APPAC

5/6/7 Juin 2019
Palais des Congrès de Biarritz

Une nouvelle valve aortique: parlons-en!

Quelles valves pour quelles anatomies ?

Eric Maupas
Hôpital Privé Franciscaines
Nîmes

Quelles valves choisir

2018: 2 VALVES DISPONIBLES EN FRANCE

Edwards

Medtronic

2019: 1 NOUVELLE VALVE DISPONIBLE

Boston Scientific
Advancing science for life™

ACURATE *neo*™
Aortic Valve System

Comment guider le choix de la valve

Accès vasculaire

- Diamètres
- Tortuosités
- Calcifications

⇩

- ➢ Fémorale
- ➢ Carotide/Sous CL
- ➢ Direct aortique
- ➢ Apicale
- ➢ Transcavale
- ➢ Transeptale

L'opérateur

Expérience +++

Analyse CT +++

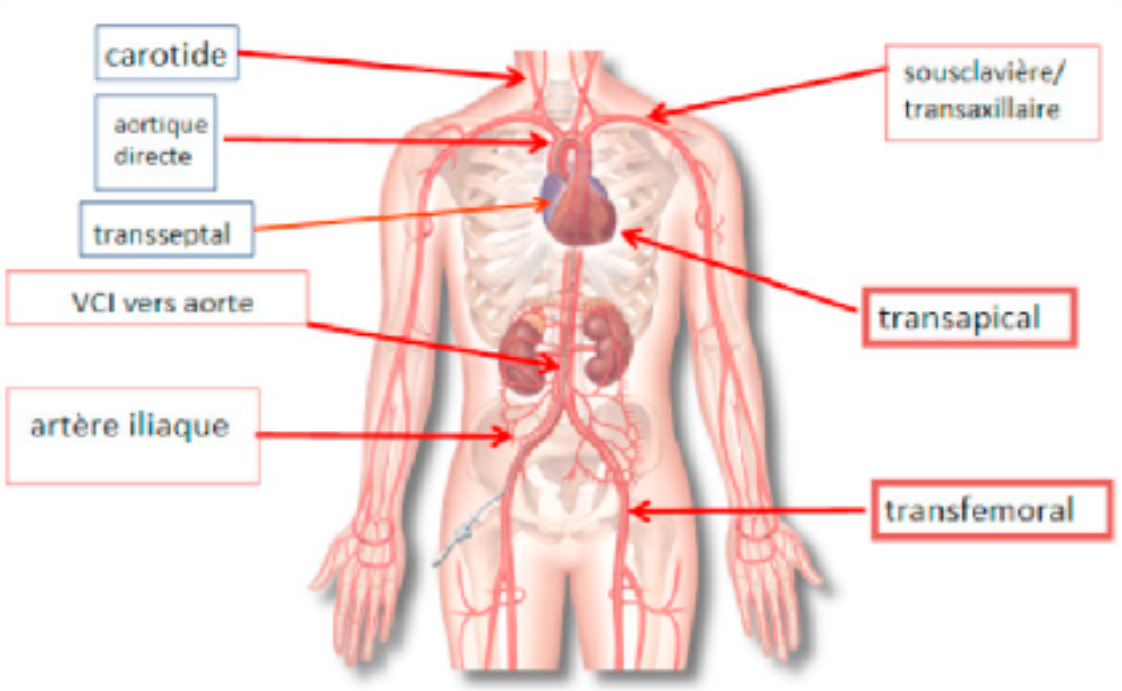
Anatomie racine aortique

- Taille de l'anneau
- Calcifications annulaires
- Aorte horizontale
- Bicuspidie
- Valve in Valve
- CMH
- Hauteur des coronaires

Le patient

- Dysfonction VG (+/- VD)
- Valvulopathie mitrale
- Troubles conductifs

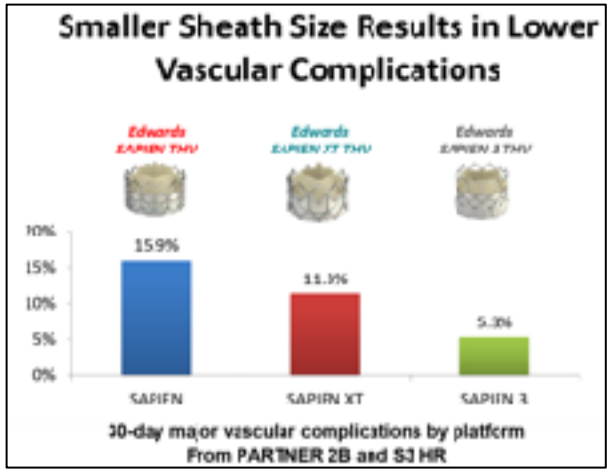
Choix orienté par l'accès vasculaire

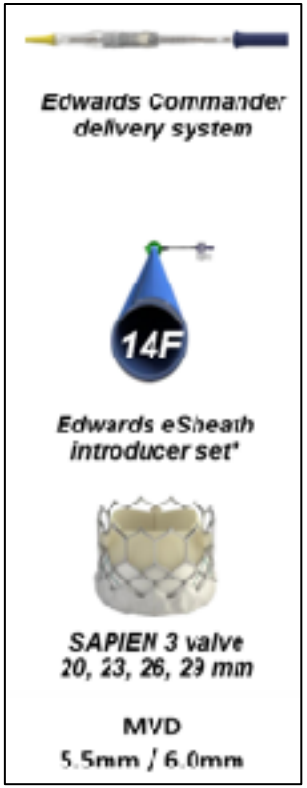


- **Privilégier ++ la voie fémorale** ⇨ meilleur pronostic
  - accès non femoral à discuter si risque important

- **Voie fémorale :** Diamètre/ Profil du cathéter diffèrent en fonction des valves et influencent le choix de la valve

Voie fémorale: profil du cathéter

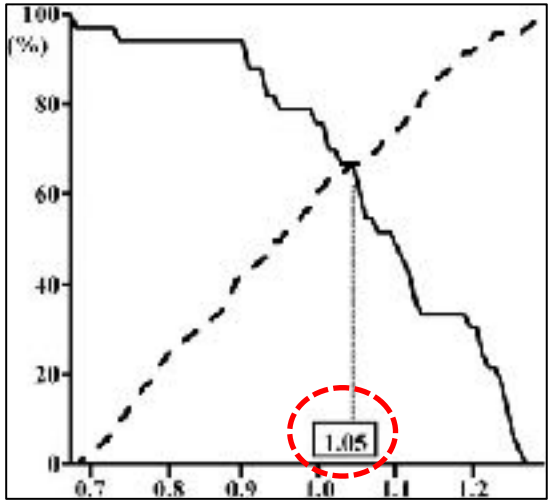




- **Réduction de la taille du catheter** ⇨ diminution des complications vasculaires

