



LEAK PARAVALVOLARI DOPO TAVI : APPROCCIO DIAGNOSTICO E STRATEGIE TERAPEUTICHE

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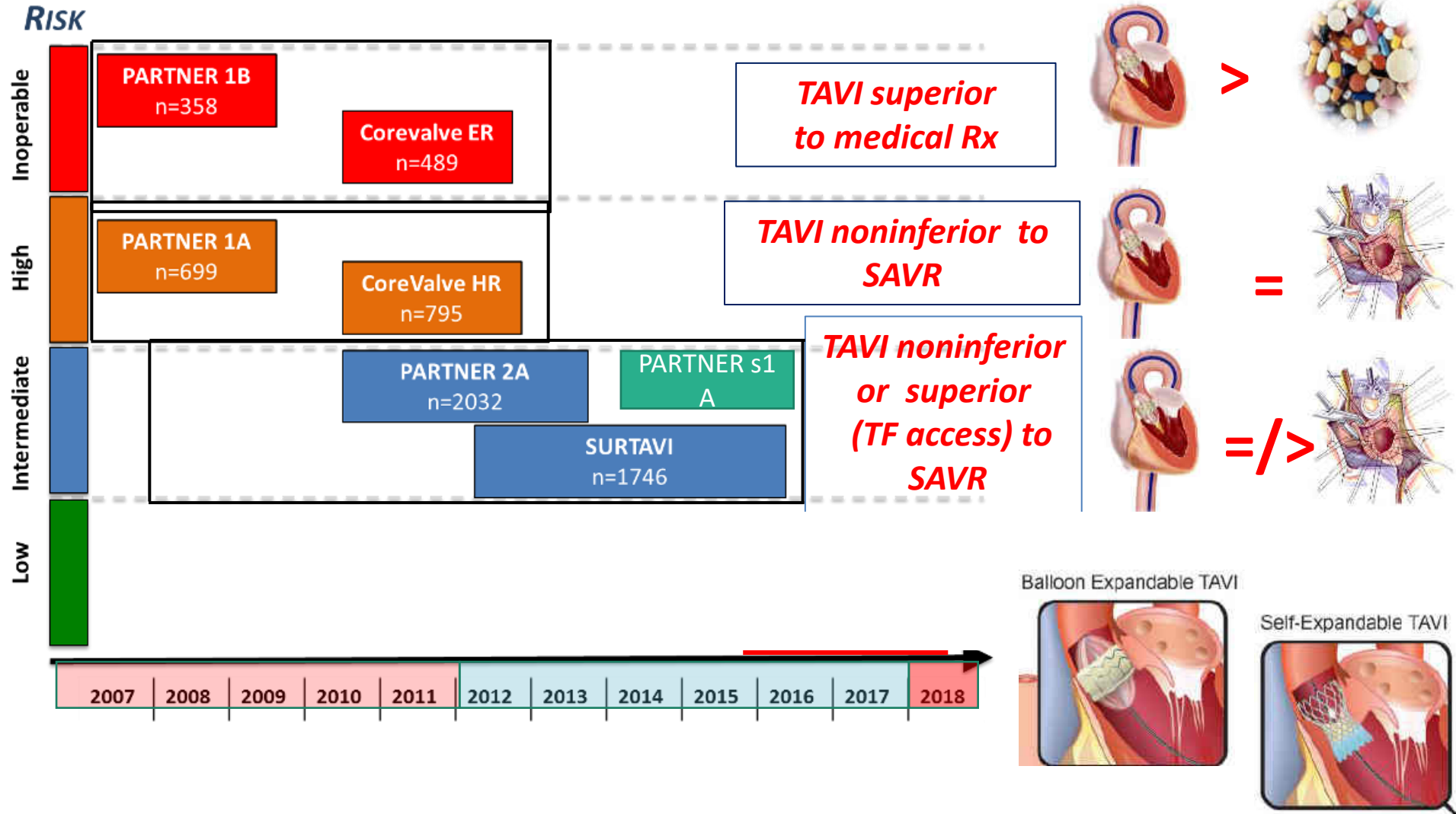


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Medical school of Salerno, Italy



