



Faculté des sciences
médicales et paramédicales
Aix-Marseille Université

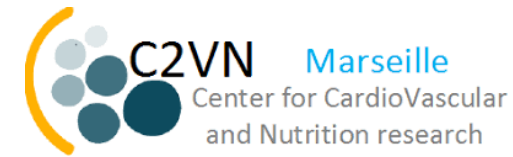
Aix-Marseille
université

Gestion dans le temps des valvulopathies

Aortiques et Mitrales

Pierre Deharo, MD PhD FESC
Equipe Structurale Timone
CHU La Timone, Marseille, France

euro
4C



Life time management of valvular disease

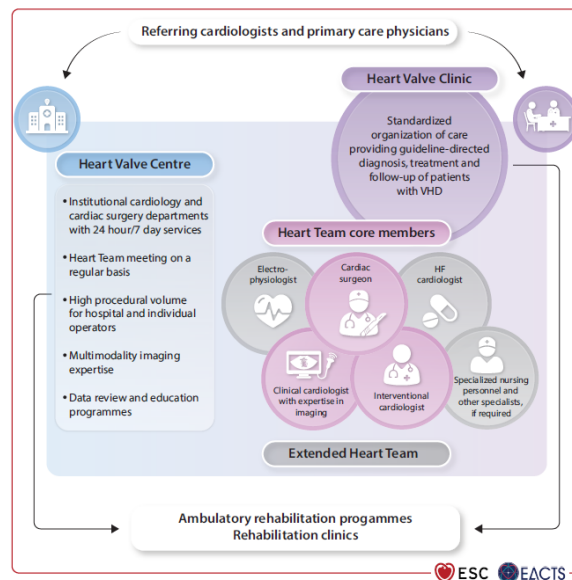
Increasing number of (old) patients to treat

Increasing number of patients not candidate to surgery

Increasing number of percutaneous technics

Increasing number of subspecialty involved

=> Improving organization



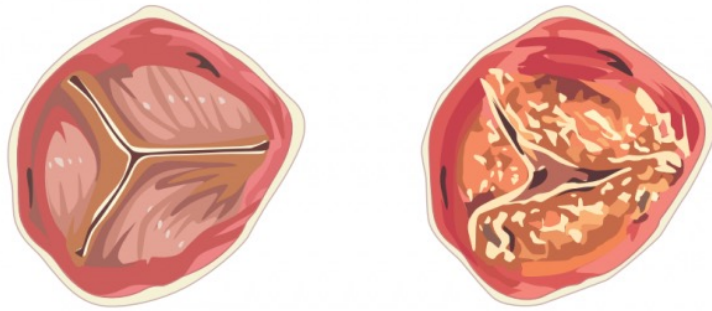
Our specility has quickly changed

2011



2025

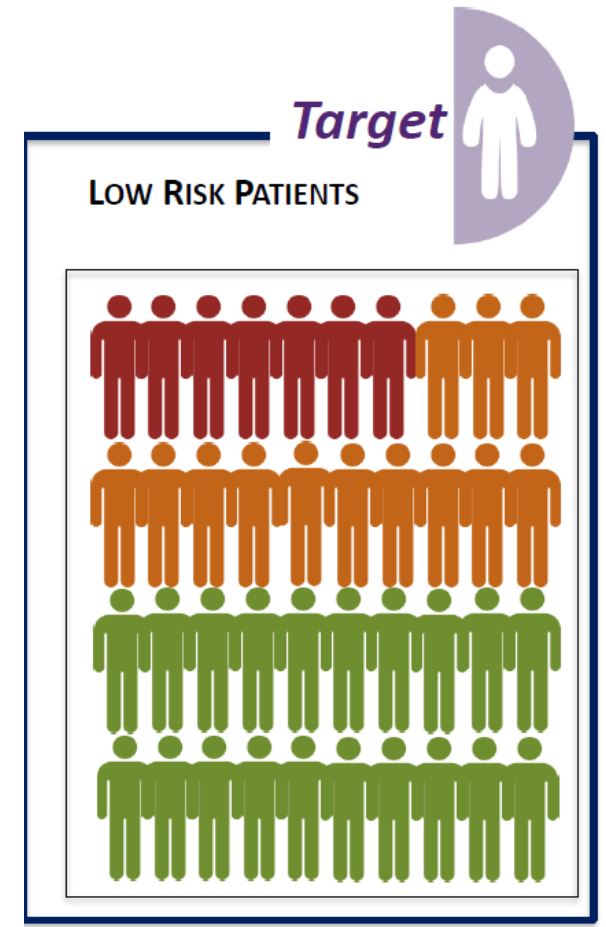
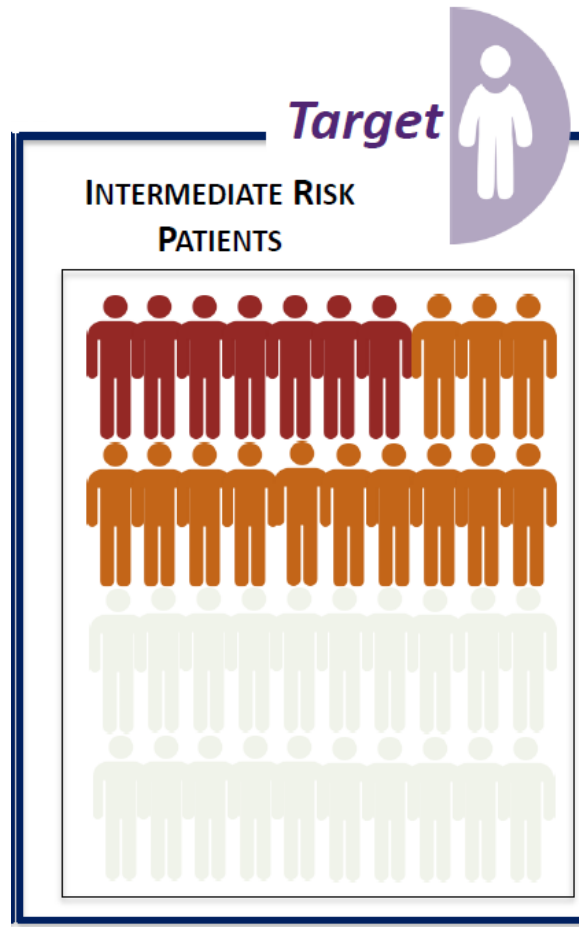
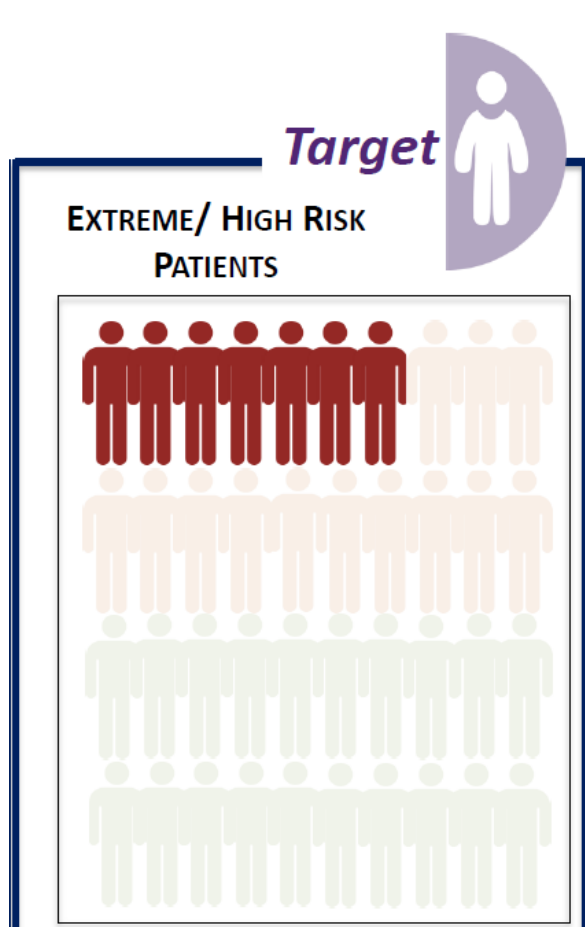




High-Risk STS > 8%

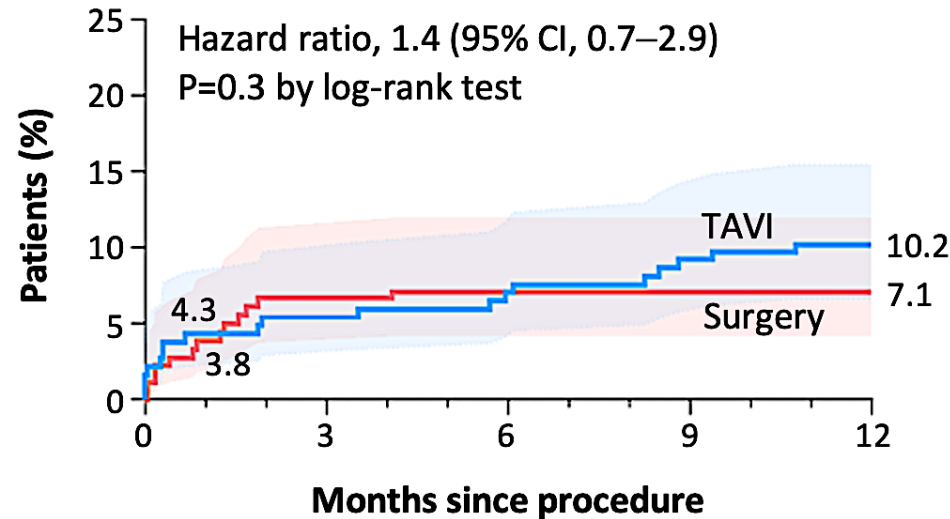
Intermediate Risk: STS 4-8%

Low Risk: STS <4%



Le TAVI fait au moins aussi bien que la chirurgie

Death, stroke or rehospitalization



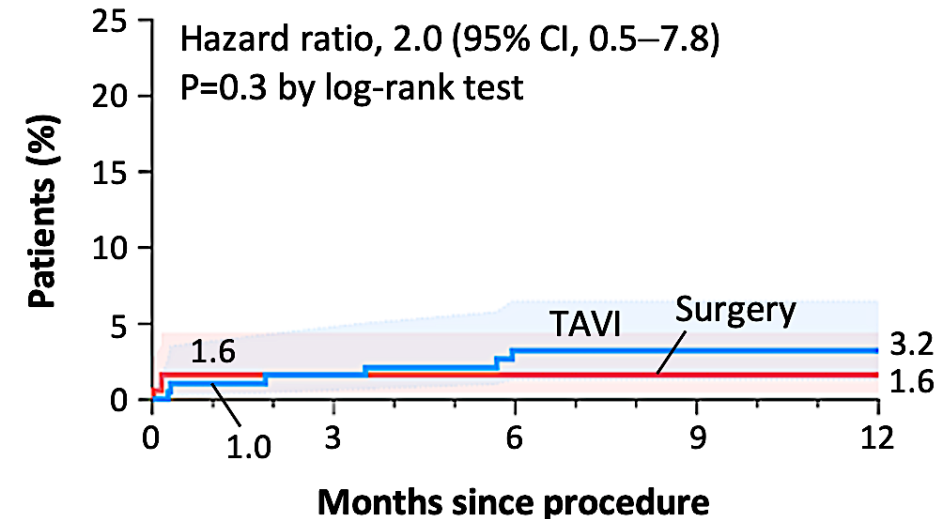
No. at Risk

Surgery	183	171	170	170	170
TAVI	187	177	174	170	168

Absolute risk difference

3.1% (95% CI -2.7% to 8.8%); P=0.3

Death or disabling stroke

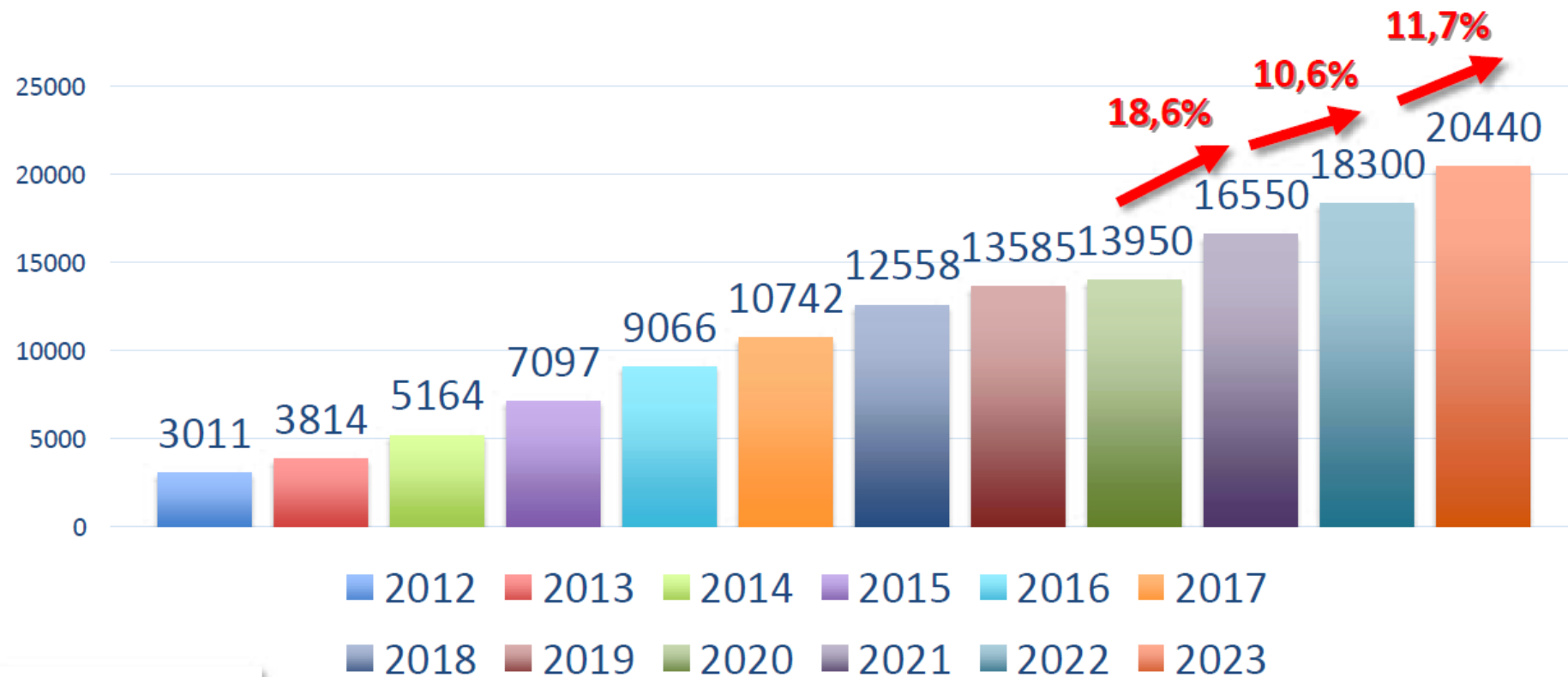


183	180	180	180	180
187	184	181	181	181

Absolute risk difference

1.6% (95% CI -2.8% to 6.1%); P=0.3

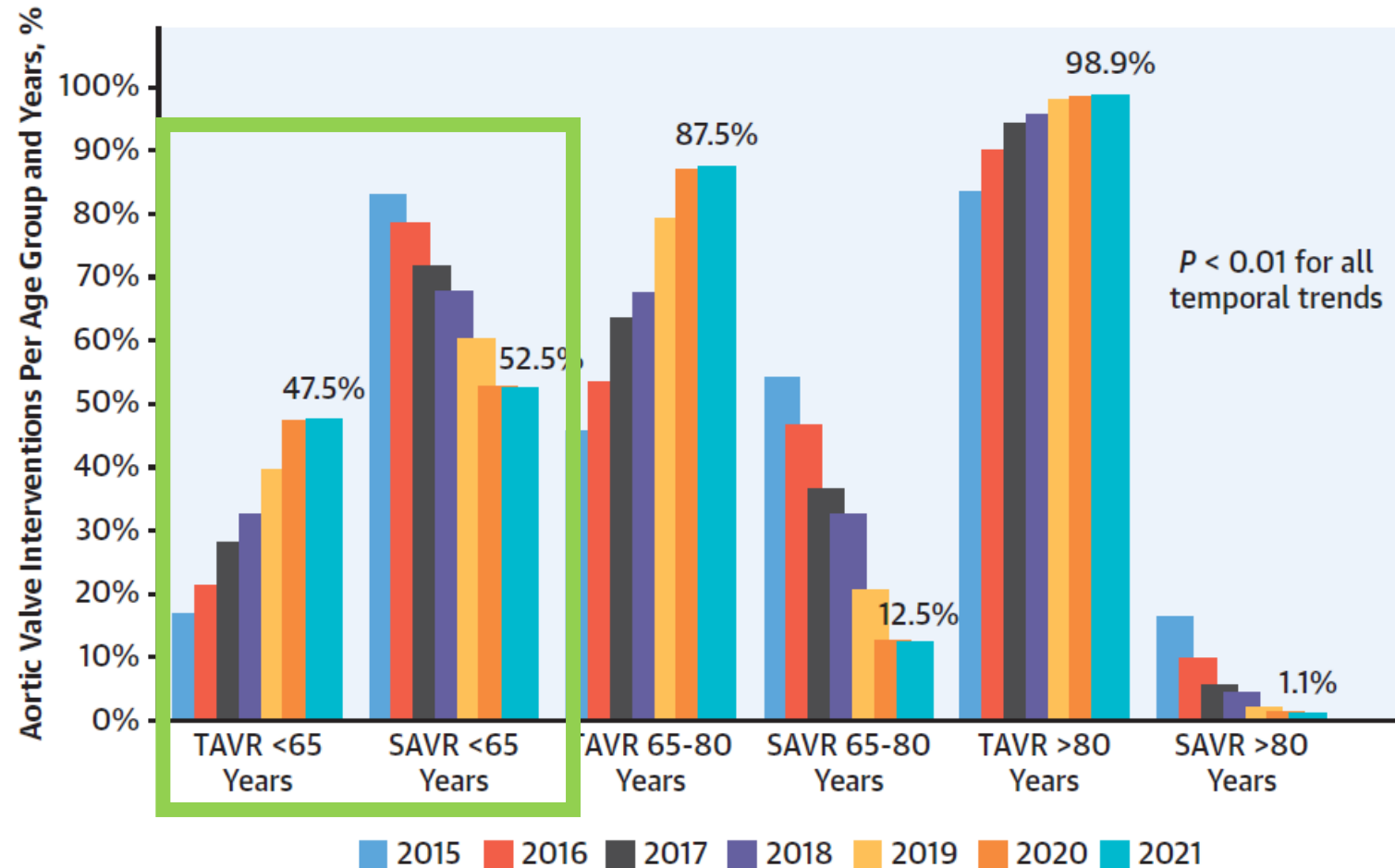
TAVI: croissance française



Source: industriels

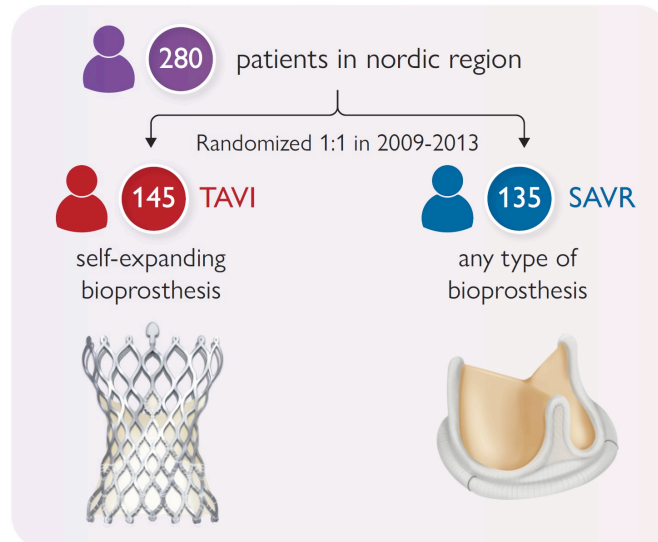
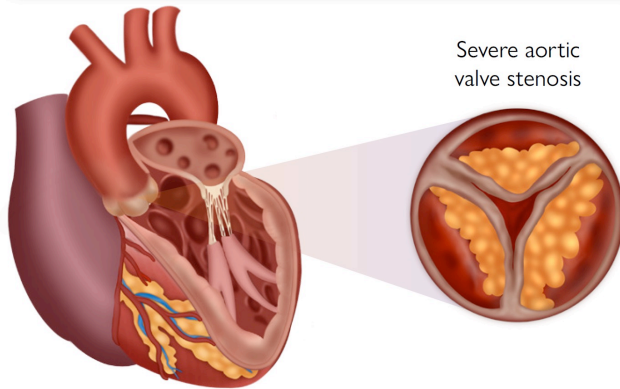
Problématique du RAO

Pathologie du sujet âgé...mais pas que



Se pose donc la question de la durabilité

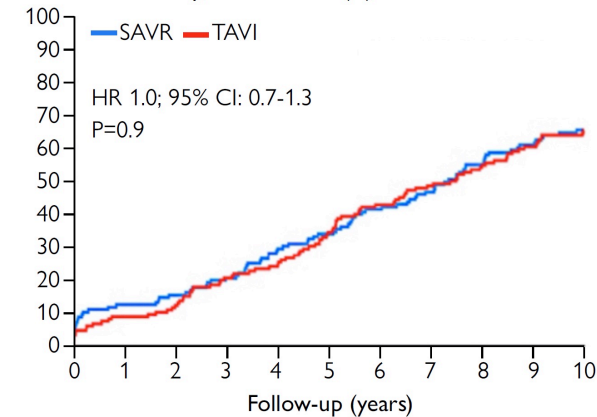
Severe aortic valve stenosis:
mean age 79 years; 80% with low mortality risk



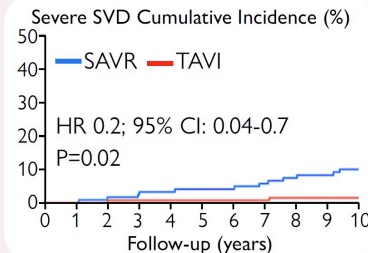
10-year follow-up

Primary composite outcome

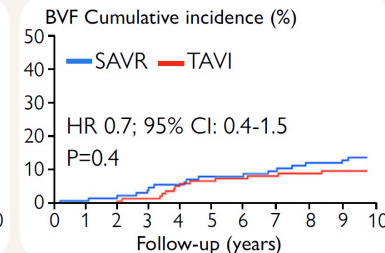
All-cause mortality, stroke or MI (%)



Severe structural valve deterioration
(modified VARC-3 criteria)



Bioprosthetic valve failure
(modified VARC-3 criteria)

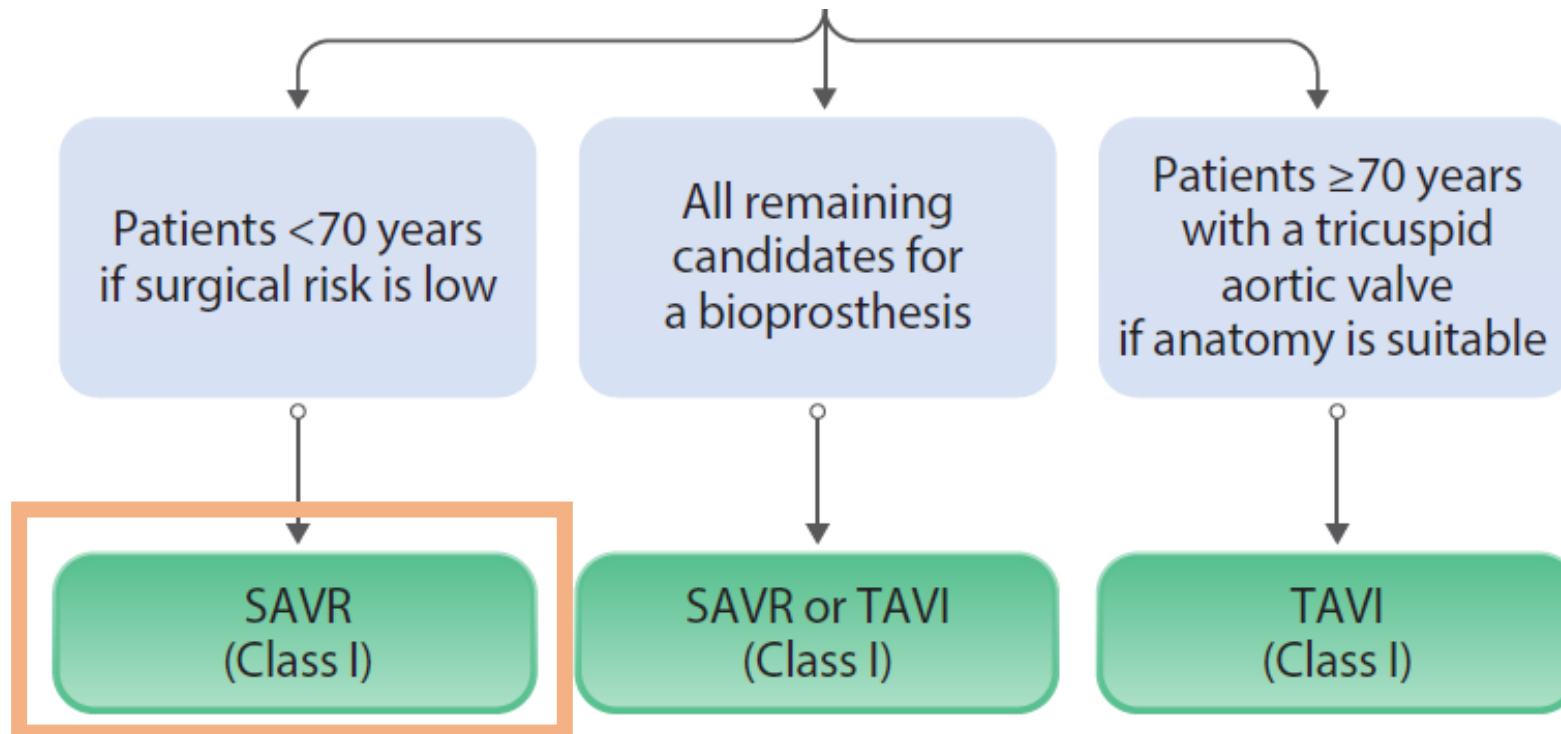


Durabilité prouvée

10 ans minimum

Severe AS: comment procéder ?

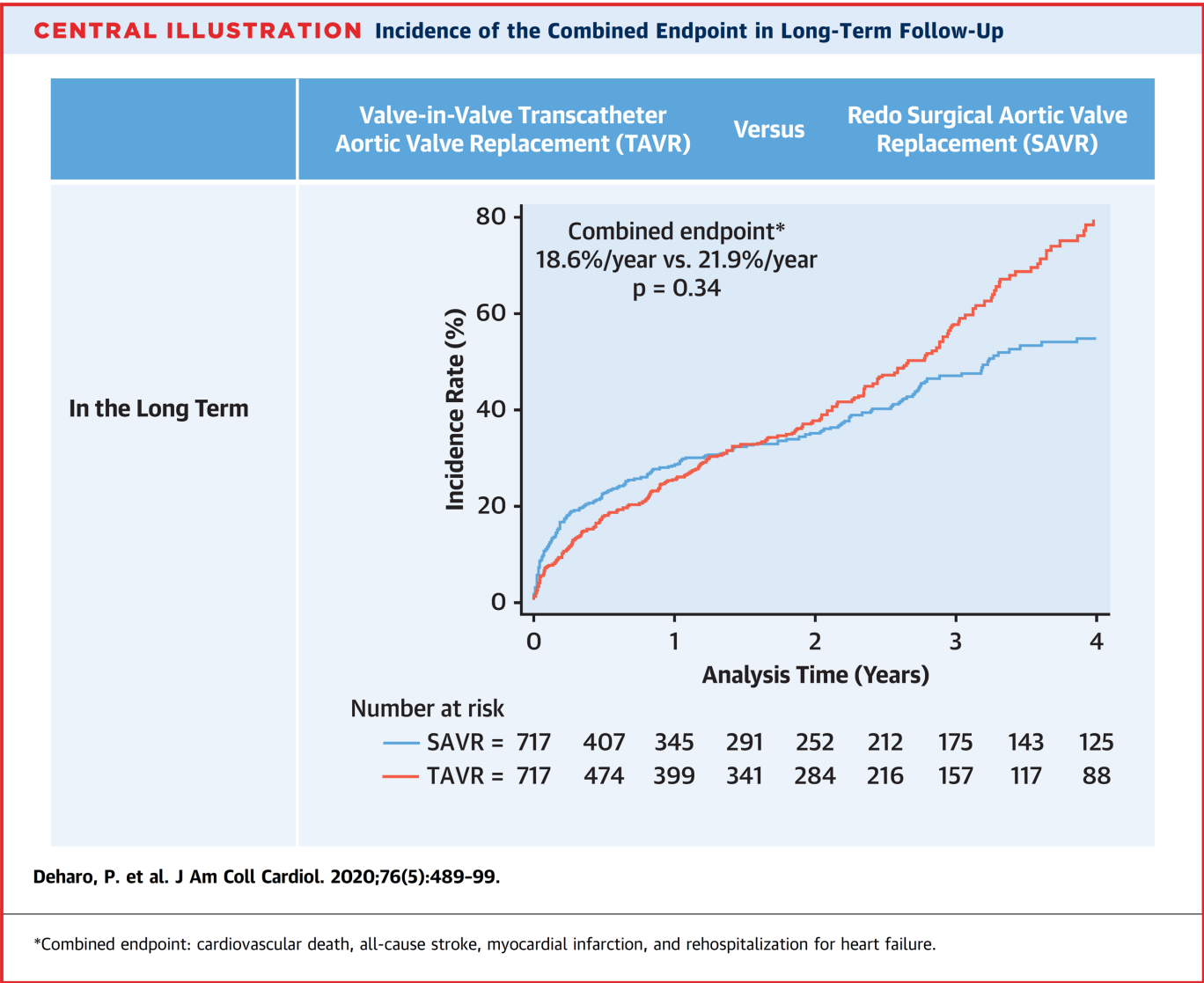
En 2025 à 70 ans espérance de vie de
13 ans chez l'homme et 17 ans chez la femme



TAVI valve in valve

Life time
Management
AS <70yo

SAVR 1st



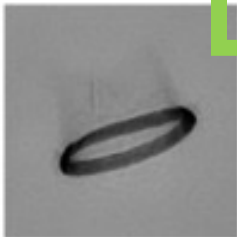
TAVI valve in valve

Life time
Management AS

SAVR 1st

Potential challenges in Valve in Valve procedures

Mitroflow



Bovine pericardial
Externally mounted leaflets
Fracturable at 12 ATM

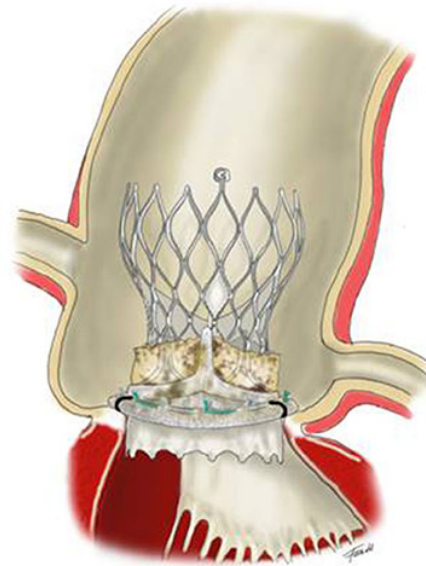
Coronary Occlusion

Predictors

- THV type
- SOV dimension
- Coronary height
- VTC

How to prevent

- THV type
- Lower THV implantation
- Coronary protection
- Coronary Stenting (Chimney snorkel technique, Orthotopic snorkel stenting technique)
- BASILICA



Post Procedural Gradient

Predictors

- THV annulus size (an elevated post procedural gradient is more common for small SHV (≤ 21 mm))

How to prevent

- THV type
- Higher THV implantation
- Bioprosthetic Valve ring Fracture (non compliant balloon ≤ 1 mm larger than the labeled valve size, inflation pressure according to SHV type, 18-24 for metal ring 8-12 for polymer ring, after THV implantation)