- **Diamètre/ Profil du catheter diffèrent en fonction des valves**
  - Autoexpandable: plus de flexibilité
  - Balloonexpandable: intêret du Flex

Voie fémorale
L'anatomie influence le choix de la prothèse



Rapport Introducteur/artère fémorale

- **Rapport Introducteur/artère fémorale; calcifications artérielles fémorales** ⇨ facteurs prédictifs des complications vasculaires

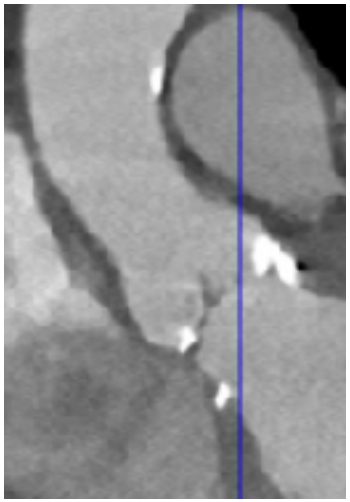
  - Artères de petit calibre: Autoexpandable sans introducteur =14 Fr
  - Tortuosités aortiques sévères avec calcifications: Autoexpandable (plus de flexibilité)
  - Tortuosités iliaques sévères: Introducteur de petit calibre Edwards ou iSLEEVE

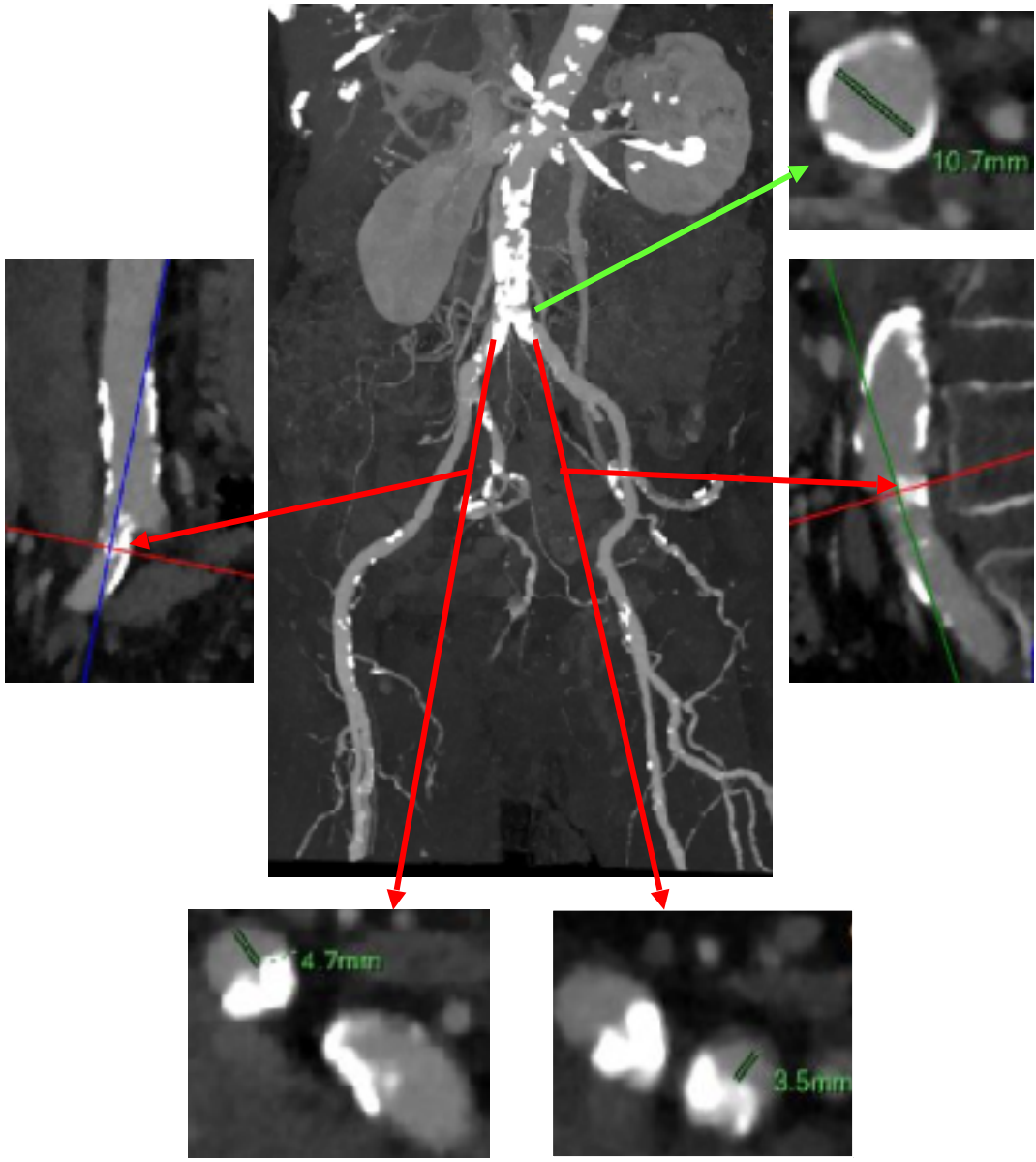
Cas clinique → artères petit calibre calcifiées

- Femme 74 ans, myélome multiple autogreffé, NYHA 3. Rao serré, Gr moyen 51 mmHg. FE= 50 % , HTAP avec PAPS=55 mmHg

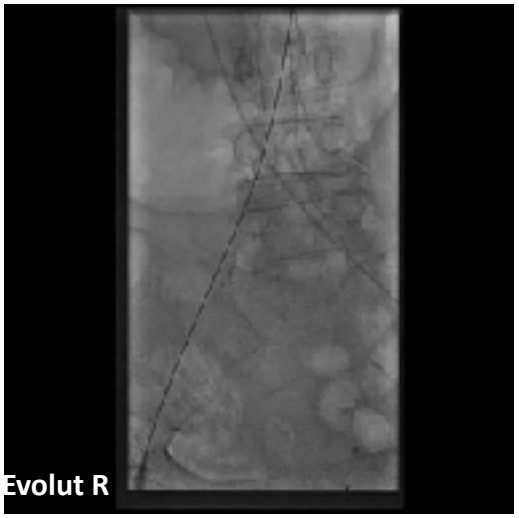
- **TDM préTAVI**: valve calcifiée avec coulée calcaire CCVG. Calcifications aorte terminale et ostia iliaques avec diamètres < 5 mm.