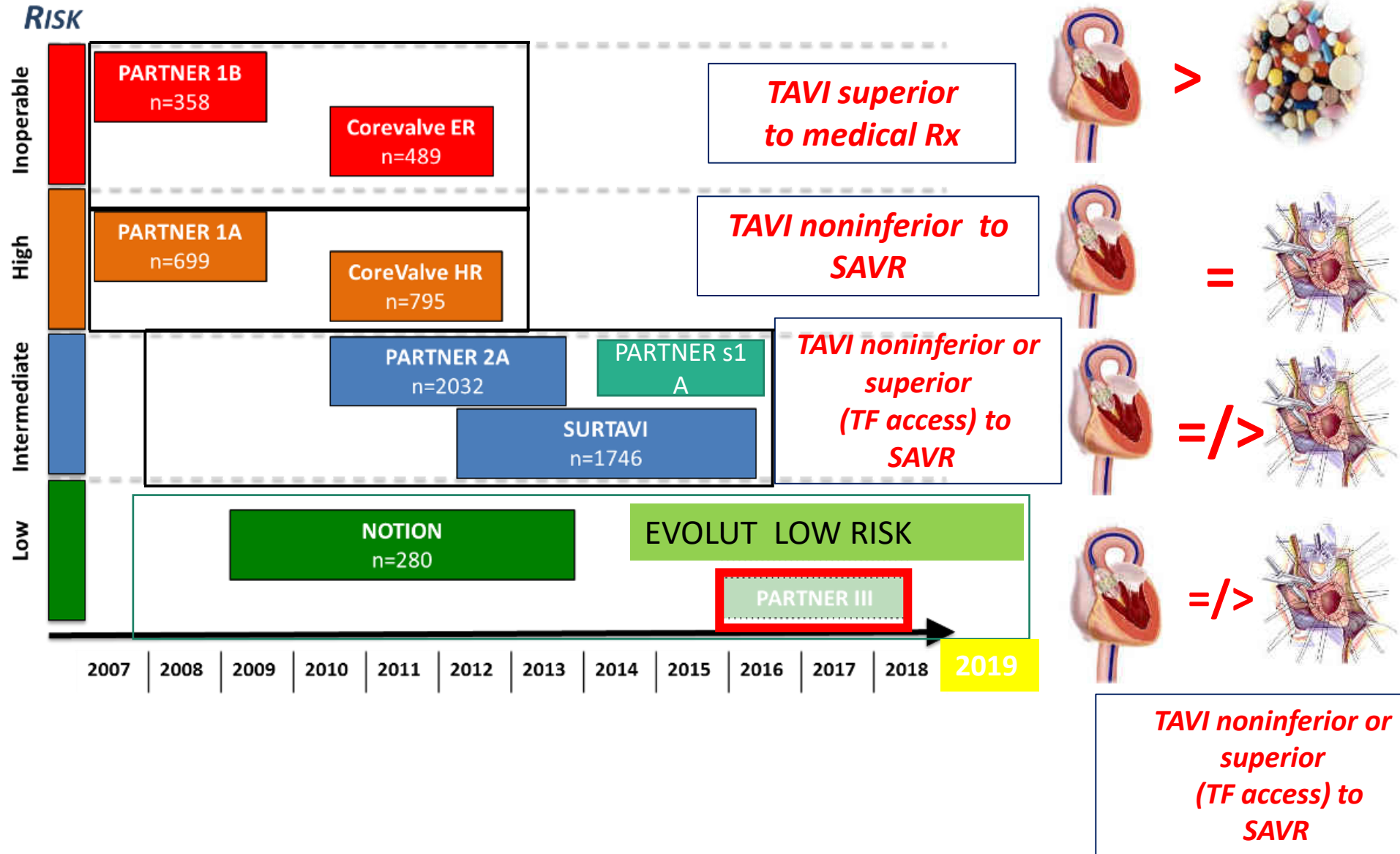
CERTEZZE

ETA' DEI PAZIENTI > 75 anni



DALLE CERTEZZE...ALLE AREE DI CONFINA

ETA' DEI PAZIENTI < 75 anni



AREE DI CONFINE

- CONDUCTION DISTURBANCES

- PVL

- CORONARY ISSUES

- BICUSPID VALVE

- DURABILITY

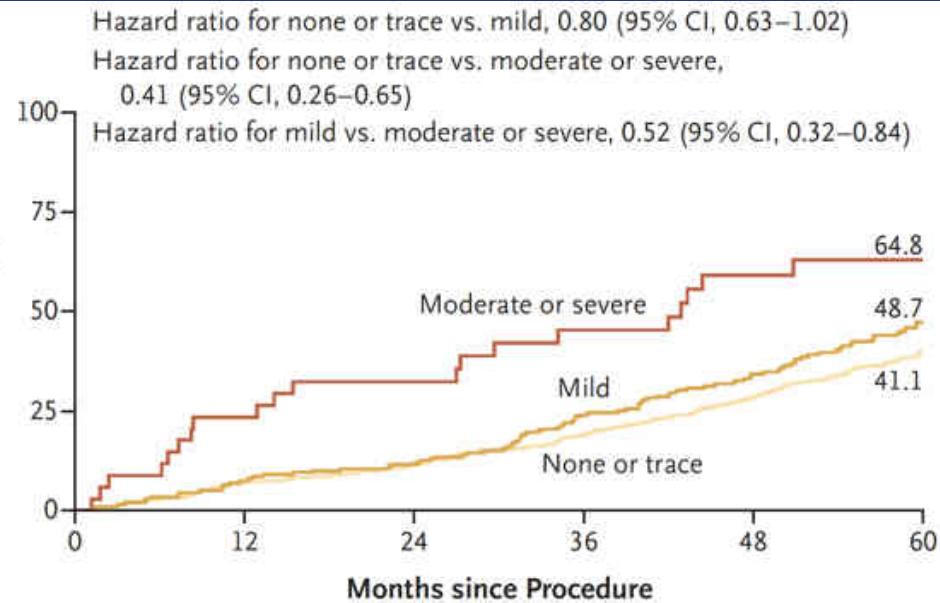
PARAVALVULAR REGURGITATION: IMPACT ON LONG-TERM OUTCOMES

PARTNER 2A



5-year

Death from any Cause



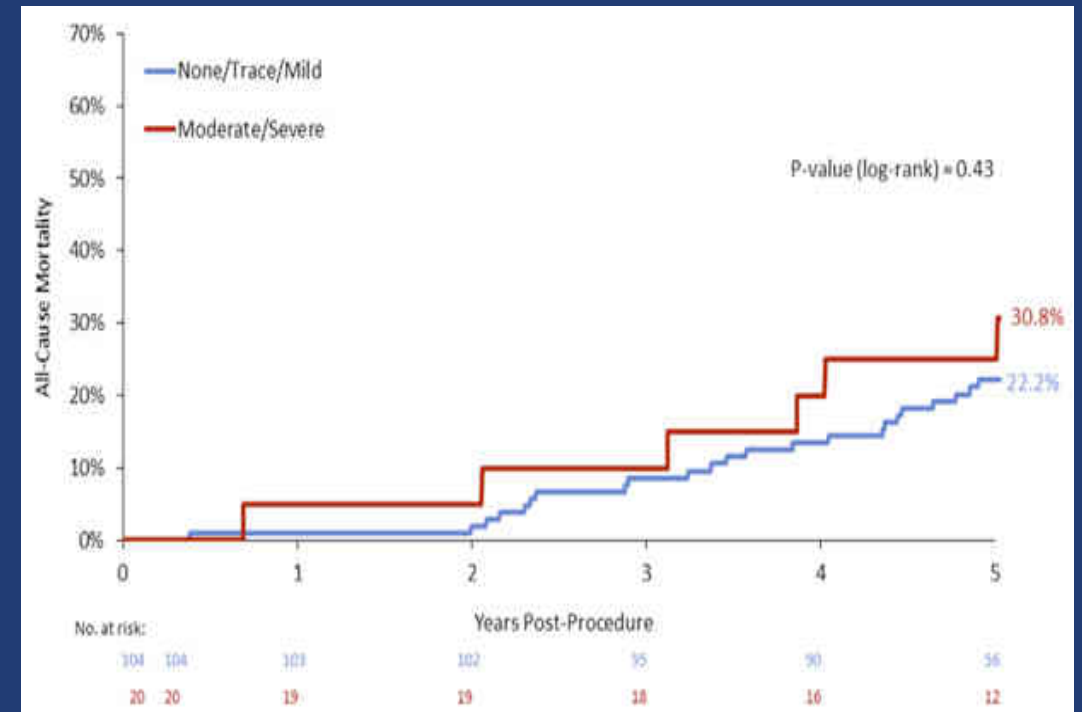
Makkar RR et al, *NEJM* 2020

NOTION



5-year

Death from any Cause



Thyregod HG et al, *Circulation*. 2019;139:2714–2723

DIMENSIONI DEL PROBLEMA

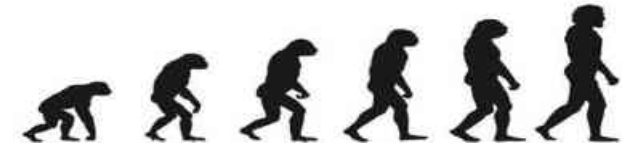
- Dal 50-85%

- Primi prototipi valvolari
- Pazienti grandi anziani
- STS score > 12

MILD : 29.4% - 33%

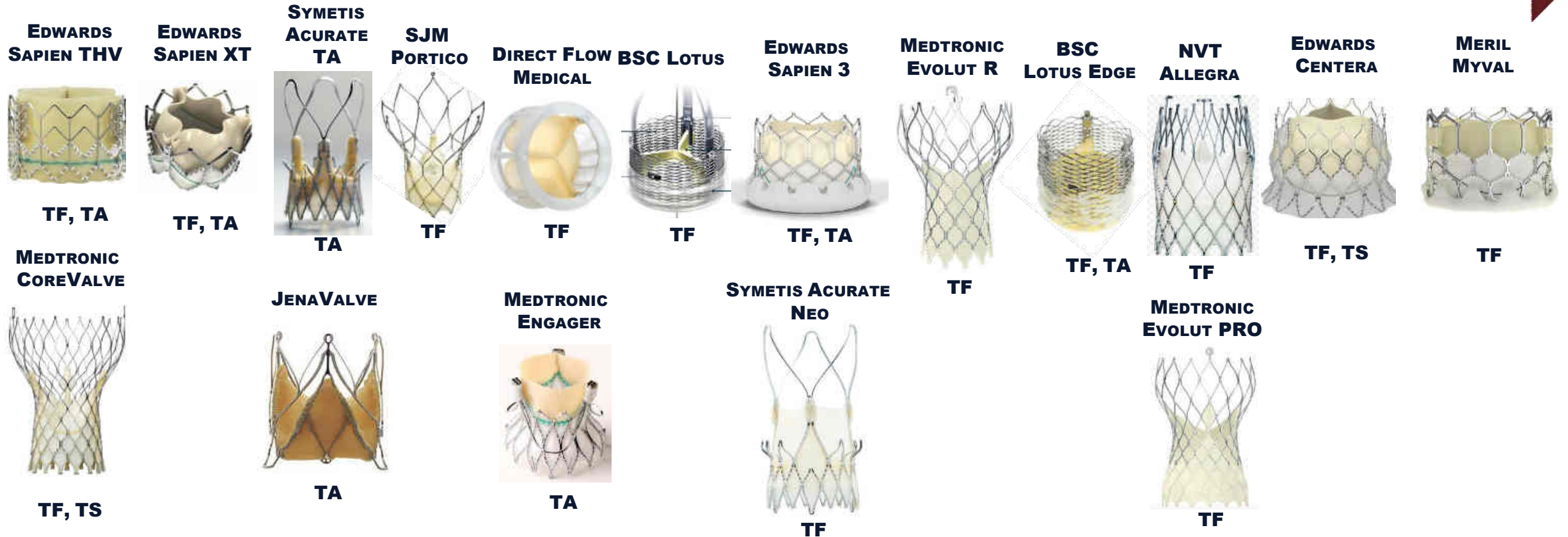
MODERATE: 0.6-37%

SEVERE : 0.5-13.6%



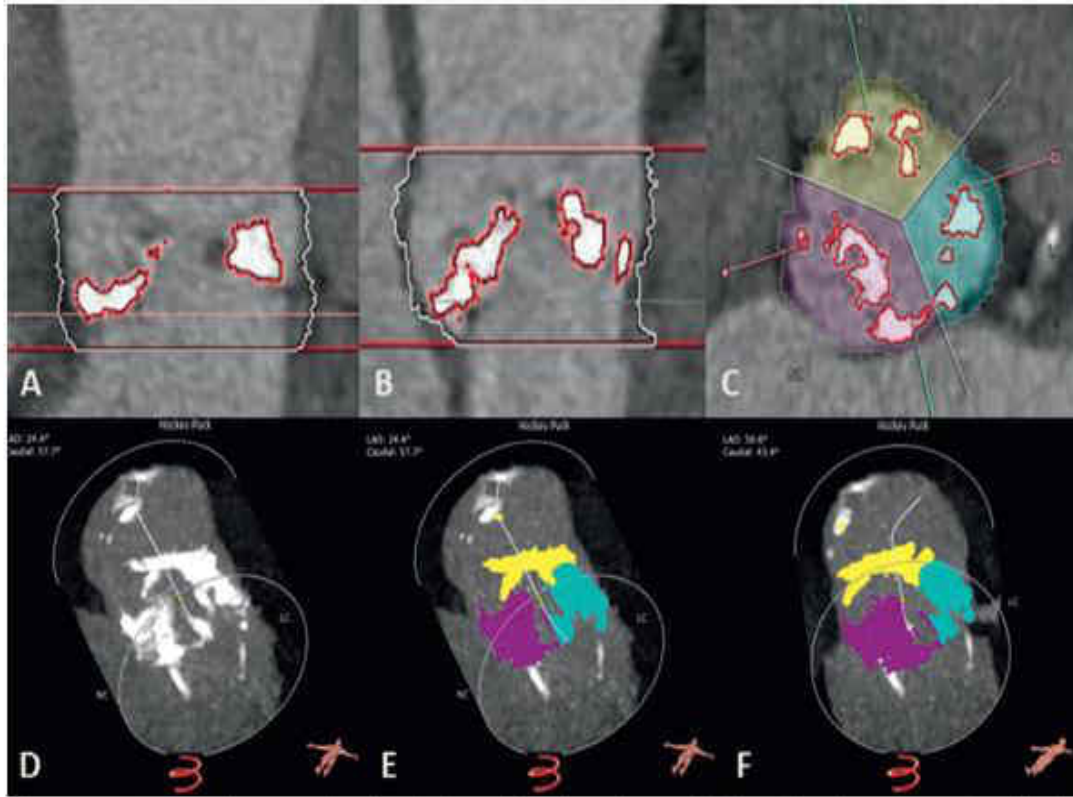
PROSTHESIS WITH CE – MARK APPROVAL

2007 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019



Prosthesis-Specific Predictors of Paravalvular Regurgitation after Transcatheter Aortic Valve Replacement: Impact of Calcification and Sizing on Balloon-Expandable versus Self-Expandable Transcatheter Heart Valves

