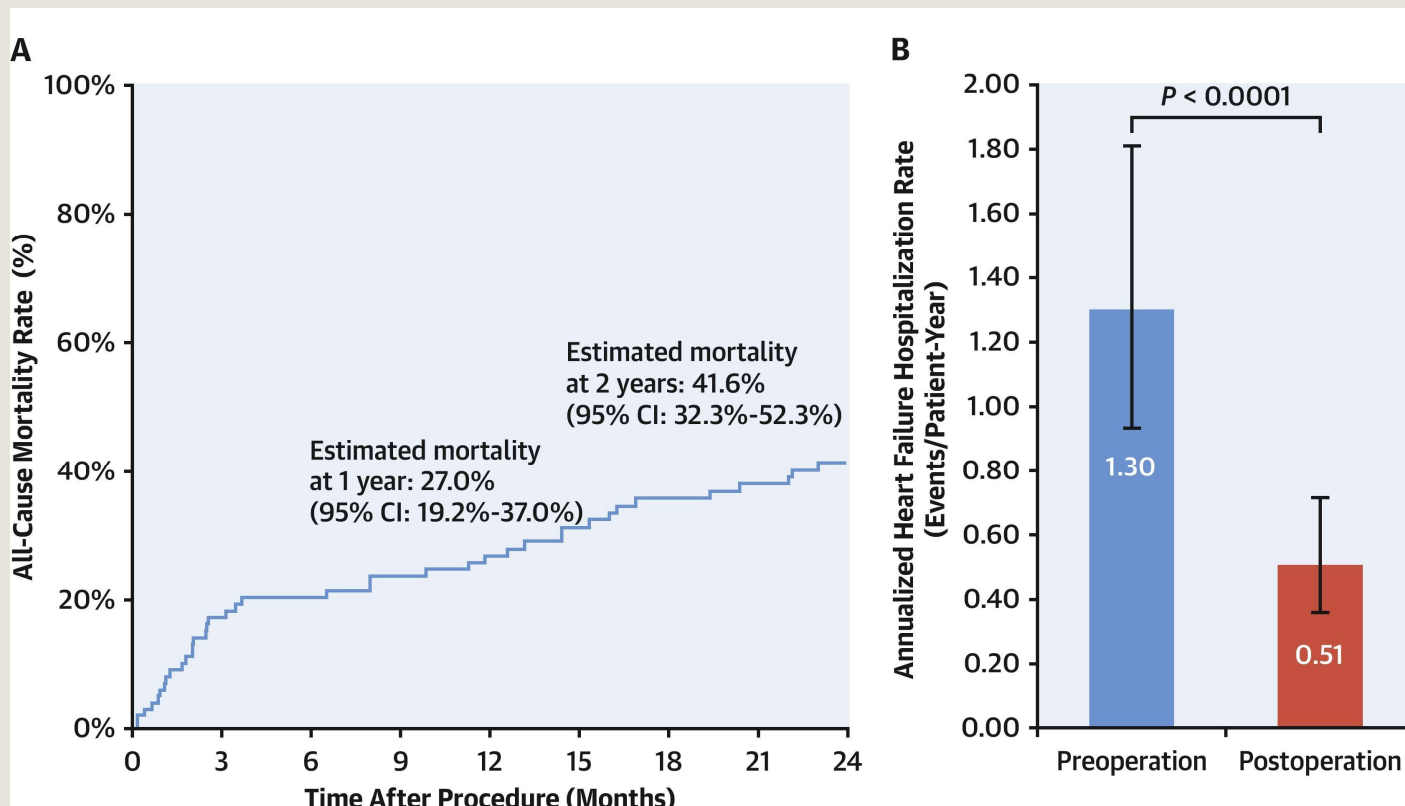
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Transcatheter replacement: dati di outcome con Tendyne



Muller DWM. J Am Coll Cardiol. 2021 Nov



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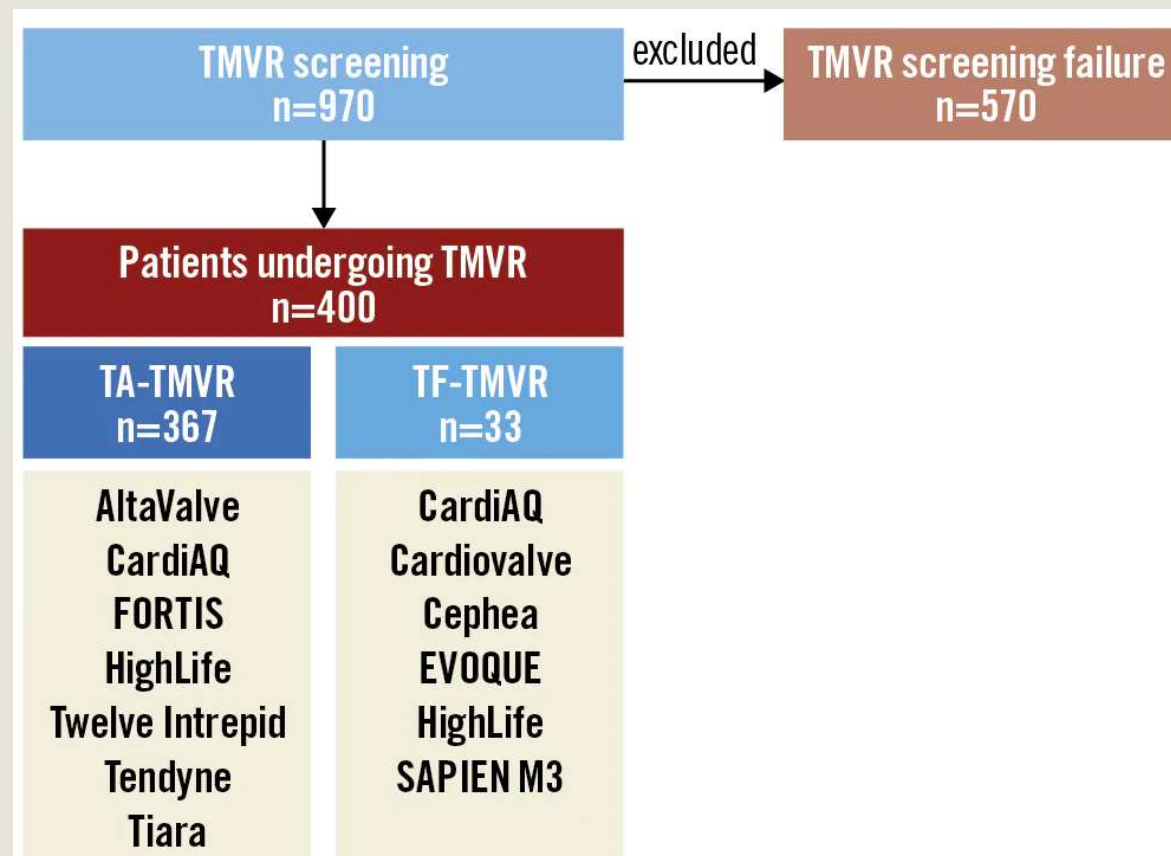
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Transcatheter replacement: registro CHOICE