Perimount



Bovine pericardial
Internally mounted leaflets
Fracturable at 20 ATM

TAVI valve in valve

Life time
Management AS

SAVR 1st

Potential challenges in Valve in Valve procedures

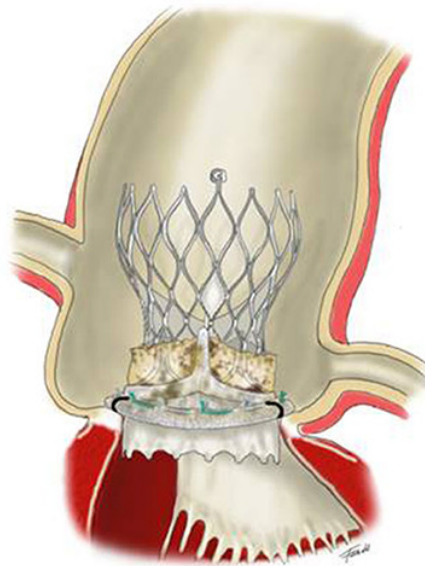
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Post Procedural Gradient

Predictors

THV and/or size (an elevated post procedural gradient is more common for small SHV (≤ 21 mm))

How to prevent

- THV type
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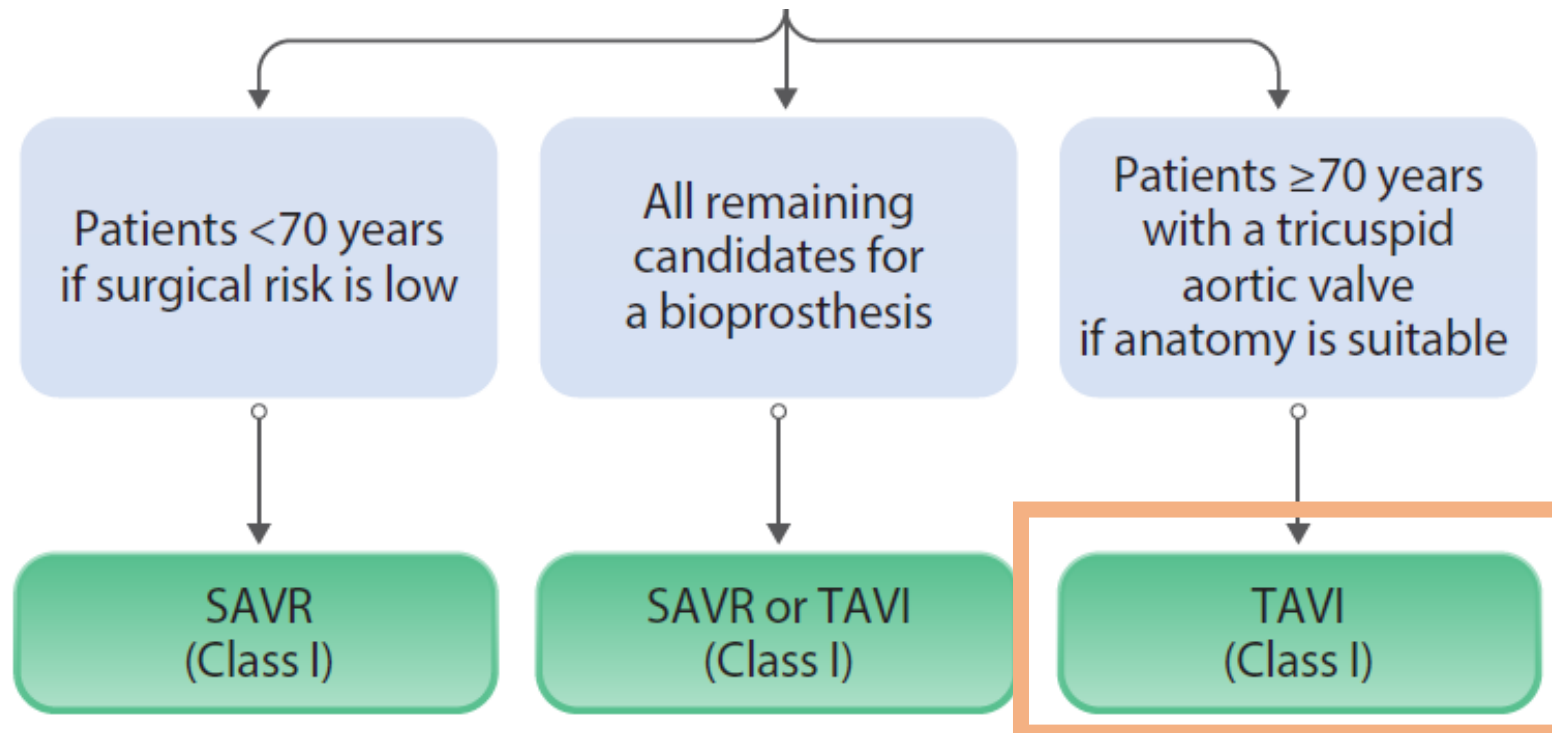


Severe AS: comment procéder

Life time
Management AS

TAVI 1st

A 70 ans espérance de vie de 13 ans chez l'homme
et 17 ans chez la femme

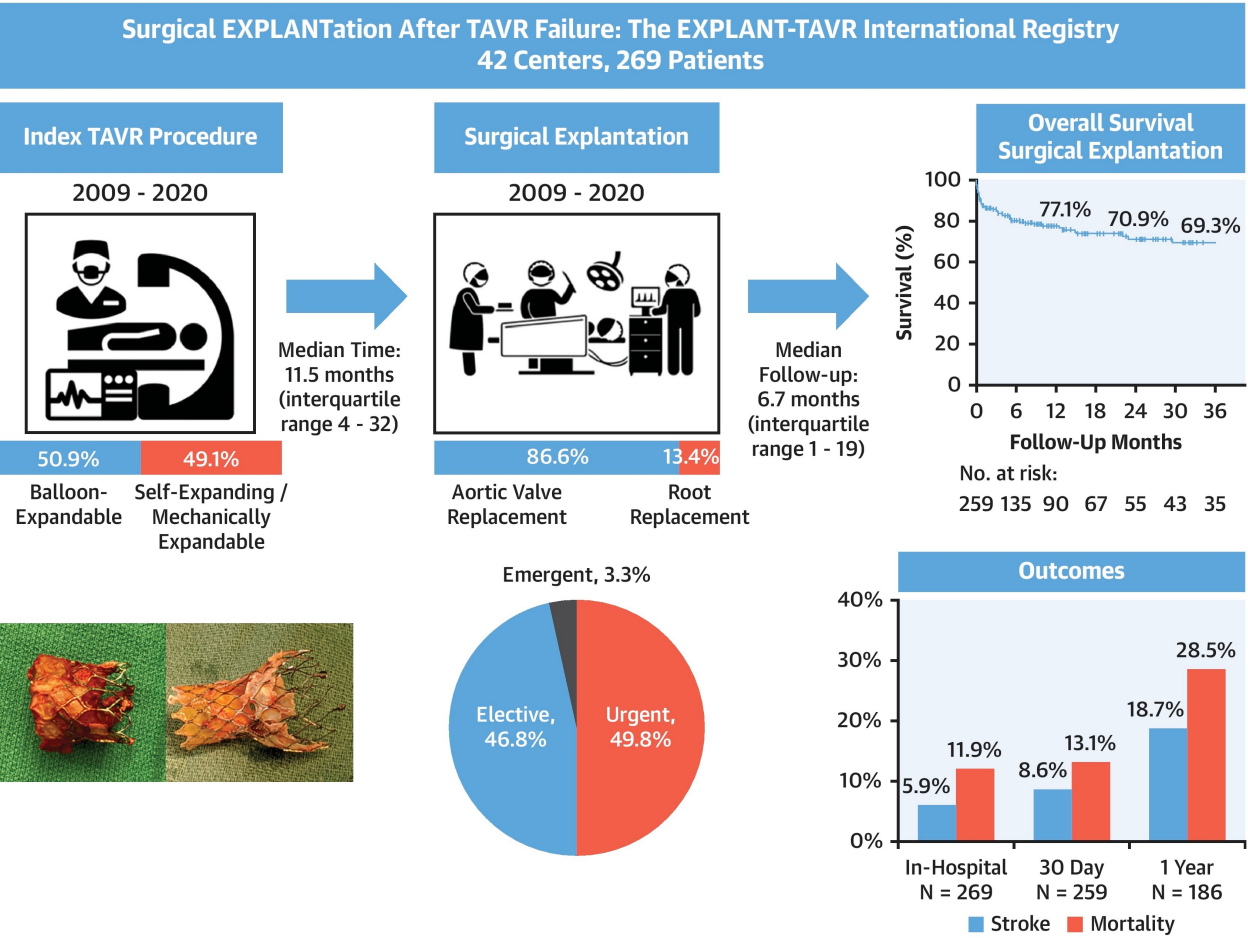


EXPLANT TAVI

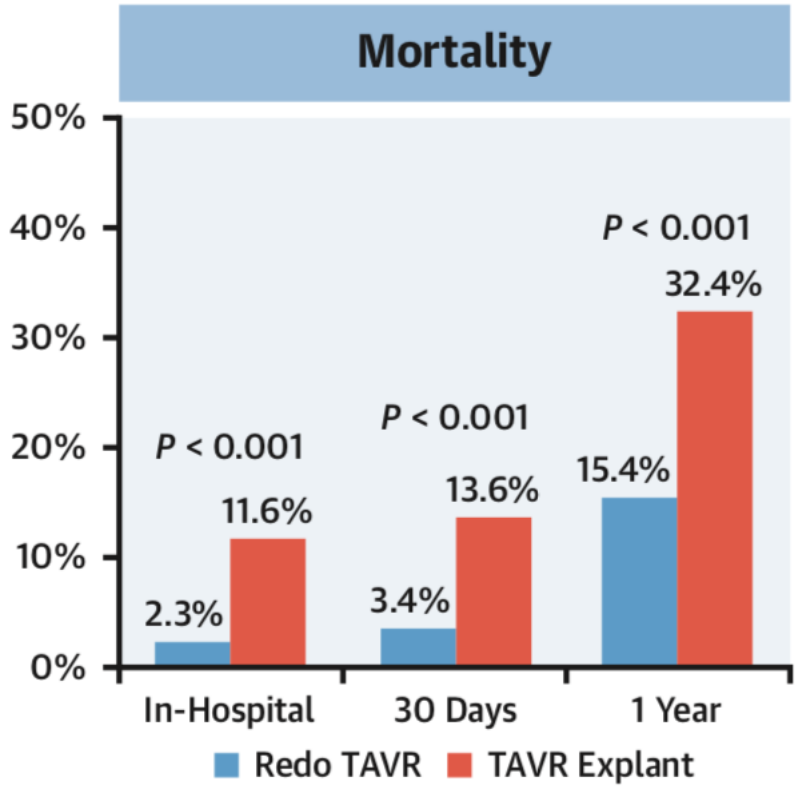
Life time
Management AS

TAVI 1st

CENTRAL ILLUSTRATION: Summary of the EXPLANT-TAVR International Registry



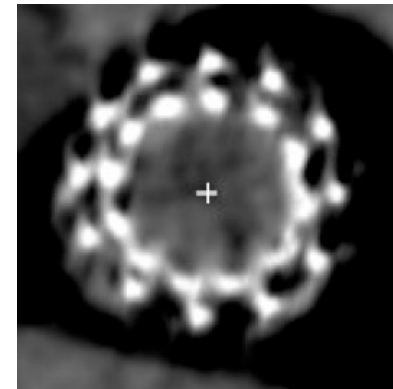
Bapat, V.N. et al. J Am Coll Cardiol Interv. 2021;14(18):1978-1991.



Tang G et al, JACC C Int 2023

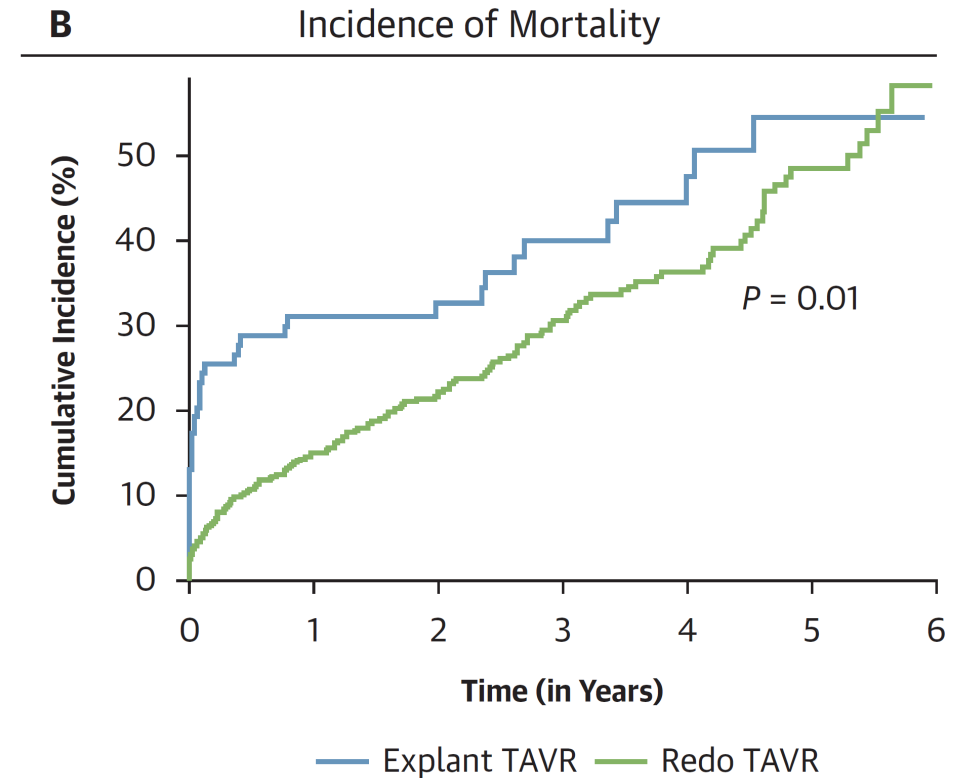
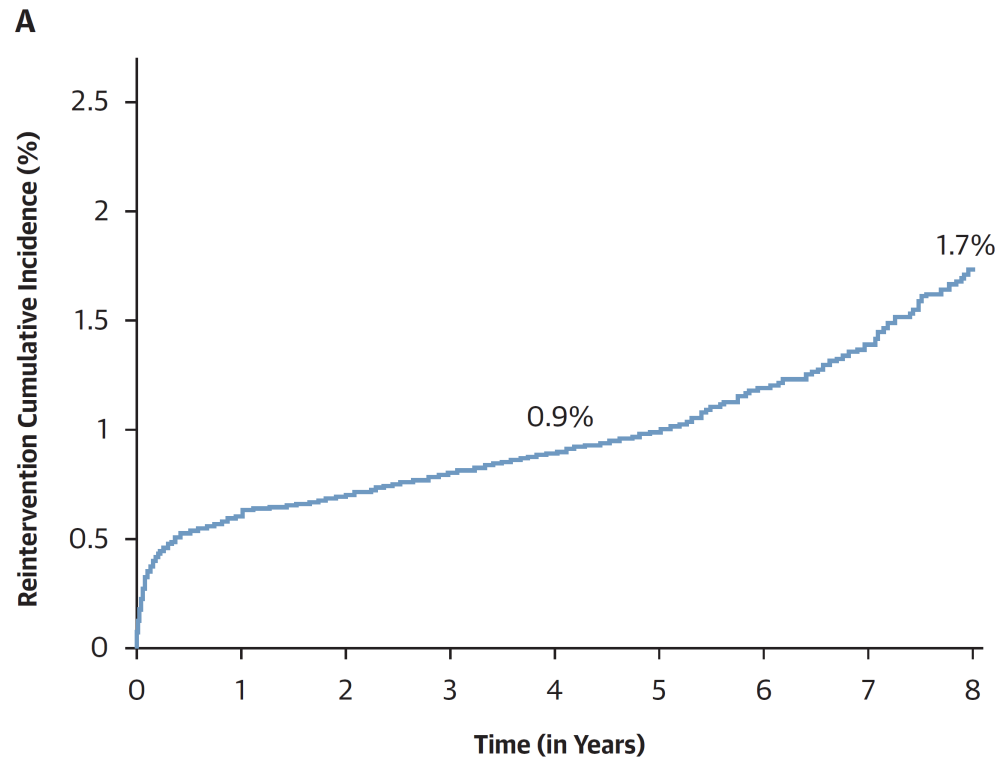
RedoTAVI

15% chir 85% redo

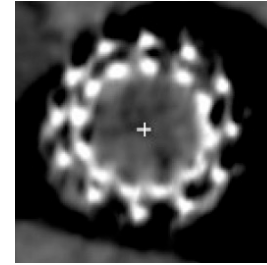
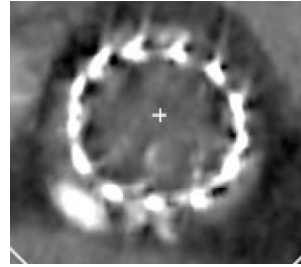


Life time
Management AS

TAVI 1st

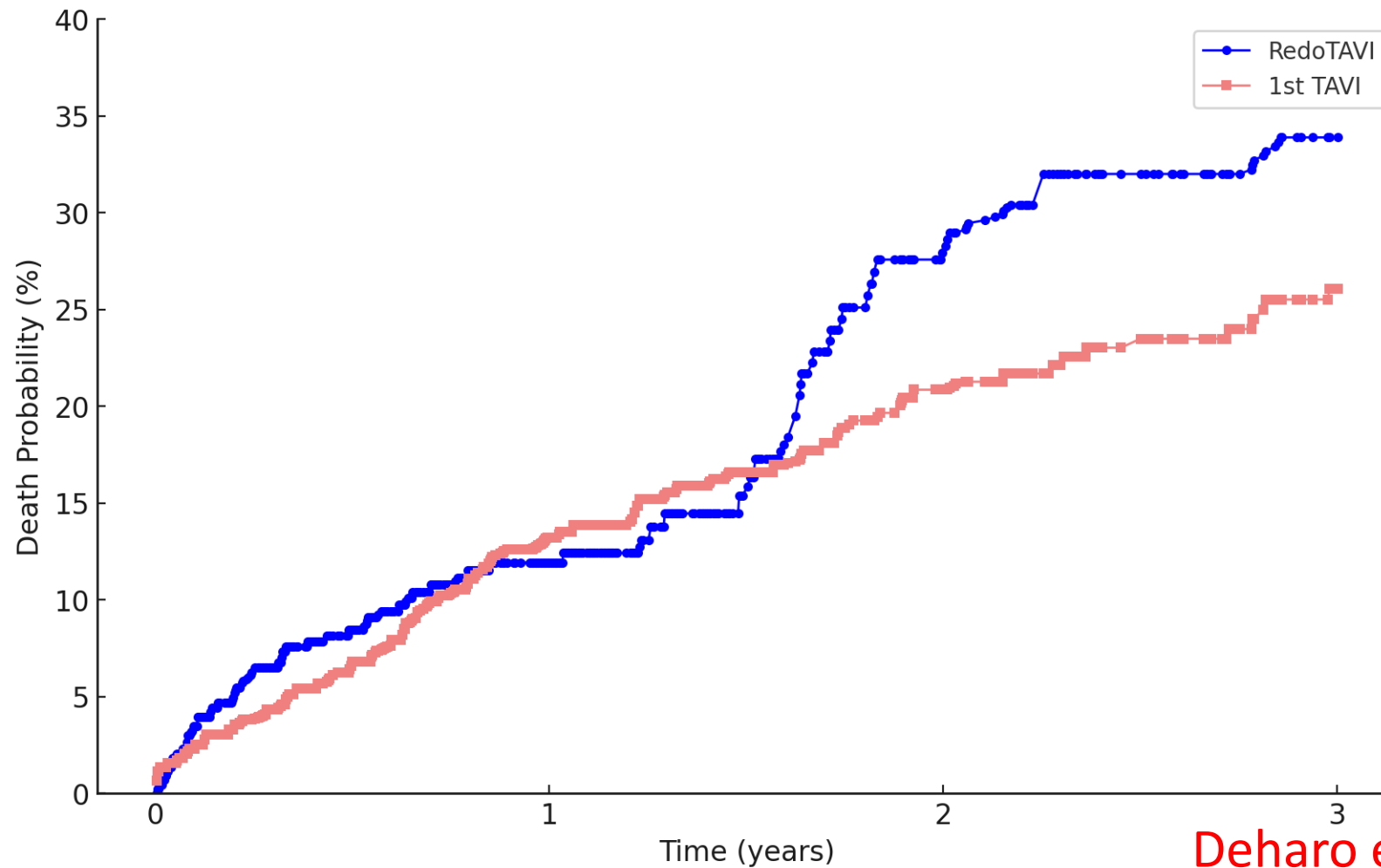


RedoTAVI



Life time
Management AS

TAVI 1st



Deharo et al, ACVD In press

Challenges redoTAVI

Life time
Management AS

TAVI 1st

Mismatch / Expansion / Thrombose

Stroke

Coronaire



Case

67 years old male patient

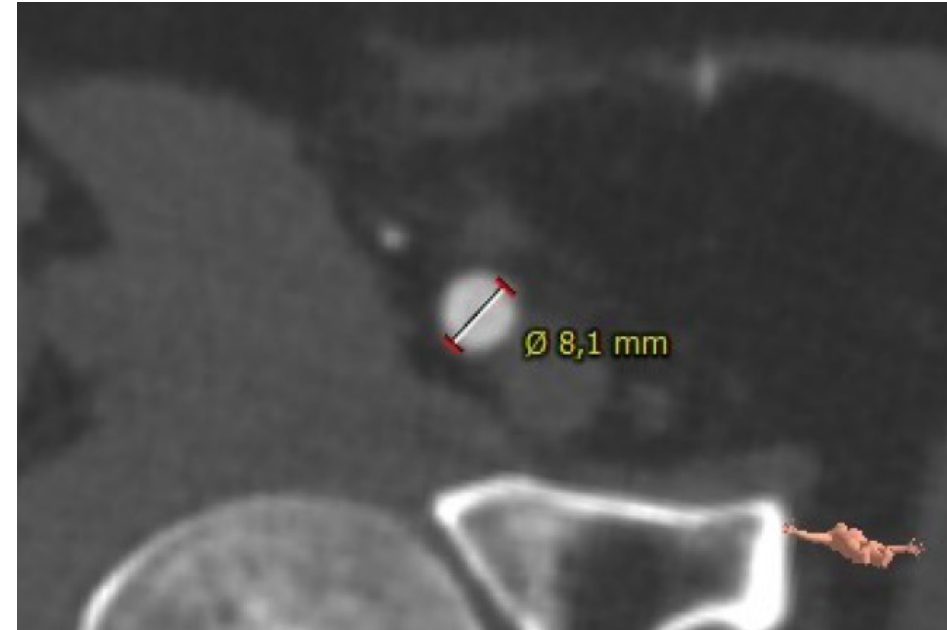
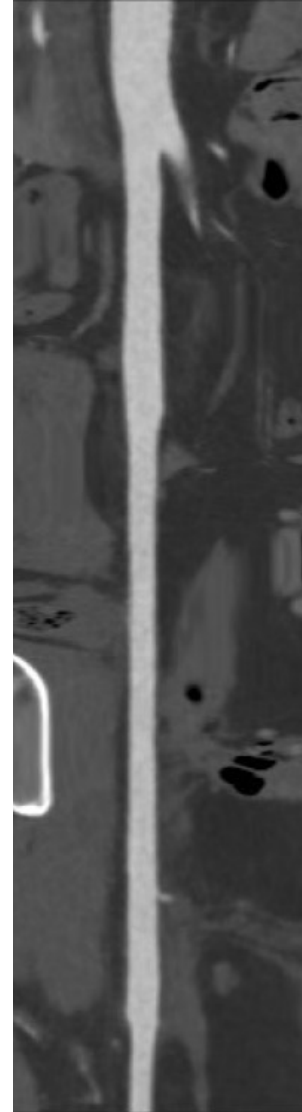
Known prosthetic valve deterioration (Sapien XT 23 mm implanted in 2010 due to porcelain aorta)

Unplanned hospitalization due to cardiogenic shock

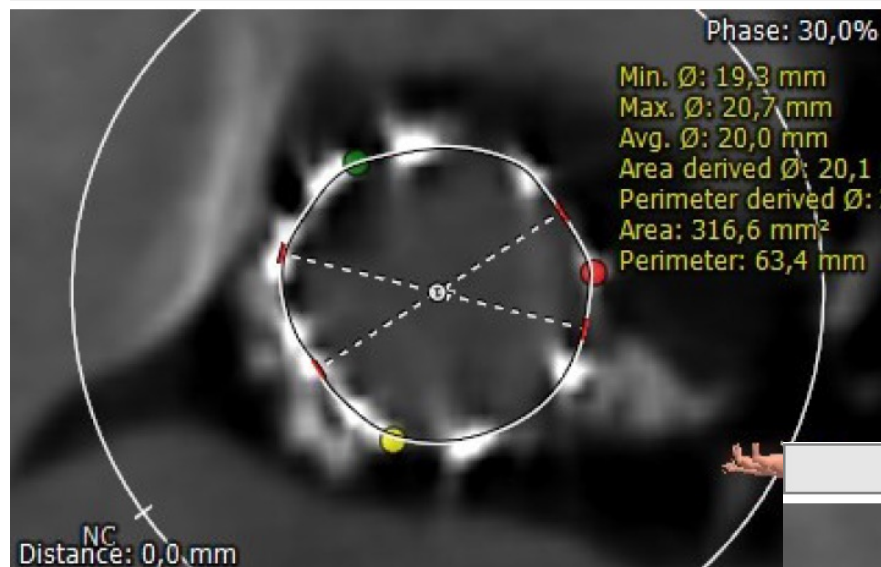
Past medical history:

- Hodgkin lymphoma treated by radiotherapy during childhood
- Ischaemic stroke in 2018

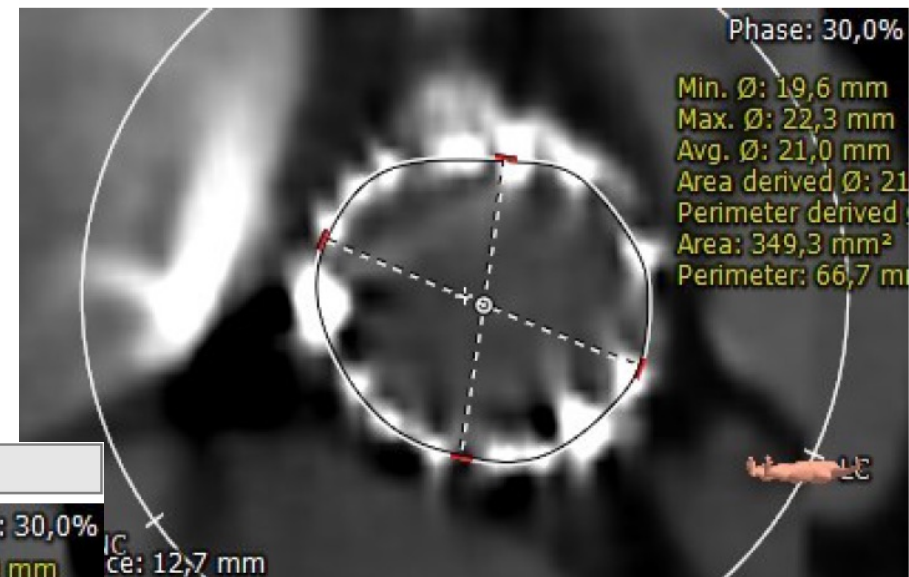
CT



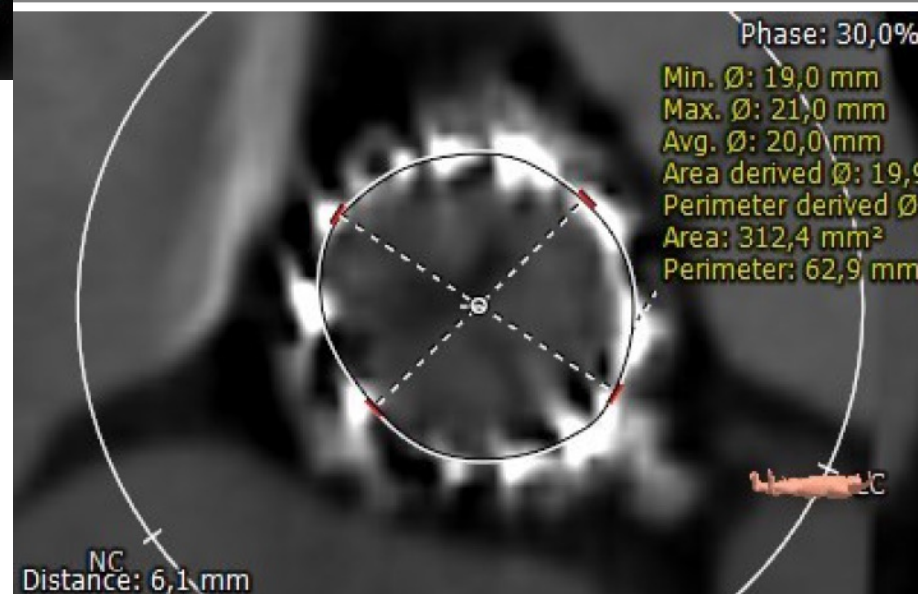
Inflow

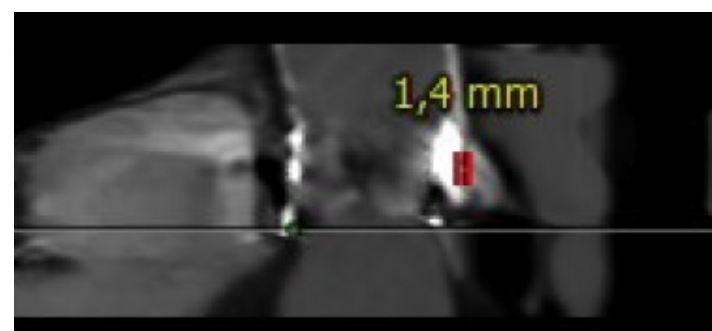
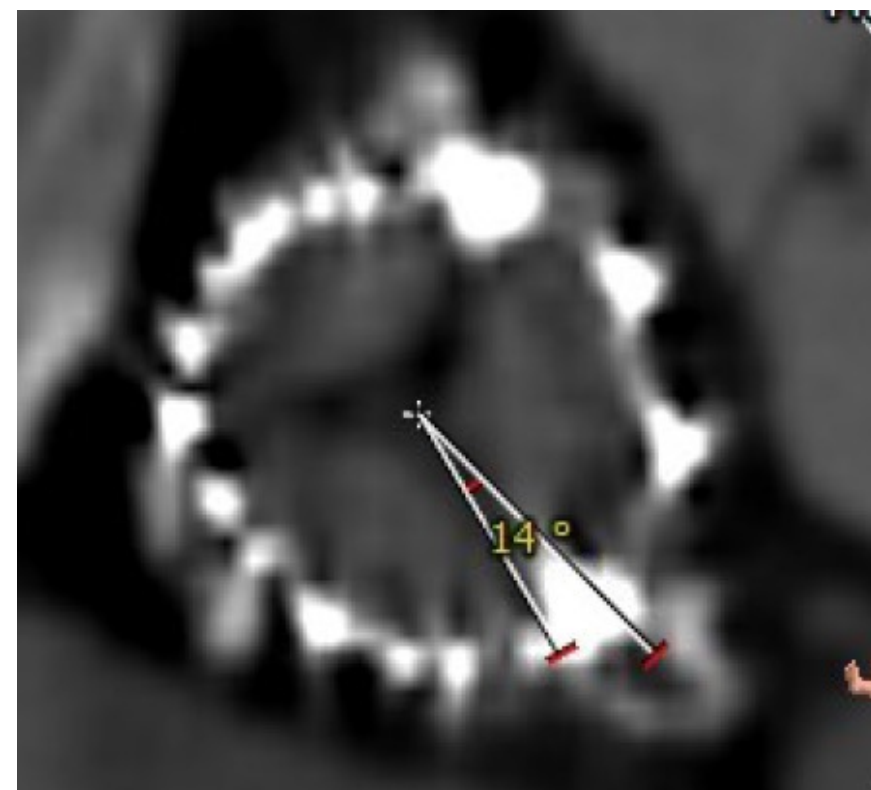
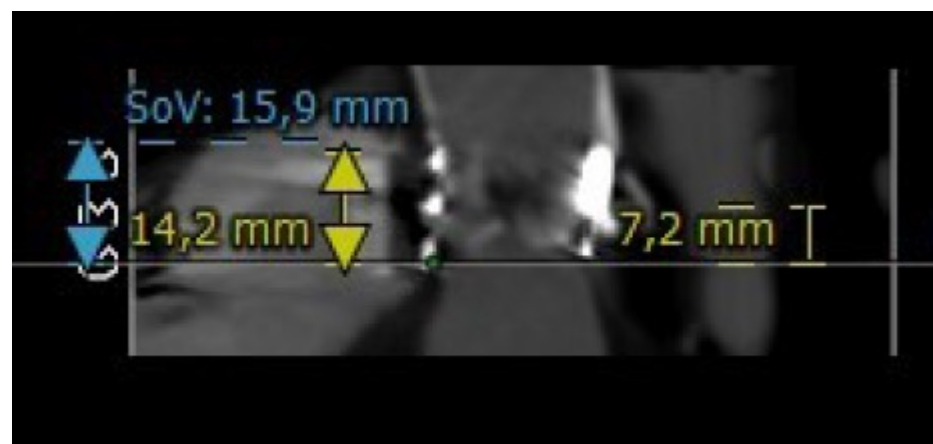