The Journal of Heart Valve Disease 2015;24:10-21

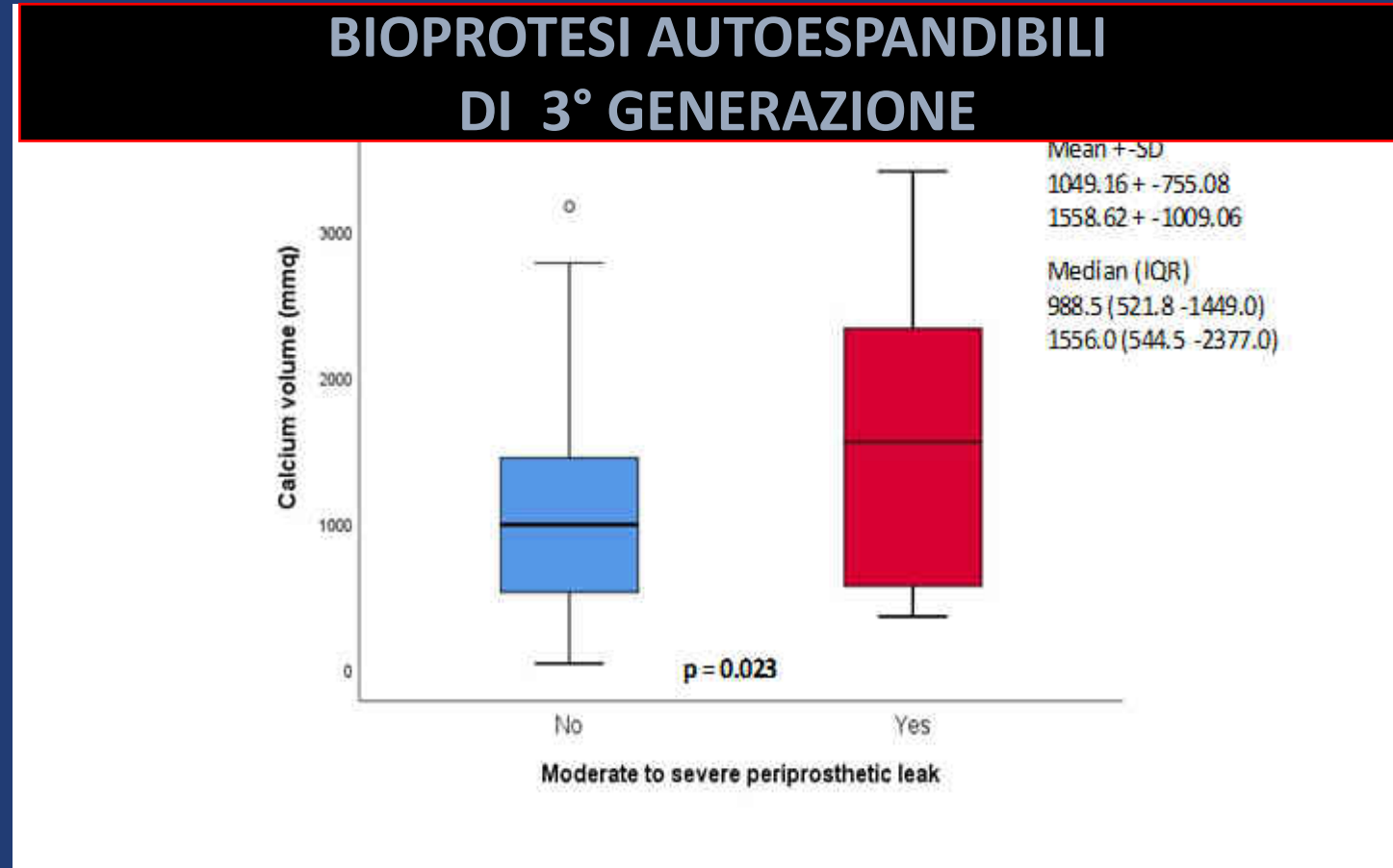


Paravalvular regurgitation in TAVR
B. E. Stähli et al.

In conclusion, the present study results showed that predictors of PAR vary with regards to **prosthesis types**.

For self-expandable THVs, aortic valve calcification was the strongest predictor for more than mild PAR, whereas for balloon-expandable THVs, it was THV undersizing. These findings strengthen the importance of thoroughly evaluating aortic root anatomy before THV type selection, and suggest the preferential use of self-expandable THVs for borderline annulus dimensions to ensure an adequate oversizing. In heavily calcified aortic roots, however, a minimization of PAR utilizing larger-sized prostheses must be balanced against the risk of annular rupture, particularly for balloon-expandable THVs.

THE ROLE OF PREPROCEDURAL ASSESSMENT OF AORTIC VALVE CALCIUM VOLUME FOR THE OPTIMIZATION OF PERCUTANEOUS AORTIC BIOPROSTHESIS IMPLANTATION (TAVI)



Attisano T et al...(Presented at SIC Congress Rome 2020)
Submitted to JACC Int



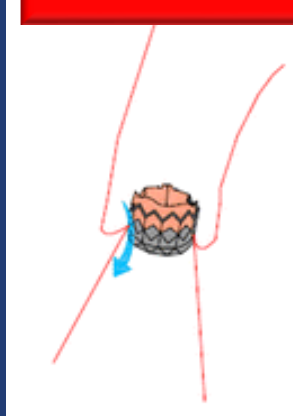
PARAVALVULAR REGURGITATION: INCIDENCE AT 1-YEAR



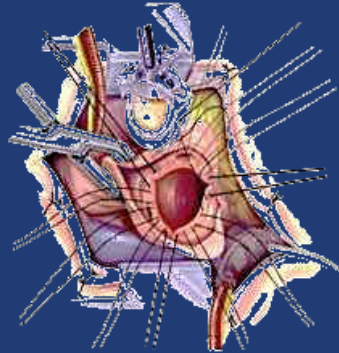
>/=MODERATE

MILD

PARTNER 3



0.6%



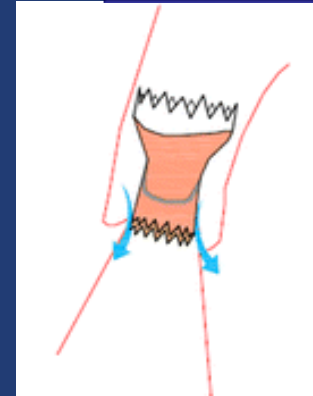
0.5%

29.4%

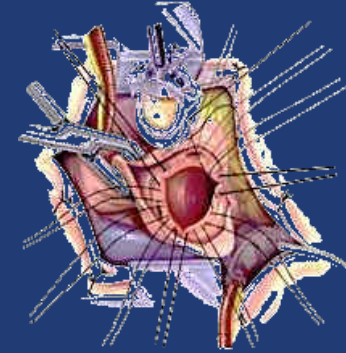


2.1%

EVOLUT Low Risk

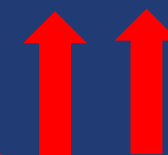


3.6%



0.6%

33.9%



2.5%

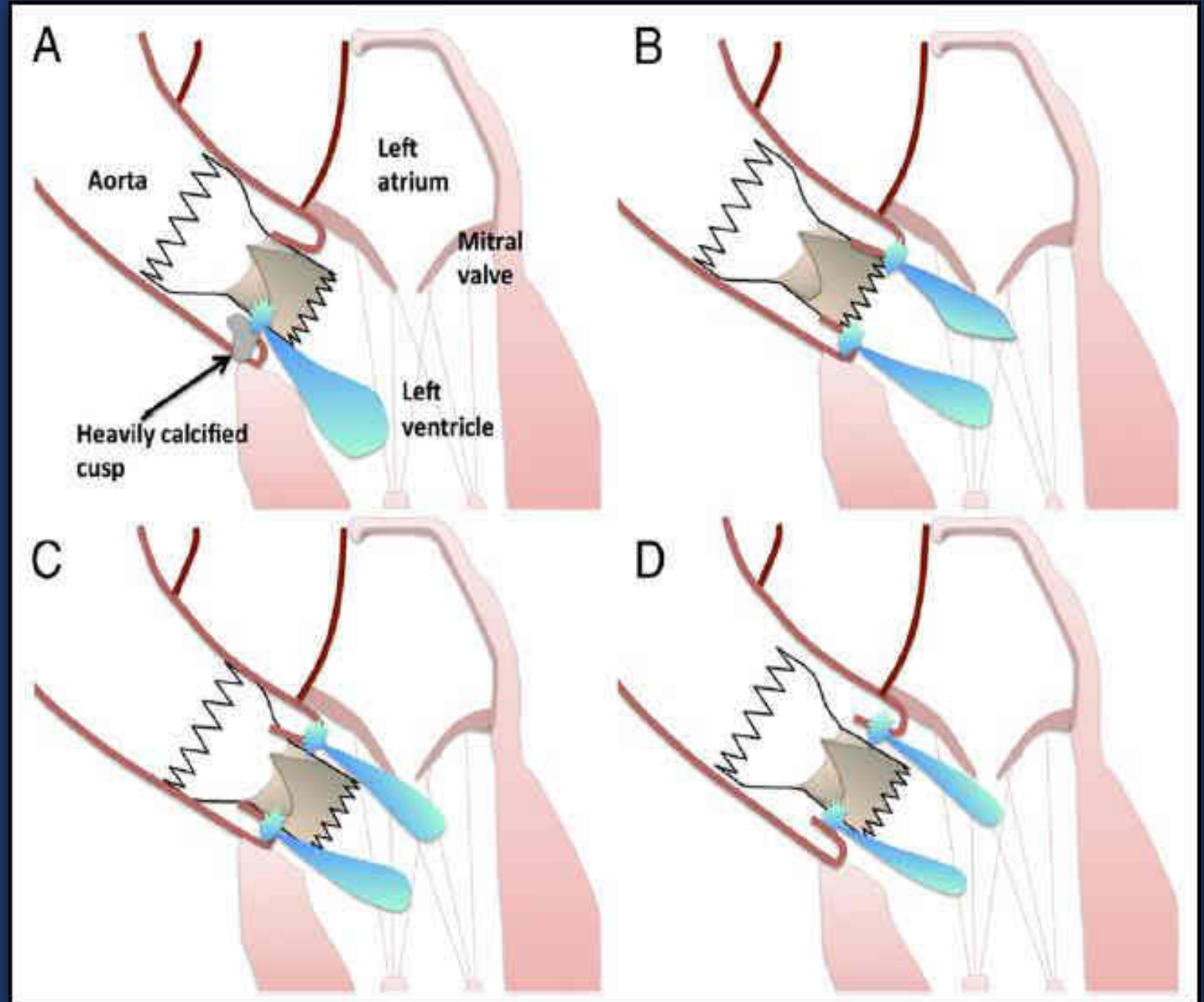
MECCANISMI DEL PVL

ETIOLOGIES:

1. EXTENSIVE
VALVULAR
CALCIFICATION(A)

2. VALVULAR
PROSTHESIS
MALPOSITIONING (B-
C)

3. ANNULUS-
PROSTHESIS
MISMATCH (D)



PROBLEMI APERTI

- Il fenomeno è ancora di gran lunga più frequente rispetto alla sostituzione valvolare per via tradizionale
- Quantizzazione del rigurgito e metodi utilizzati