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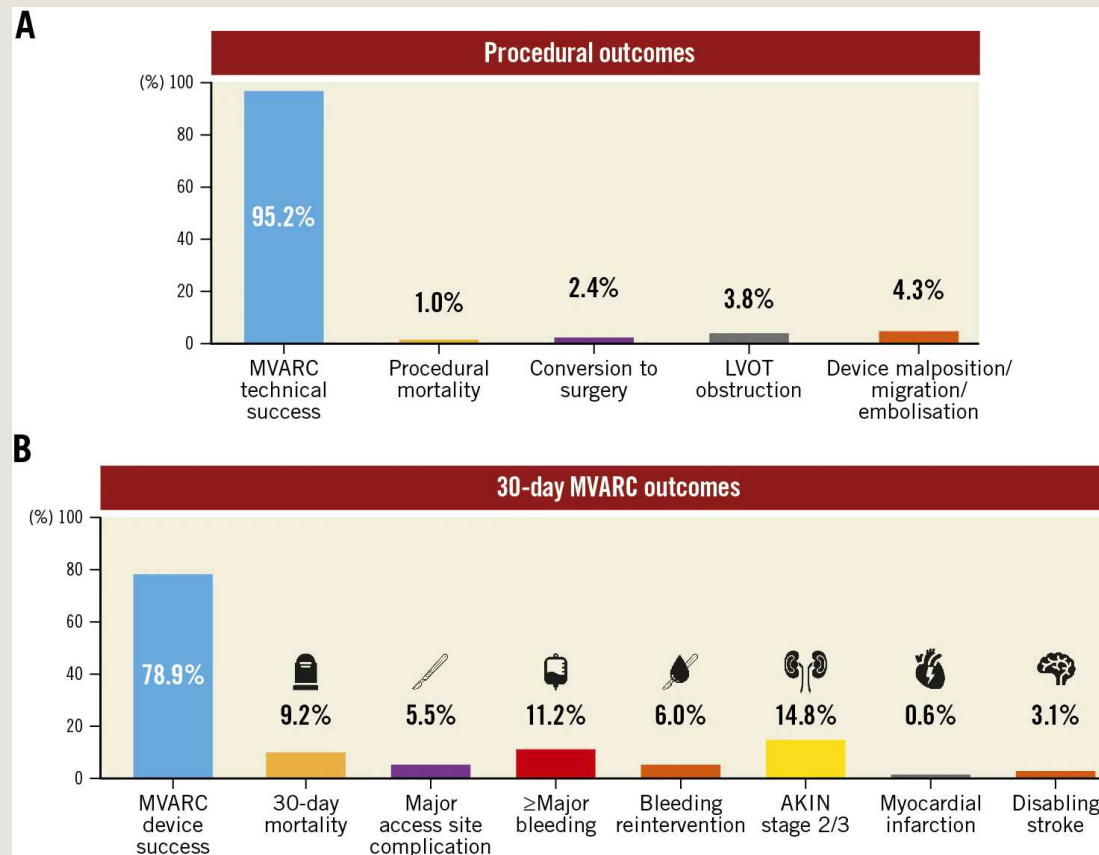
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Transcatheter replacement: registro CHOICE



Ludwig S. EuroIntervention
2023 May



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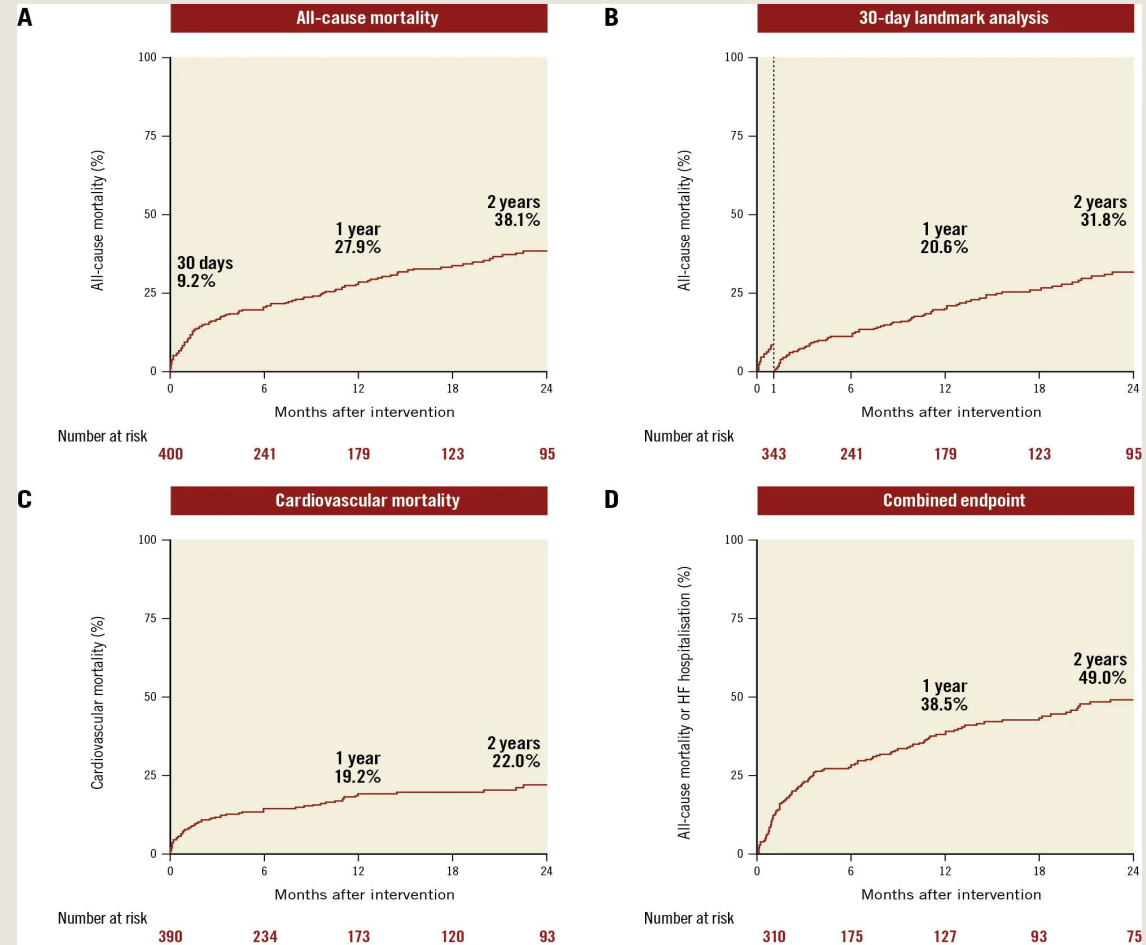
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Transcatheter replacement: registro CHOICE