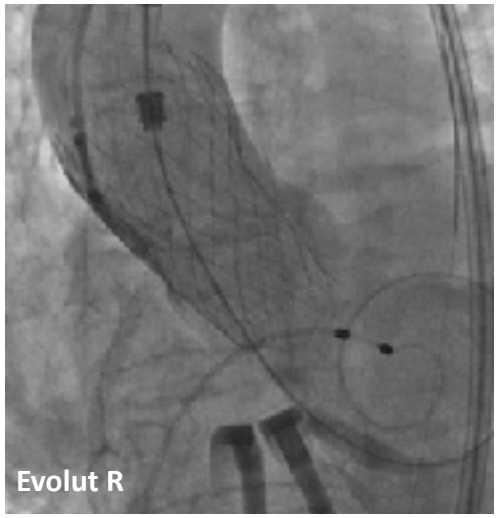
- **<u>Valve Evolut R 26 mm introducteur 14 Fr intégré</u>** (InLine Sheath)

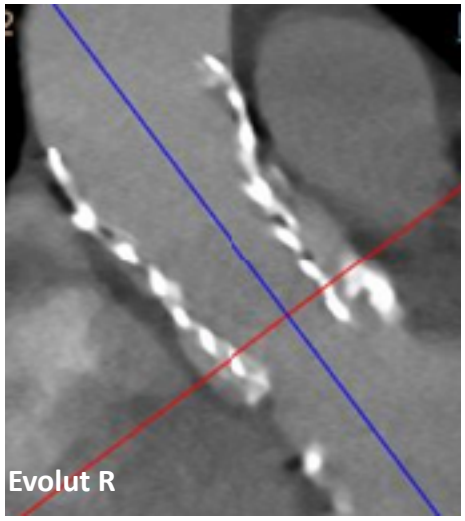


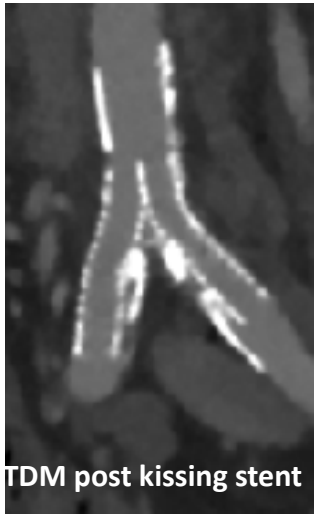


Cas clinique → artères petit calibre calcifiées

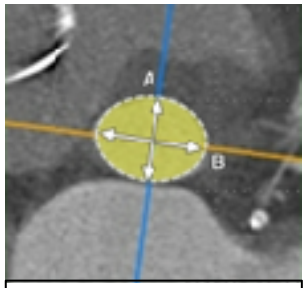








Choix lié à l'anatomie de la racine aortique

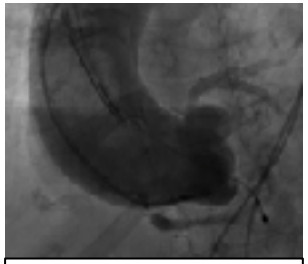


ANNEAU AO

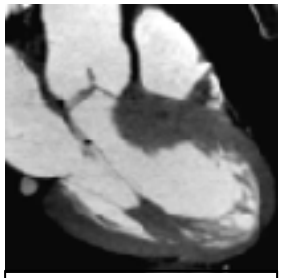
BICUSPIDIE AO

ANNEAU CALCIF

VALVE IN VALVE



ANGULATION AO



CMH

HAUTEUR DES CORONAIRES

Anneau aortique de petite taille

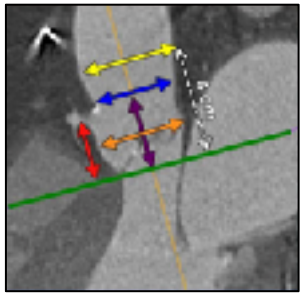
➢ PROBLEMATIQUE:

- <u>Rupture d'anneau</u> (++ si calcifications importantes)
  - Privilégier valves autoexpansives ++ après prédilatation

- <u>Gradient post implantation élevés</u>
  - Privilégier valves autoexpansives , supra annulaires ++

- <u>Occlusion coronaire</u> (danger si petit valsalva)

	CoreValve Evolut
	23 mm
Annulus diameter (mm)	18-20
Annulus perimeter (mm)	56.5-62.8
Annulus area (mm²)	254.5-314.2
Ascending aorta diameter (mm)	≤34
Sinus of Valsalva diameter (mm)	≥25
Sinus of Valsalva height (mm)	≥15