Table 3 Assessment of PVL Severity in Prosthetic Aortic Valves

3-Class Grading Scheme	None/Trace	Mild	Moderate		Severe	
4-Class Grading Scheme	1	1	2	2	3	4
Unifying 5-Class Grading Scheme	Trace	Mild	Mild to Moderate	Moderate	Moderate to Severe	Severe
Doppler echocardiography						
Structural parameters						
Sewing ring motion*	Usually normal	Usually normal	Normal/abnormal [†]	Normal/abnormal [†]	Usually abnormal [†]	Usually abnormal [†]
LV size ^{‡§}	Normal	Normal	Normal	Normal/mildly dilated	Mildly/moderately dilated	Moderately/severely dilated
Doppler parameters (qualitative or semiquantitative)						
Jet features*						
Extensive/wide jet origin	Absent	Absent	Absent	Present	Present	Present
Multiple jets	Possible	Possible	Often present	Often present	Usually present	Usually present
Proximal flow convergence visible	Absent	Absent	Absent	Possible	Often present	Often present
Vena contracta width, mm (color Doppler) [‡]	Not quantifiable	<2	2 to <4	4 to <5	5 to <6	≥6
Jet width at its origin, % LVOT diameter (color Doppler) [¶]	Narrow (<5)	Narrow (5 to <15)	Intermediate (15 to <30)	Intermediate (30 to <45)	Large (45 to <60)	Large (≥60)
Jet density (CW Doppler) ^{††}	Incomplete or faint	Incomplete or faint	Variable	Dense	Dense	Dense
Jet deceleration rate (PHT), ms (CW Doppler) ^{‡‡¶¶}	Slow (>500)	Slow (>500)	Variable (200–500)	Variable (200–500)	Variable (200–500)	Steep (<200)
Diastolic flow reversal in the descending aorta (PW Doppler) ^{‡¶¶¶}	Absent	Absent or brief early diastolic	Intermediate	Intermediate	Holodiastolic (end-diastolic velocity >20 to <30 cm/s)	Holodiastolic (end-diastolic velocity ≥30 cm/s)
Circumferential extent of PVL, % (color Doppler)*	Not quantifiable	<5	5 to <10	10 to <20	20 to <30	≥30
Doppler parameters (quantitative)						
Regurgitant volume, ml/beat ^{‡‡}	<10	<15	15 to <30	30 to <45	45 to <60	≥60
Regurgitant fraction, % [‡]	<15	<15	15 to <30	30 to <40	40 to <50	≥50
Effective regurgitant orifice area, mm ^{2‡‡*}	<5	<5	5 to <10	10 to <20	20 to <30	≥30
CMR						
Regurgitant fraction, % ^{††}	<15	<15	15 to <30	30 to <40	40 to <50	≥50

TRATTAMENTI POSSIBILI DEL PVL

- **Valvular Prosthesis Balloon Post-Dilation**

- **Valve-in-Valve procedure**

- **Conversion to surgery**

- Percutaneous paravalvular closure

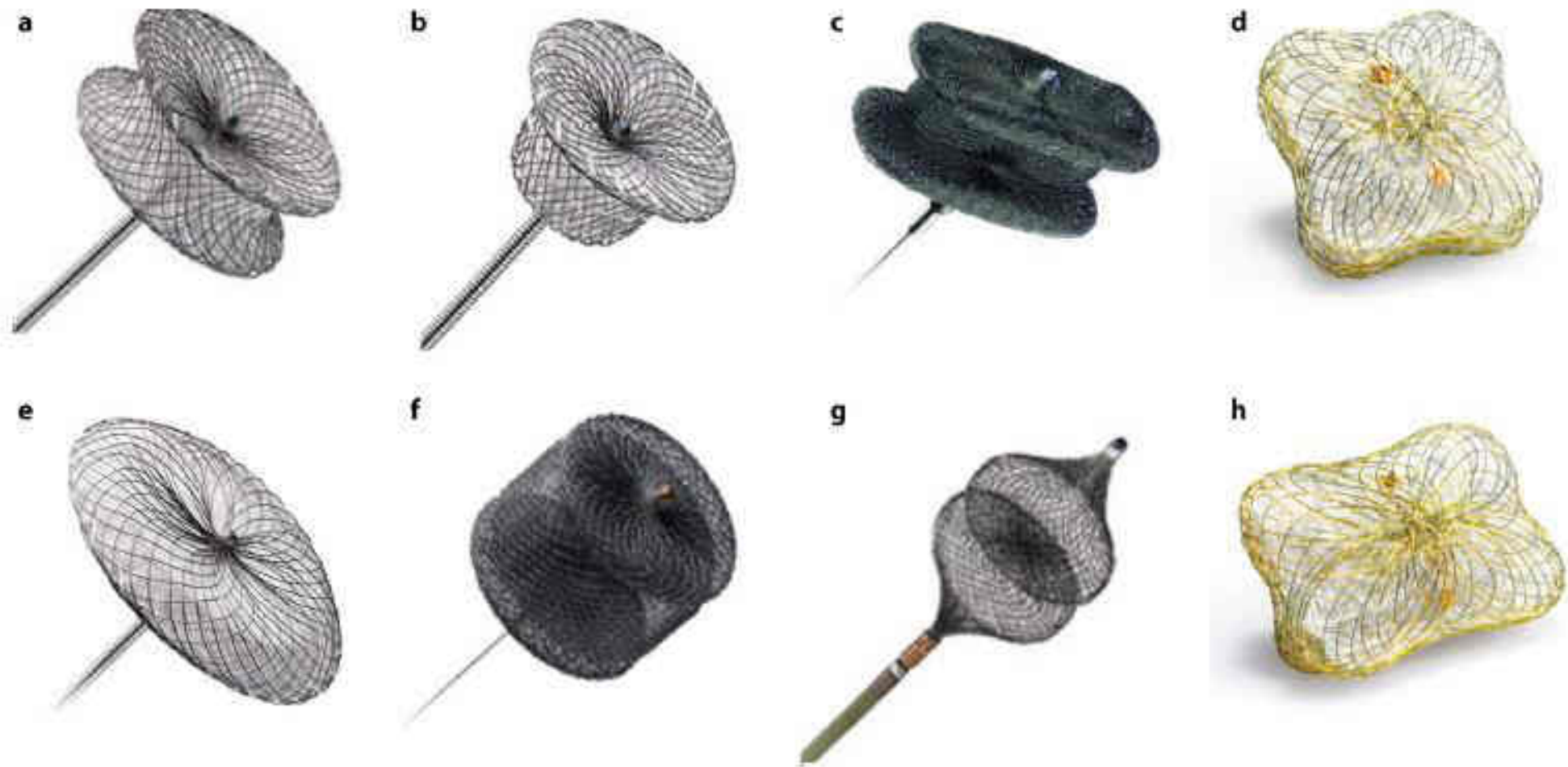


Fig. 4 PVL closure devices. **a** Amplatzer Muscular VSD Occluder. **b** Amplatzer Duct Occluder. **c** Amplatzer Vascular Plug III. **d** Occlutech PLD (square-shaped design). **e** Amplatzer Septal Occluder. **f** Amplatzer Vascular Plug II. **g** Amplatzer Vascular Plug IV. **h** Occlutech PLD (rectangular-shaped design)

Table 3 Main complications associated with PVL closure

Complication	Percentage
Device embolisation	4% [9]
Cardiac perforation	4% ^a [9], 0% [23], 0% [11]
Death	2% [9], 1.7% [11]
Vascular complications	2% [9], 0.9% [11]
Embolic stroke	1.7% [11]
Emergency cardiac surgery for prosthetic impingement	0.9% [11]
Intracranial haemorrhage	0.9% [11]
Sepsis	0.9% [11]

^aTransapical access

Case Summary

Patient Demographics

Age: 71 years old

Gender: Male

Risk Factors

-Hypertension, Diabetes, Dyslipidemia

Comorbidities

-COPD

Clinical History

1996: underwent CABG for UA secondary to multivessel CAD

2010: TAVI for severe aortic stenosis (Edward-Sapien XT 23).