Ludwig S. EuroIntervention
2023 May



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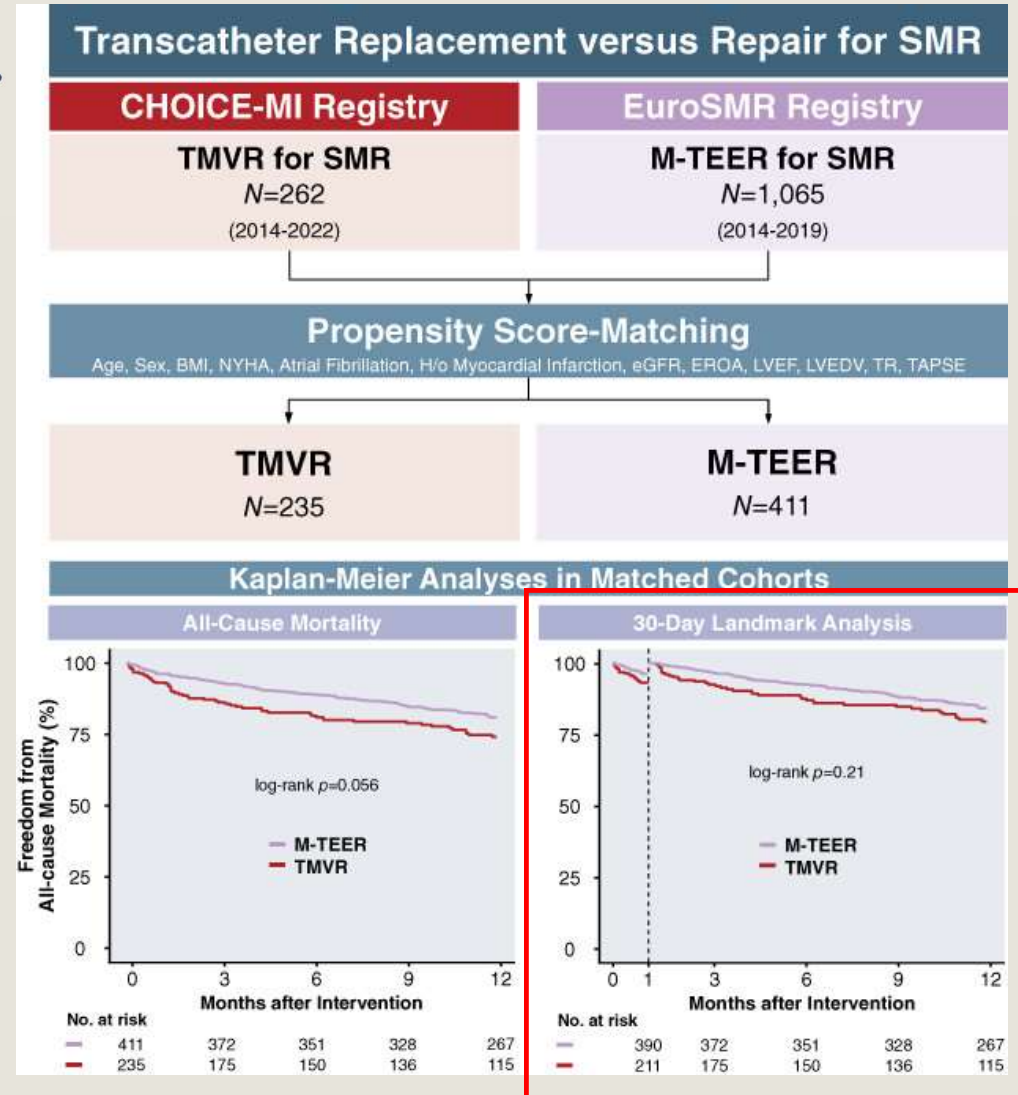
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Transcatheter replacement vs repair