Outflow

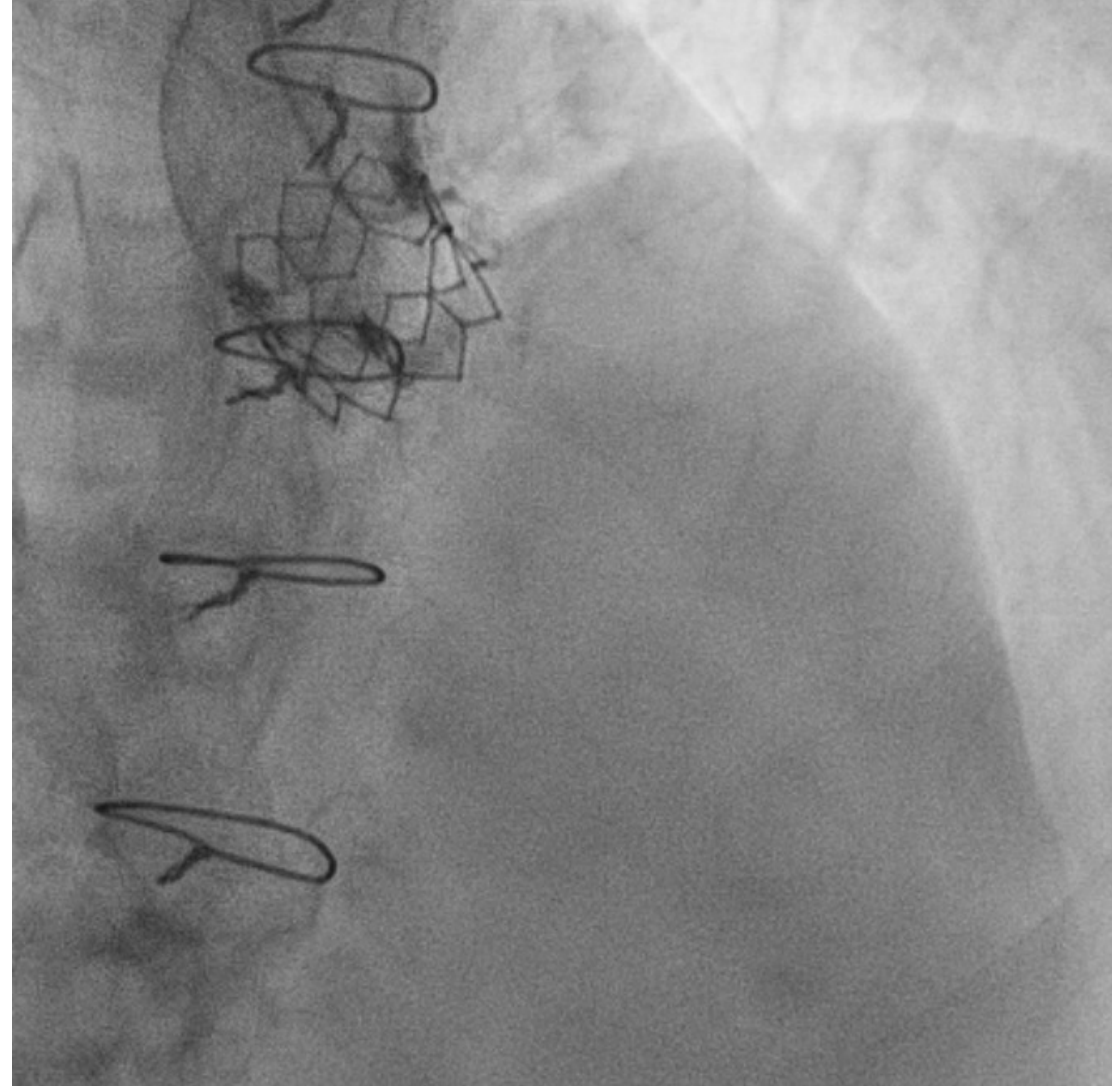
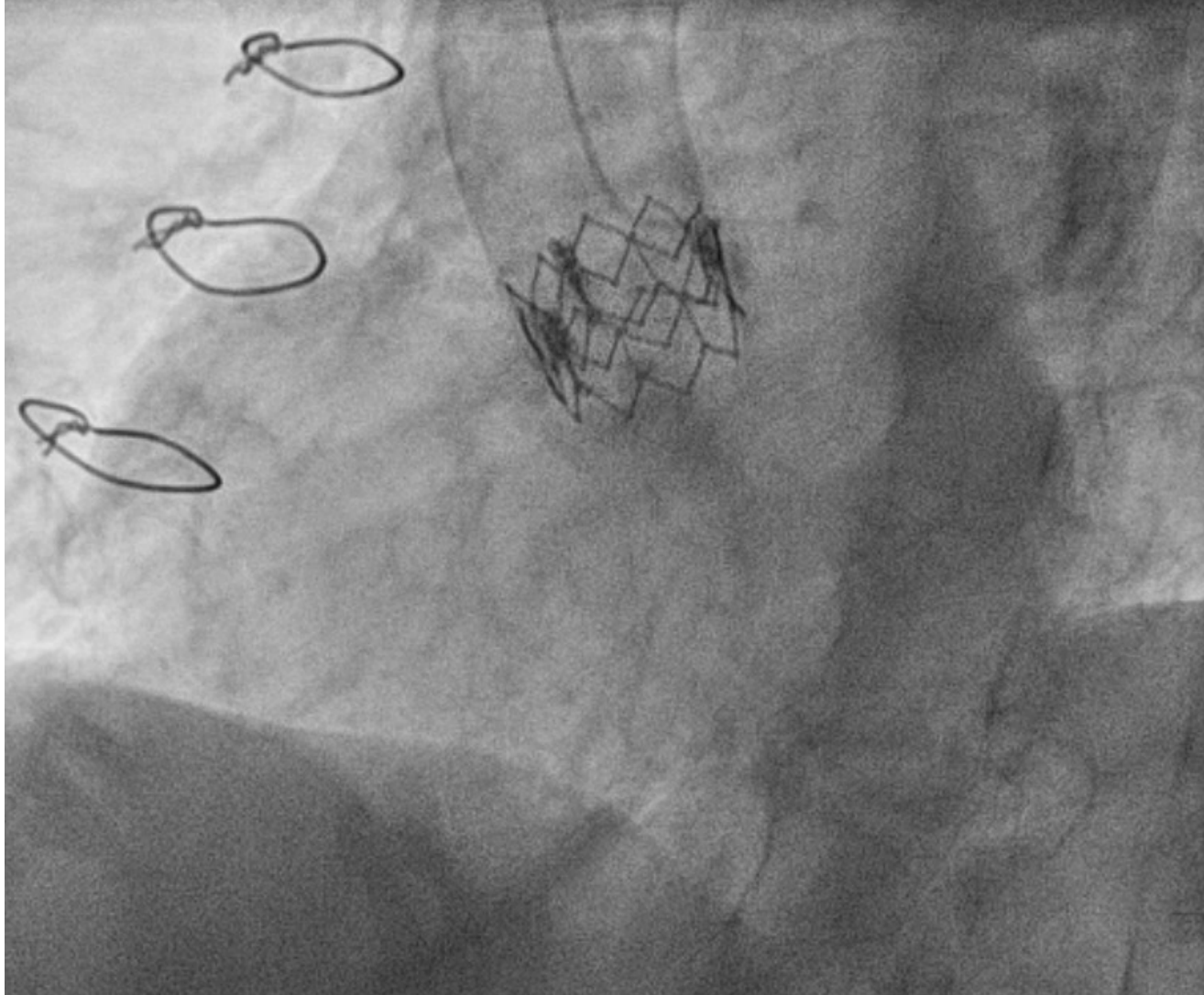


Minimal diameter



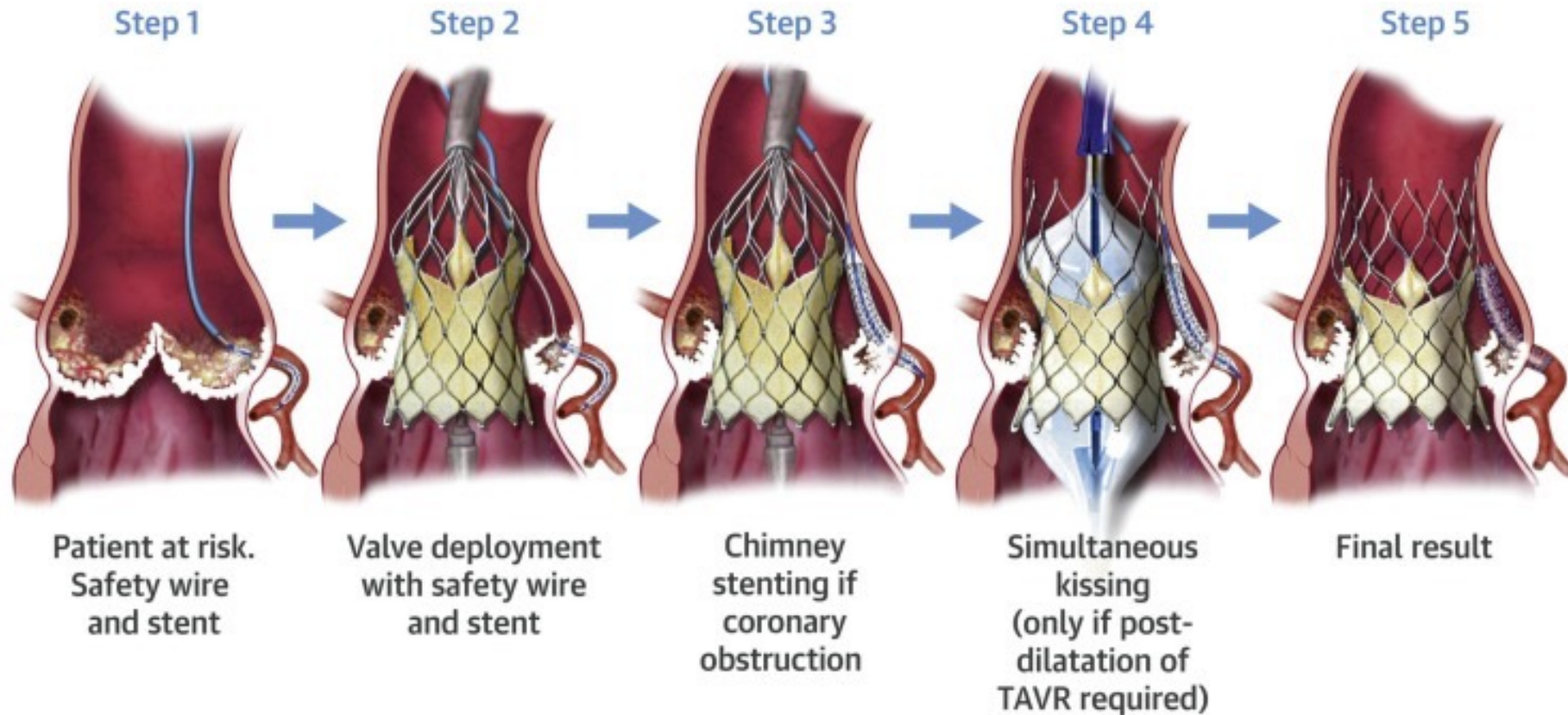


Coronary angiography



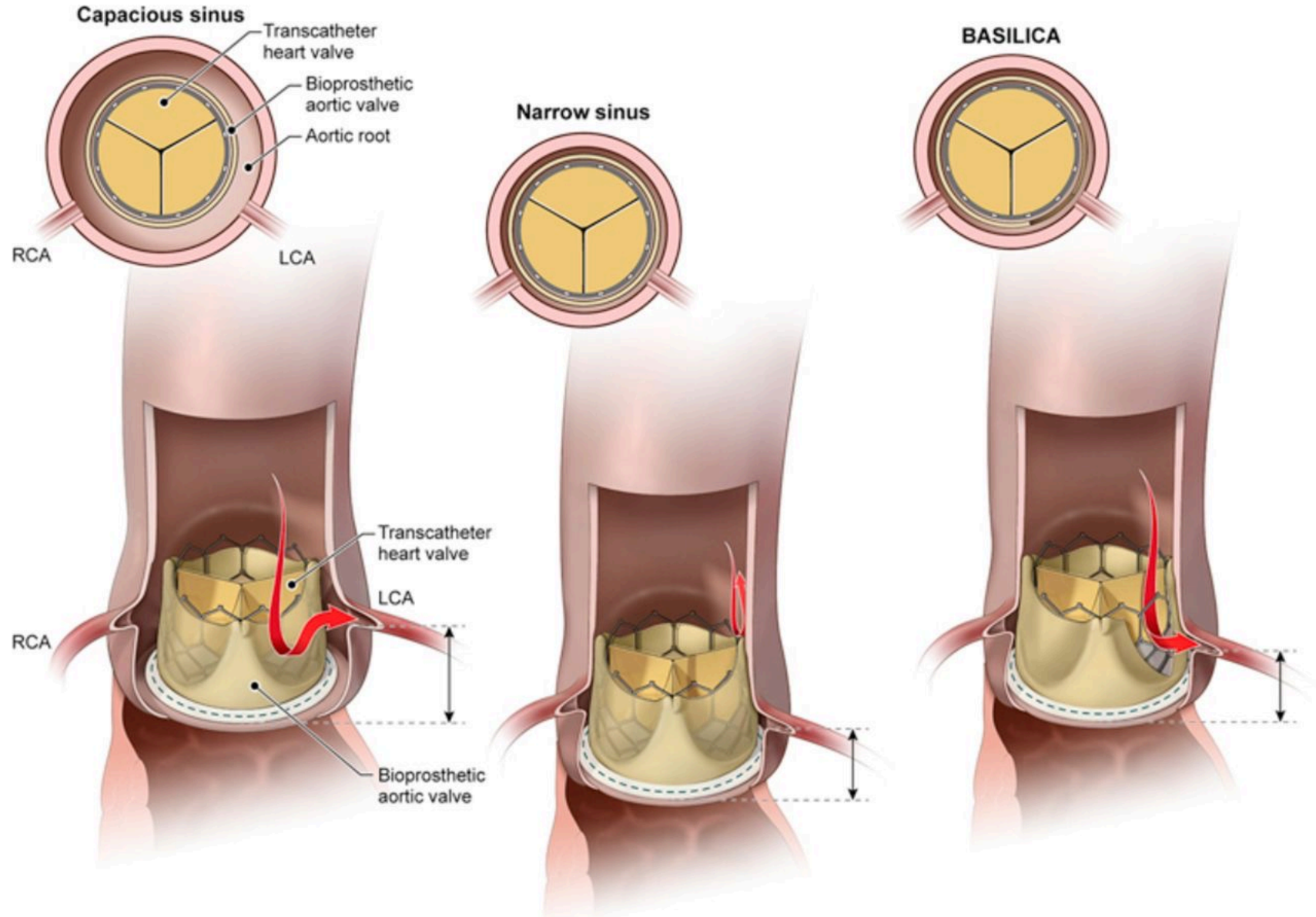
How to manage coronary risk

CENTRAL ILLUSTRATION: Chimney Stenting Procedural Steps

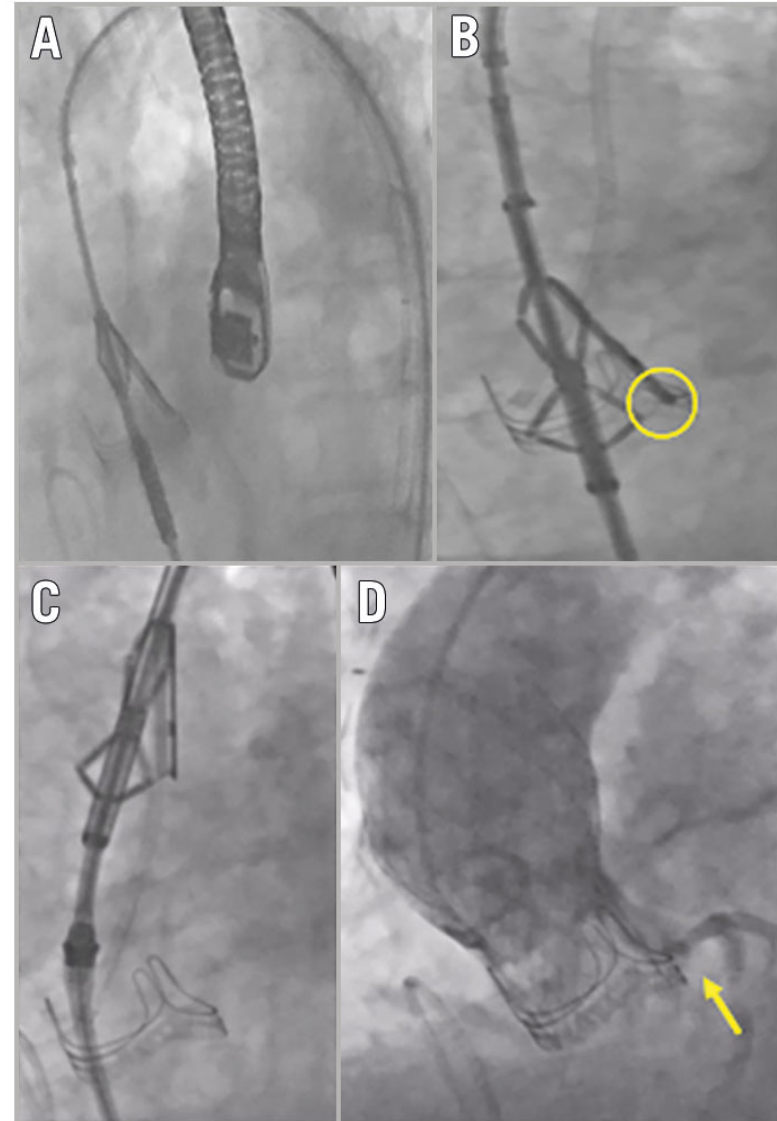


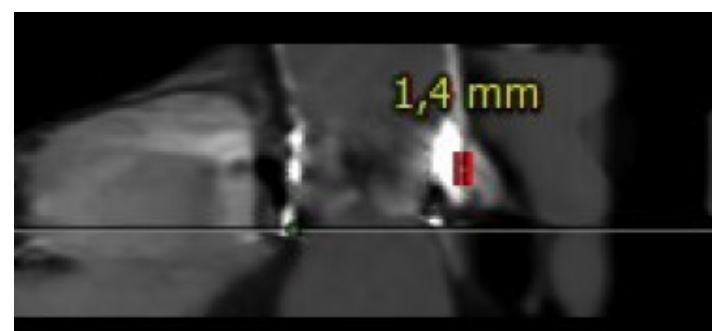
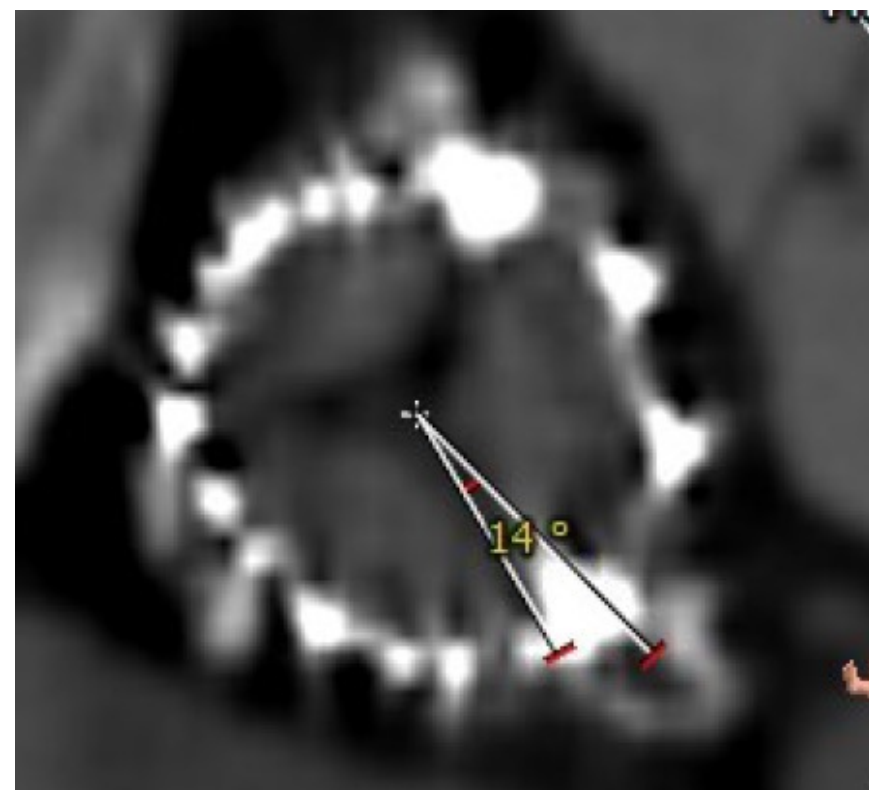
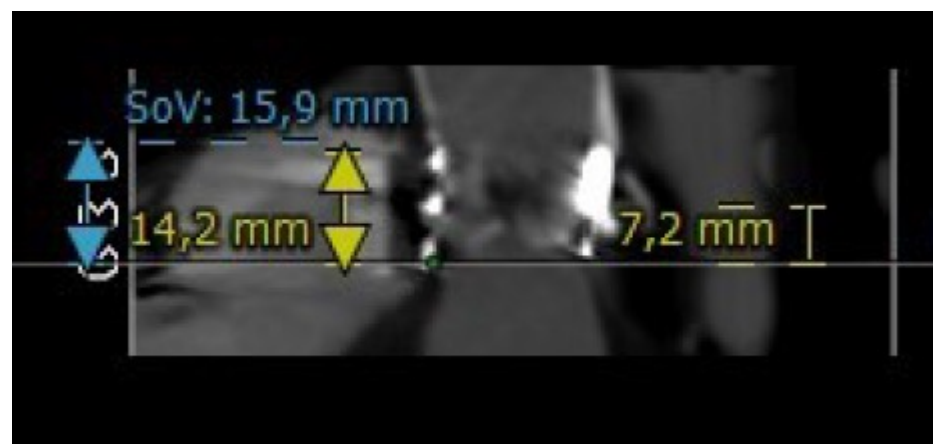
Mercanti, F. et al. J Am Coll Cardiol Interv. 2020;13(6):751-61.

How to manage coronary risk

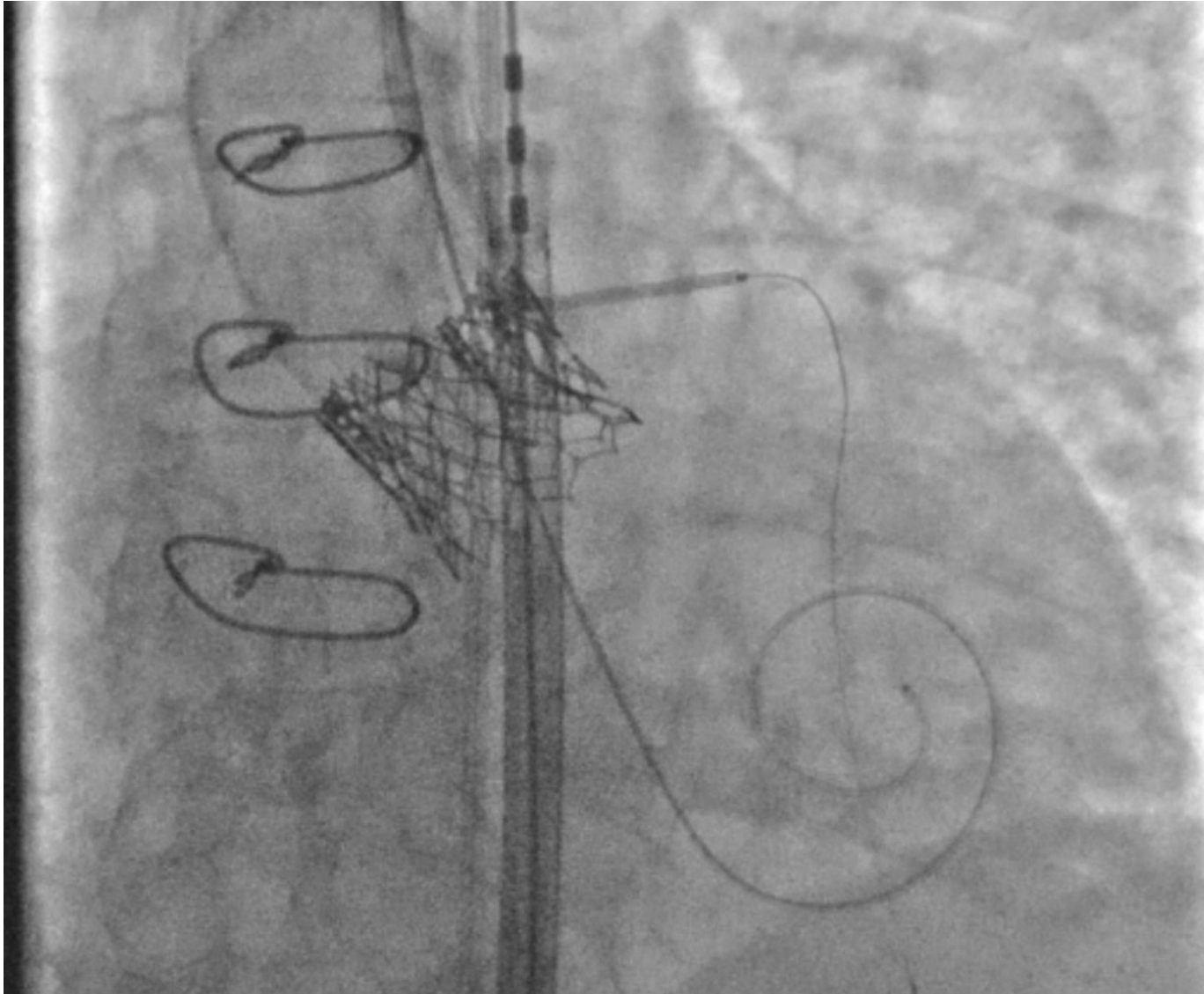


How to manage coronary risk





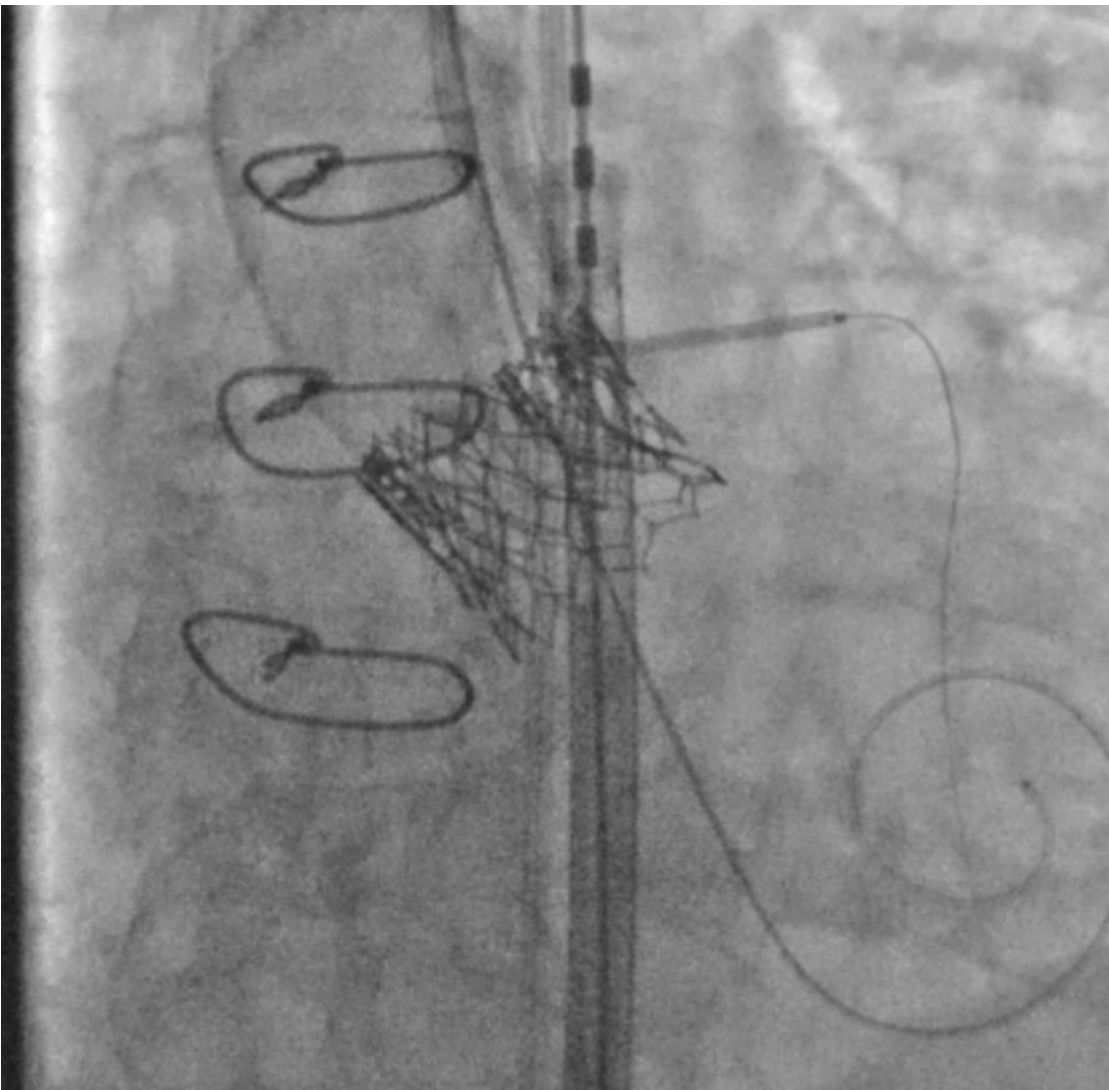
Procedure



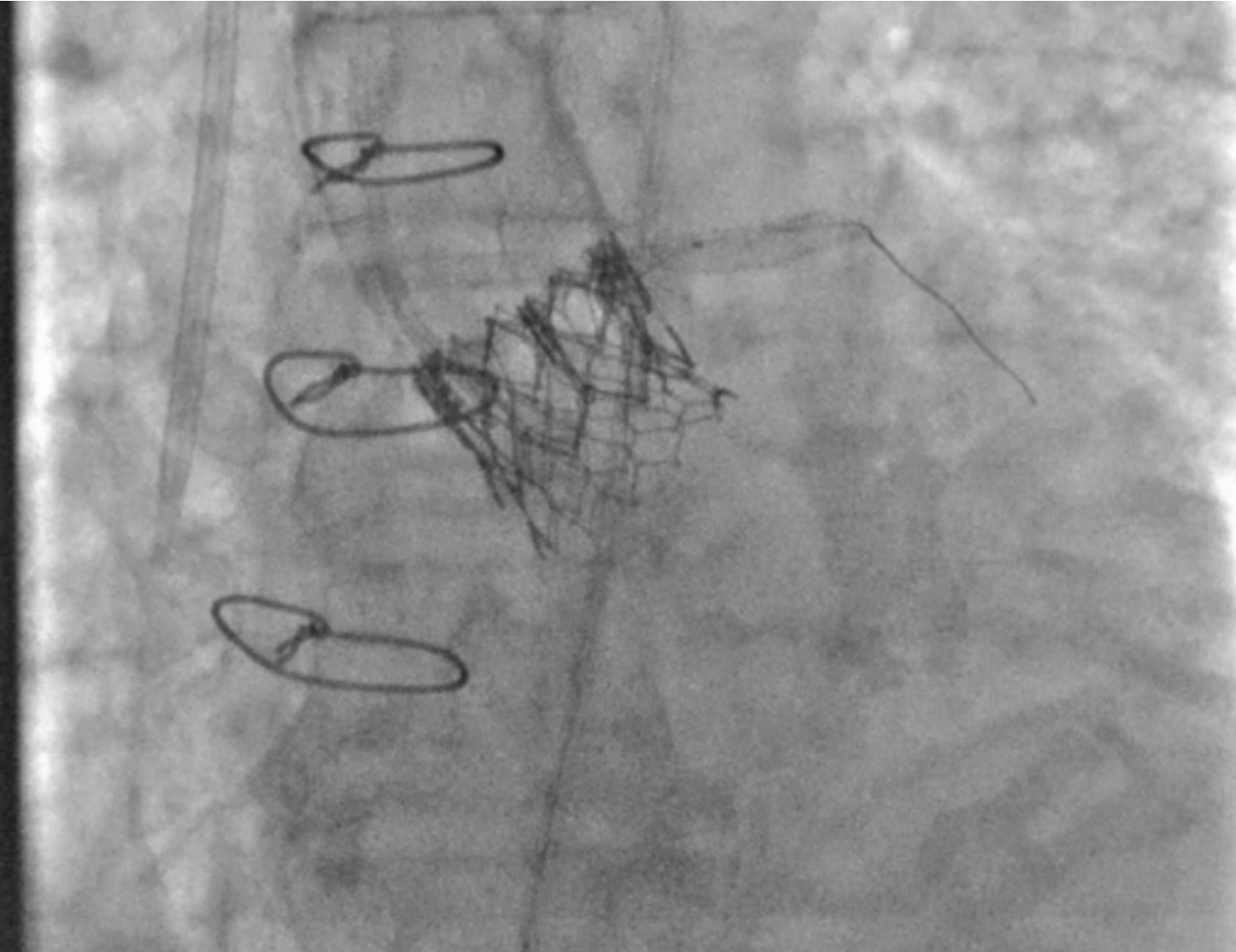
**Pre-dilatation Atlas Gold 22 x 40 mm
Valve crossing S3 Ultra 23 mm**