September 2014

Admitted in our hospital for increasing effort dyspnea

- ECG: AF and LBBB

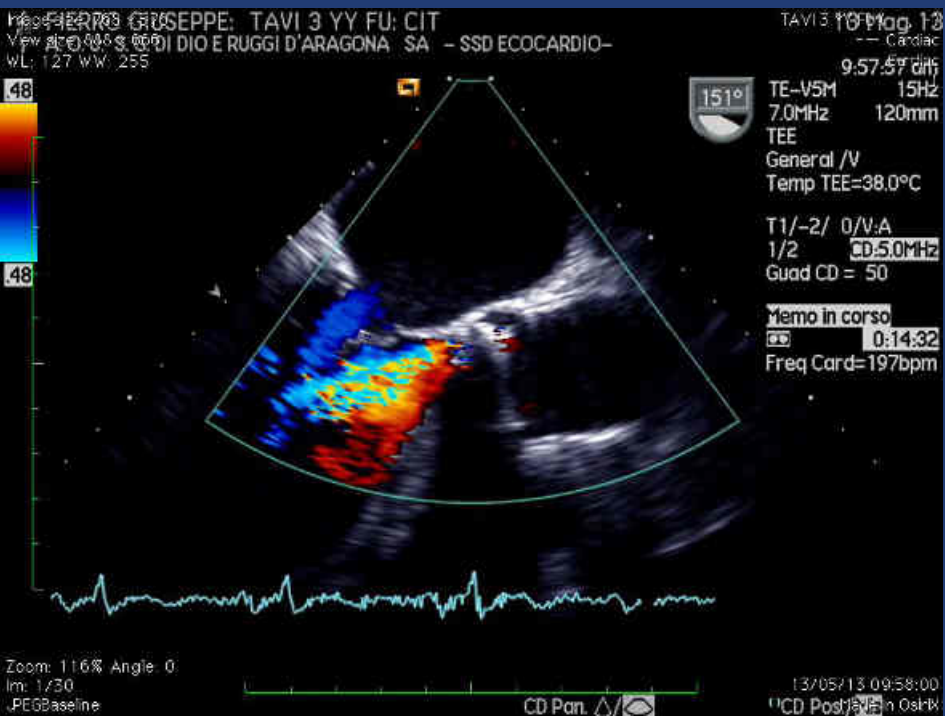
**-TTE: severe AR
elevated PASP**



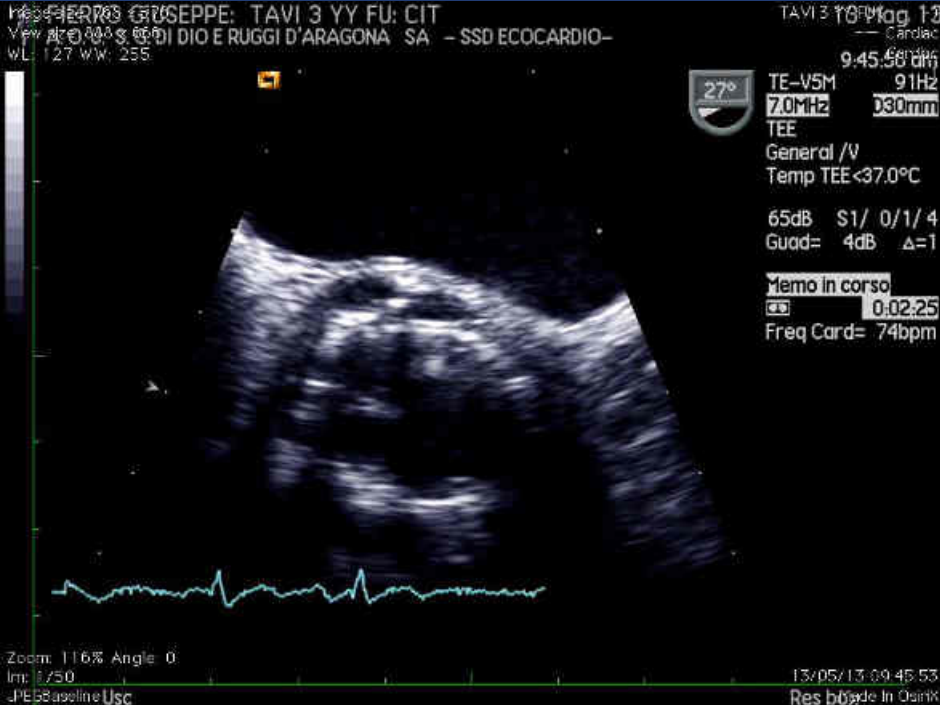


TEE

Aortic bioprosthesis
underexpansion

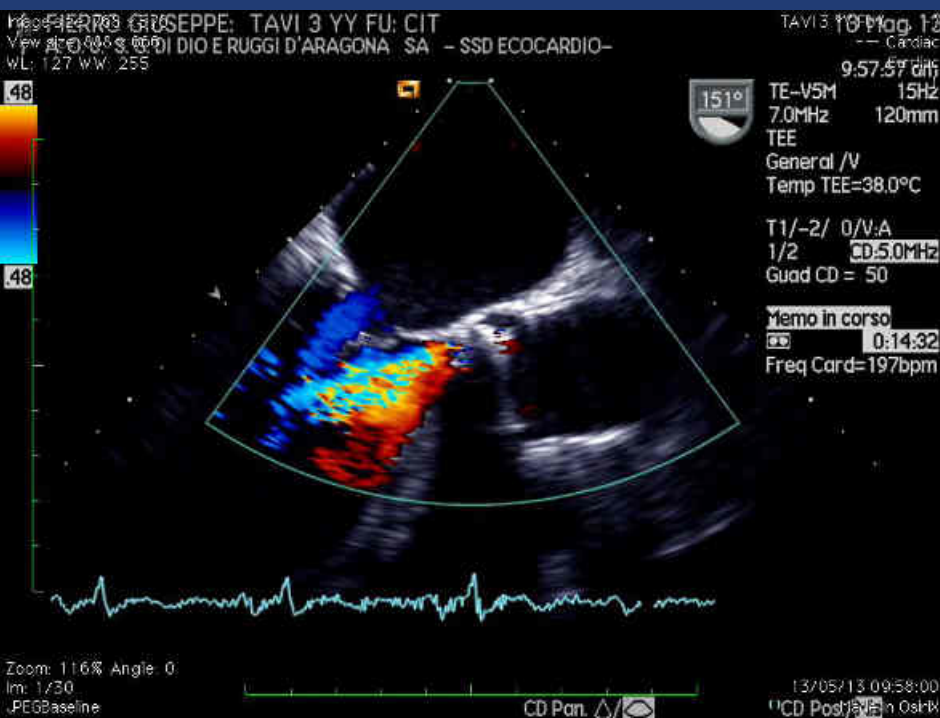


Severe AR
due to a
posterior PVL

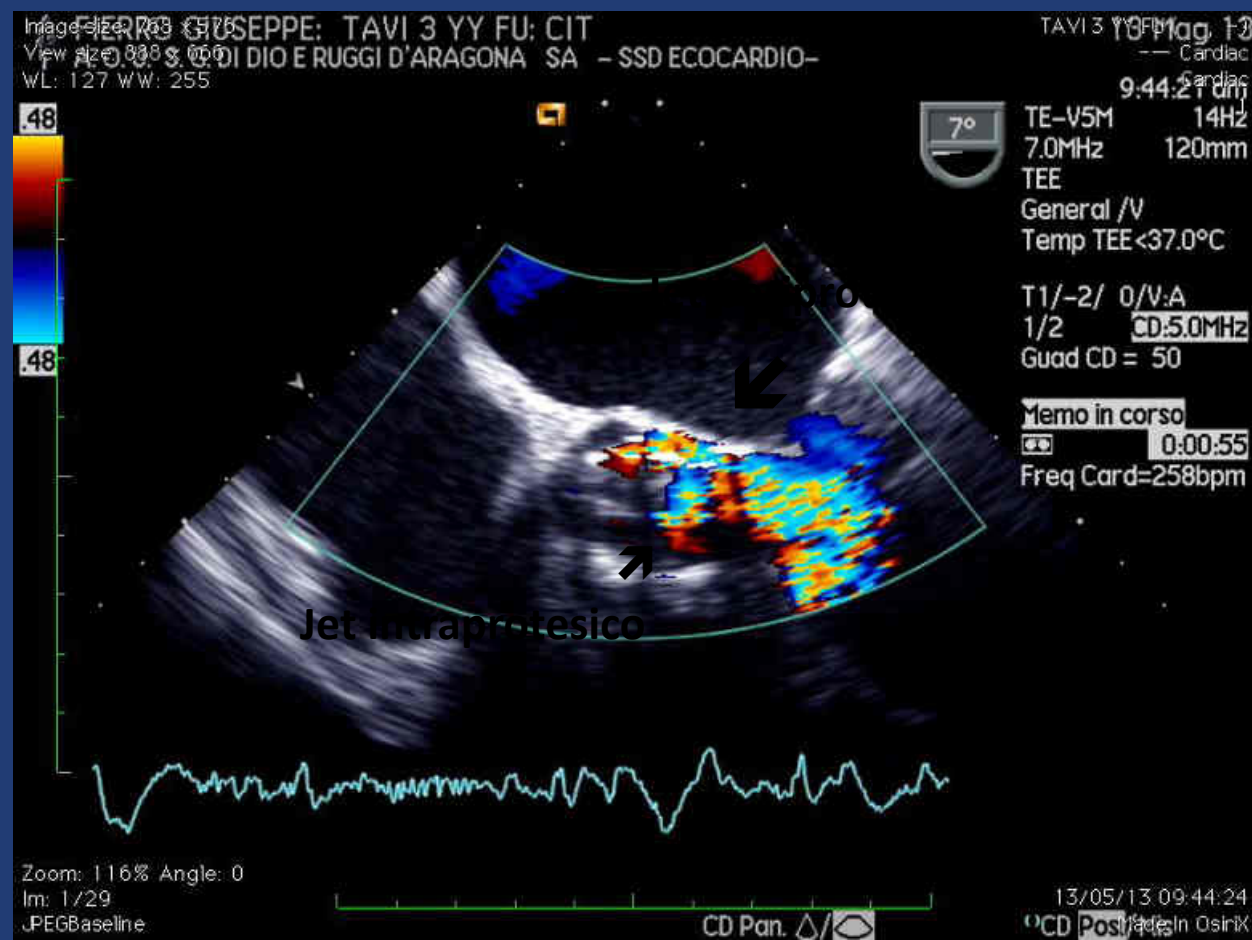


TEE

Aortic bioprosthesis
underexpansion



Severe AR
due to a
posterior PVL

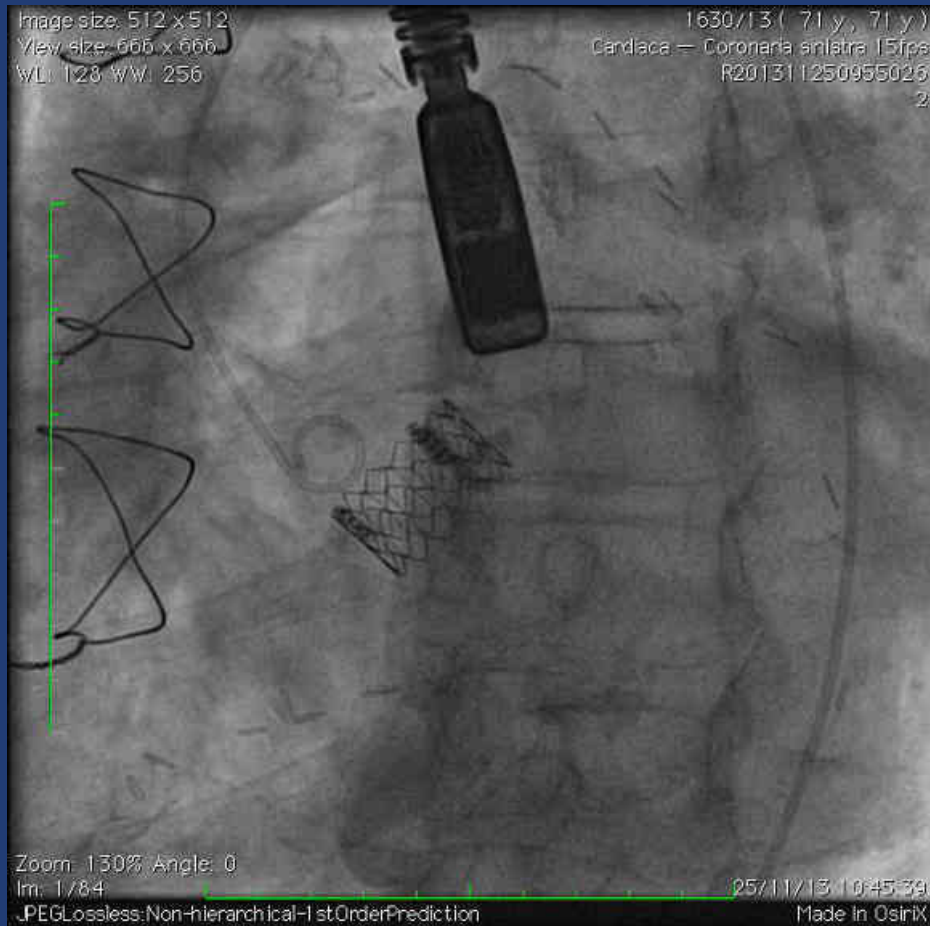


Therapeutic options for PVL after TAVI

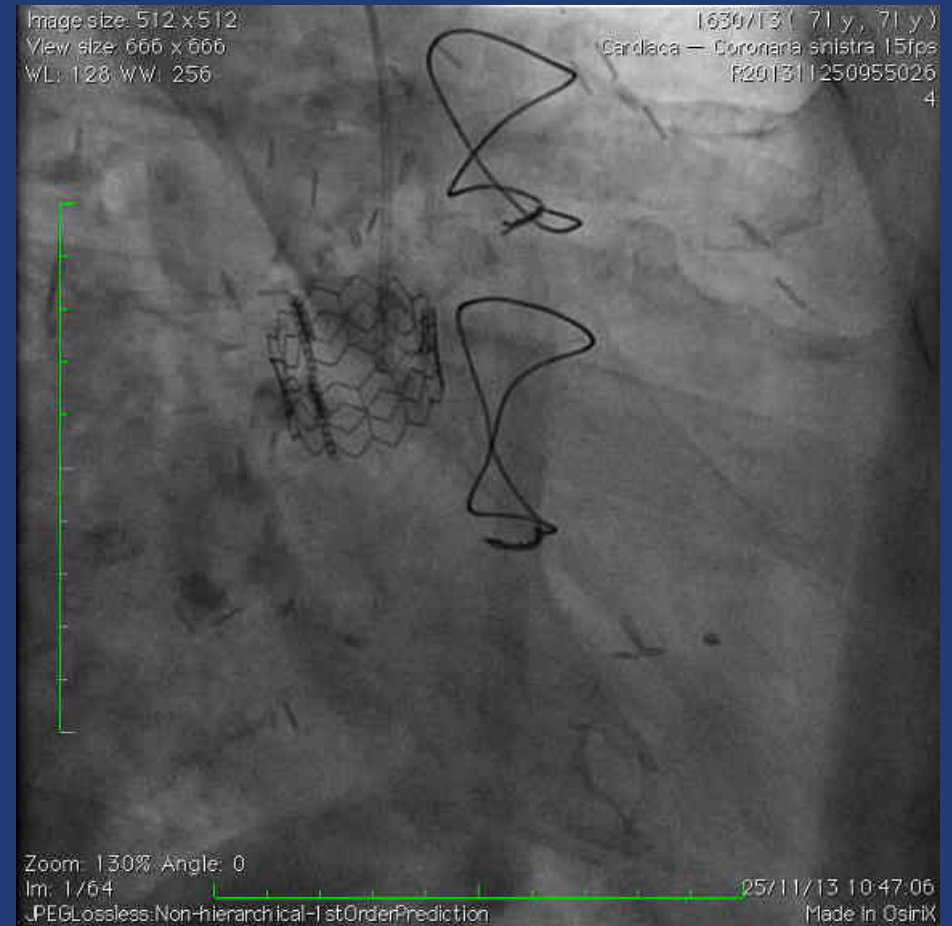