Mortalità post-procedura tende a essere maggiore per TMVR rispetto a TEER

Dopo aver escluso i primi 30 giorni dopo la procedura non si osserva differenza





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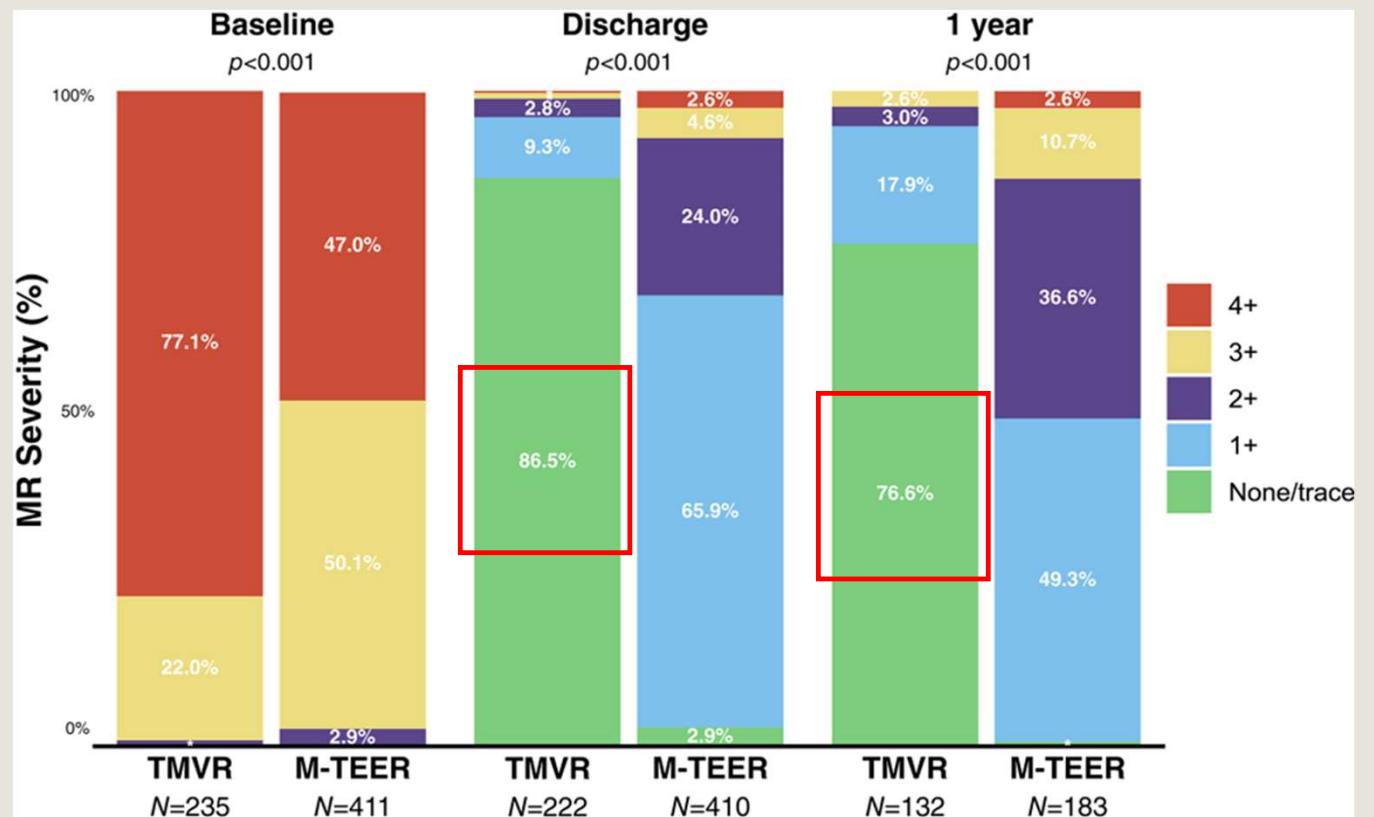


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Transcatheter replacement vs repair

TMVR si associa a maggior riduzione dell'insufficienza





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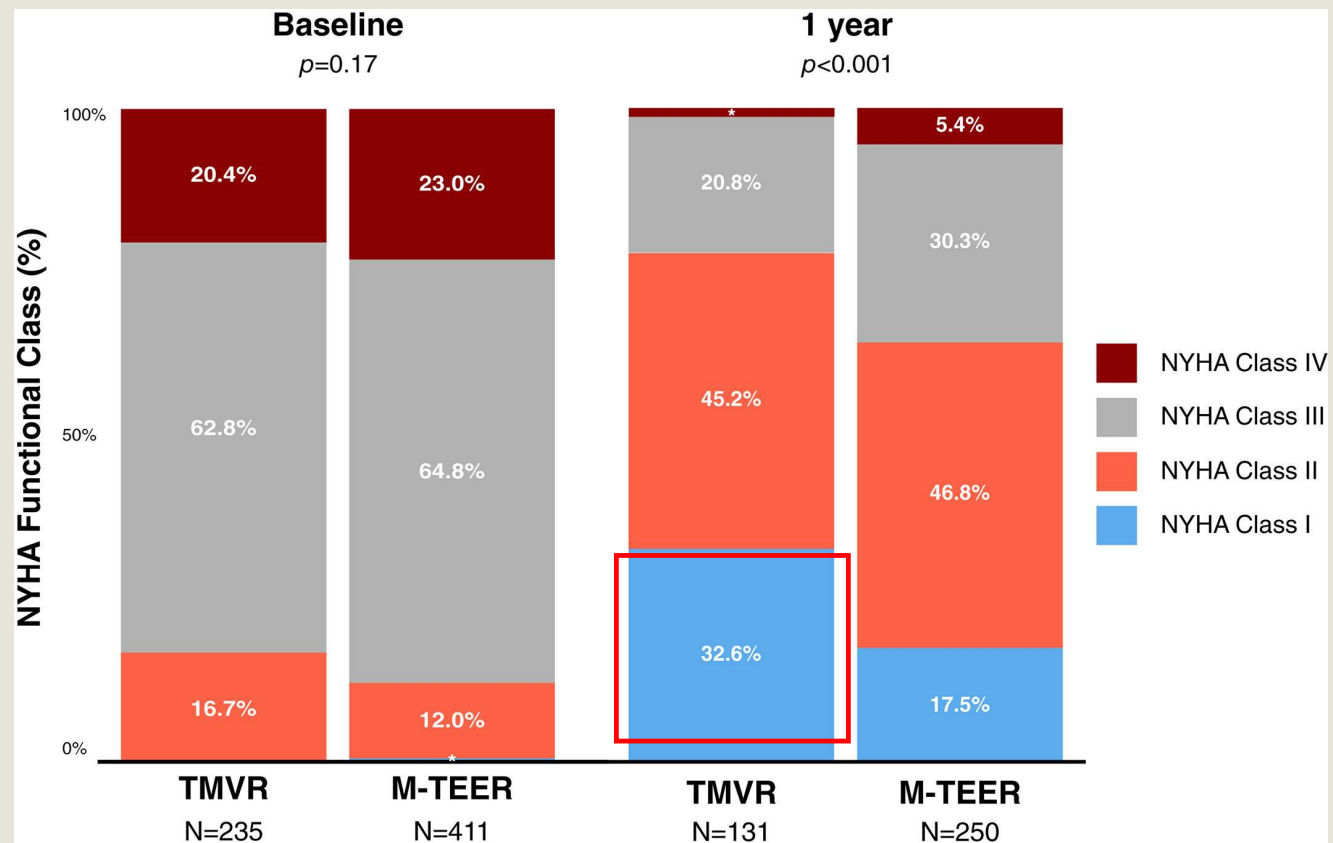