**Stent deployment
(Synergy Megatron 3,5 x 28 mm)
+ POT (NC balloon 4,0 x 15 mm)**

Procedure



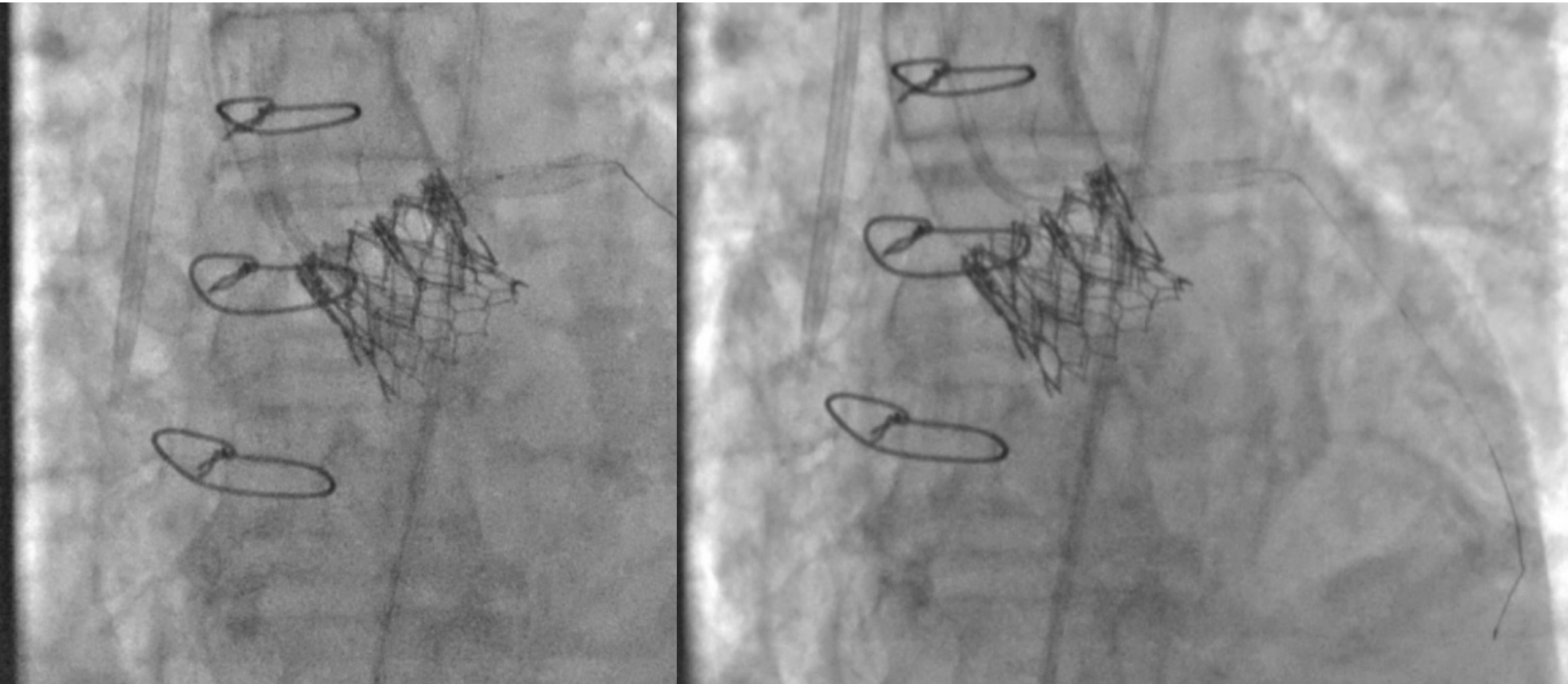
Procedure



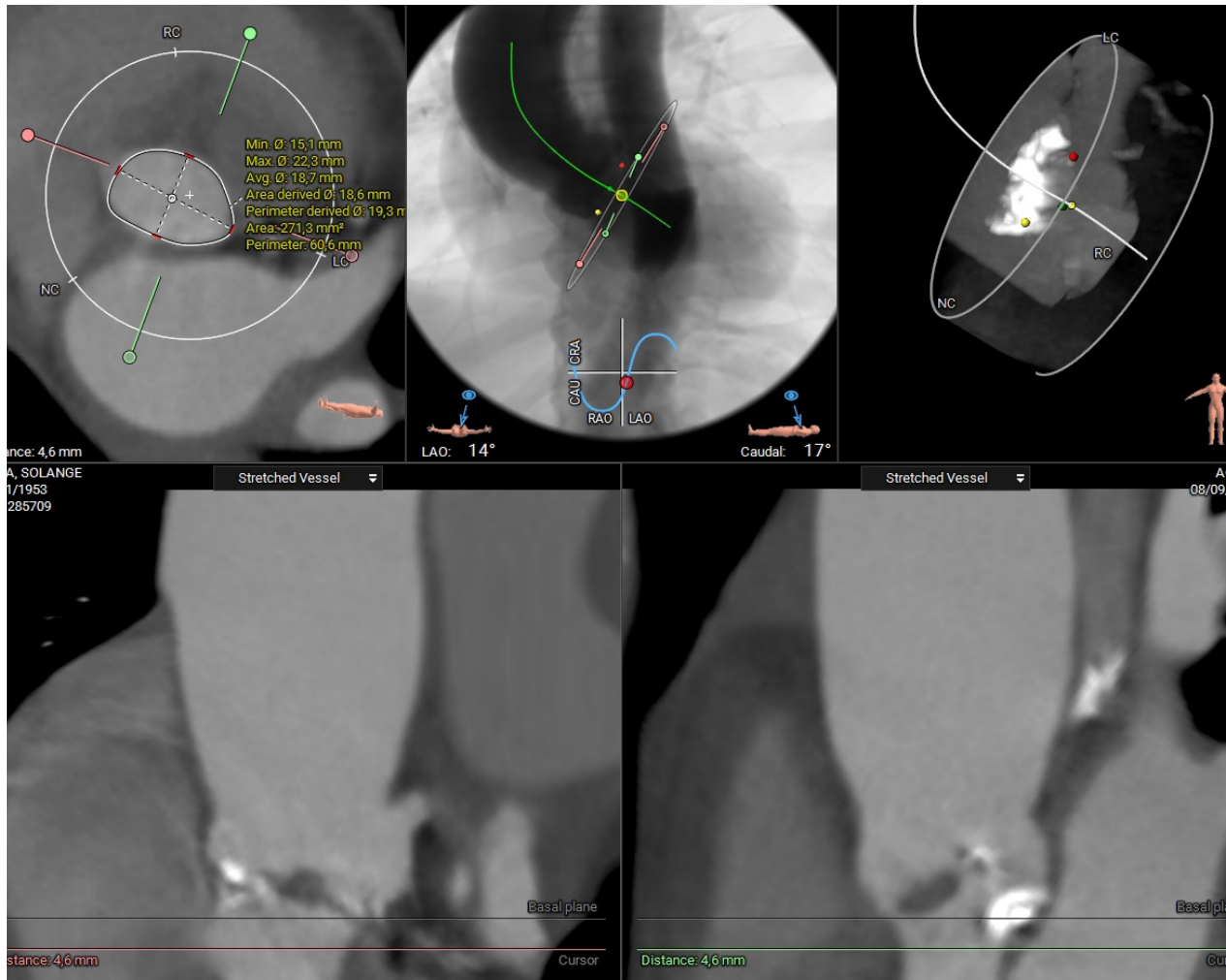
**Recrossing LM
(JL 3 6F + Whisper ES guidewire)**

**Post dilatation
Non compliant balloon
(4,5 x 15 mm)**

Procedure



Petit anneau ? => élargissement chir puis TAVI in valve

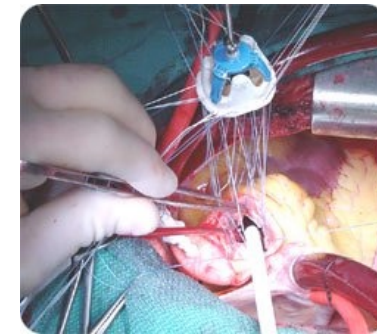


72 yo

S3 20 ou Evolut 23 ?

Mismatch? PVL? PMK?
Coronaire si TAV in TAV ?

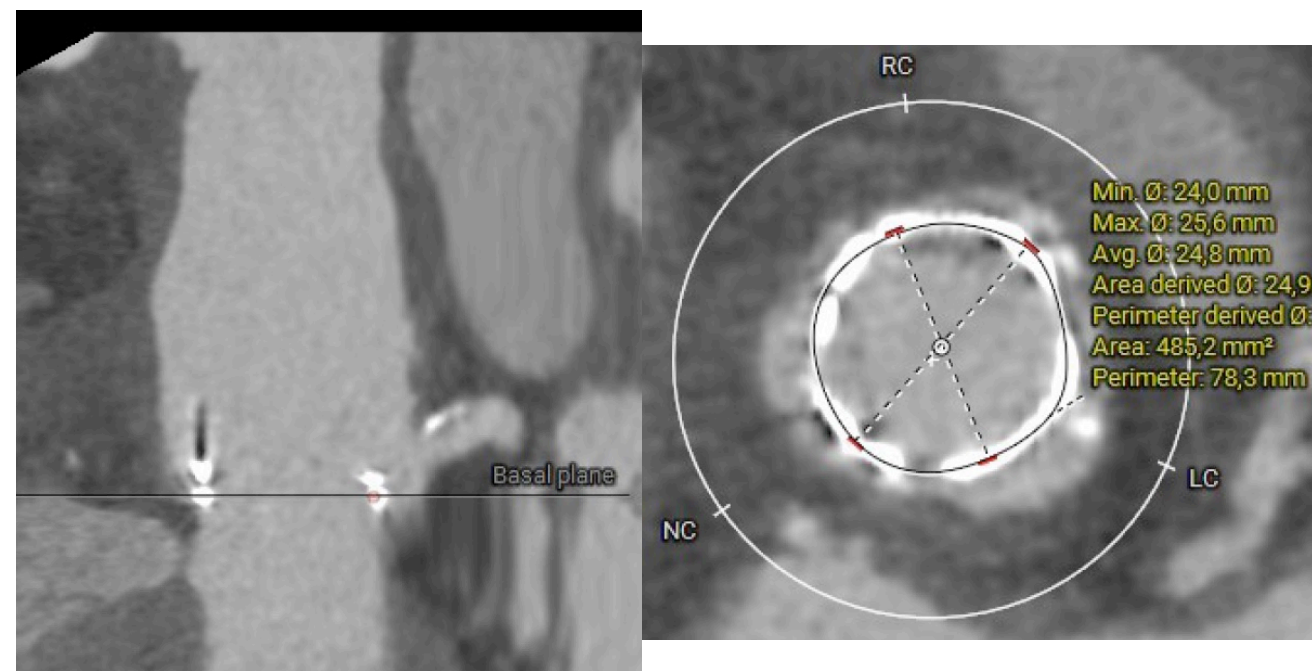
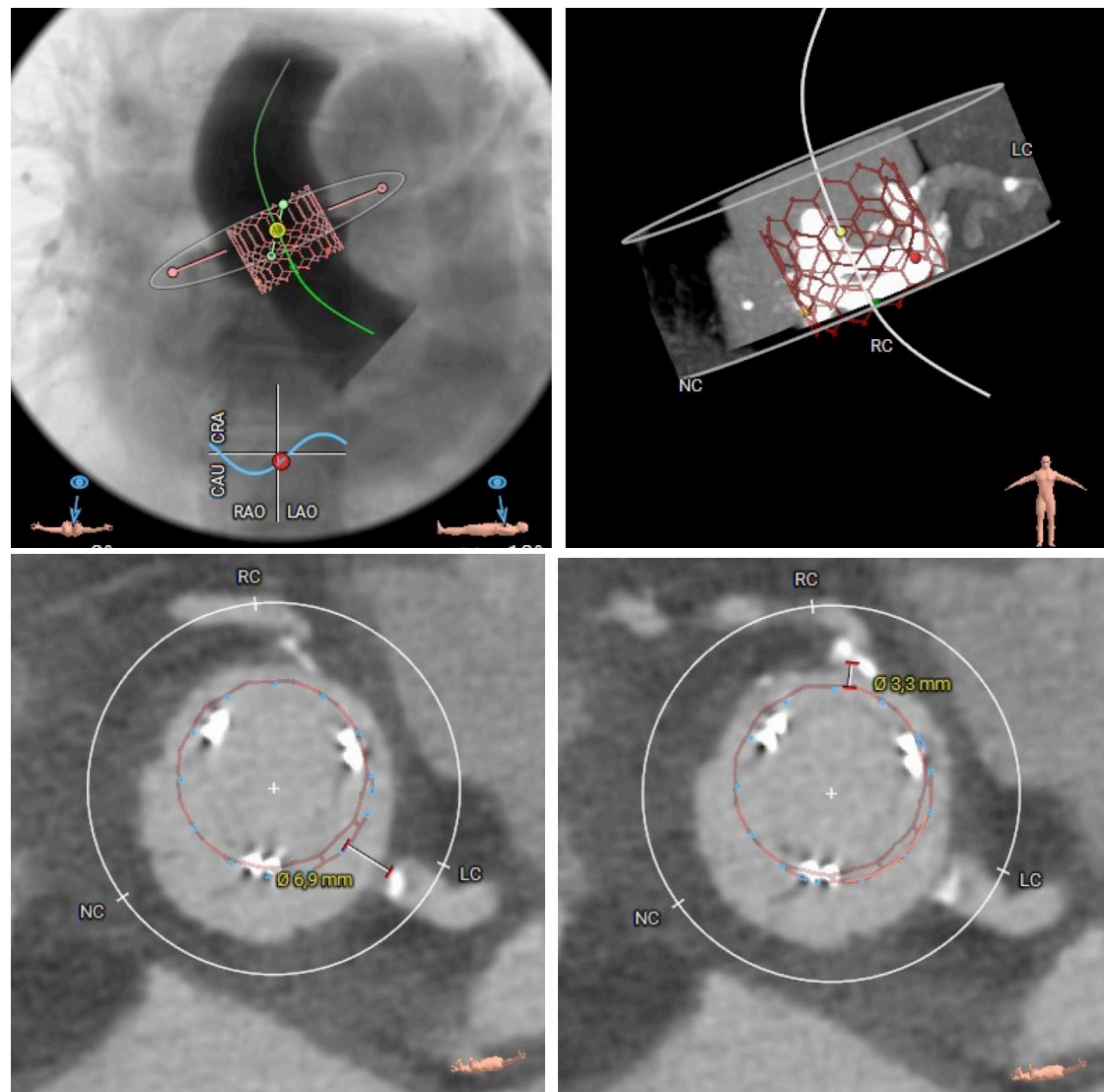
=> Chirurgie d' élargissement
anneau (Perimount 25)



Petit anneau ? => élargissement chir puis TAVI in valve

72 yo

=> Chirurgie d' élargissement
anneau (Perimount 25)





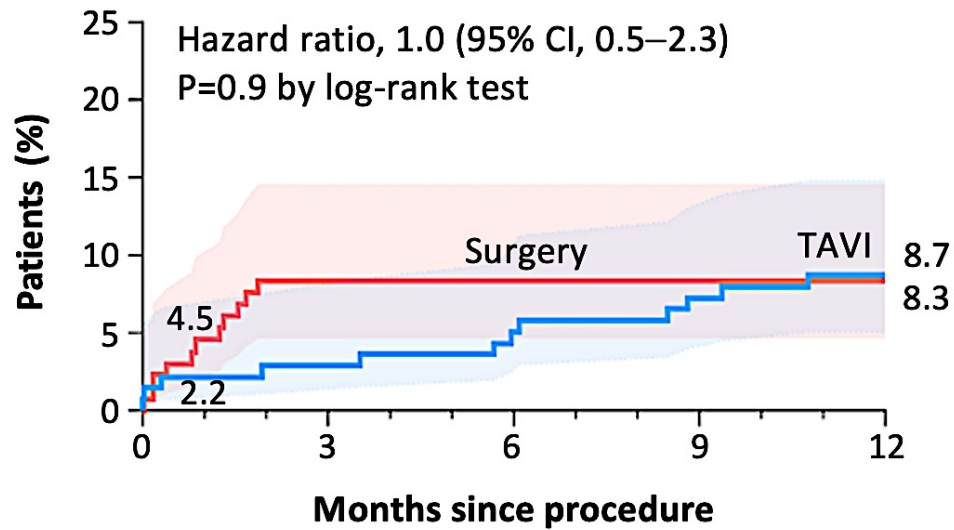
Individualized medicine?
age / petites anatomies / risque coronaire



Tous les RAO sont ils les mêmes?



Primary endpoint Tricuspid cohort

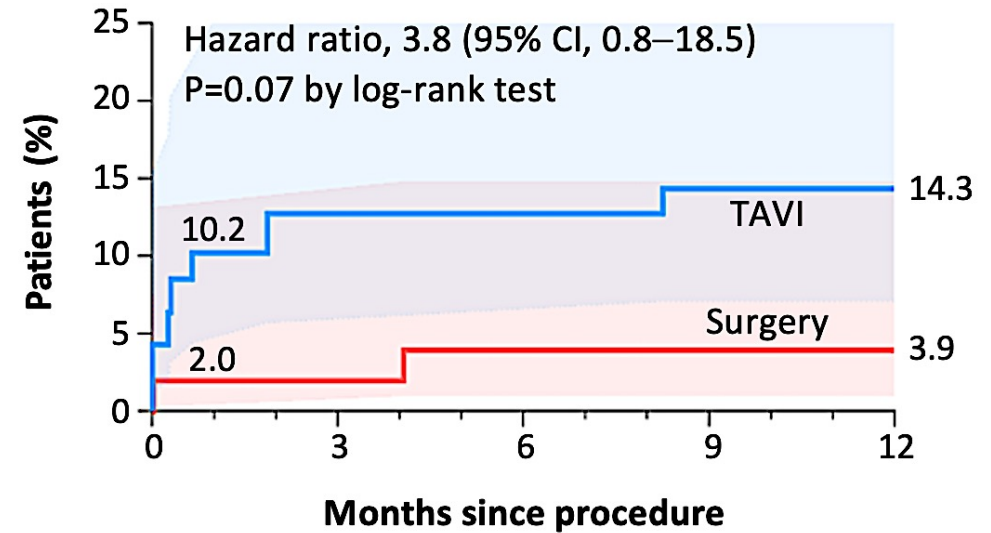


No. at Risk

Surgery	132	121	121	121	121
TAVI	138	134	131	128	126

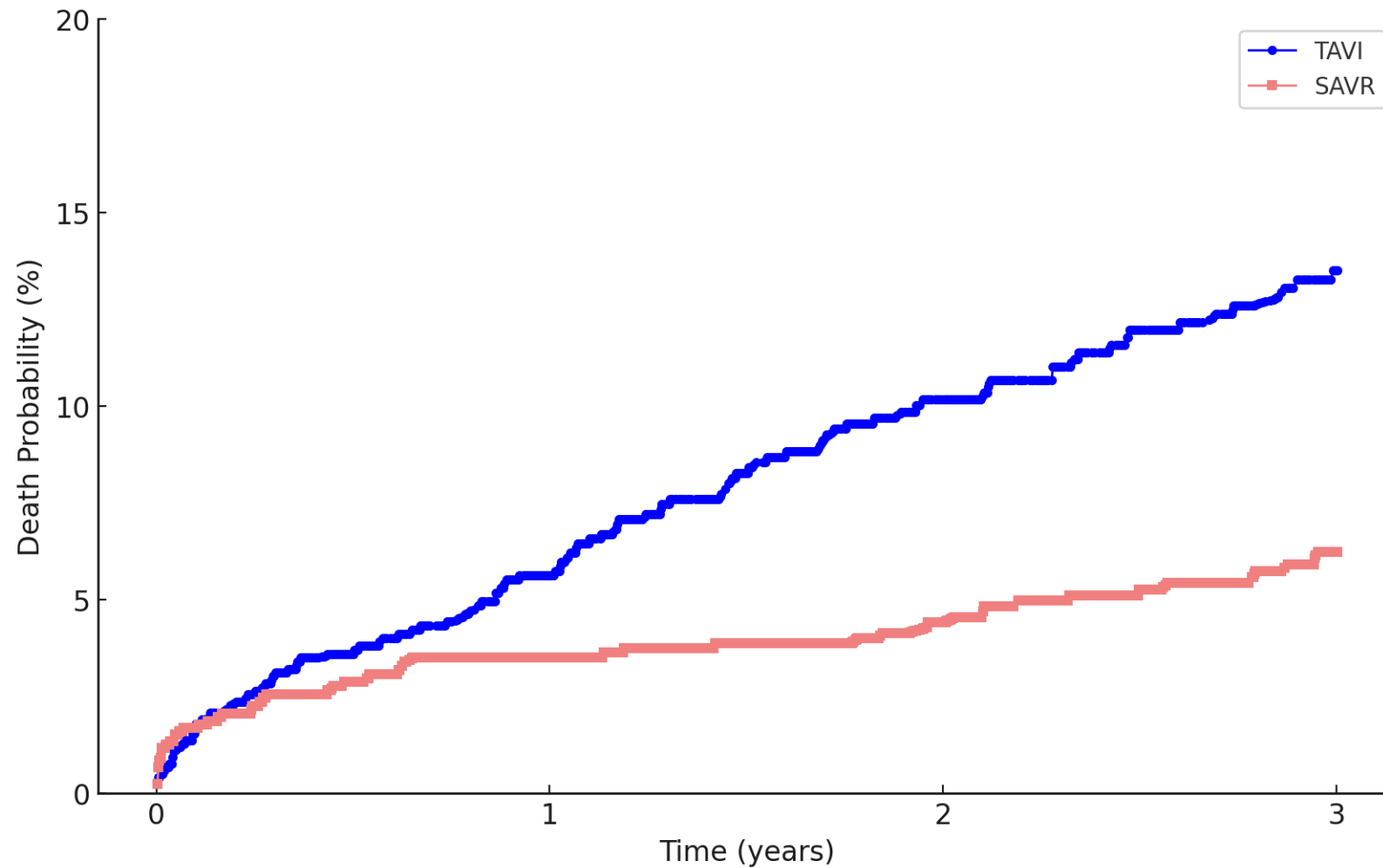
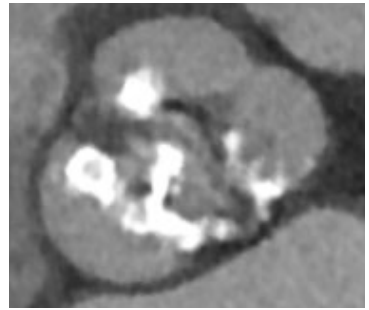


Primary endpoint Bicuspid cohort

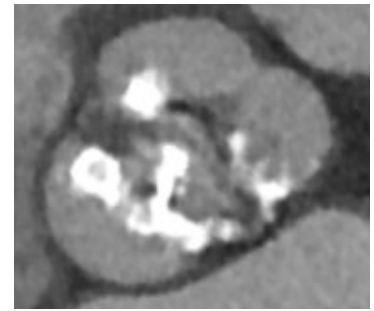


51	50	49	49	49
49	43	43	42	42

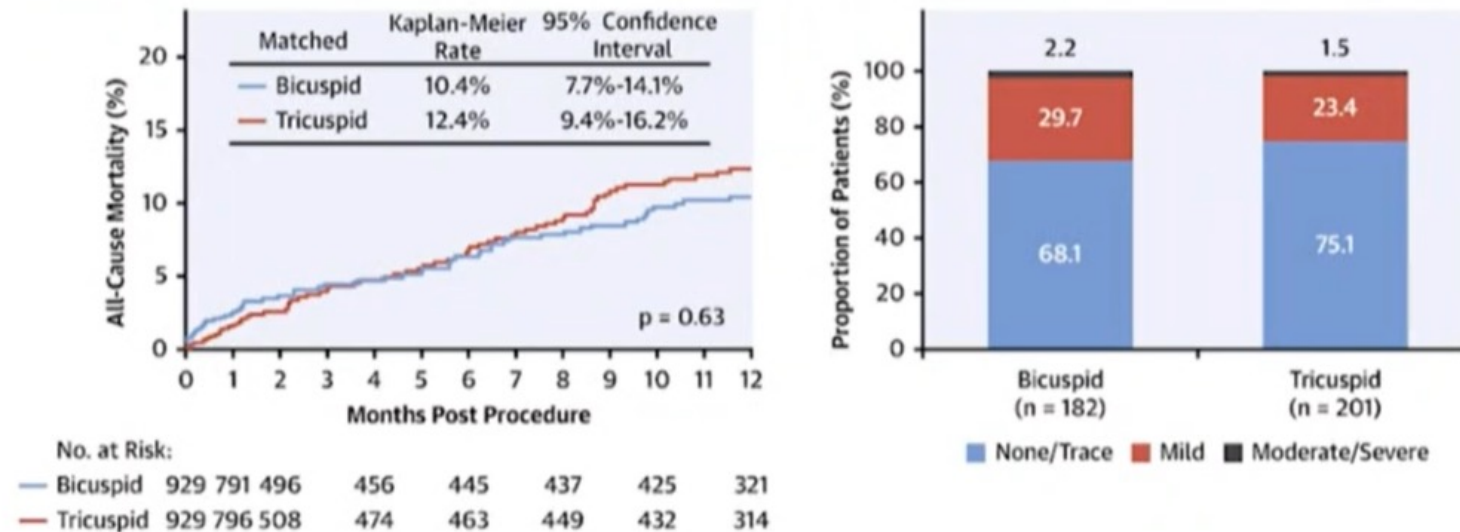
Tous les RAO sont ils les mêmes?



Challenges de la bicuspidie



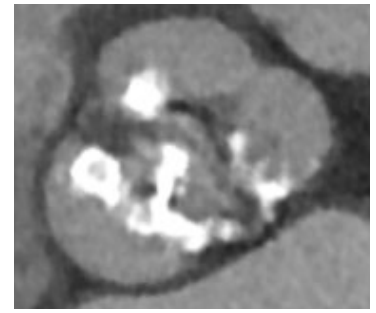
Retrospective analysis have show feasibility of TAVI
with good outcomes



Conclusions

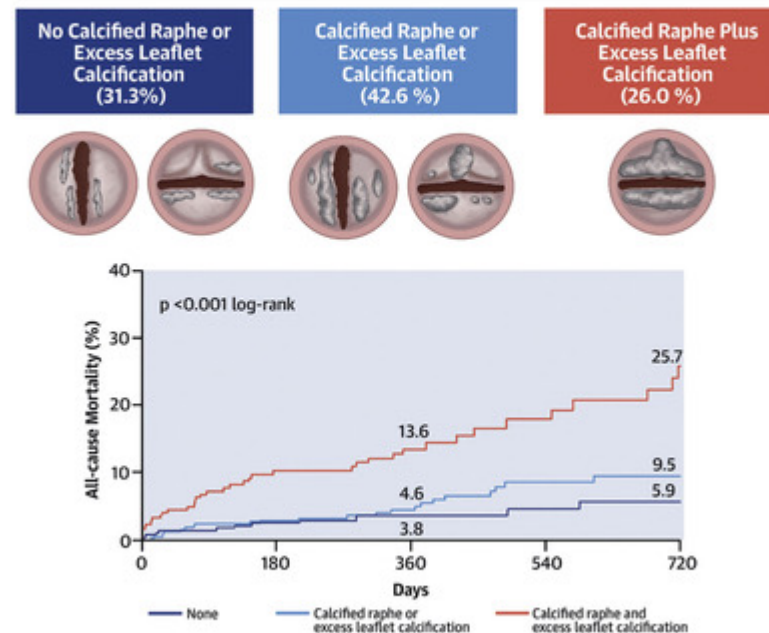
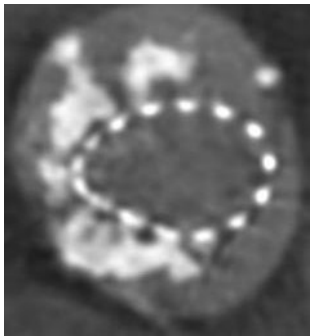
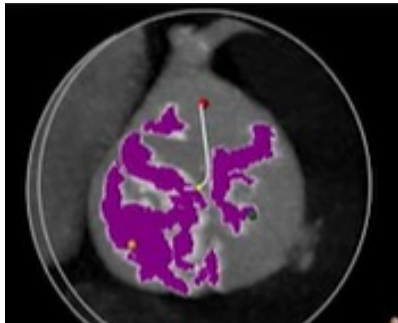
Among highly select bicuspid aortic stenosis low-surgical-risk patients without extensive raphe or subannular calcification, TAVR with the SAPIEN 3 valve demonstrated similar outcomes to a matched cohort of patients with tricuspid aortic stenosis.

Challenges de la bicuspidie

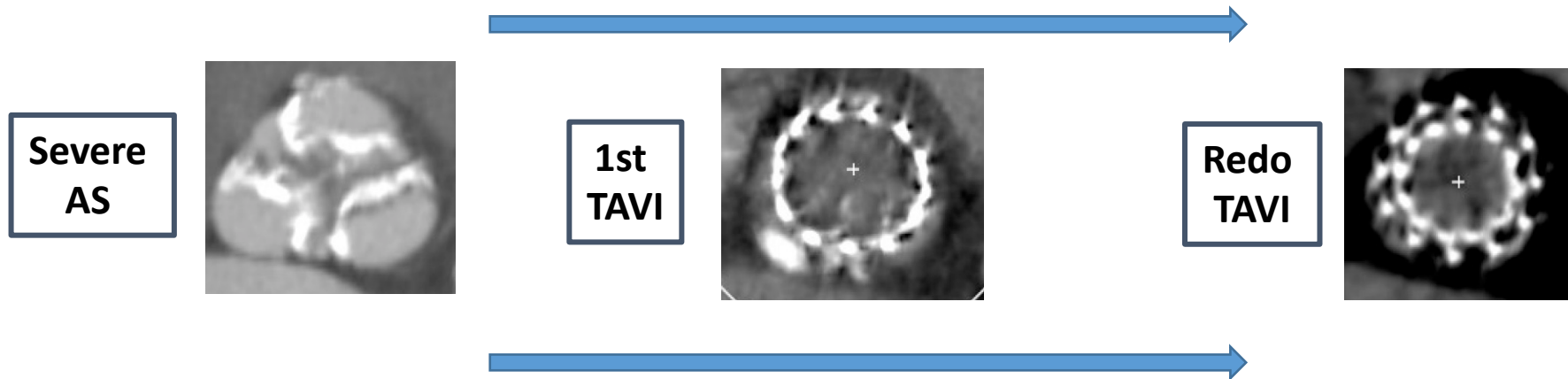


Retrospective analysis have show feasibility of TAVI
with good outcomes

Despite variability according to BAV morphology



Risk of PVL
Annular rupture
Coronary access
SVD



Individualized medicine? Bicuspid vs. Tricuspid?