- Valvular Prosthesis Balloon Post-Dilation - already performed
- Cardiac surgery – prohibitive surgical risk Logistic EuroSCORE: 35,3;
EuroSCORE II: 9,6;
STS mortality = 9,8
- Amplatzer occluders for PVL closure

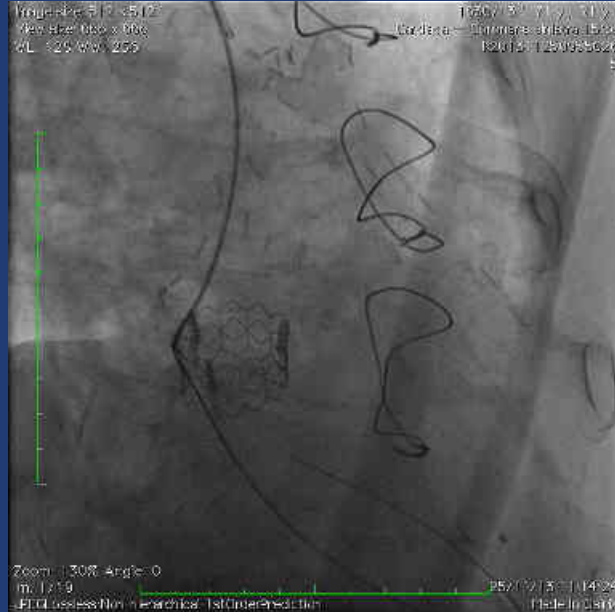
Aortography showing severe AR

RAO



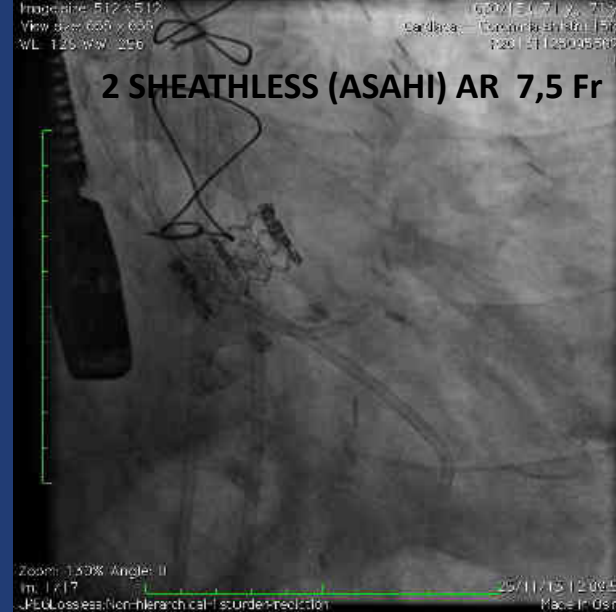
AP





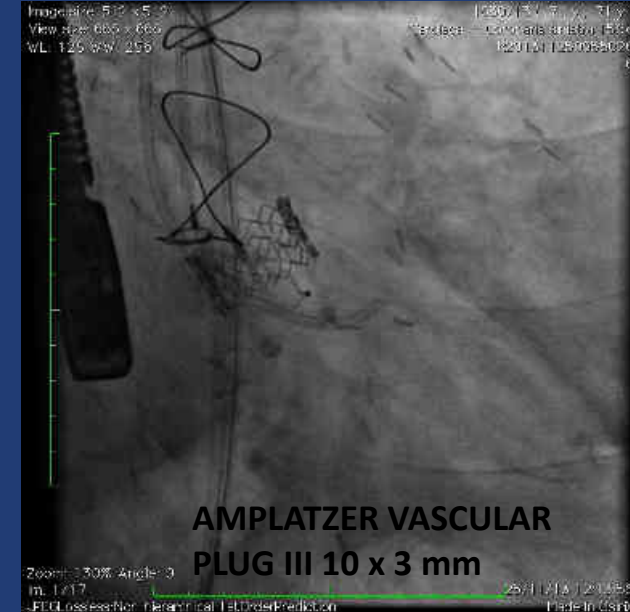
1

PVL crossing by using
TERUMO guidewires
260 mm



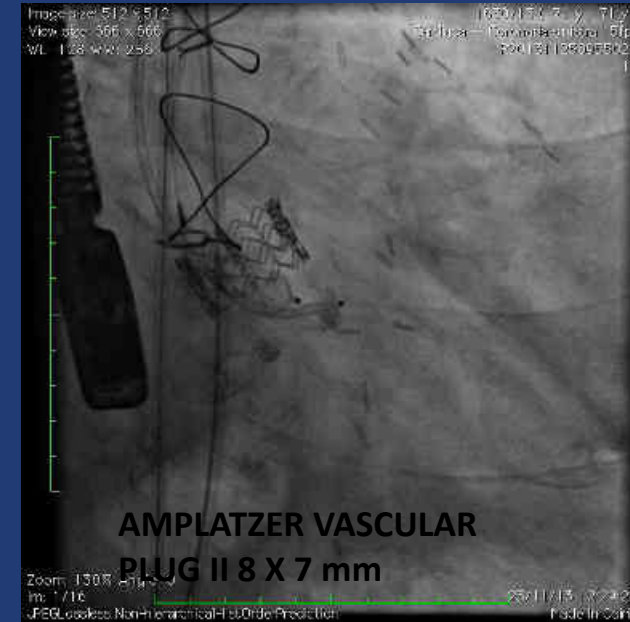
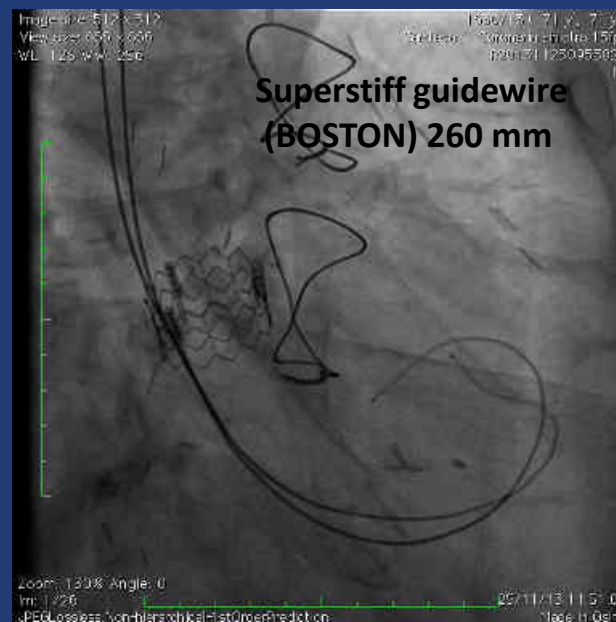
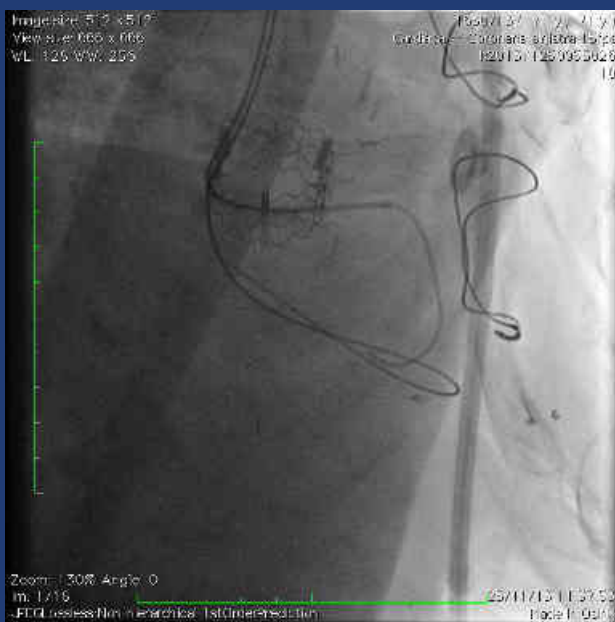
2