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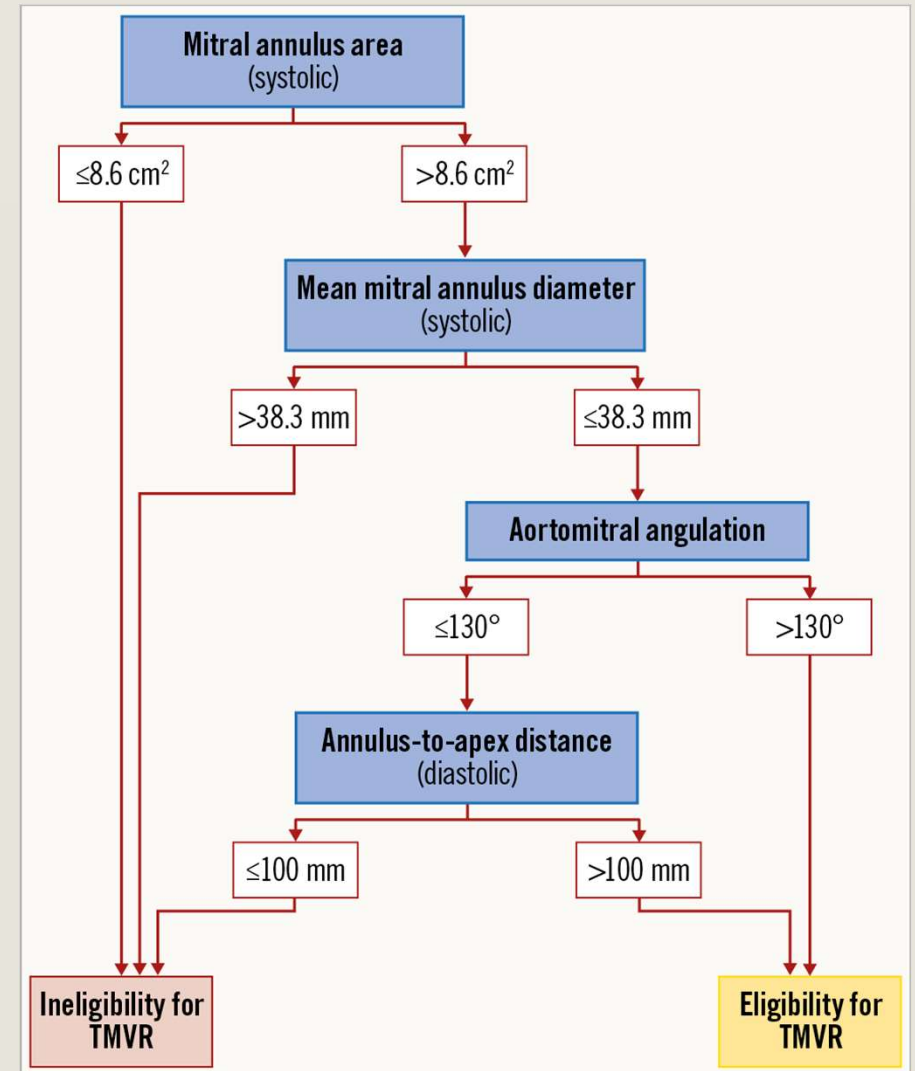
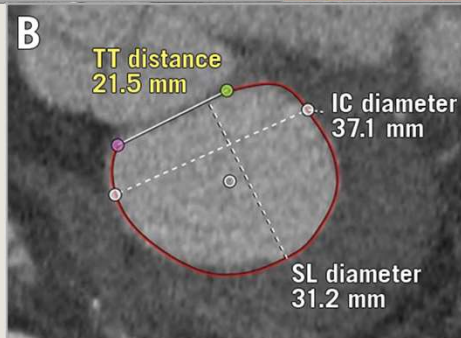
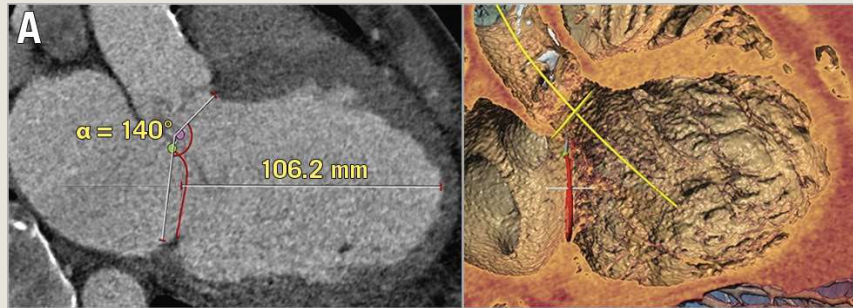
Transcatheter replacement vs repair

TMVR più evidente
miglioramento dei sintomi





Transcatheter replacement: algoritmo decisionale





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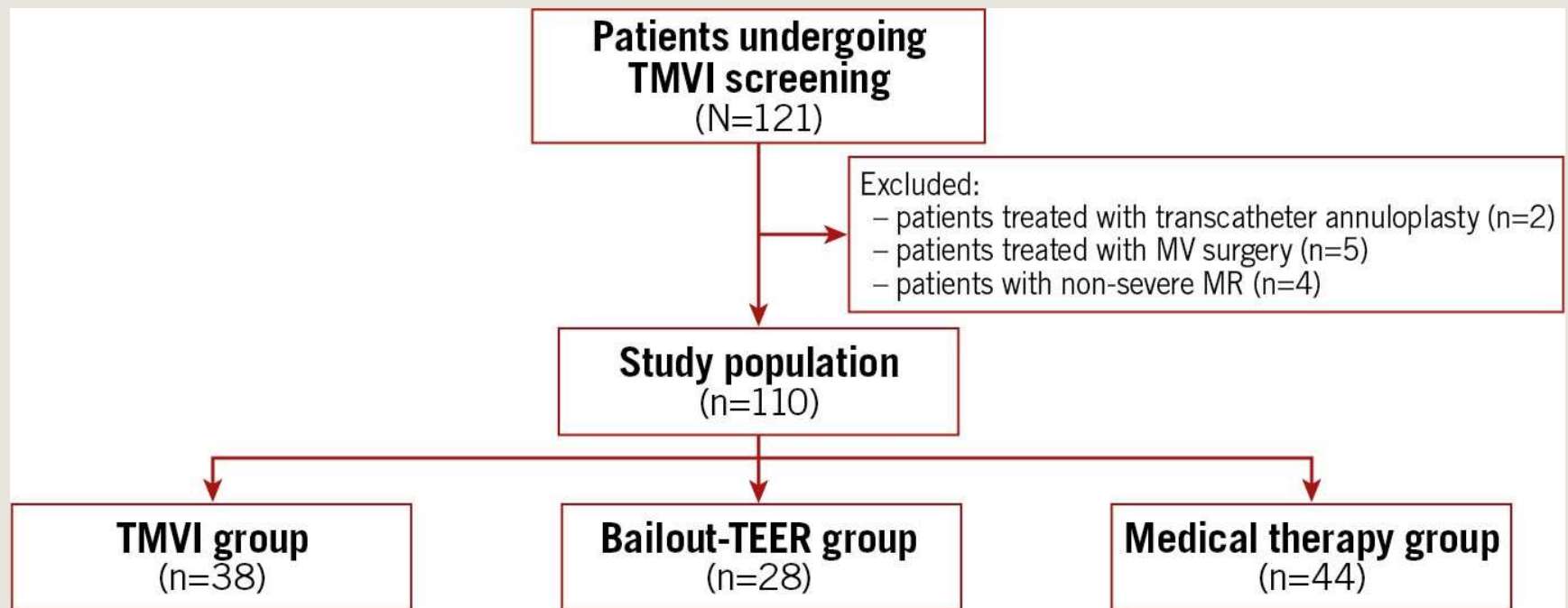
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Transcatheter replacement: screening failure