Gestion dans le temps des valvulopathies

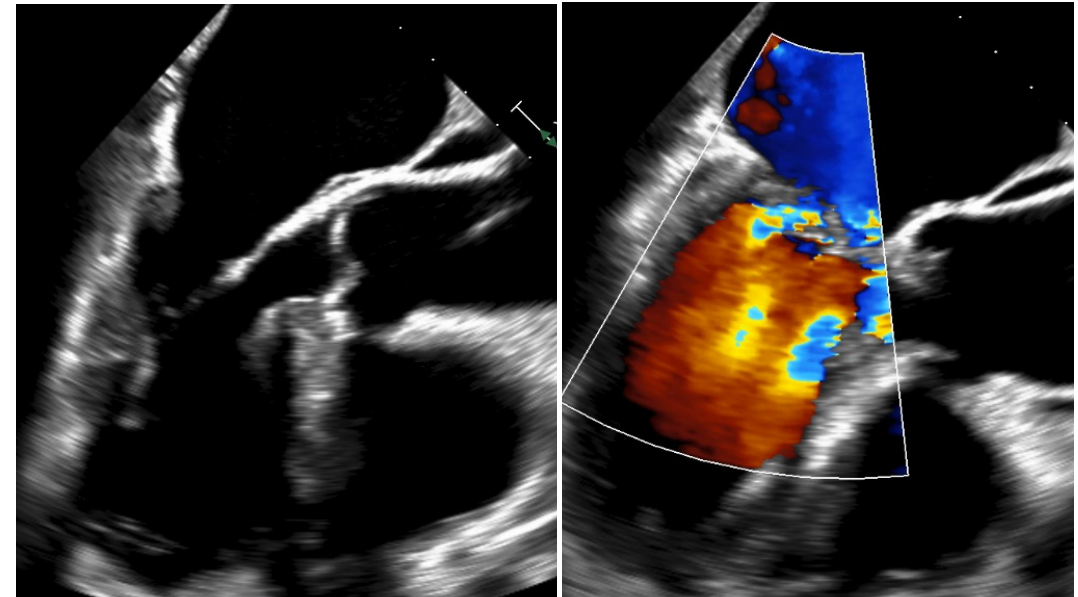
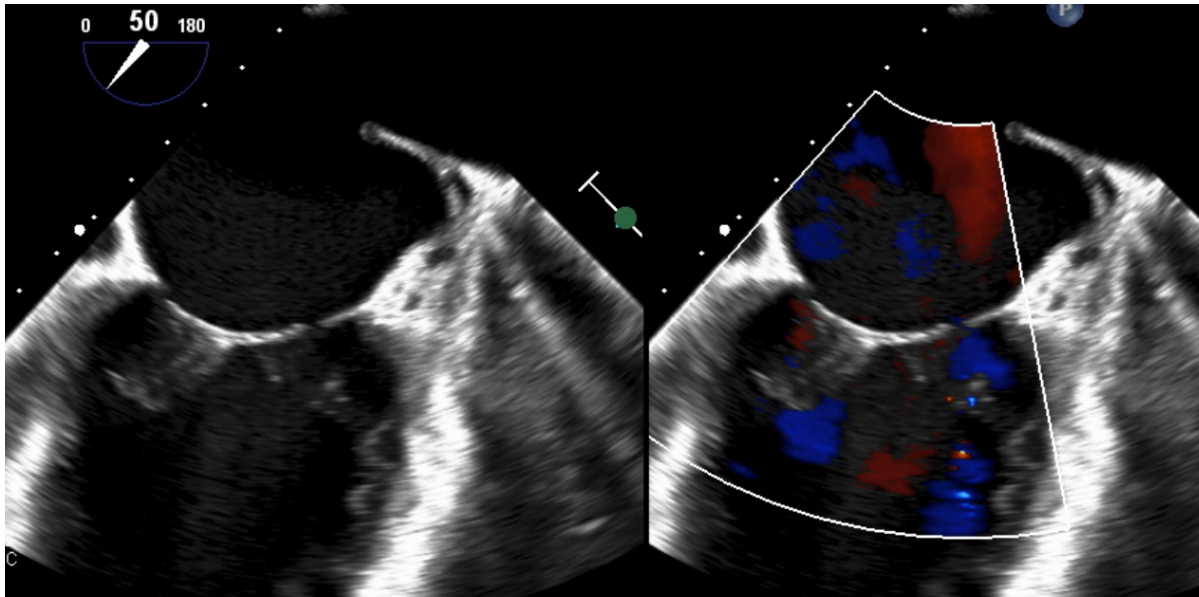
Aortiques et Mitrales

Life-time management Mitrale

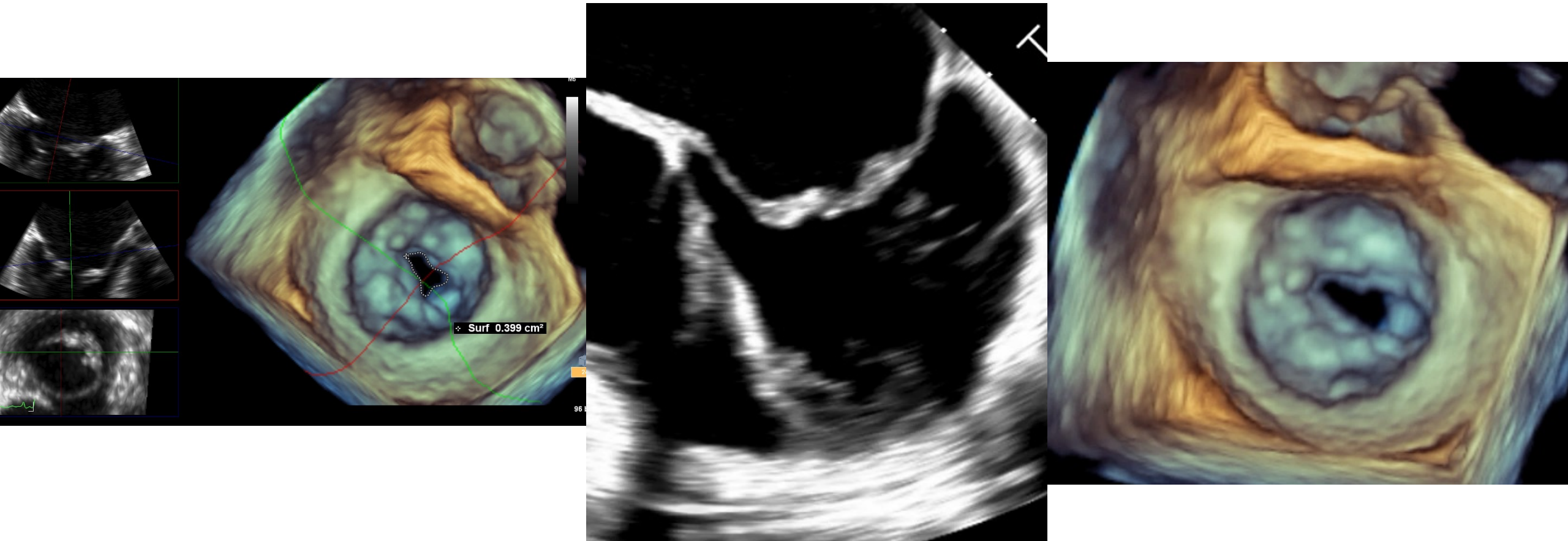
Gestion dans le temps des valvulopathies

Aortiques et Mitrales

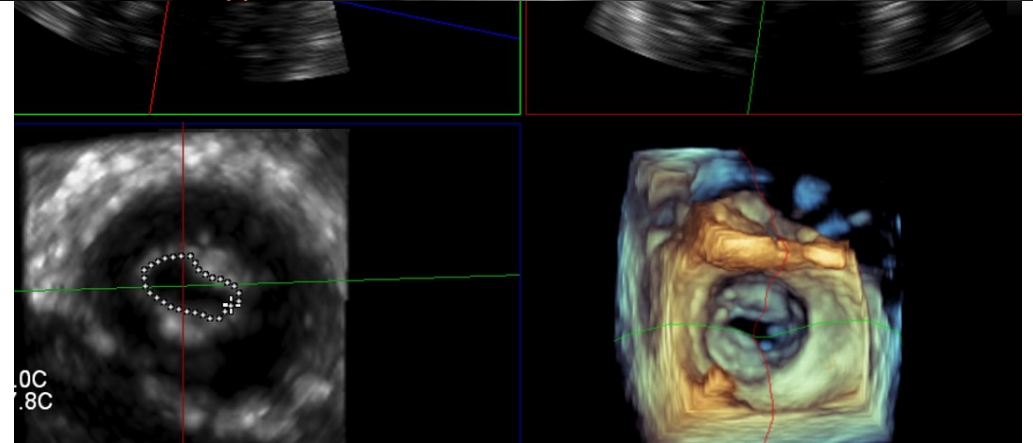
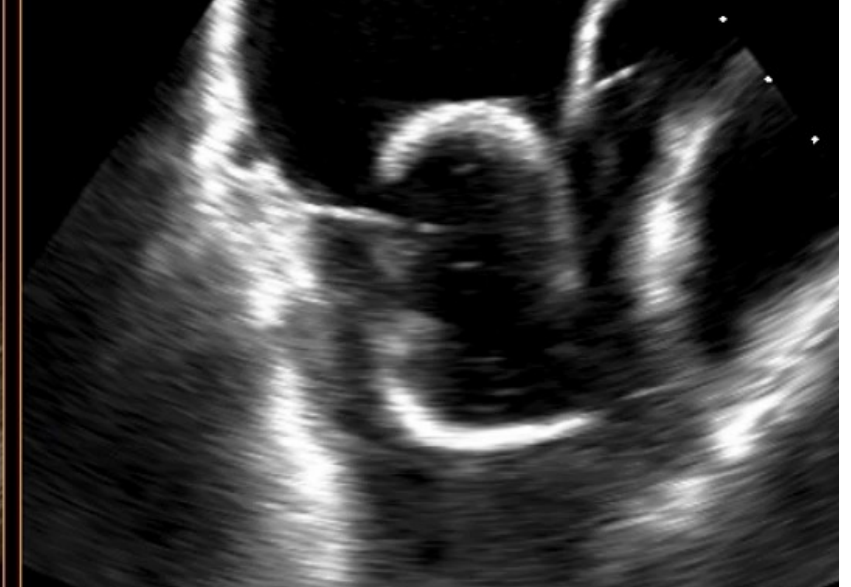
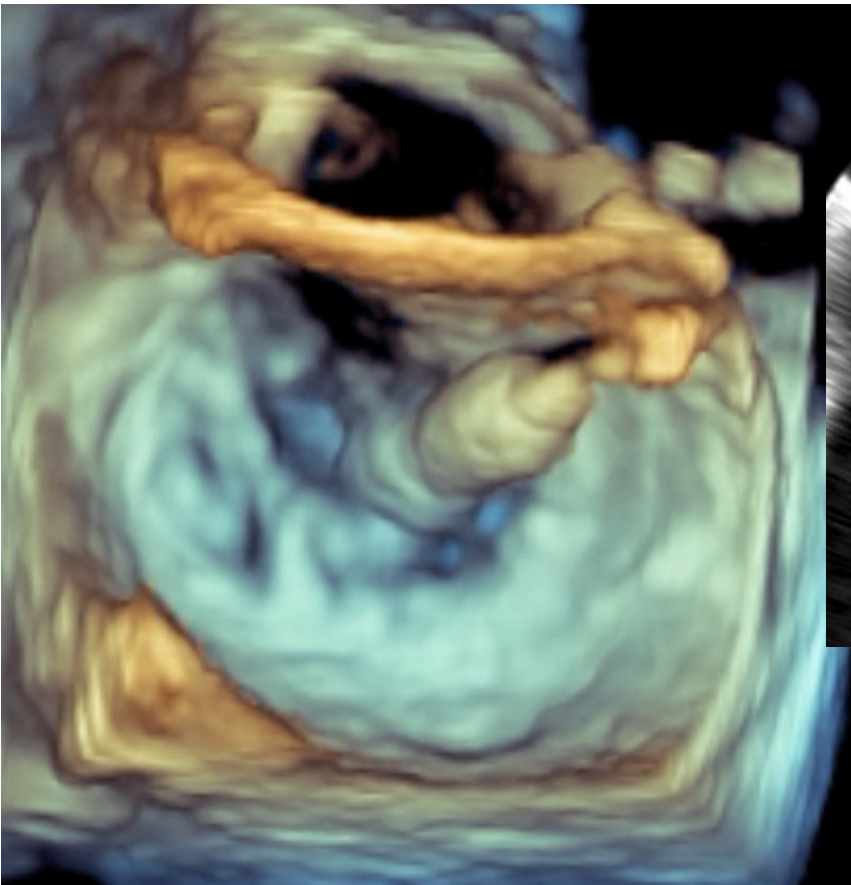
Life-time management Mitrale



Rétrécissement mitral



Rétrécissement mitral



De : Alexandre Trigano [{ HYPERLINK "mailto:jatrigano@free.fr" }]
Envoyé : mercredi 13 novembre 2024 10:13
À : DEHARO Pierre <[{ HYPERLINK "mailto:pierre.deharo@ap-hm.fr" }]>
Cc : PICA Emmanuelle <[{ HYPERLINK "mailto:Emmanuelle.PICA@ap-hm.fr" }]>
Objet : Ré dilatation mitrale ?

Ce message provient d'un expéditeur externe : traiter avec précaution liens et fichiers

Voudriez vous bien voir la patiente [redacted] - 165 cm – 60 Kg : pour resténose après Valvuloplastie mitrale percutanée du 18 06 1987 par Pr Vahanian
Surface modifiée de 1,34 à 2,20 cm2 post plastie - Actuellement autour 1,50 au scan et 1,20 en Echo avec grande oreillette gauche-
Etat fonctionnel : asthénie et dyspnée et épisodes de tachycardie-
est sous previscan =Peut on redilater ?
Sur le plan social : elle réside en Algérie et est rentrée au pays après nos examens.
Elle a maintenant un nouveau visa et attends votre convocation pour venir en France
- Pour convoquer la patiente 0672145461 ou 0980733611 et me prévenir aussi si possible-
Remerciements = Dr JA Trigano

From: Alec Vahanian <[{ HYPERLINK "mailto:alec.vahanian@gmail.com" }]>
Date: 23 December 2024 at 10:36:00 CET
To: Pierre DEHARO <[{ HYPERLINK "mailto:deharopierre@gmail.com" }]>
Subject: Re:

Merci pour ton appel ce matin
Tu m as fait très plaisir : c est vraiment du Life time management
Bon Noël pour toi et la famille
Alec

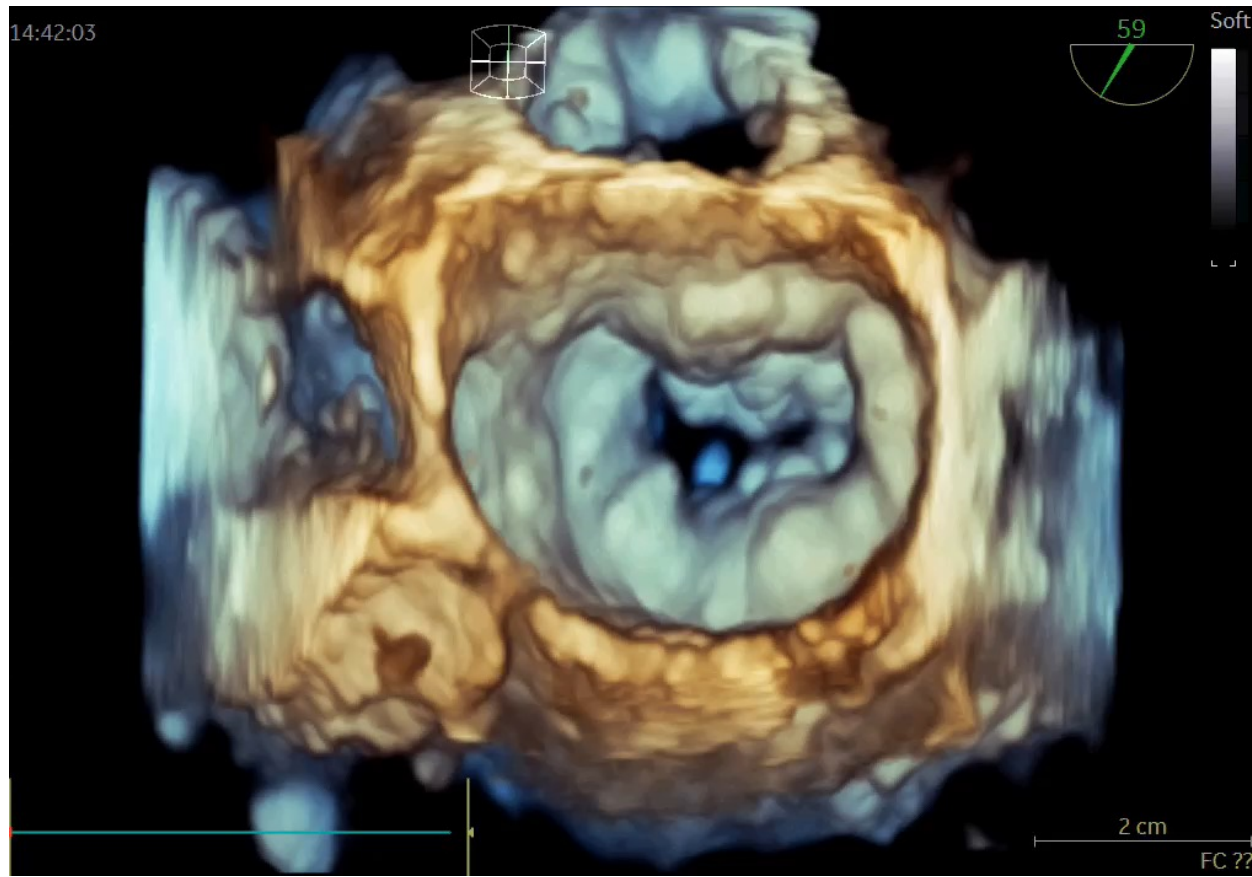
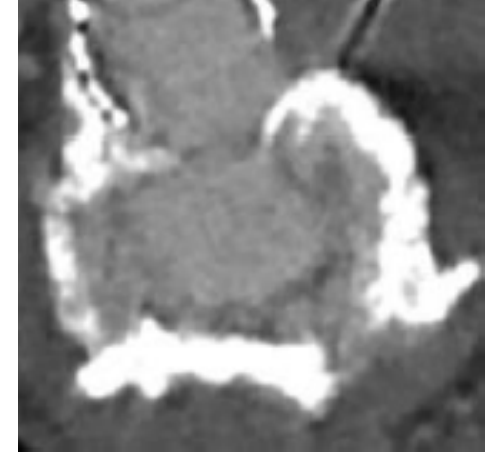
Envoyé de mon iPhone

De : DEHARO Pierre <[{ HYPERLINK "mailto:pierre.deharo@ap-hm.fr" }]>
Envoyé : lundi 23 décembre 2024 11:21
À : Alexandre Trigano [{ HYPERLINK "mailto:jatrigano@free.fr" }] &
Cc : PICA Emmanuelle <[{ HYPERLINK "mailto:Emmanuelle.PICA@ap-hm.fr" }]>
Objet : Ré dilatation mitrale ?

Chers collègues,
Vous trouverez ci joint le CR de votre patiente
En rythme sinusal 65bpm 1. Bon VG non dilaté non hypertrophié. Absence de trouble de la cinétique segmentaire. Débit cardiaque normal. 2. IAO minime sur valve tricommissurale. Aorte ascendante non dilatée. 3. Bon résultat de commissurotomie percutanée : Gdm 4mmHg vs 7mmhg, planimétrie 2D 2.1cm² vs 1.2 -1.3cm² avec ouverture de la commissure interne. IM minime avec apparition d'une 2ème composante commissurale interne. 4. Bon VD non dilaté. PAPs calculées sur IT modérée à 30+5mmHg (vs 45mmHg). Minime CIA post ponction avec shunt gauche-droit exclusif. 5. POD normales. Absence d'épanchement péricardique.

Valve in MAC

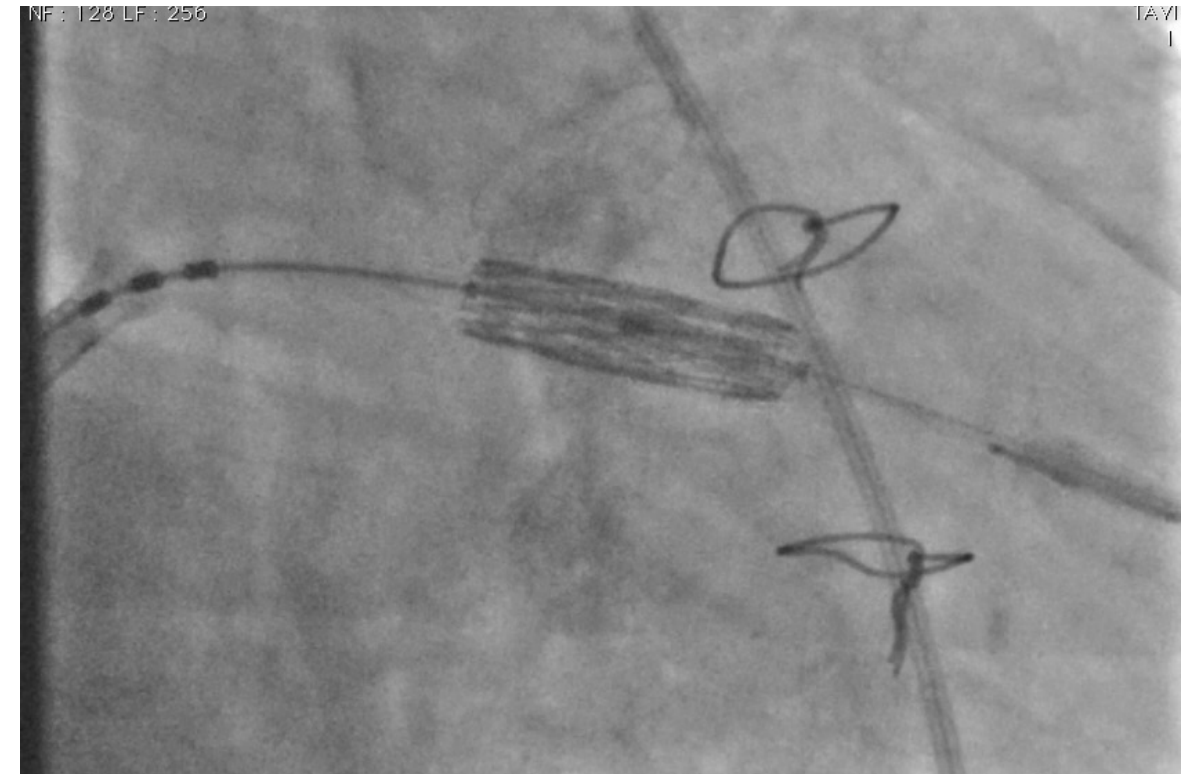
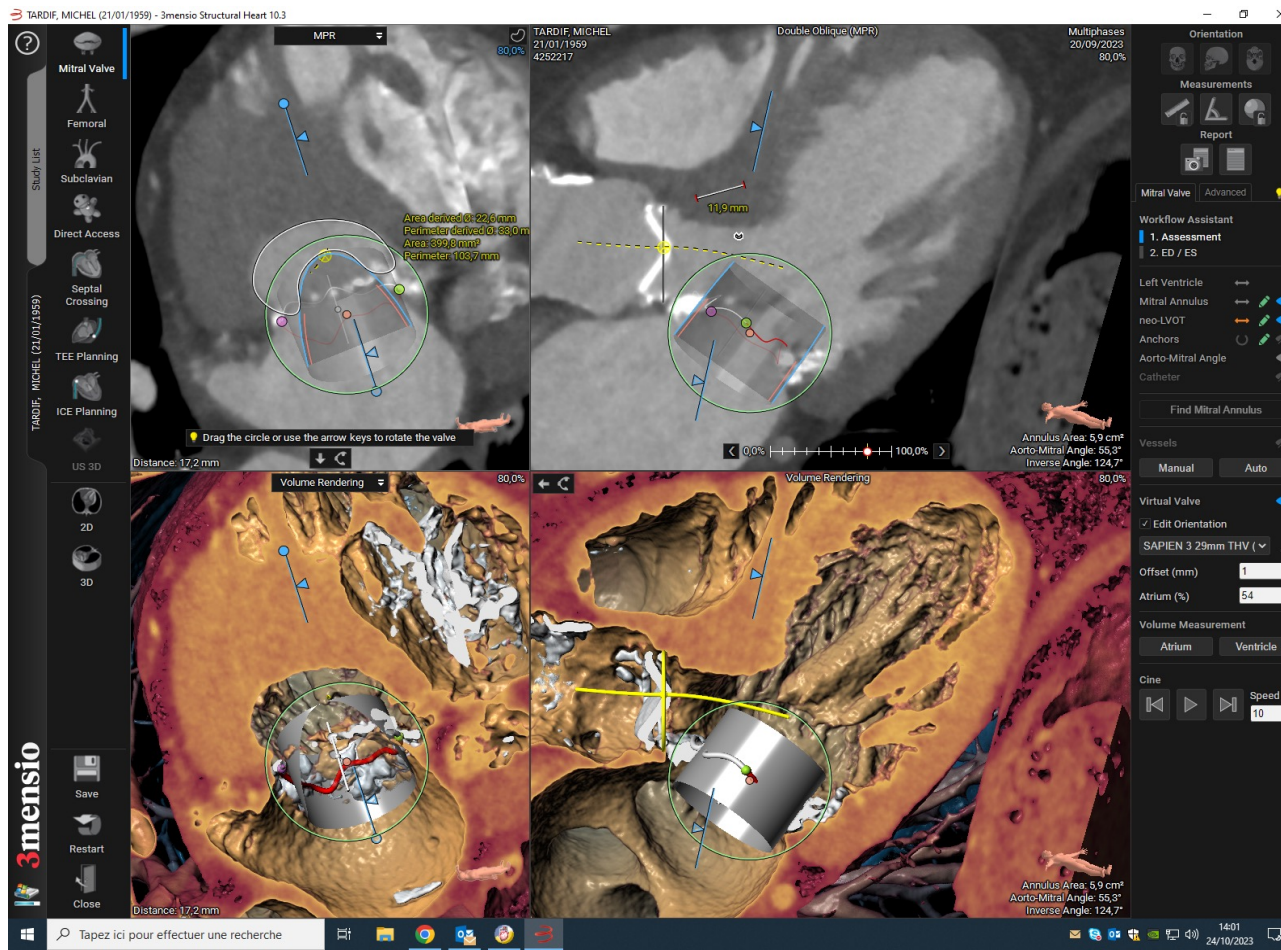
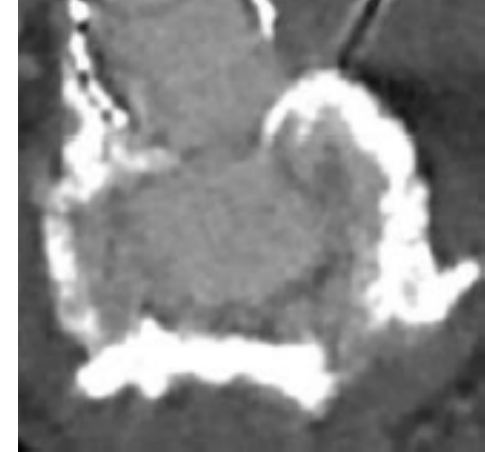
MAC fréquent et principale CI à la chirurgie mitrale
Critère exclusion des essais de valves mitrales percutanées...
=>complications importantes



Valve in MAC

64 ans - Hodgkin

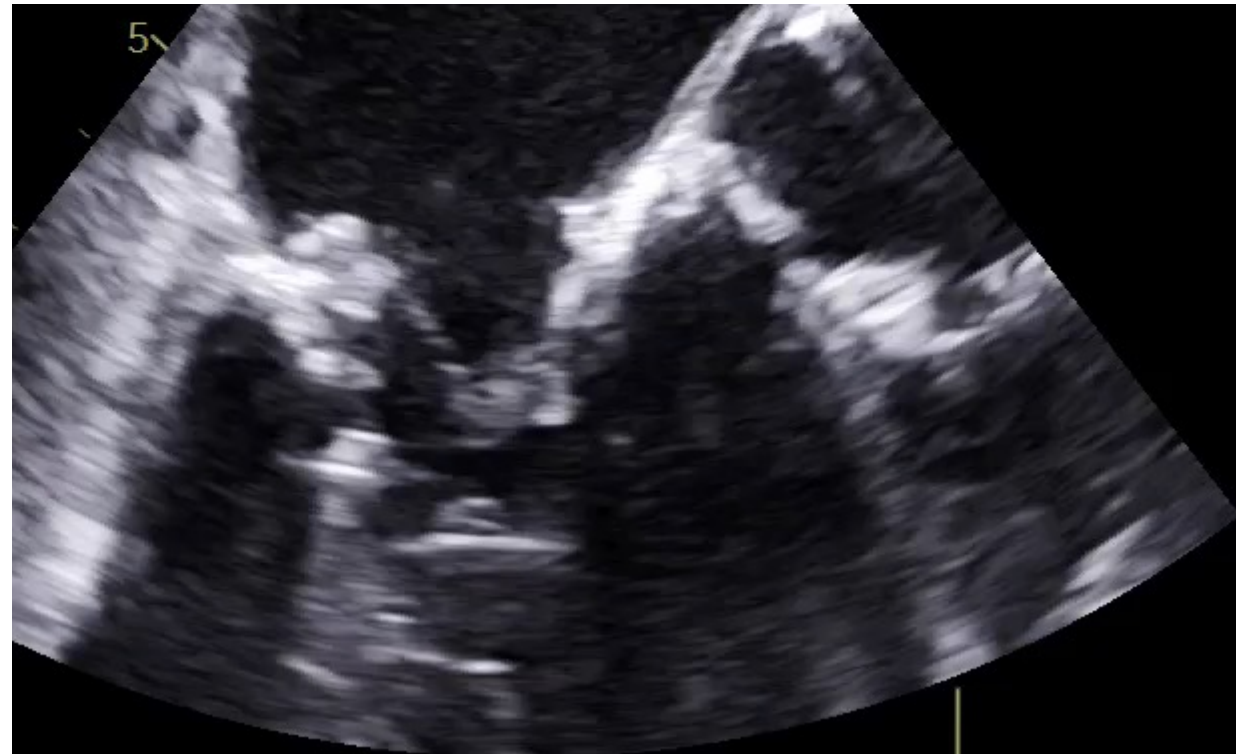
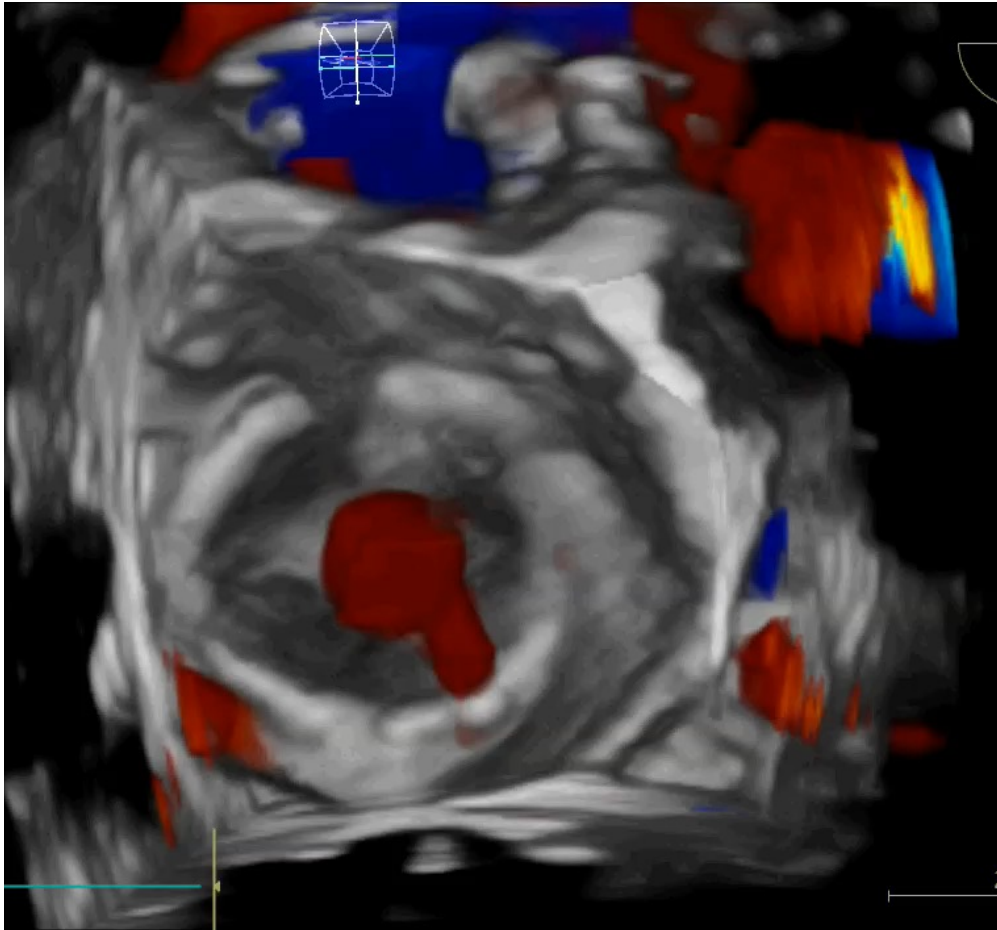
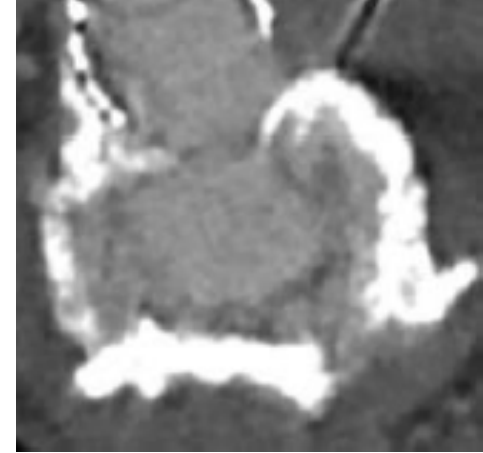
RVAO méca 2007 – aorte porcelaine – OAP x4 2023