TERUMO guidewires exchanged
with superstiff guidewires by
using Sheathless AR catheter

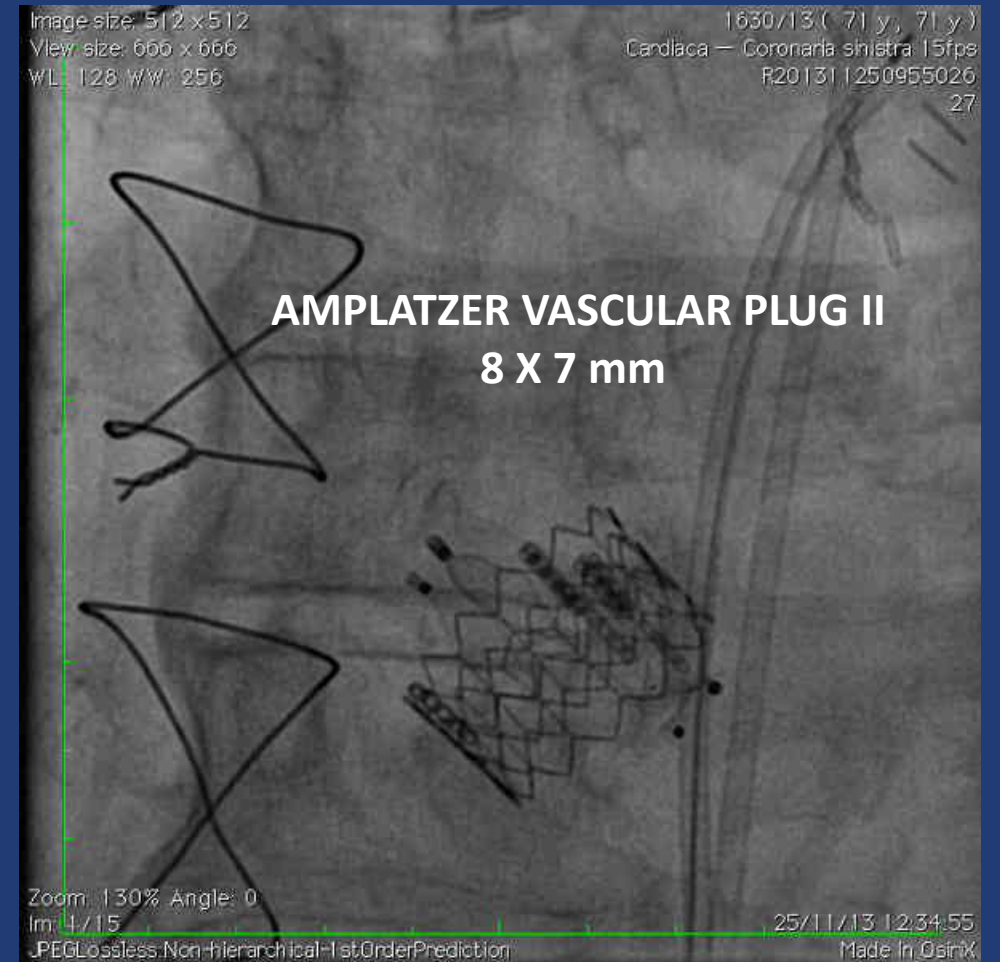
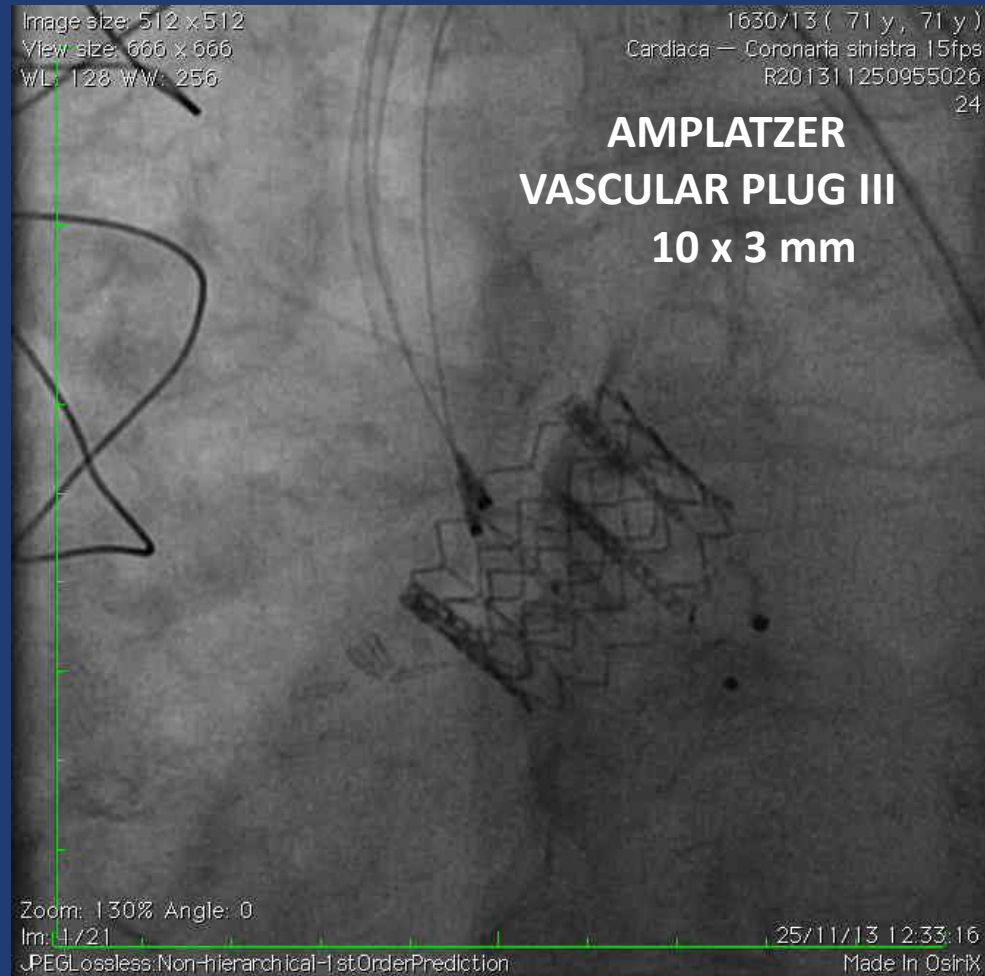