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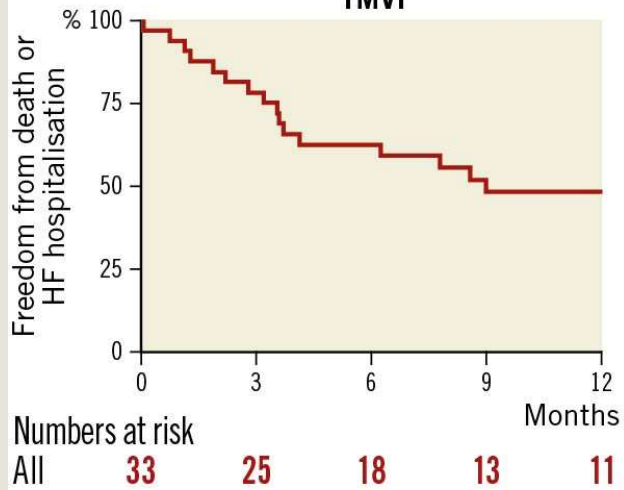


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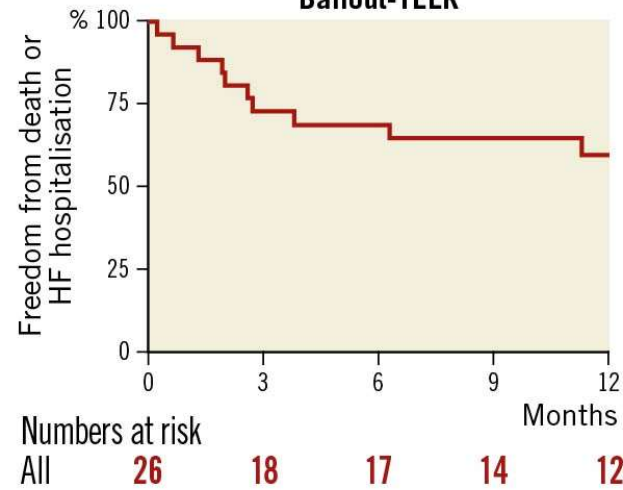
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Transcatheter replacement: screening failure

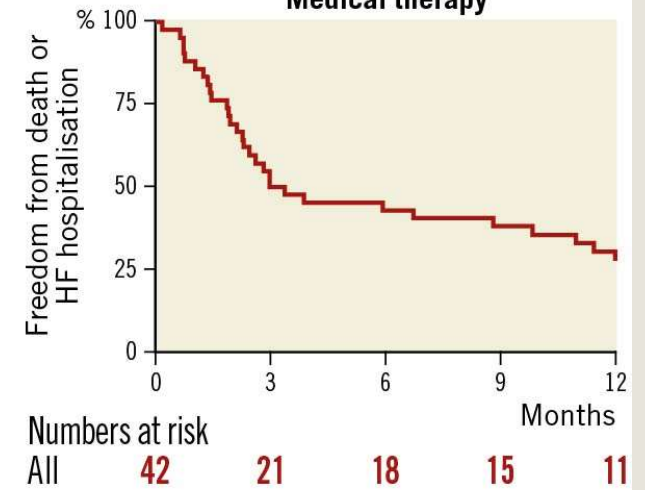
All-cause death or HF hospitalisation
TMVI



Bailout-TEER



Medical therapy





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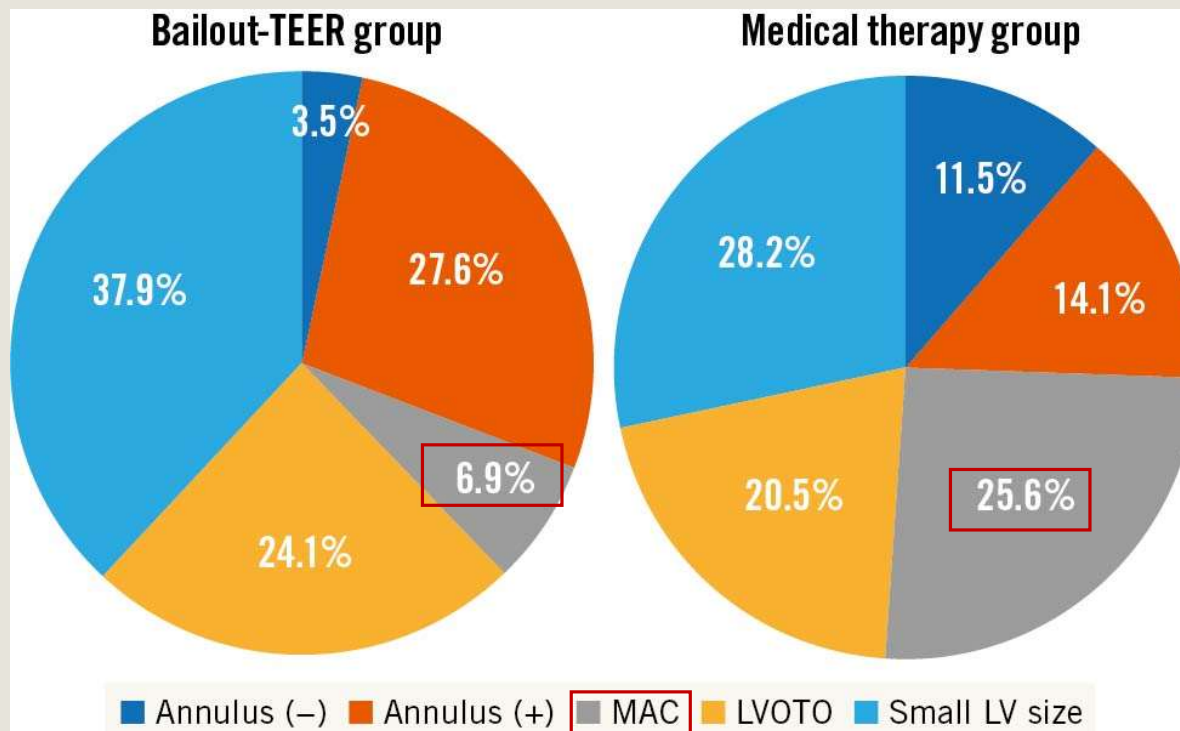
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Transcatheter replacement: i motivi dello screening failure