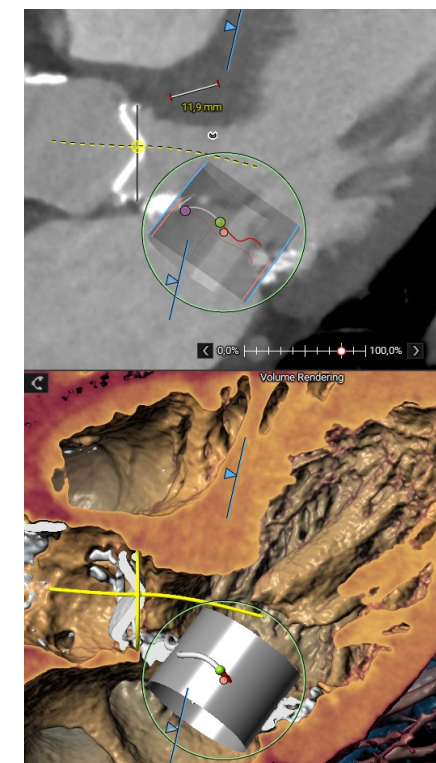
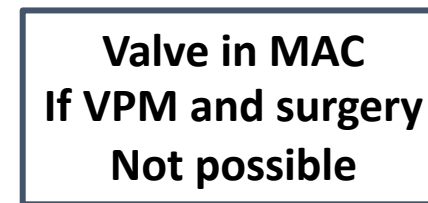
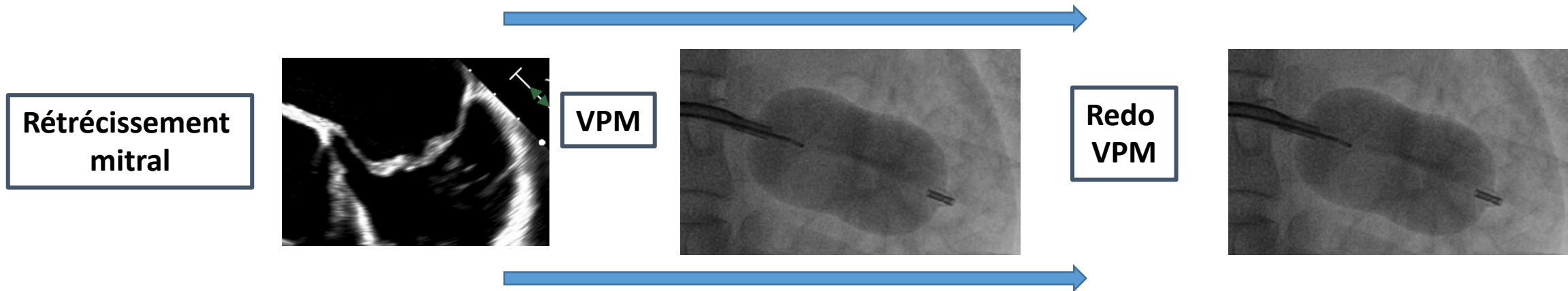


Valve in MAC

64 ans - Hodgkin

RVAO méca 2007 – aorte porcelaine – OAP x4 2023

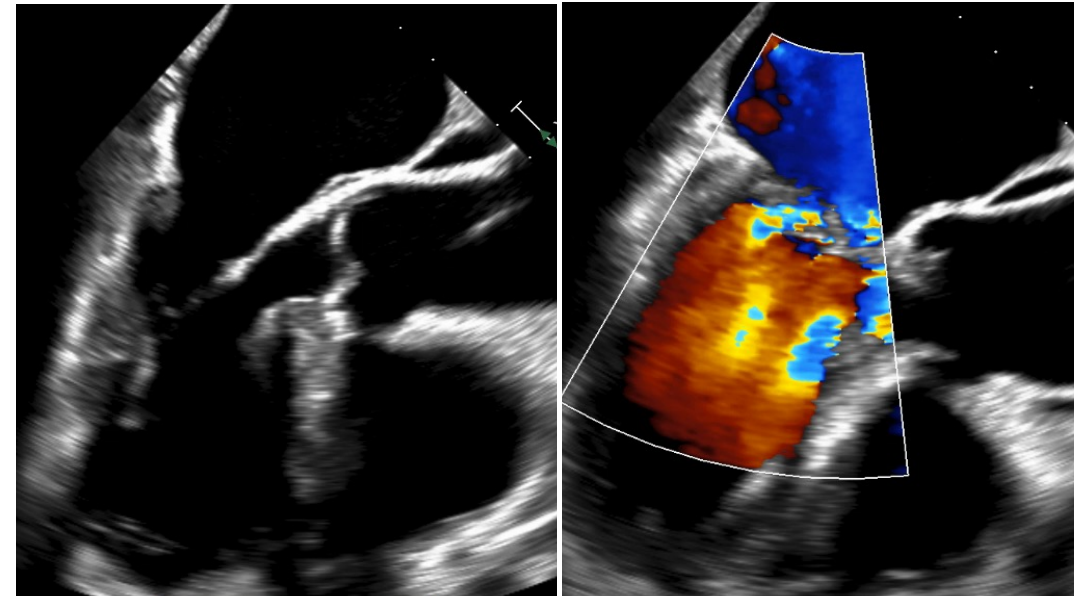
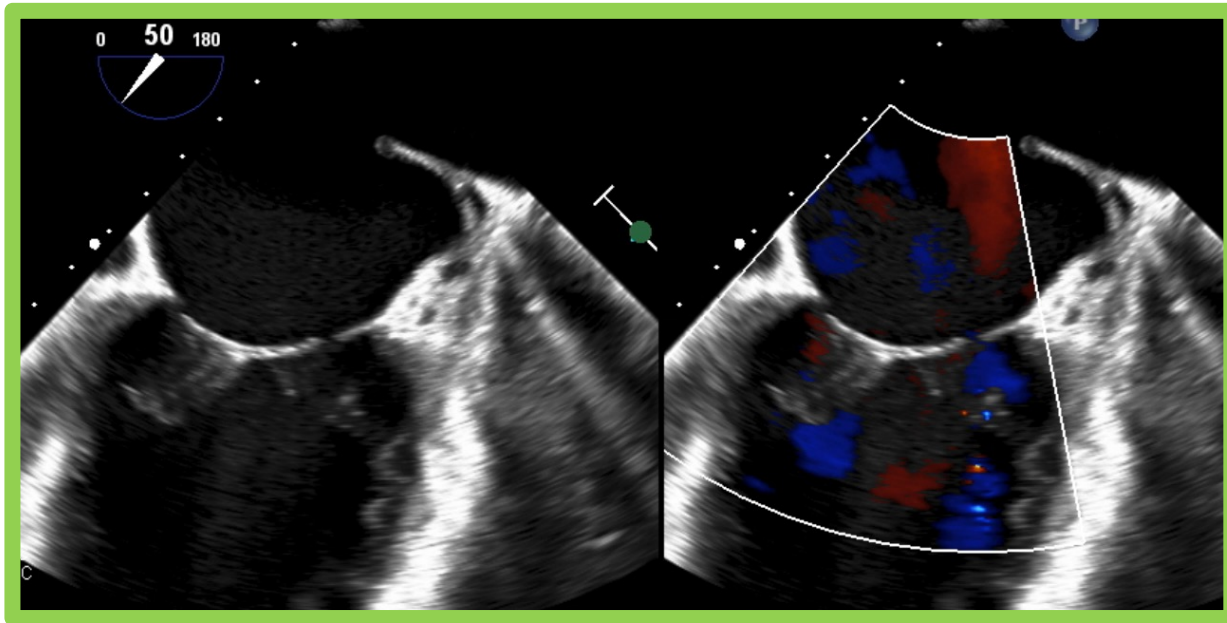




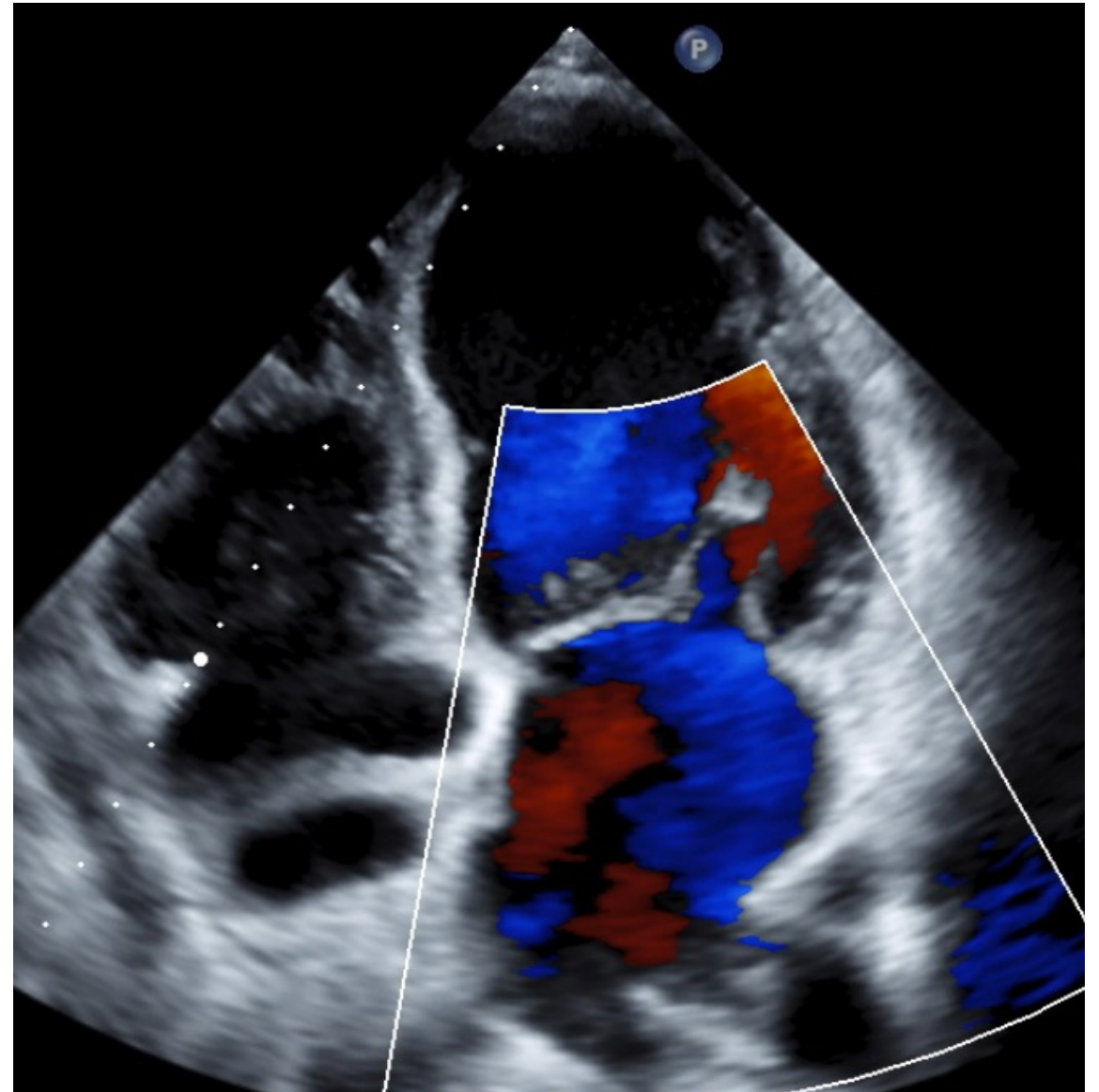
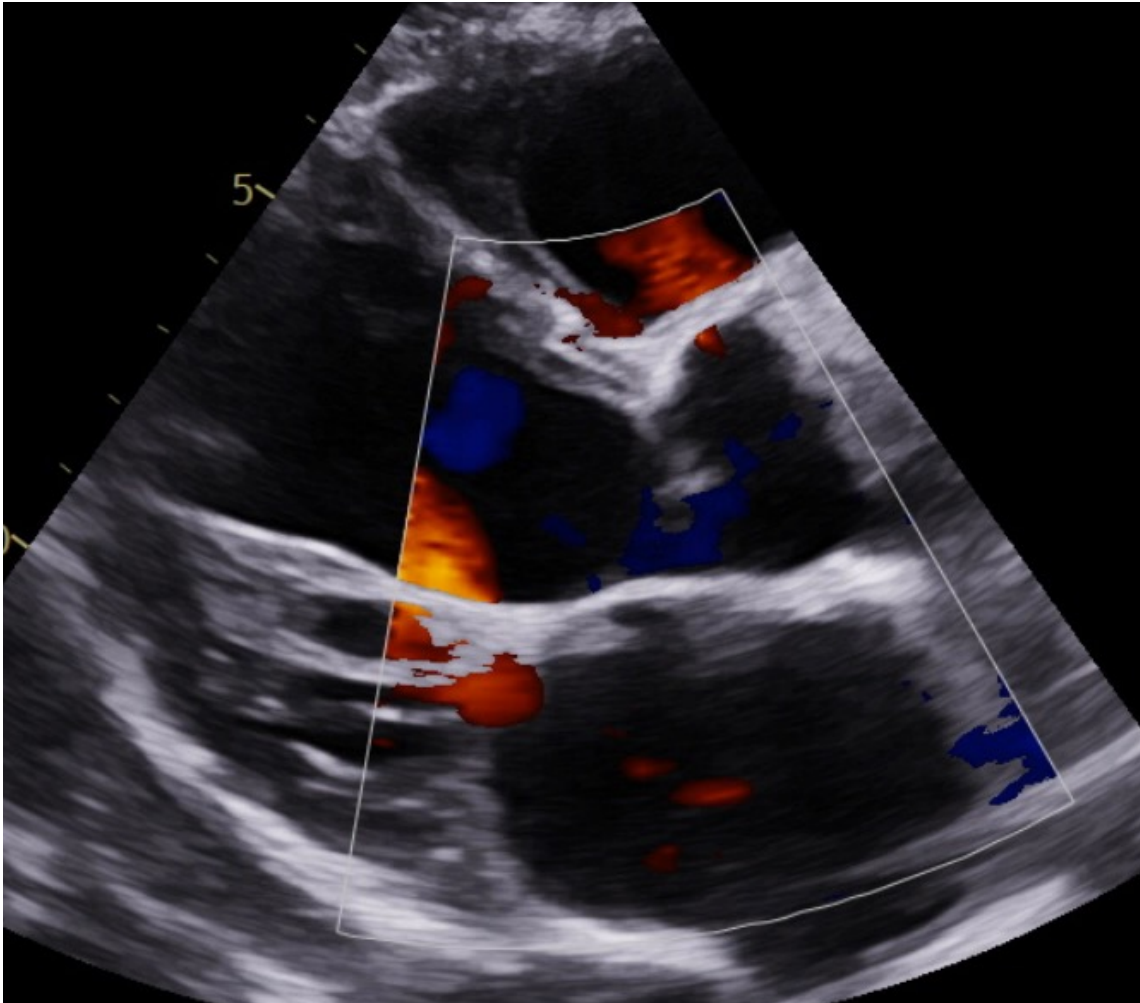
Gestion dans le temps des valvulopathies

Aortiques et Mitrales

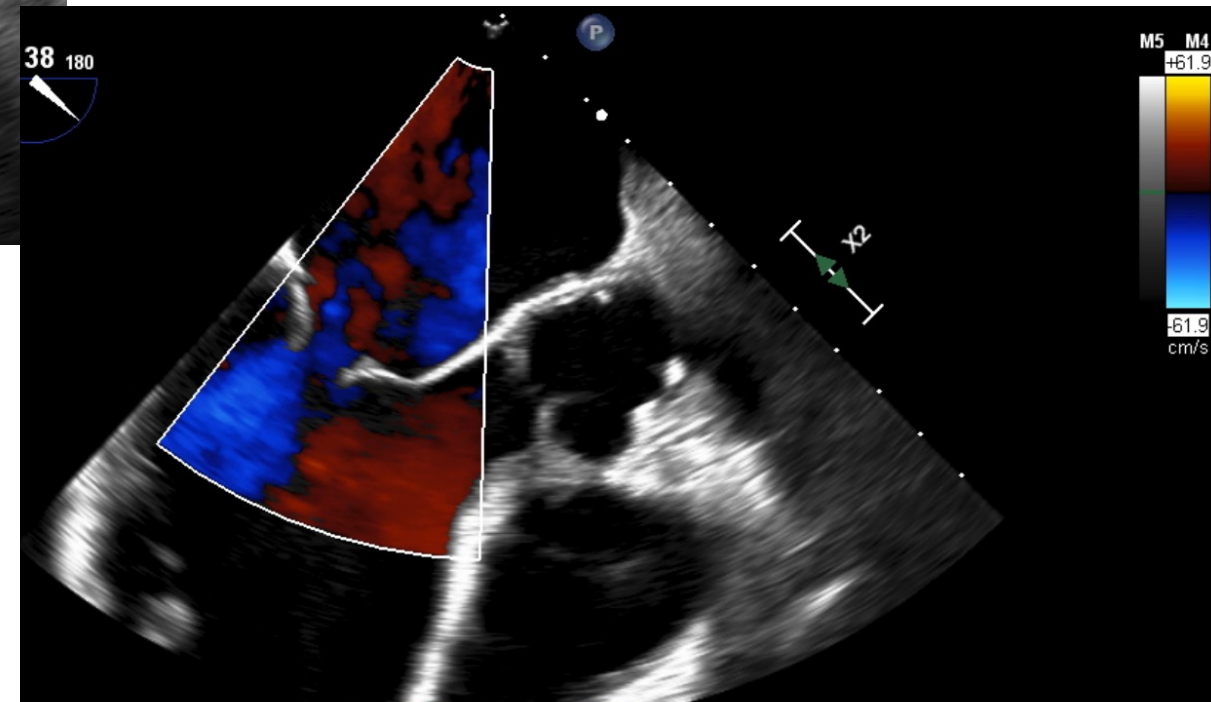
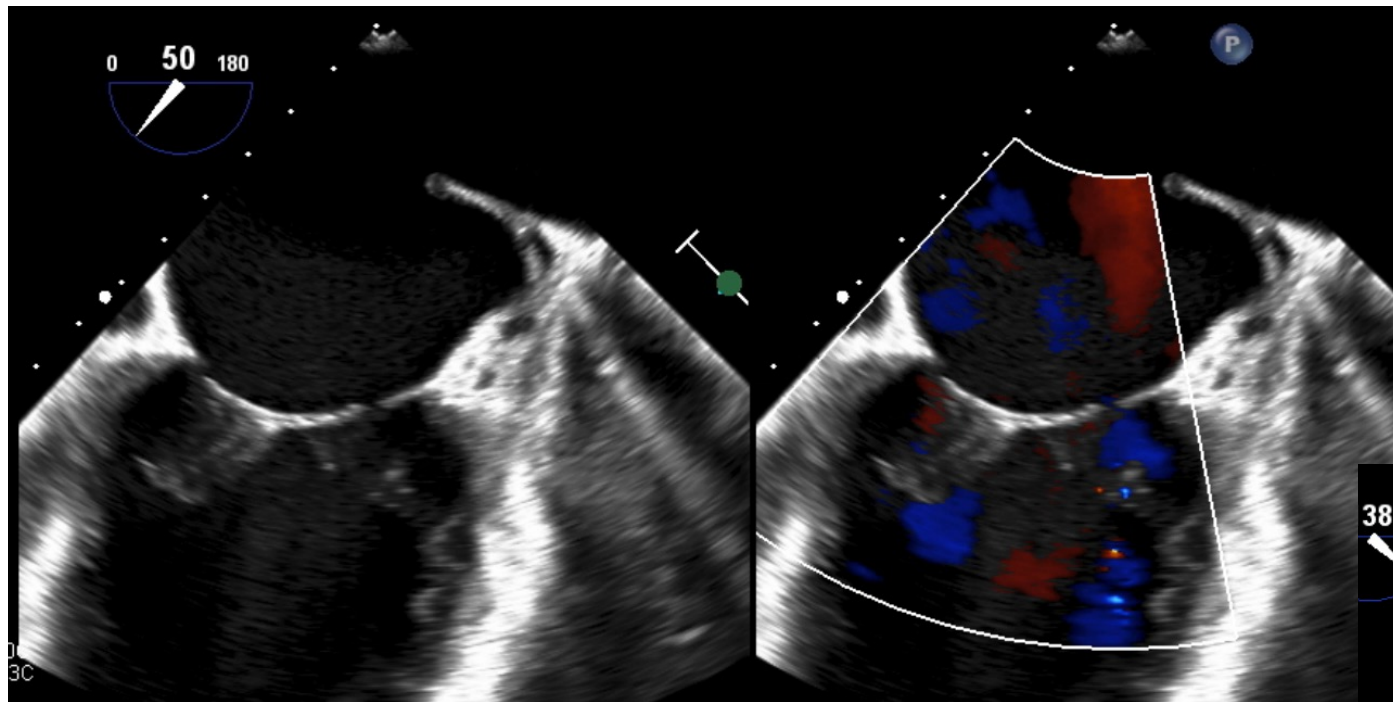
Life-time management Mitrale



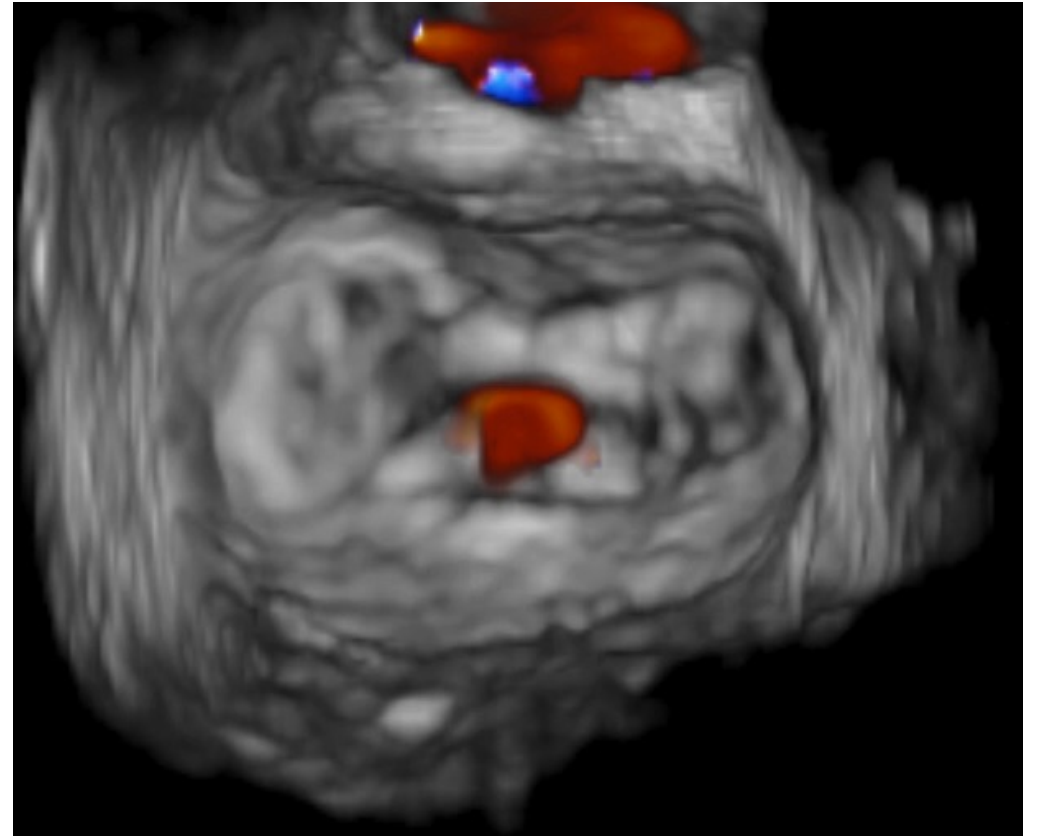
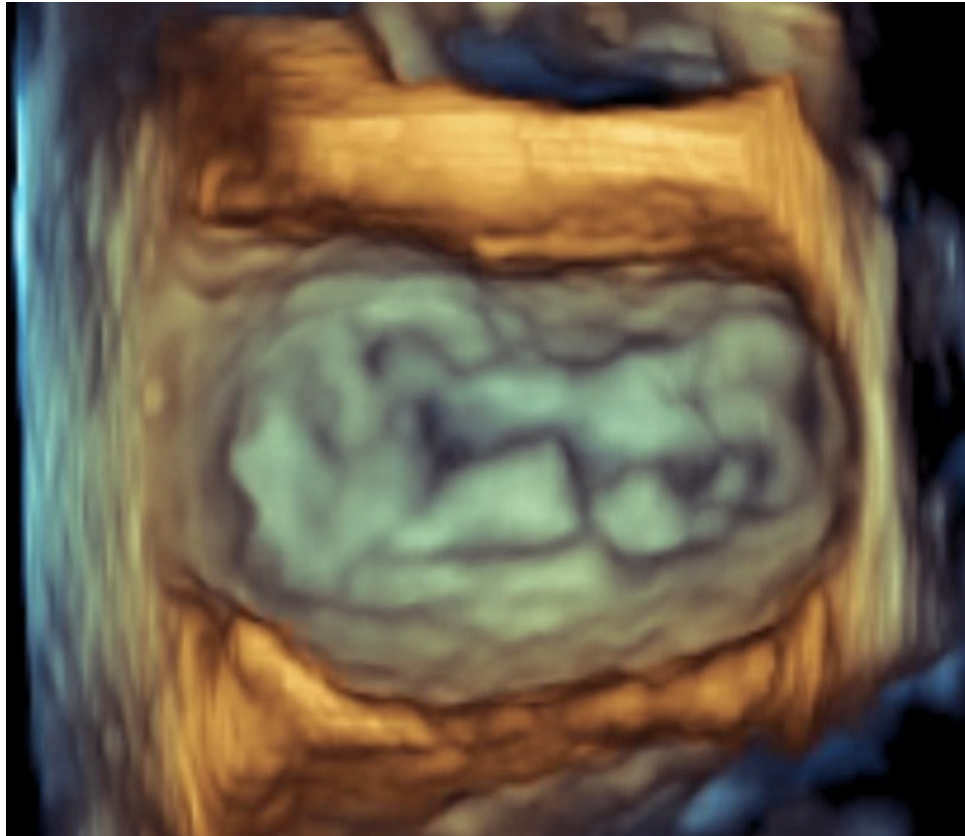
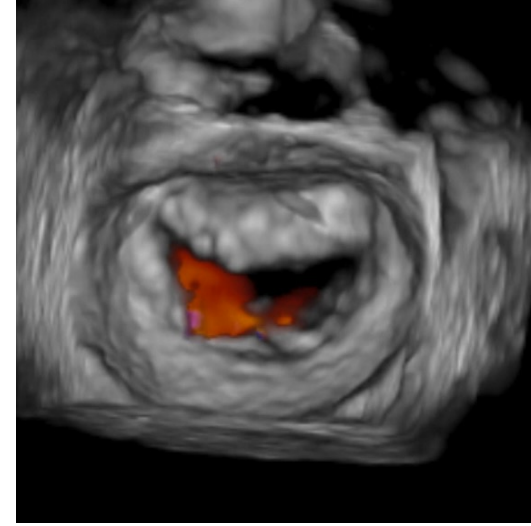
64 ans – infarctus ancien – traitement médical
optimal – QRS fins



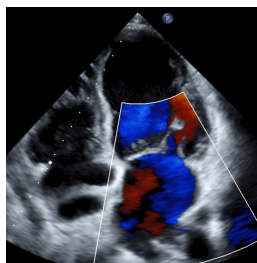
64 ans – infarctus ancien – traitement médical optimal – QRS fins



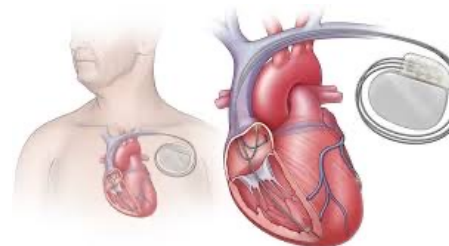
64 ans – infarctus ancien – traitement médical
optimal – QRS fins