3

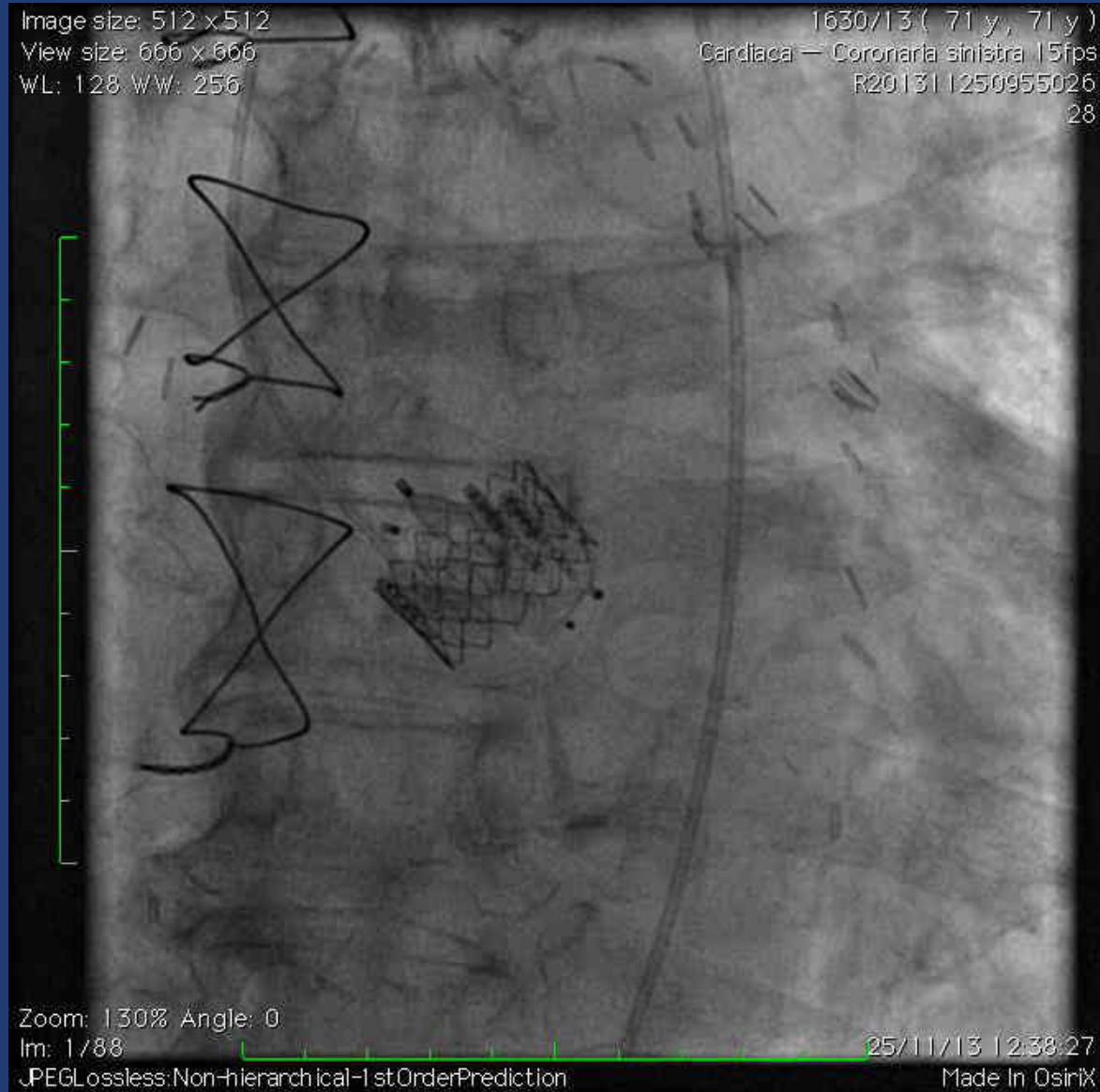
Amplatzer vascular plug
implantation



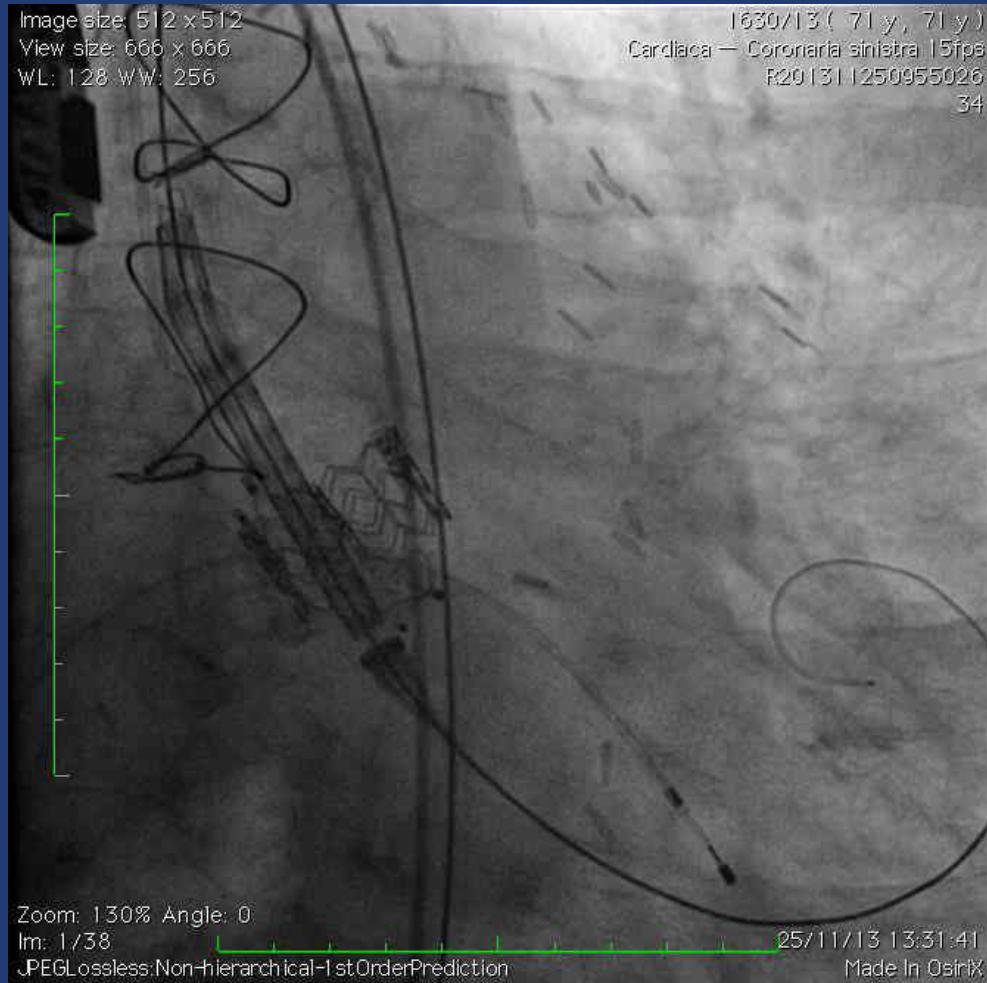
Plugs delivery



Aortography showing persistent moderate-to-severe AR

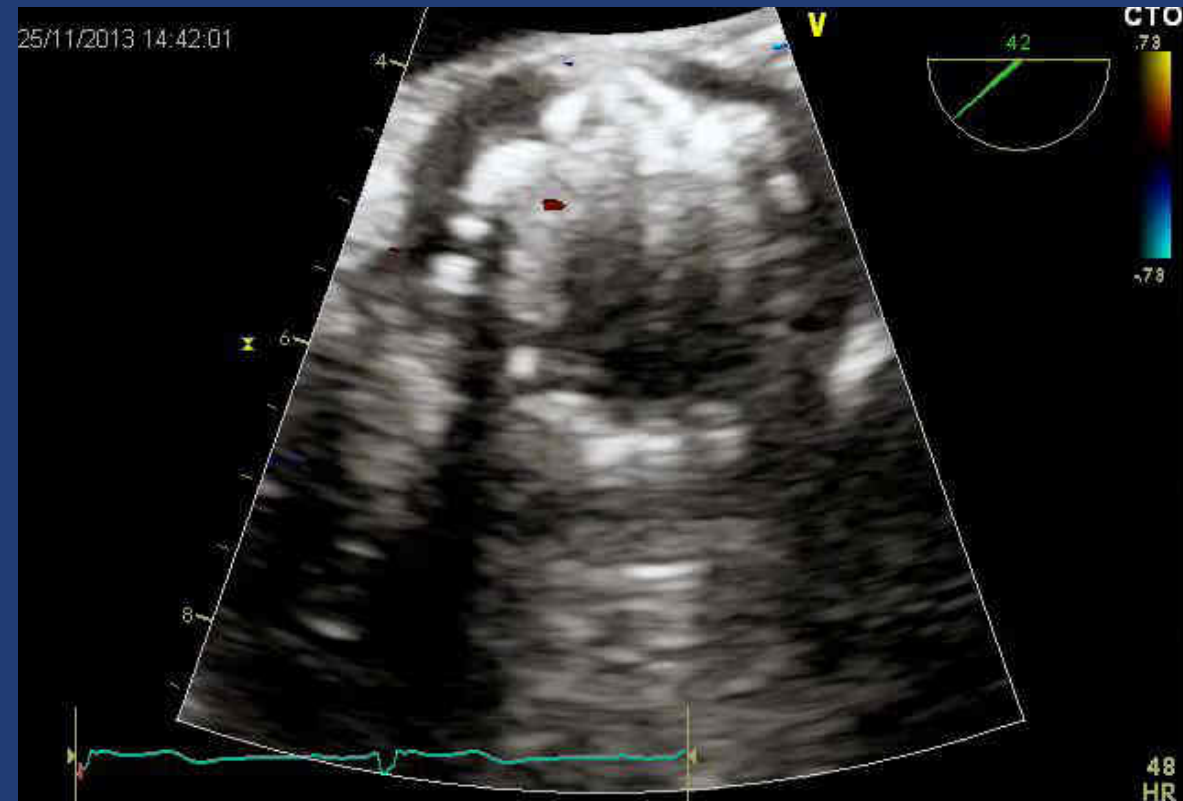
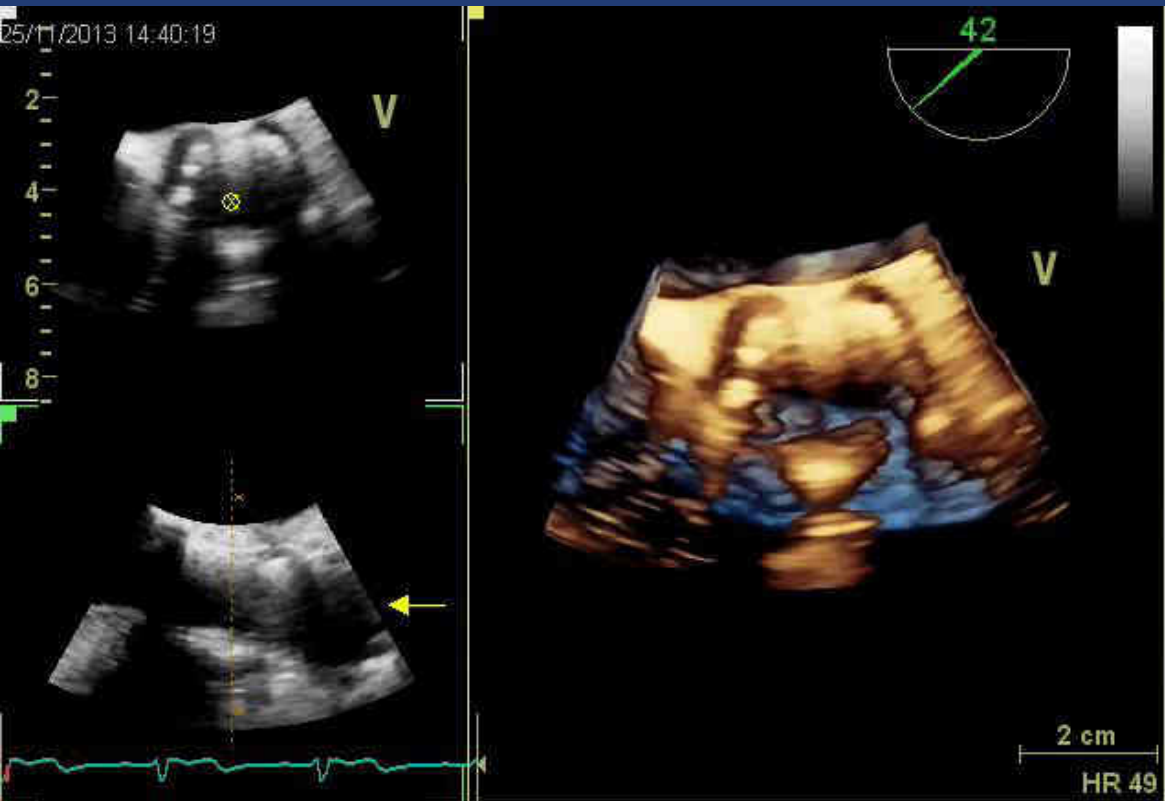


TAVI in TAVI by using 26 mm CoreValve (Medtronic)



Final result

TEE



FU

After 4 days the patients was discharged
NYHA II

2 years follow-up: NYHA I

Mild residual AR

LEAK PARAVALVOLARE POST TAVI : IL TALLONE DI ACHILLE IN EPOCA TAVI possiamo fare di piu'?

- PREVENZIONE :
 - NUOVI DEVICES (SAPIEN 3, EVOLUTE R, Etc)
 - ANGIO TAC PRELIMINARE SEMPRE
- TERAPIA:
 - APPROCCIO MULTIIMAGING PER IL SIZING CORRETTO
 - POST-DILATAZIONI PIU' CORAGGIOSE
 - La chiusura percutanea utilizzando devices dedicati , si è dimostrata fattibile, sicura ed efficace e può rappresentare la soluzione in pazienti non candidabili a chirurgia