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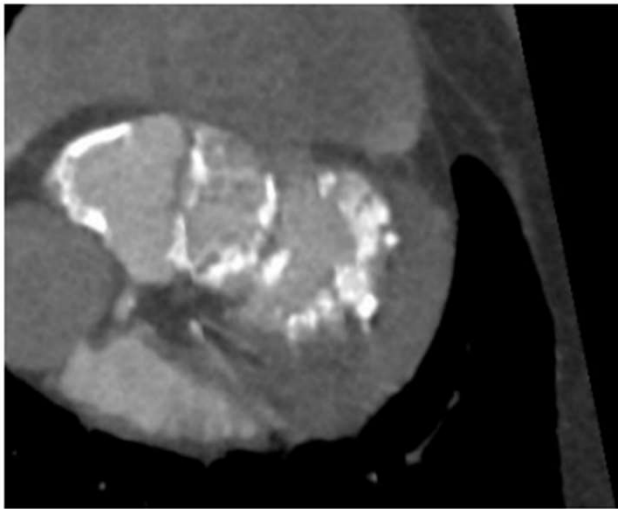


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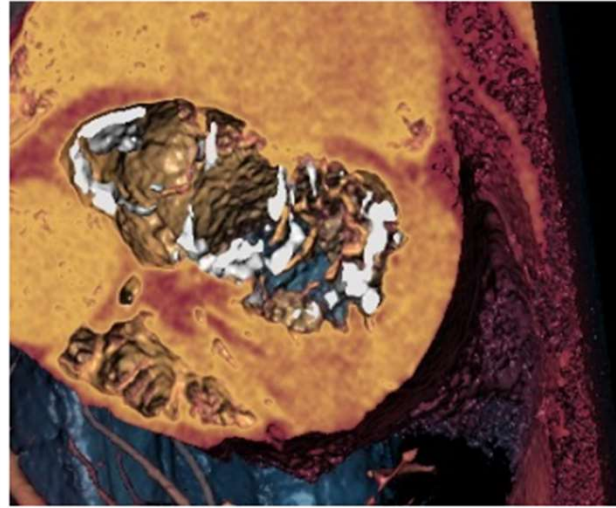
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Transcatheter replacement: MAC

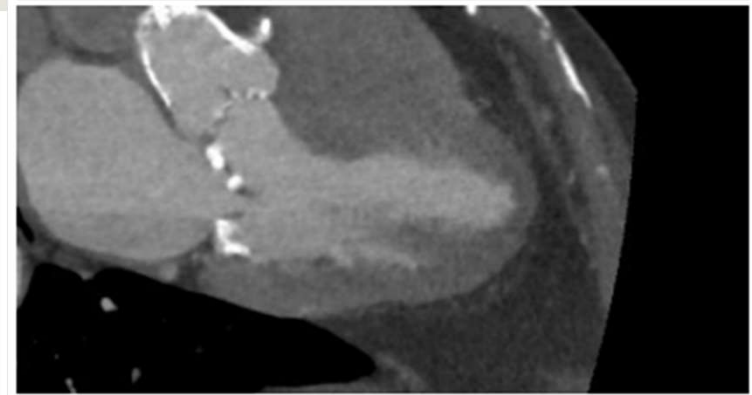
MPR



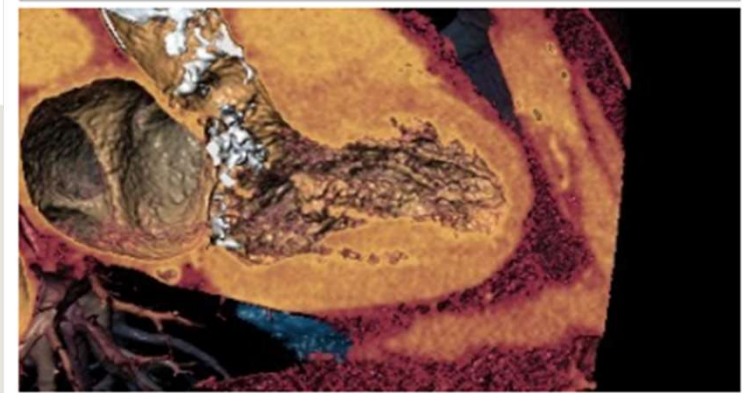
Volume Rendering



Double Oblique (MPR)