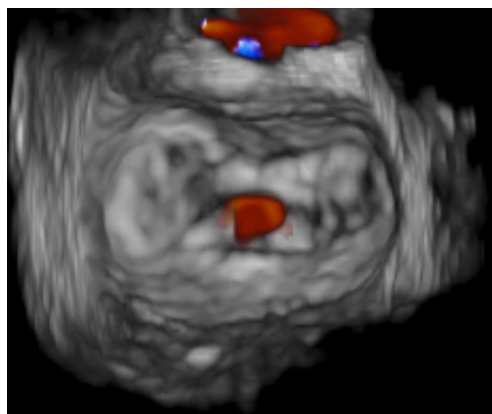
**2 ary
ventricular MR**



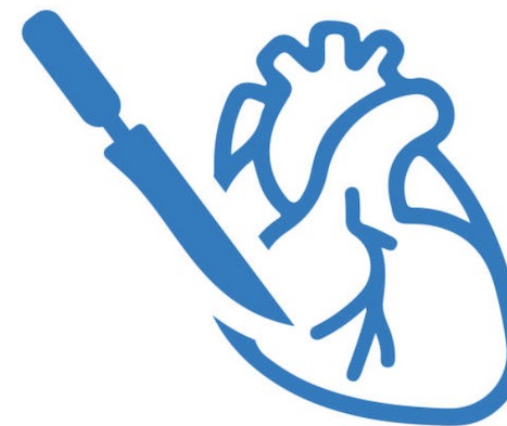
**OMT
+
CRT**



TEER



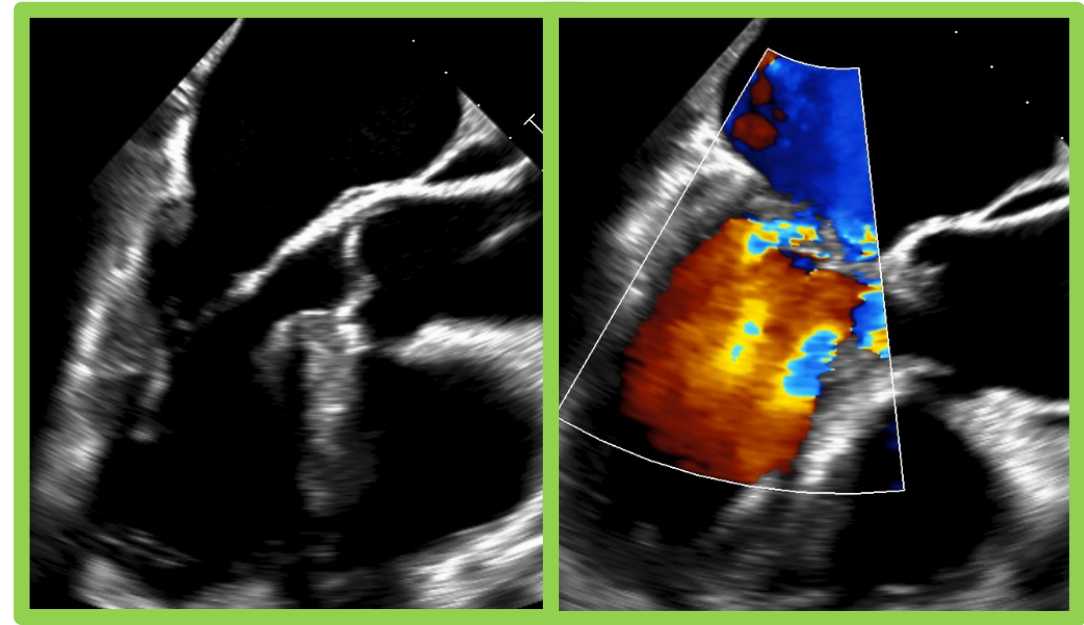
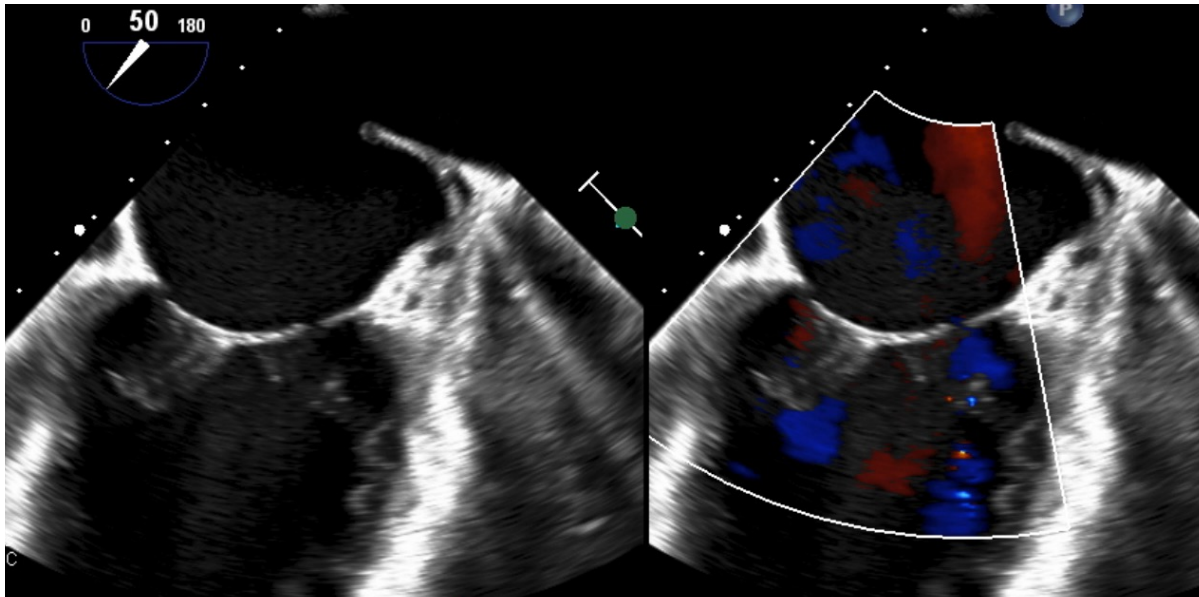
**Surgery
If TEER not possible**



Gestion dans le temps des valvulopathies

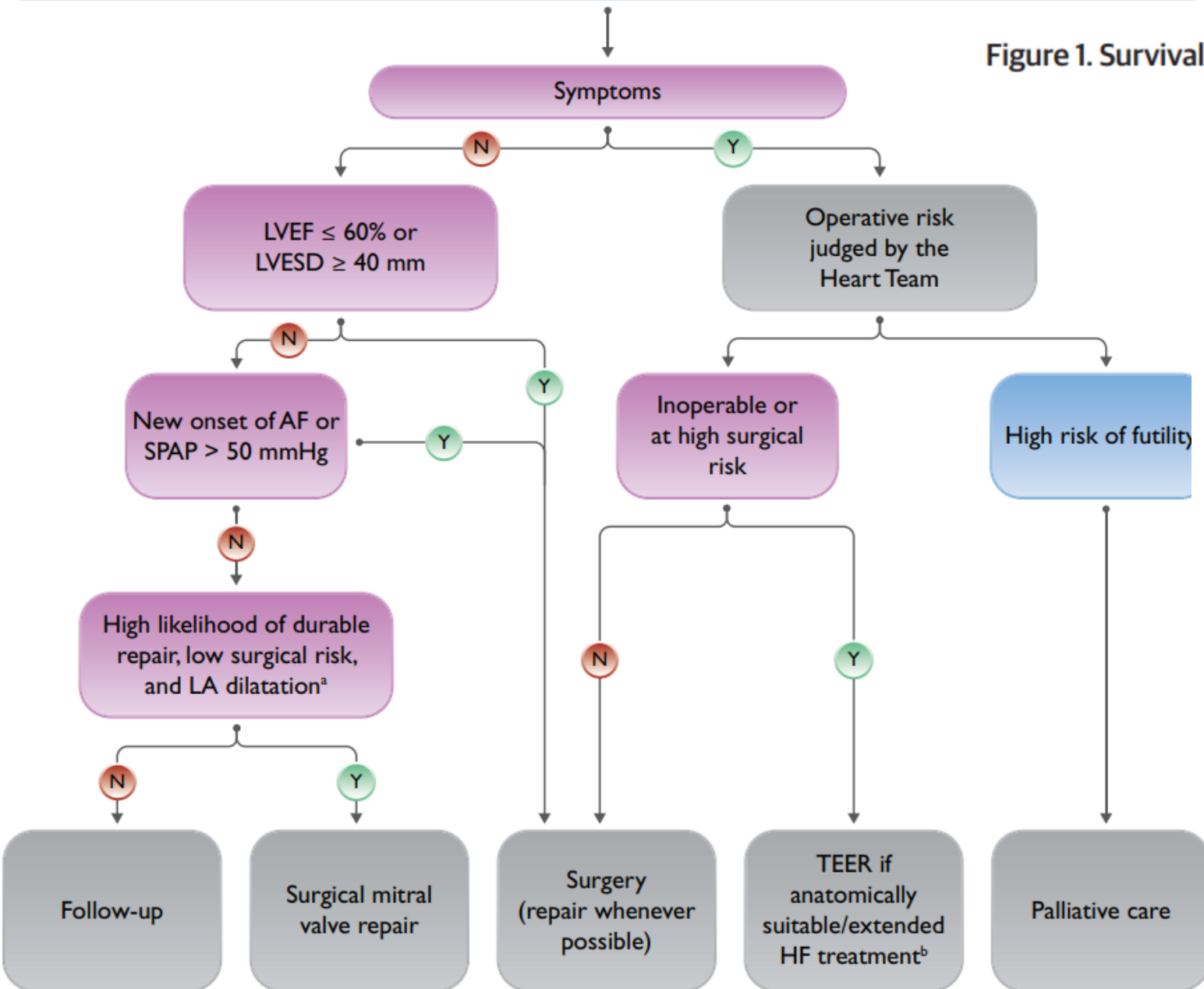
Aortiques et Mitrales

Life-time management Mitrale

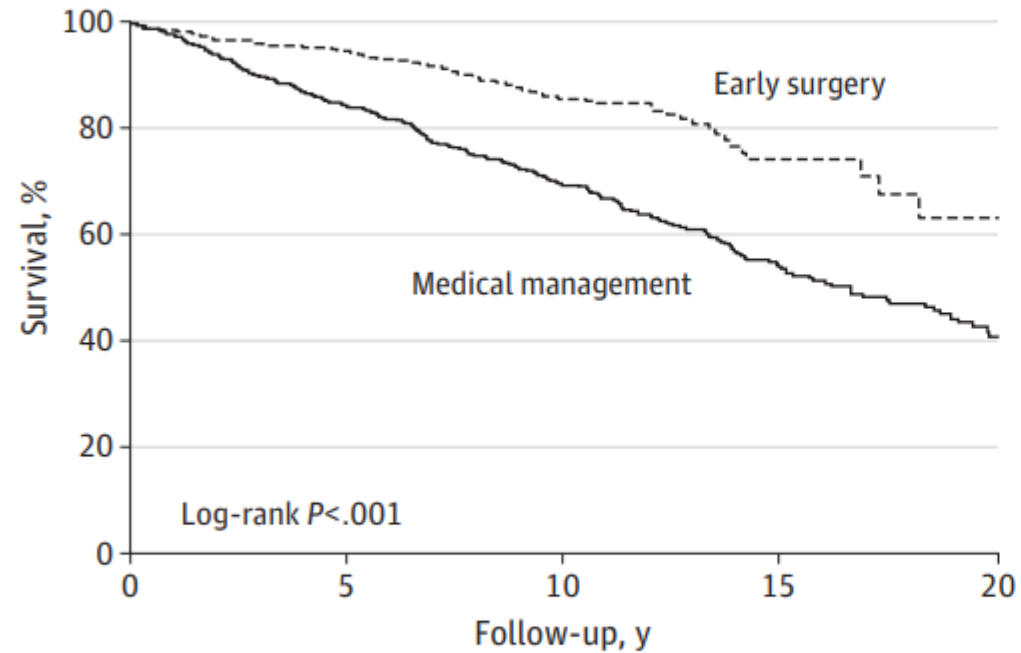


Management of patients with severe chronic primary mitral regurgitation

Figure 1. Survival After Diagnosis of Mitral Regurgitation Due to Flail Mitral Leaflet



A Overall population



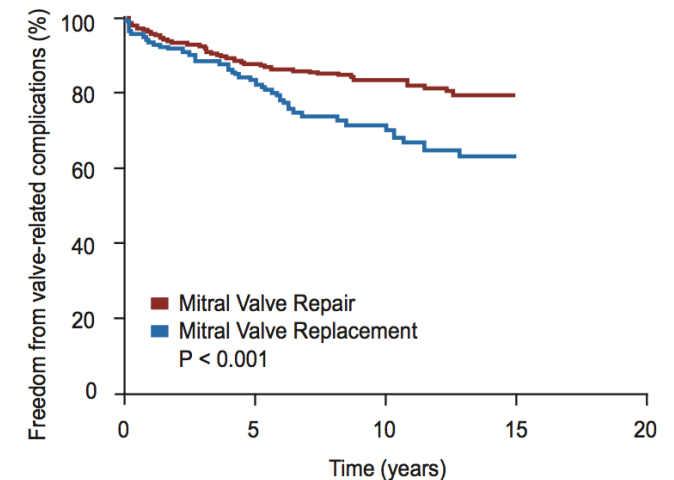
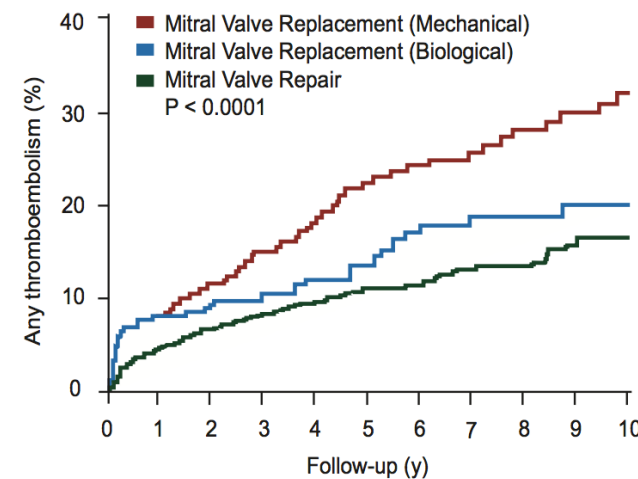
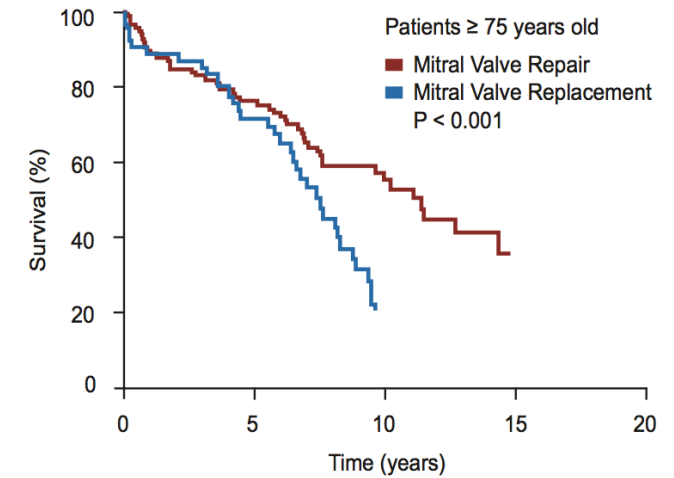
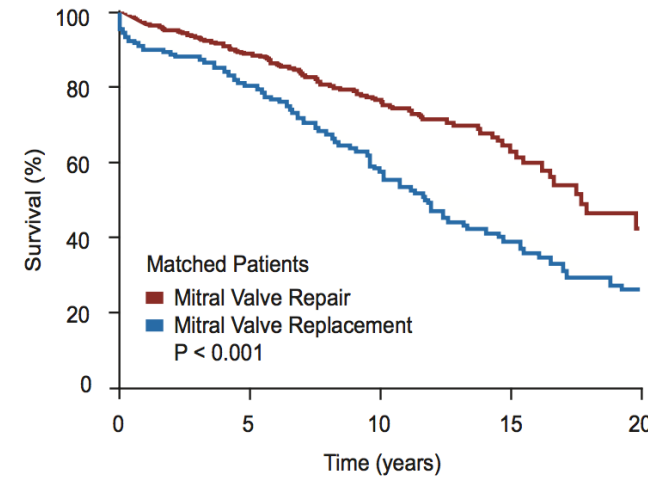
Replace or repair?

↓ complications

↑ survie

↑ fonction VG

↓ endocardite

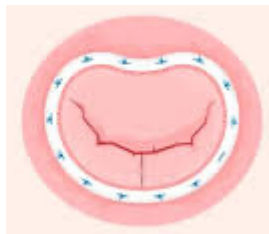


Russo et al, J Am Cardiol 2008
MIDA investigators, Circulation 2017

IM organique



Surgery



TEER ?

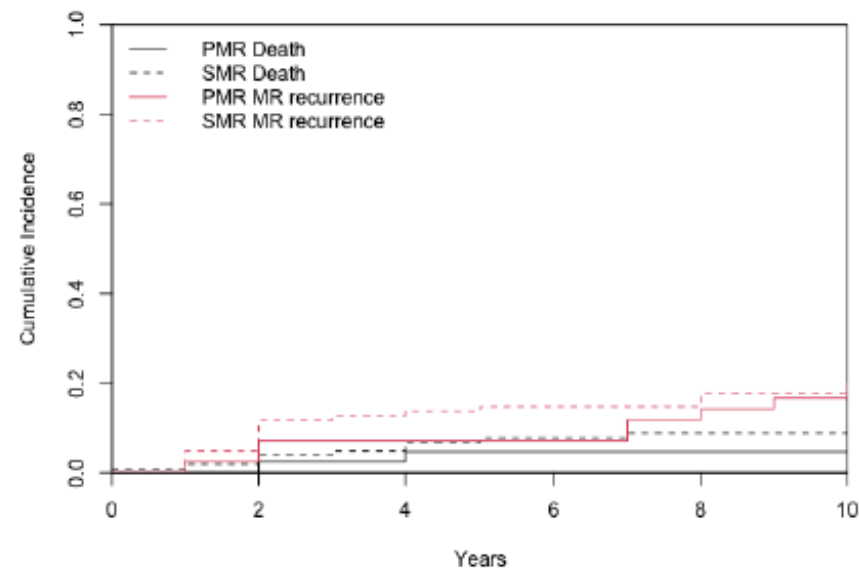
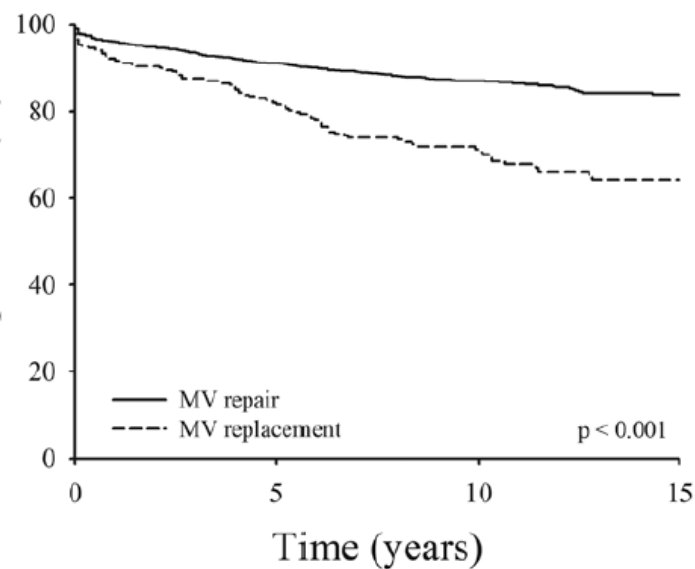


Life time
Management MR

c

IPW-adjusted cohorts

Freedom from valve-related
complications (%)



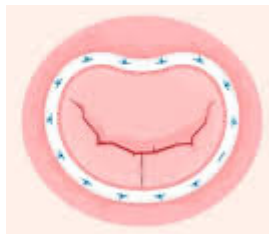
MV repair	1512	1193	596	169
MV replacement	208	125	54	22

Bargagna et al, EIJ 2024

IM organique



Surgery



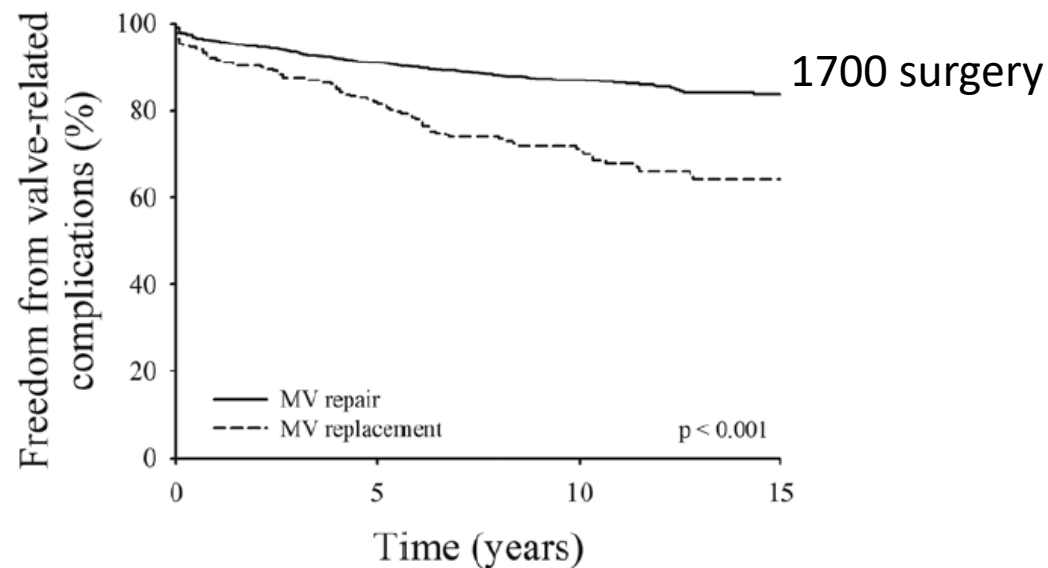
TEER
Is surgery
not possible



Life time
Management MR

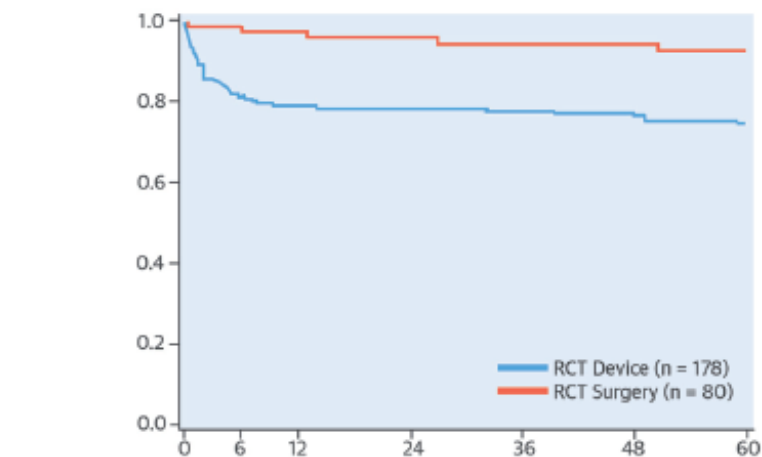
C

IPW-adjusted cohorts



MV repair	1512	1193	596	169
MV replacement	208	125	54	22

C. Freedom From MV Surgery or Reoperation



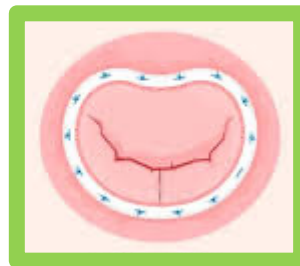
	0	6	12	24	36	48	60
Patients At Risk							
Device Group	178	136	128	117	109	98	45
Control Group	80	75	69	63	54	49	21

Feldman et al, JACC 2015

IM organique

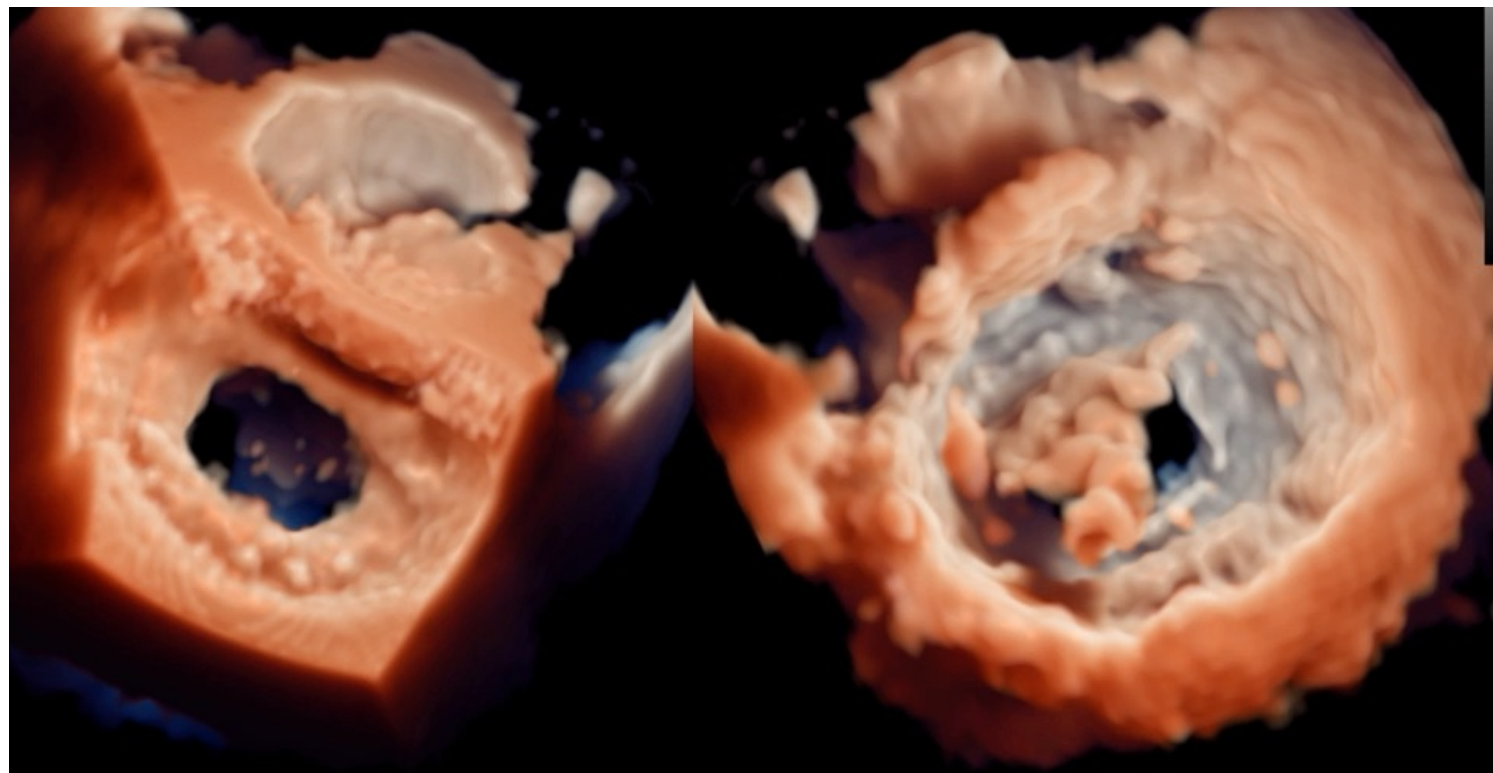


Surgery



Life time
Management MR
Surgery 1st

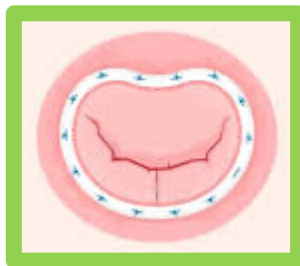
TEER



IM organique

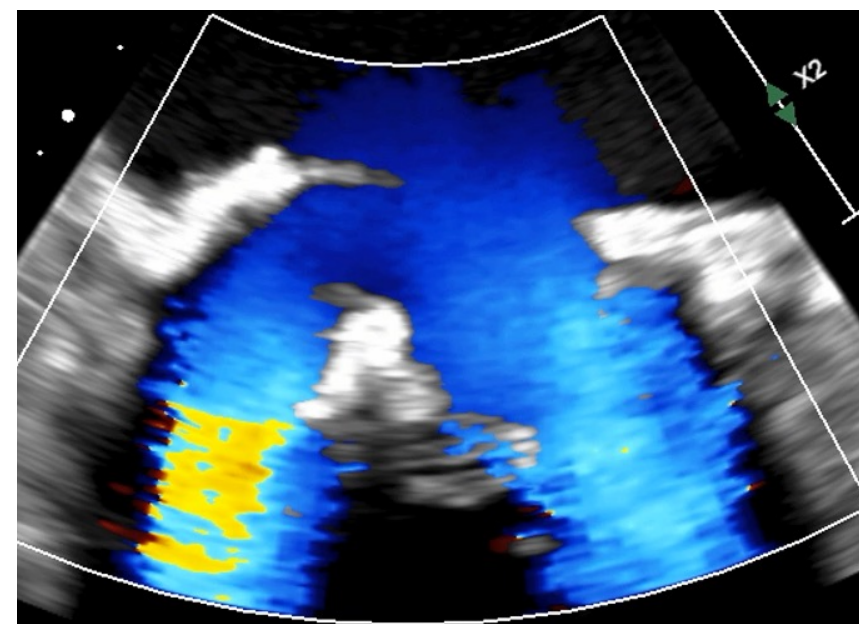
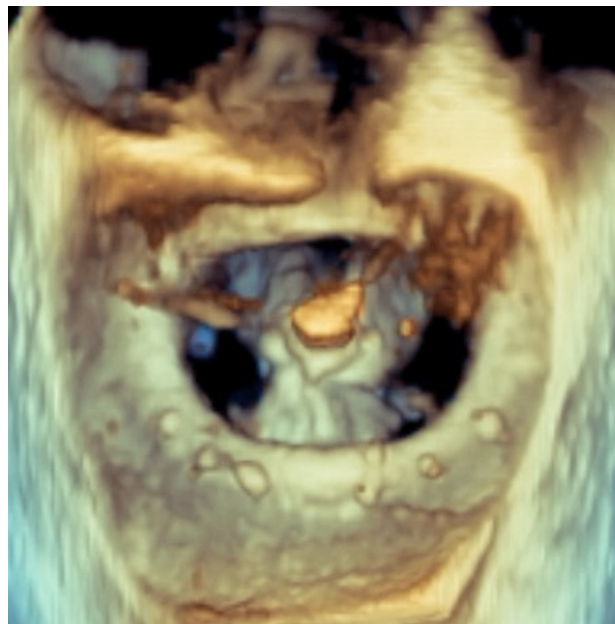
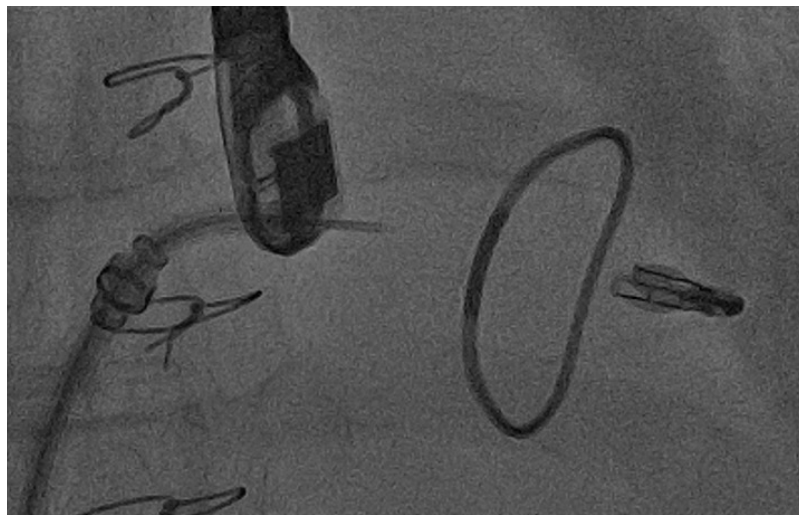


Surgery



Life time
Management MR
Surgery 1st

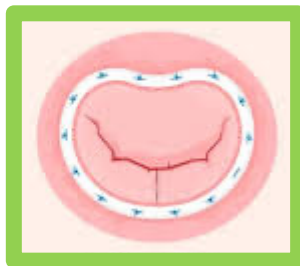
TEER



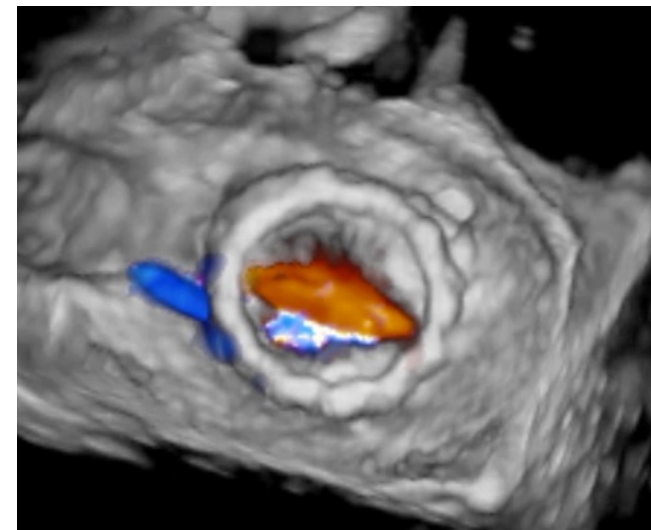
IM organique



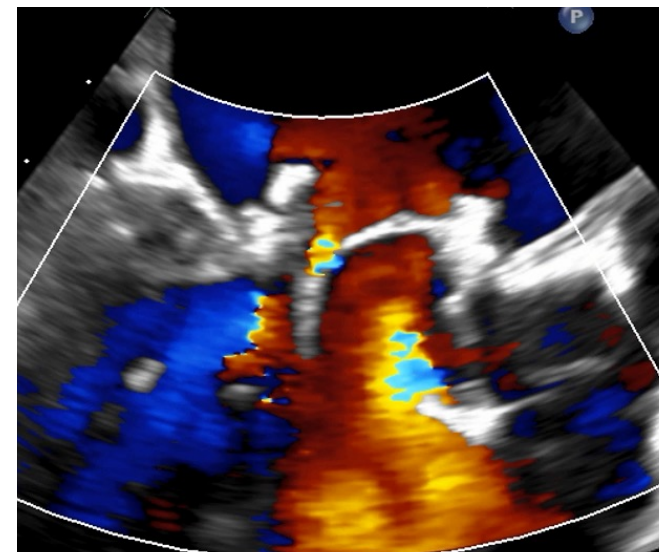
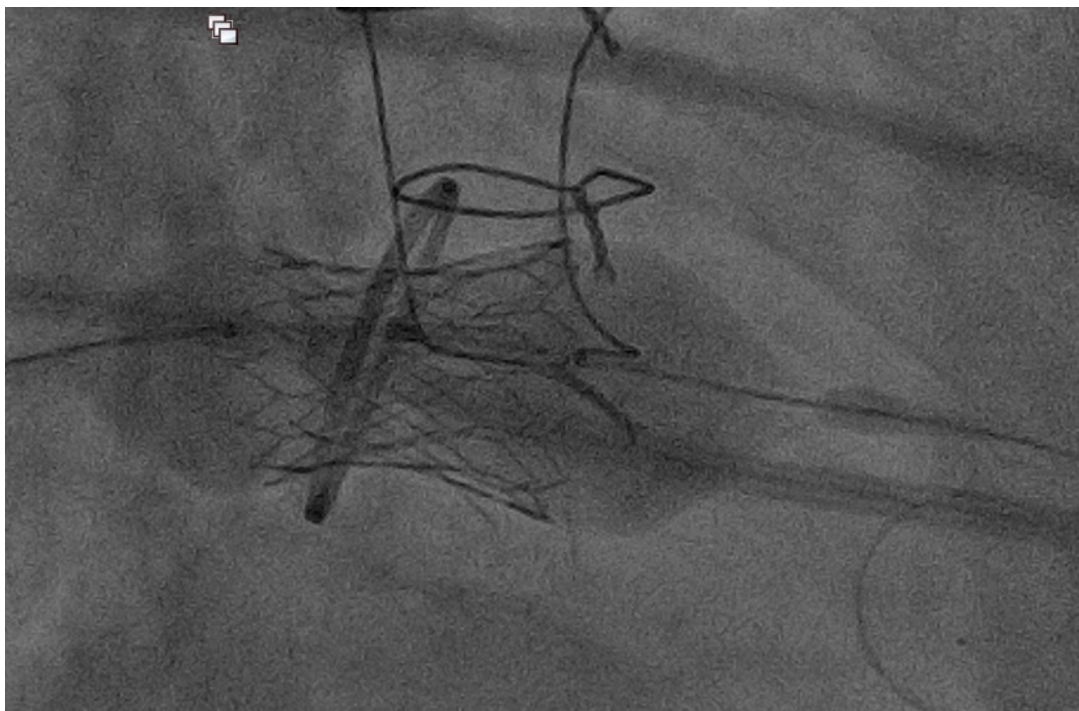
Surgery