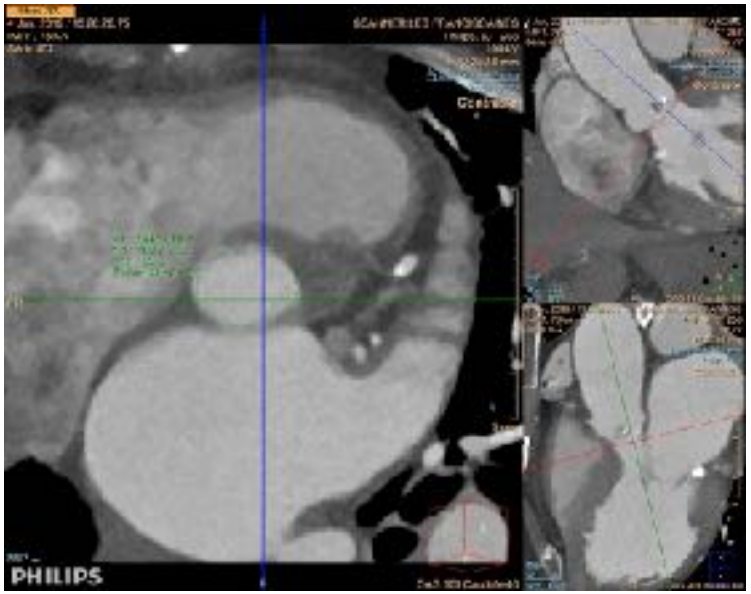
Diameter (mm)	Perimeter (mm)	Area (mm²)	Sapien 3				Evolut R				Accurate Neo		
			20	23	26	29	23	26	29	34	S	M	L
17.8	56	250					56.5						
18.2	57.1	260											
18.5	58.2	270	273										
18.9	59.3	280											
19.2	60.4	290											
19.5	61.4	300											
19.8	62.4	310					62.8						
20.2	63.4	320											
20.5	64.4	330											
20.8	65.3	340	345	358									
21.1	66.3	350									66		
21.4	67.2	360											
21.7	68.2	370											
22	69.1	380											
22.3	70	390											
22.6	70.9	400											
22.9	71.8	410										77	
23.1	72.6	420						72.5					
23.4	73.5	430			430								
23.7	74.3	440											
23.9	75.2	450											
24.2	76	460											
24.5	76.8	470											
24.7	77.6	480											
25	78.4	490											79
25.2	79.2	500											
25.5	80	510											
25.7	80.8	520											
26	81.6	530							81.7				
26.2	82.4	540				543							
26.5	83.1	550			546								
26.7	83.9	560											
26.9	84.8	570											85
27.2	85.4	580											
27.4	86.1	590											
27.6	86.8	600											
27.9	87.5	610											
28.1	88.2	620											
28.3	89	630											
28.6	89.7	640											
28.8	90.4	650											
29	91	660											
29.2	91.7	670											
29.4	92.4	680				680							
29.6	93.1	690											
29.9	93.8	700											
30.1	94.4	710								94.2			

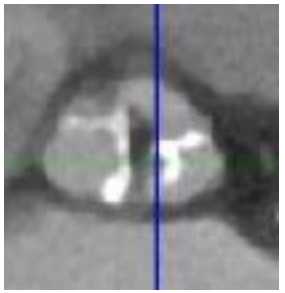
Cas clinique → petit anneau aortique

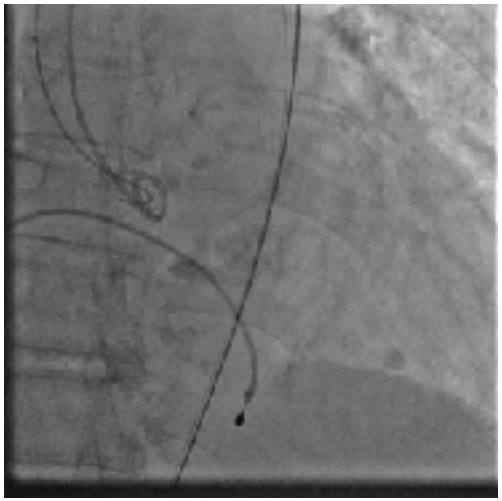
- Femme, 84 ans, 151 cm, NYHA 3
- Rao serré, Gr moyen 45 mmHg
- FE 45 % , séquelle nécrose inférieure large

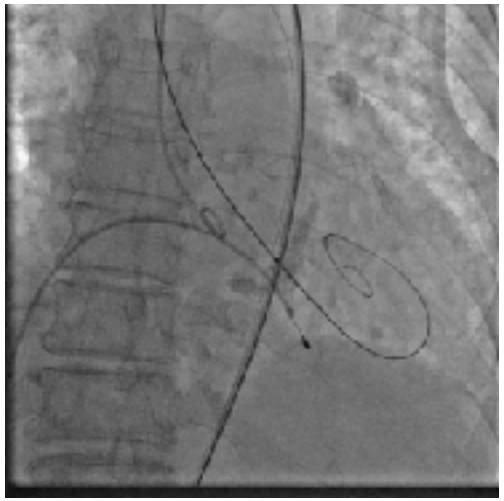
- **TDM préTAVI**: petit anneau aortique, surface 295 mm2, périmètre 62 mm, valsalva 24 mm