Volume Rendering

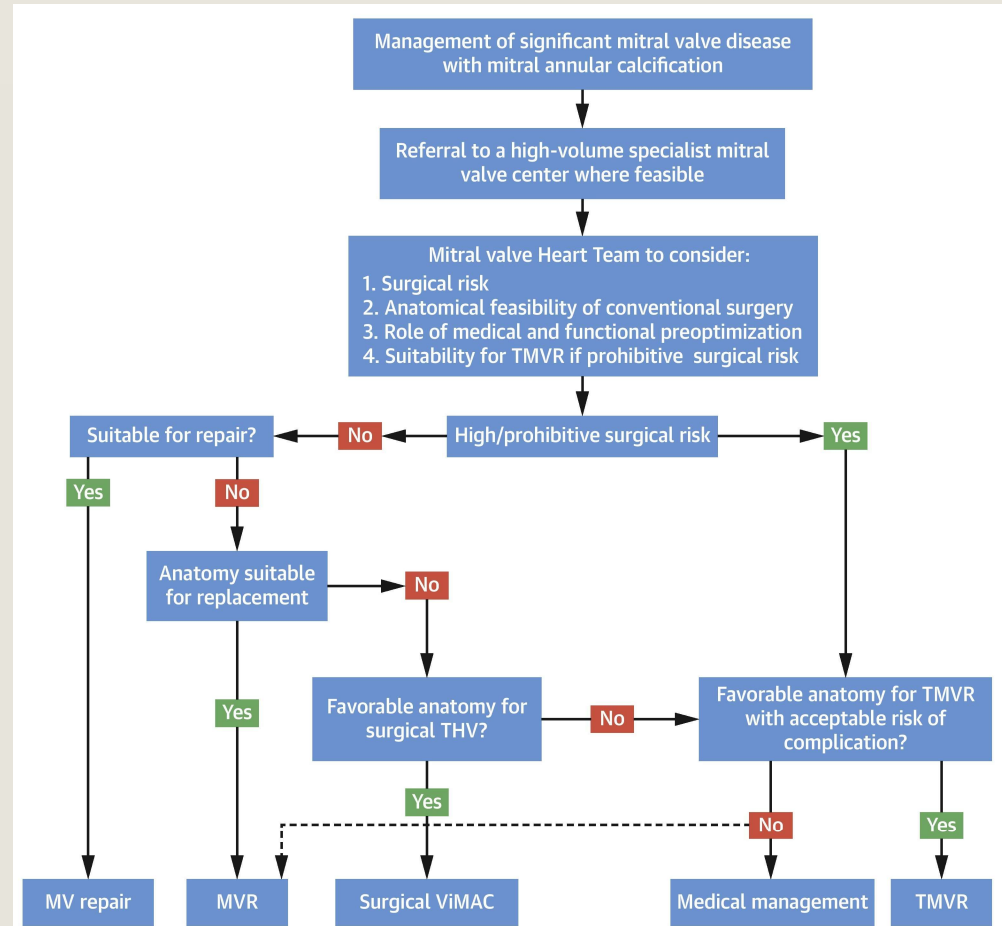


Giannini C. J Cardiovasc Med (Hagerstown) 2022 Nov



Transcatheter replacement: MAC

UN'OPZIONE POSSIBILE





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Transcatheter replacement: Tendyne e MAC

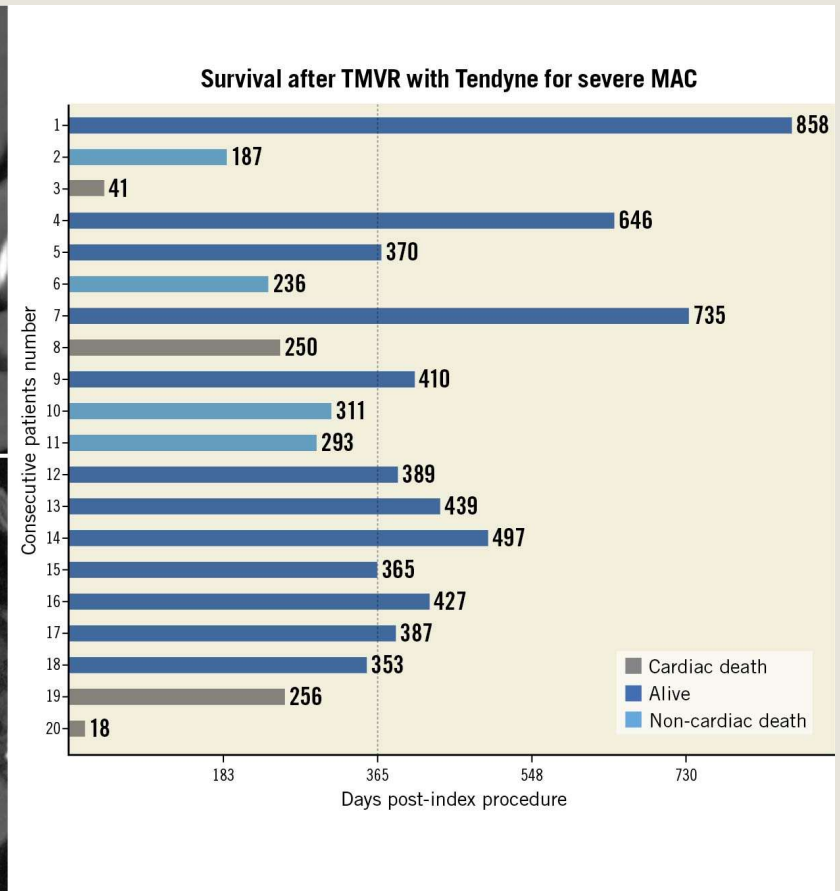
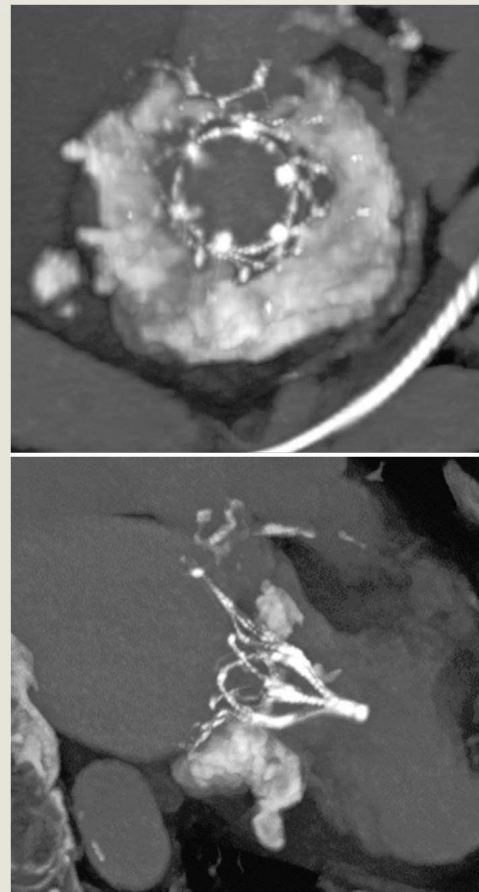
Gössl M. EuroIntervention. 2022 Apr

A 1 anno

- Mortalità per tutte le cause: **40%** (8 pazienti)
- La mortalità per causa **cardiovascolare: 20%** (4 pazienti)



Mortalità simile a TEER ad alto rischio (16 – 22%) e ai risultati del registro SAPIEN in MAC (24 – 33 %)





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Conclusioni

- ✓ **Gli interventi percutanei** rappresentano **un'alternativa sicura e valida** per i pazienti con insufficienza mitralica.
- ✓ La **corretta selezione** dei pazienti e **l'ottimizzazione della terapia medica** sono fondamentali per garantire una buona prognosi post-procedurale.
- ✓ Anche in caso di **anatomie mitraliche ostiche**, le **procedure percutanee di riparazione/sostituzione** sembrano garantire **una prognosi migliore rispetto alla sola terapia medica**.



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Grazie per l'attenzione