Life time
Management MR
Surgery 1st



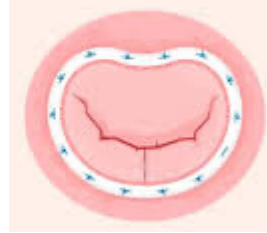
Valve in Ring



IM organique

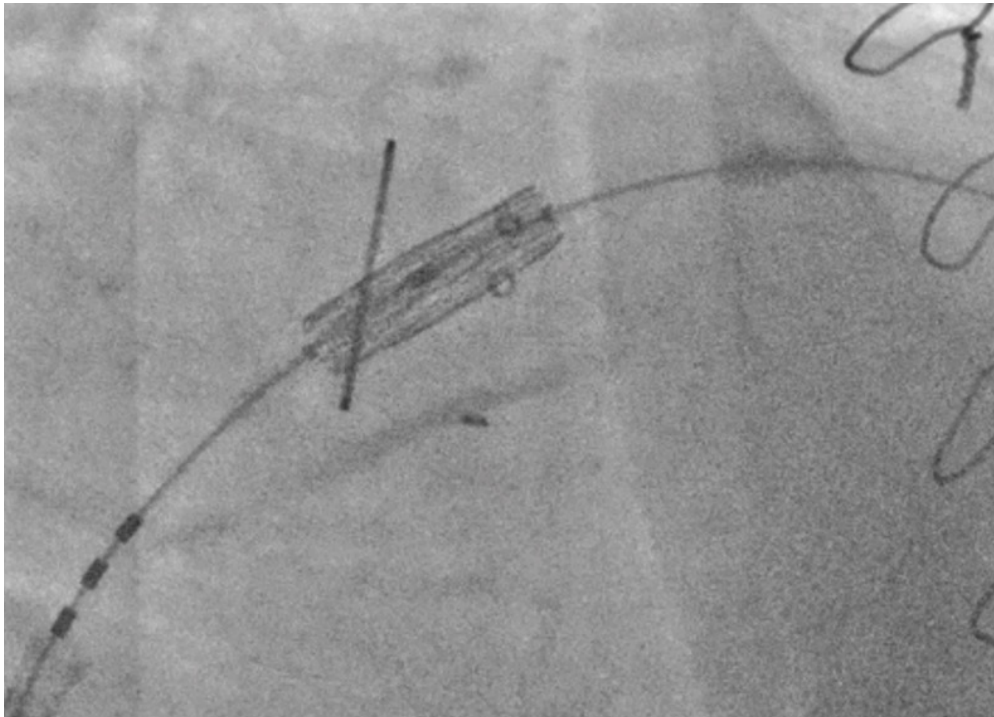


Surgery

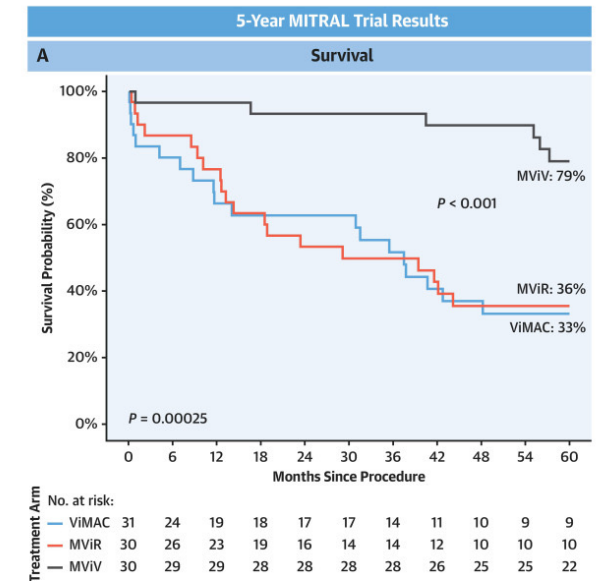


Life time
Management MR
Surgery 1st

Valve in Valve



CENTRAL ILLUSTRATION: 5-Year Outcomes of Mitral Valve-in-Valve, Valve-in-Ring, and Valve-in-MAC

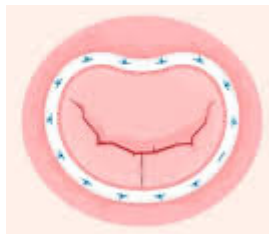


Guerrero ME, et al. J Am Coll Cardiol Interv. 2023;16(18):2211-2227.

IM organique



Surgery

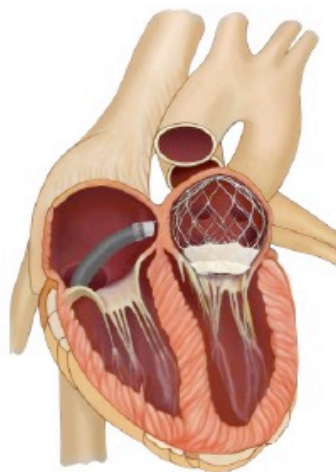
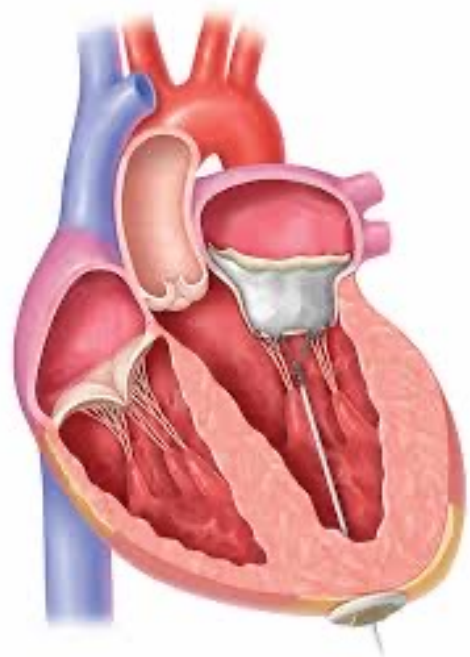


TEER
Is surgery
not possible



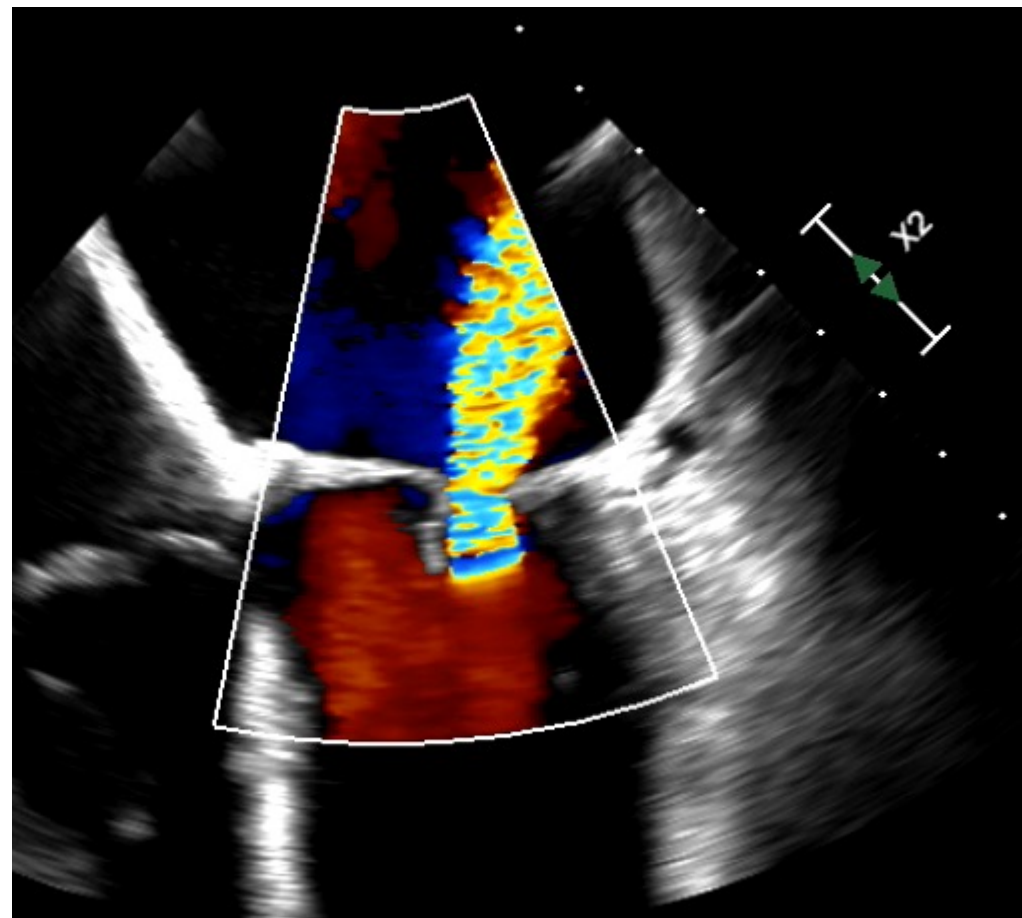
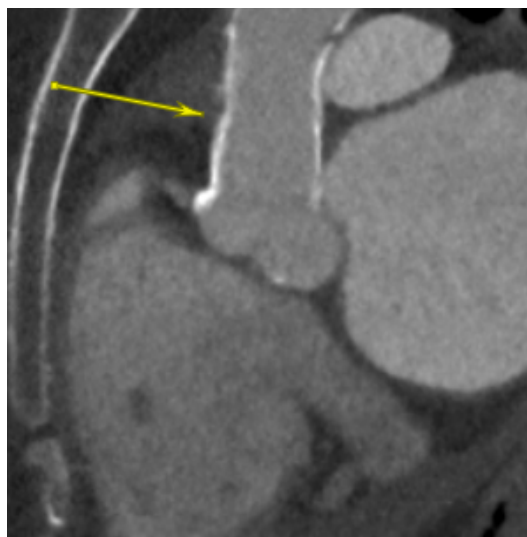
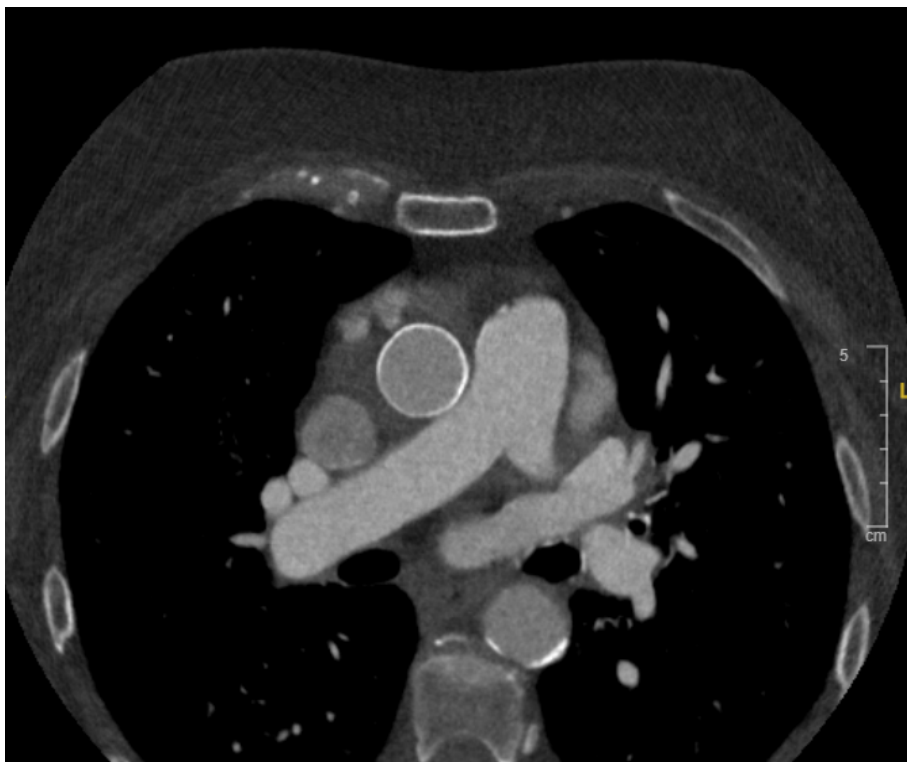
Life time
Management MR

Percutaneous
Mitral valve replacement
If surgery and TEER not possible



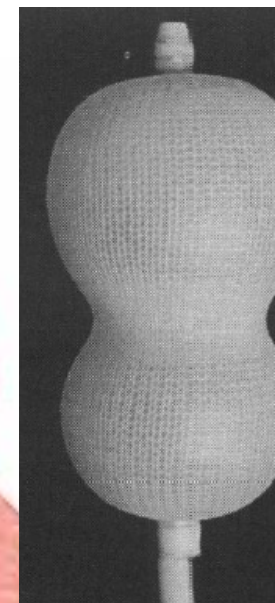
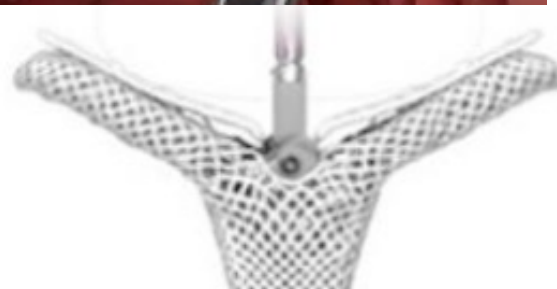
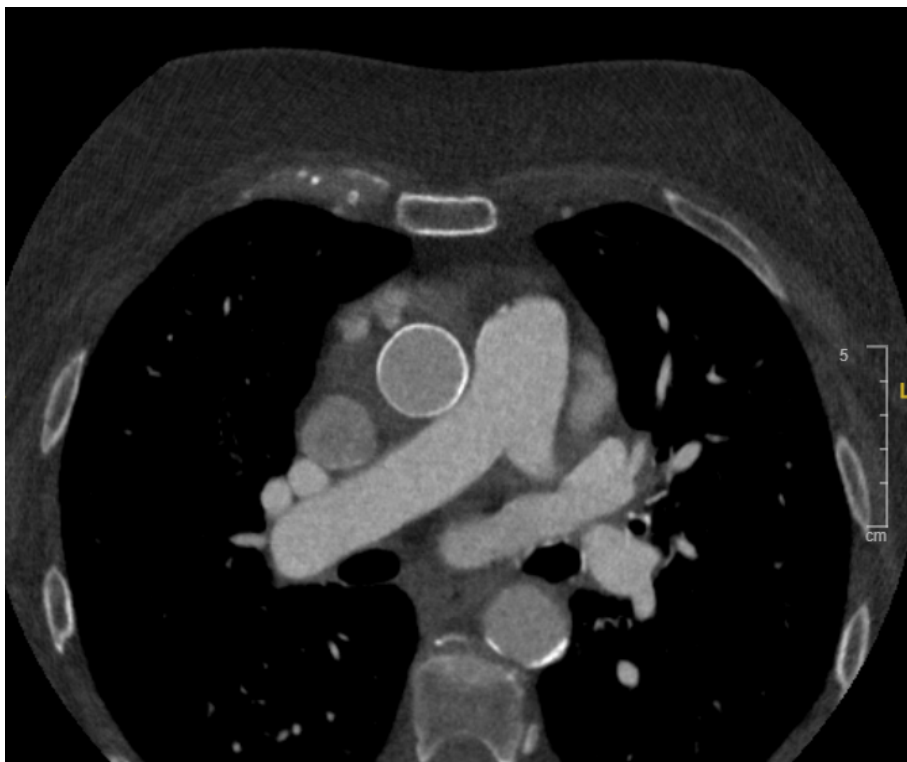
**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)



**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

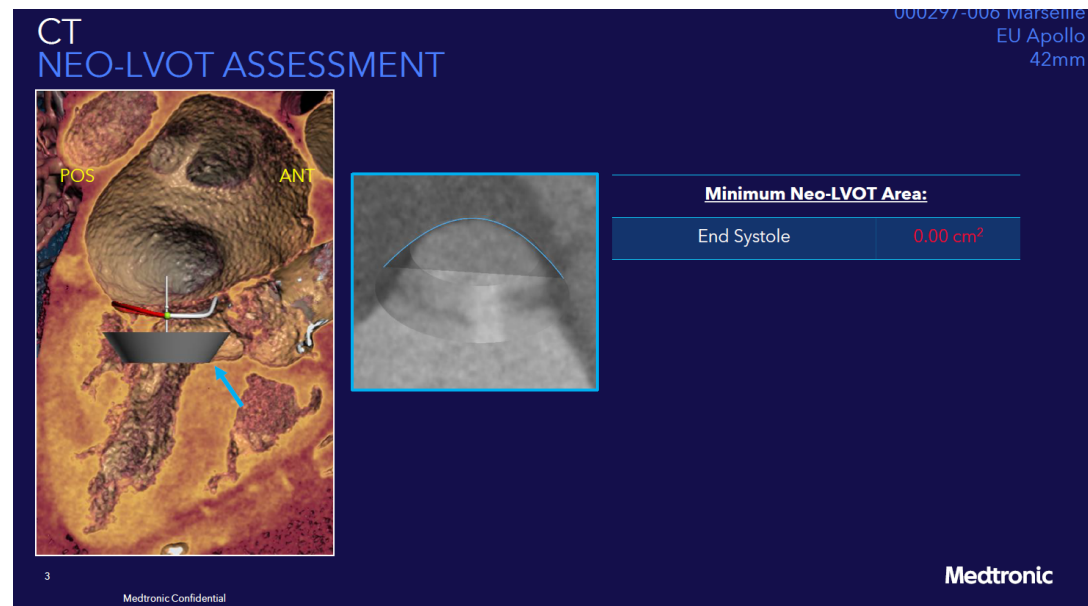
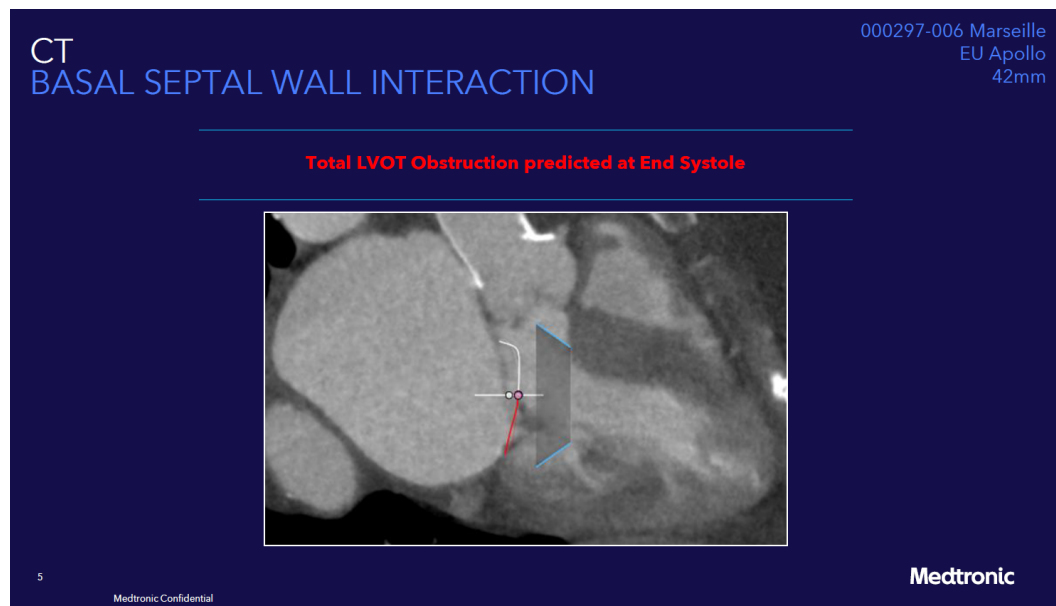
Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)



Et on se tourne vers nous ...

**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)

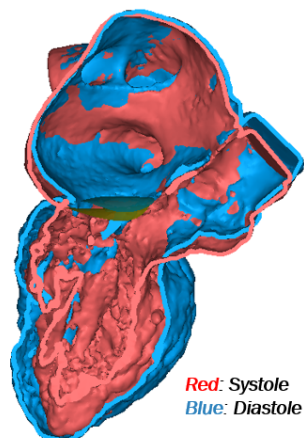


**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

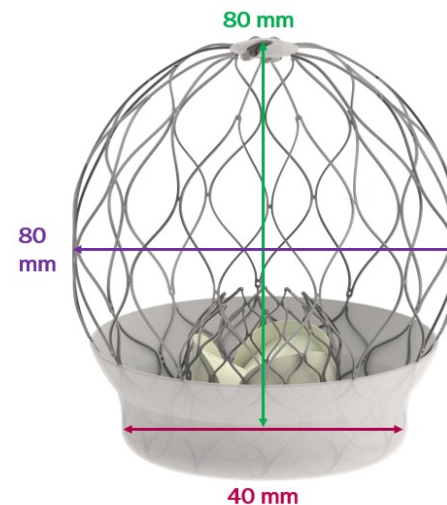
Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)

Left Atrium Dynamics

Parameter	Diastole	Systole
LA Height (mm)	69.9	75.0
LA Width: AP (mm)	64.9	67.0
LA Width: SL (mm)	61.0	65.1
LA Width (Average)	63.0	66.1
LA Ellipse Ratio	0.94	0.97
LA Volume (mL)	187.9	170.0
LA Volume Change (%)	10.5%	
Mitral Valve Motion (mm)	4.3	



AltaValve Sizing



OVERSIZING ANALYSIS

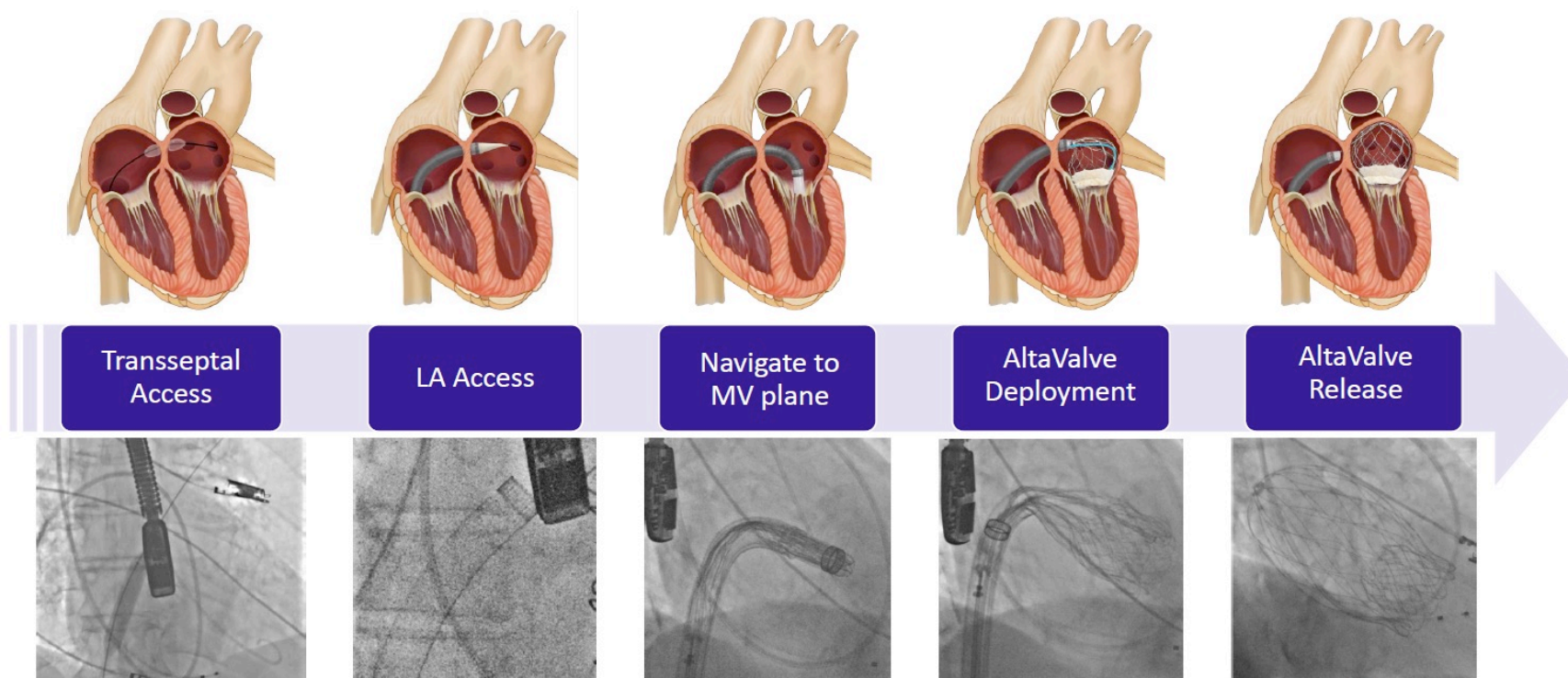
Implant Size (80 x 80 x 40) (80 mm Tall, 80 mm Wide, 40 mm Ann. Ring)	
LA Height	7% - 14%
LA Width	21% - 27%
MV Perimeter: Systole	19%
MV Area: Systole	50%



**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

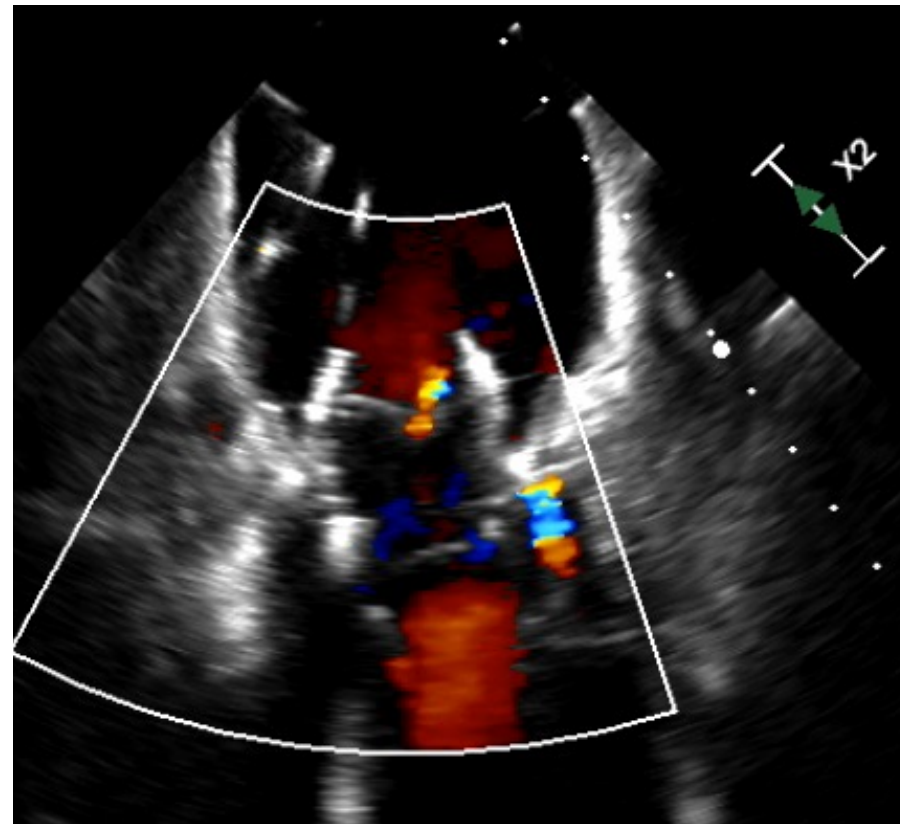
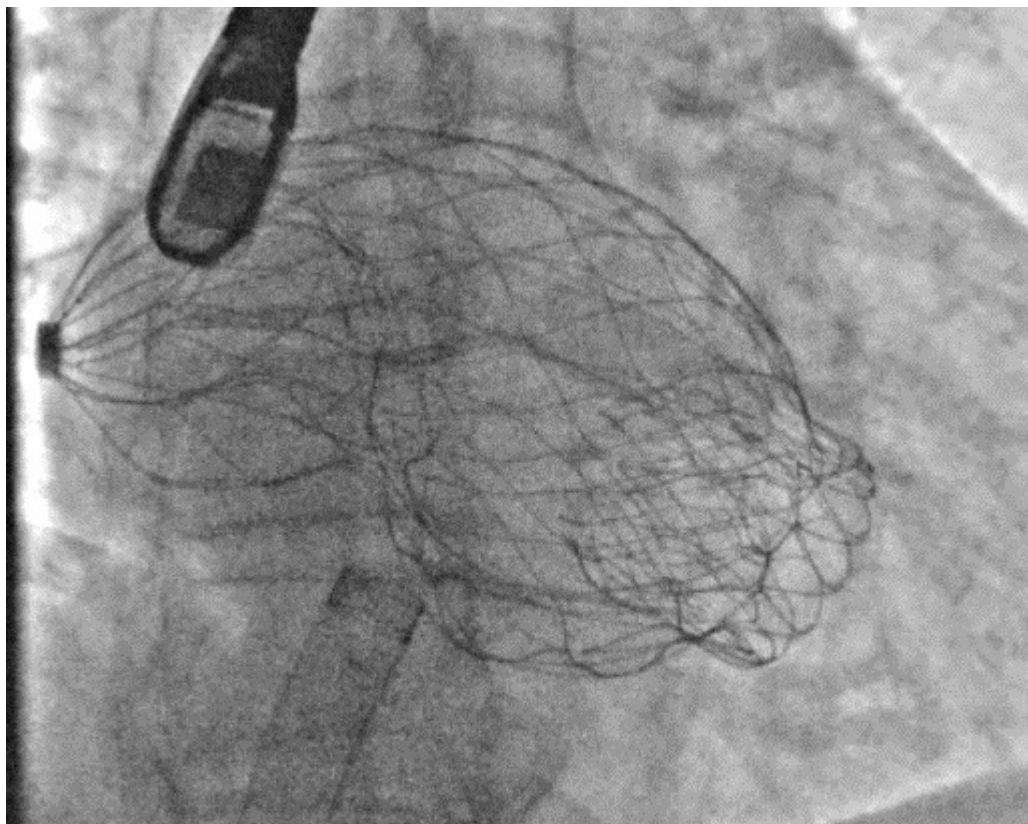
Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)

AltaValve Transseptal Procedure Overview



**Percutaneous
Mitral valve replacement
If surgery and TEER not possible**

Patiente de 65 ans Origine Maghrébine Valvulopathie rhumatismale (suivi > 10ans)
HTA / DNID / Dyslipidémie / FA permanente / Insuffisance rénale modérée (DFG 45)





Faculté des sciences
médicales et paramédicales

Aix-Marseille Université

Thanks for your attention

cardiologie-structurelle@ap-hm.fr