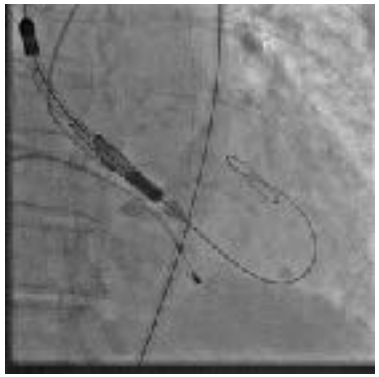
- **<u>Valve ACURATE NEO Boston S</u>**

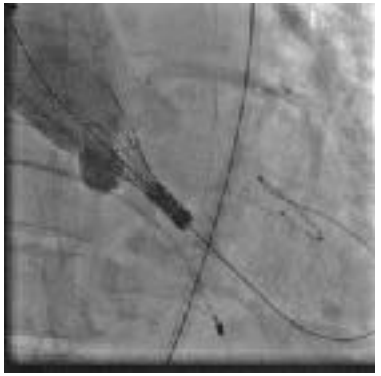




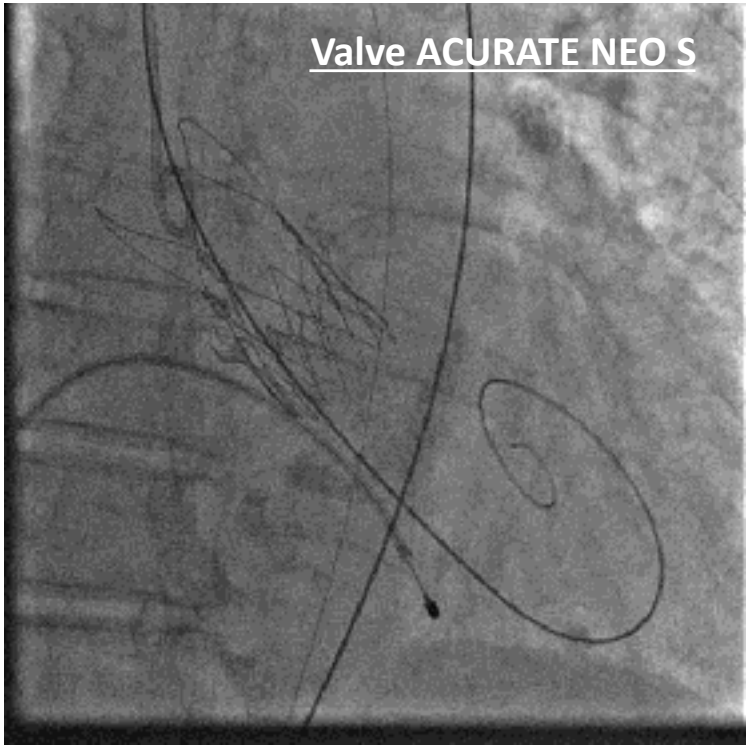


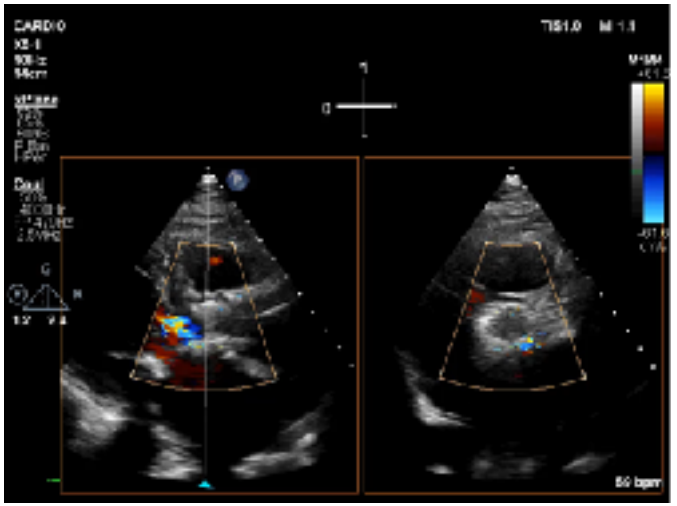


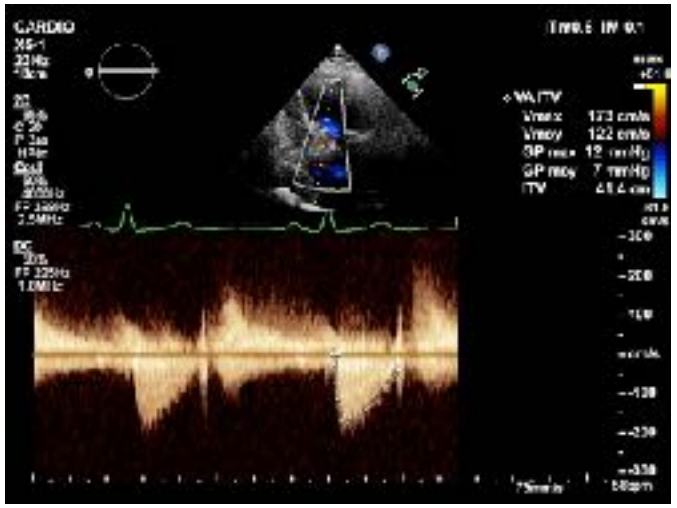




Cas clinique → petit anneau aortique

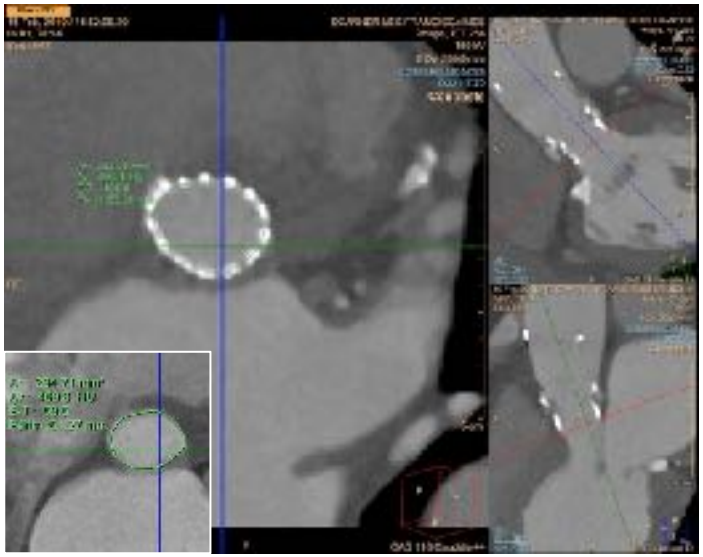


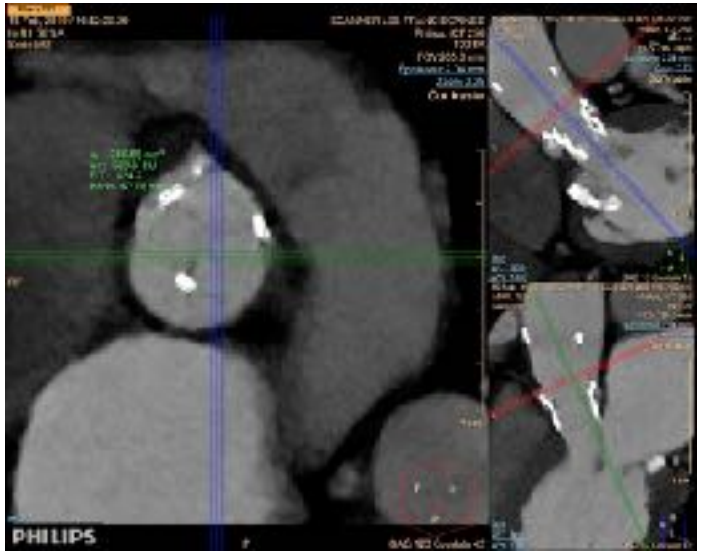




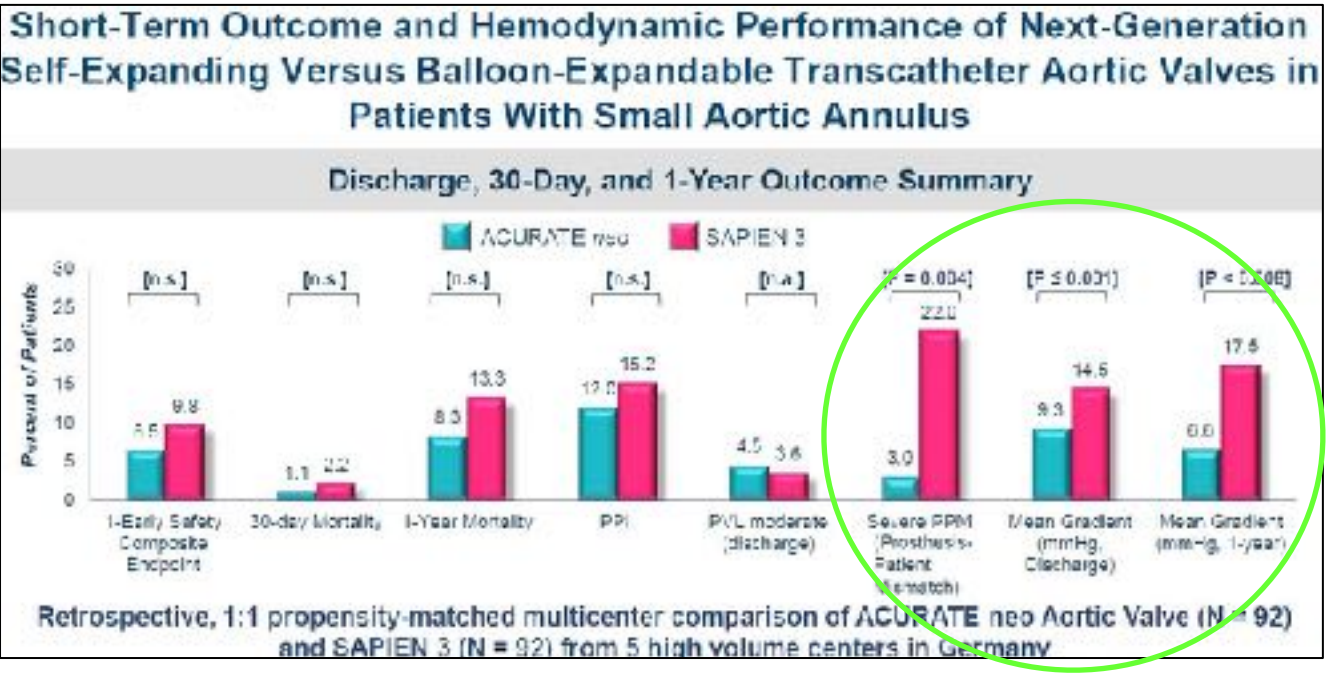
- Excellente tolérance hémodynamique pendant le positionnement de le déploiement
- Bon résultat échographique avec gradient moyen 7 mmHG et fuite minime.

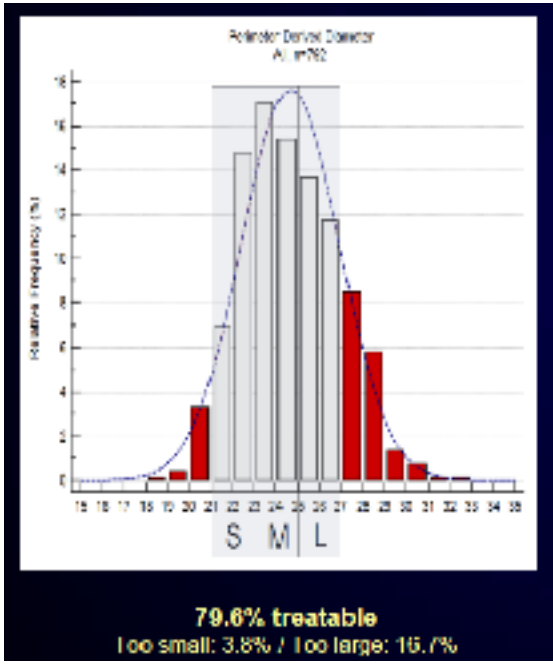
Cas clinique → petit anneau aortique





ACURATE neo – Small Aortic Annulus





V. Mauri, *Circ Cardiovasc Interv. 2017*

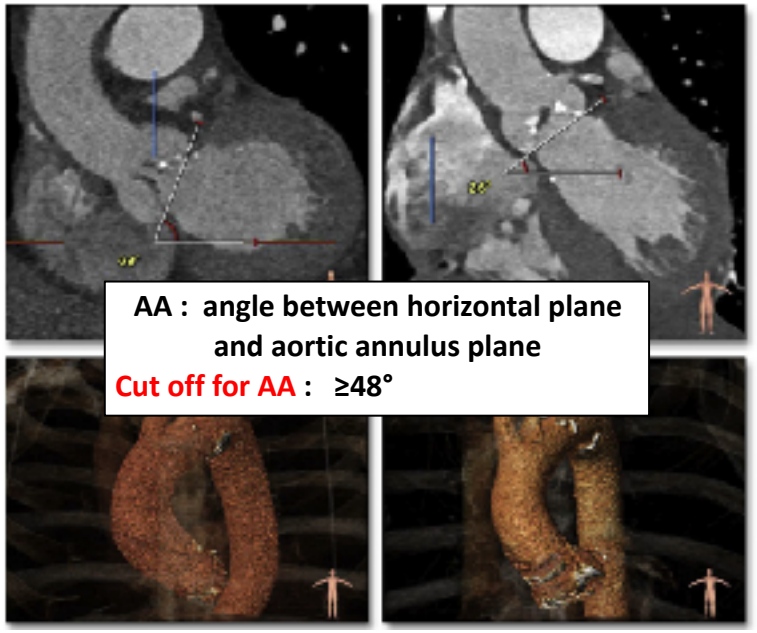
Angulation aortique

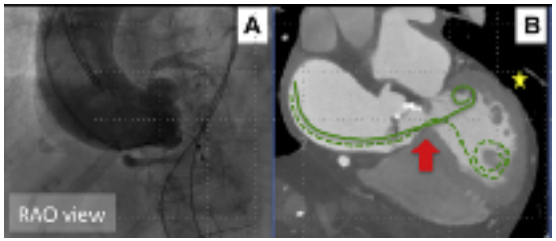
➢ PROBLEMATIQUE:

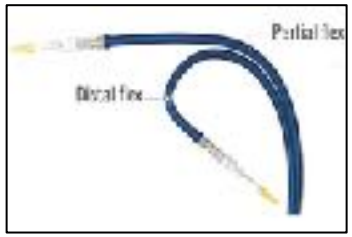
- <u>Difficultés de franchissement</u>
  - Privilégier Sapien 3 avec Cathéter orientable
  - Self expandable (Medtronic) : impact négatif sur succès procédural

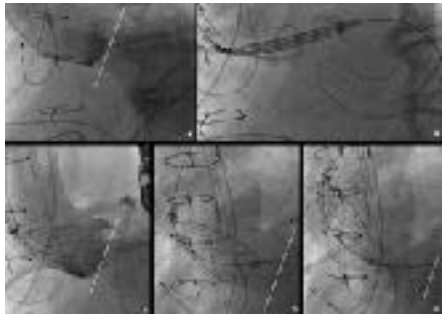
- <u>Fuite ≥ mild , Malposition, Pace maker:</u> plus fréquent avec Self expandable (Medtronic)

- <u>Facteur de risque de perforation VG</u>





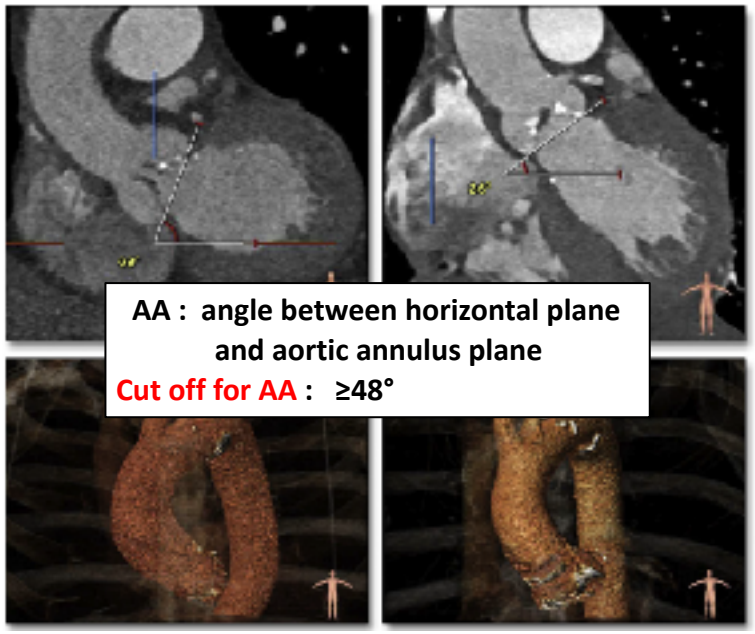


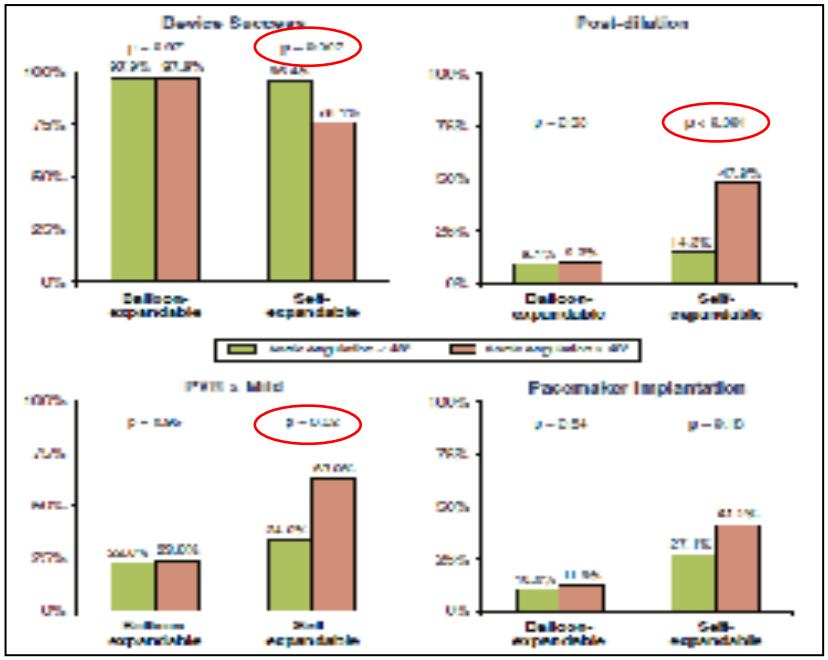


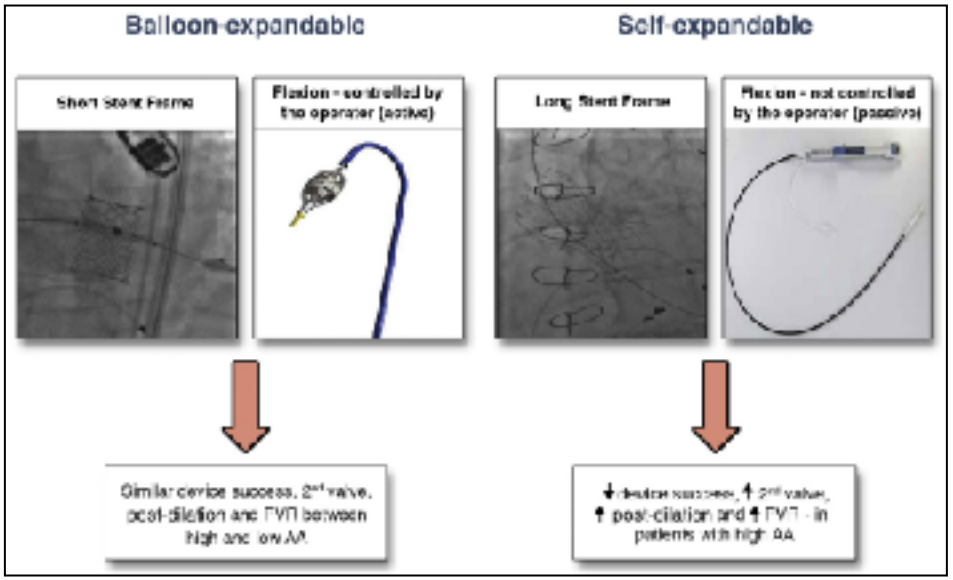
➢ Privilégier ES3 plutôt que Evolut. Acurate Neo?

Increased Aortic Angulation → negatively impact procedural success following SE prothesis implantation

- 582 PTS (Edwards or Medtronic)
- 85 % TF, 4 % TA, 10% TDAo, 1% TSCL
- CT Assessment of Aortic Root Angulation
- Impact of increased AA on success following TAVR

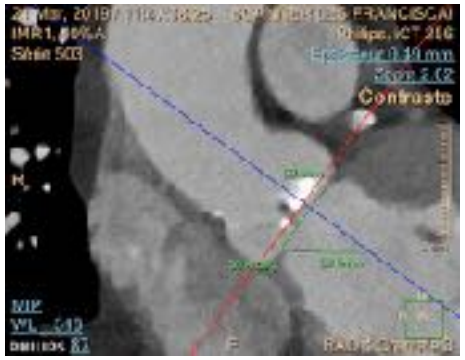


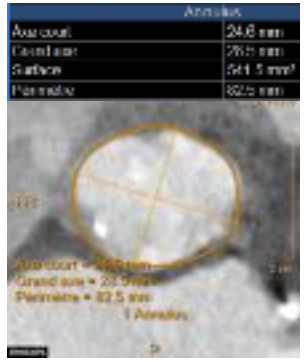


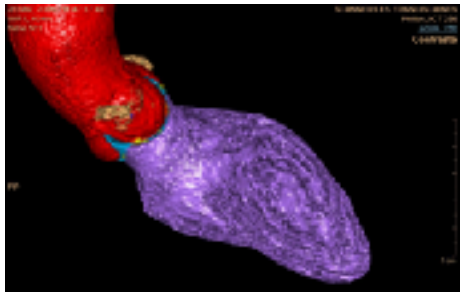


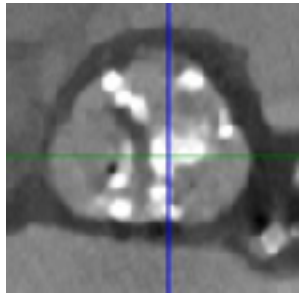
Cas clinique → ACURATE NEO – Aorte Horizontale

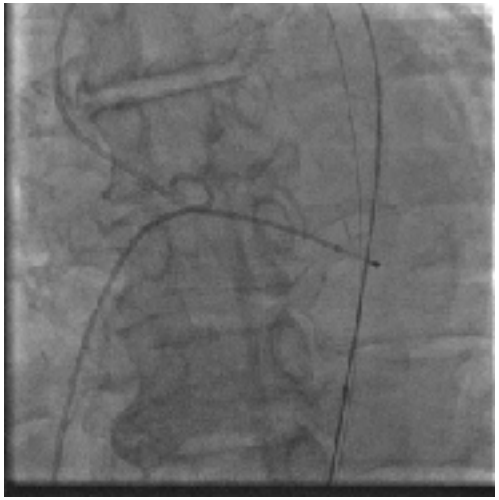
- Homme 86 ans, ATCD AVC, troubles cognitifs débutants. NYHA 2. Rao serré, Gr moyen 44 mmHg. FE= 44 %
- **TDM préTAVI**: valve calcifiée avec surface anneau 450 mm, périmètre 76 mm. Aorte horizontale avec angle 55°
- **<u>Valve ACURATE NEO M (Boston)</u>**

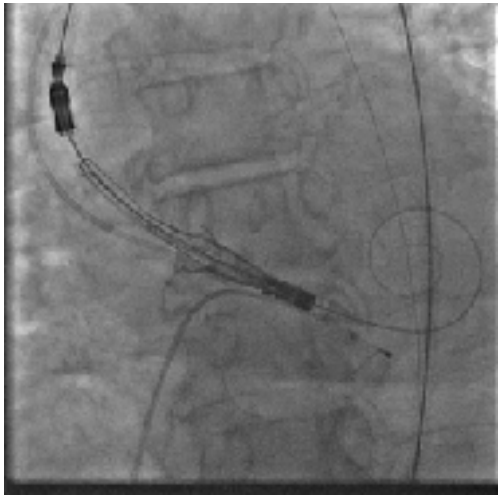




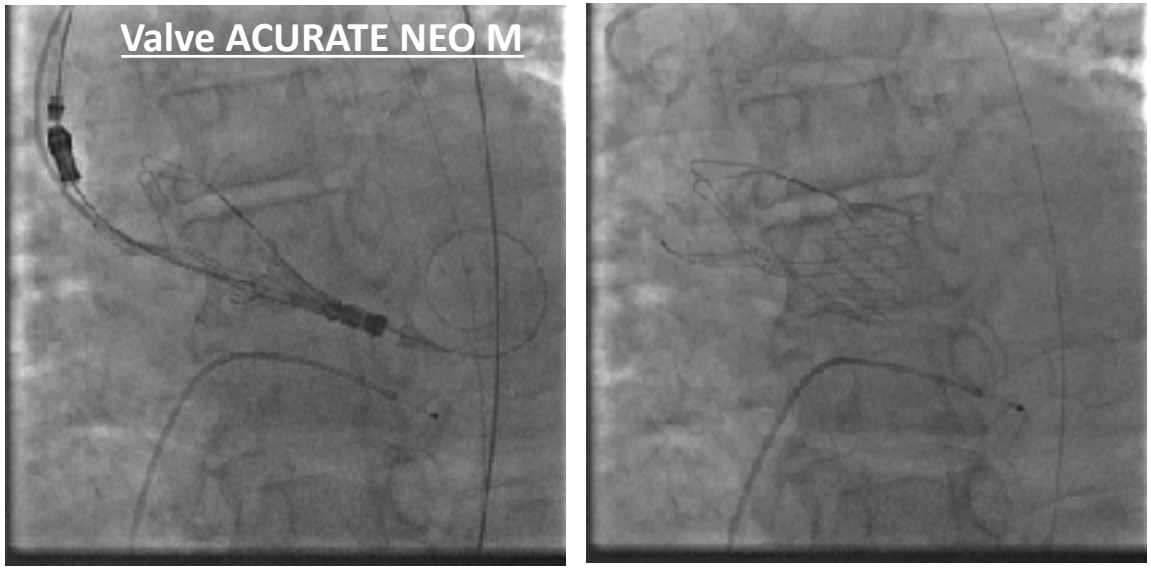


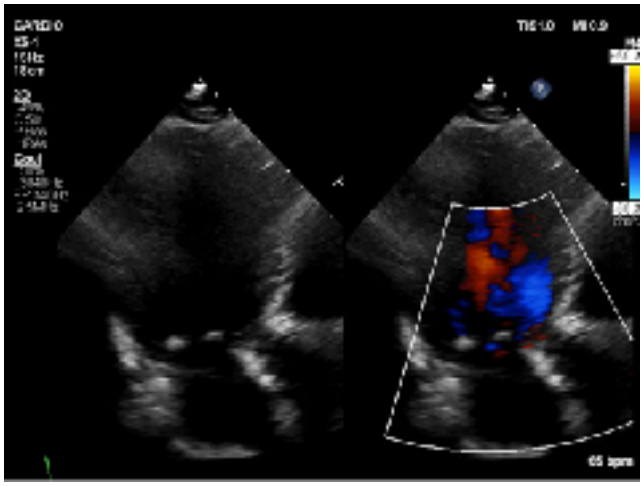


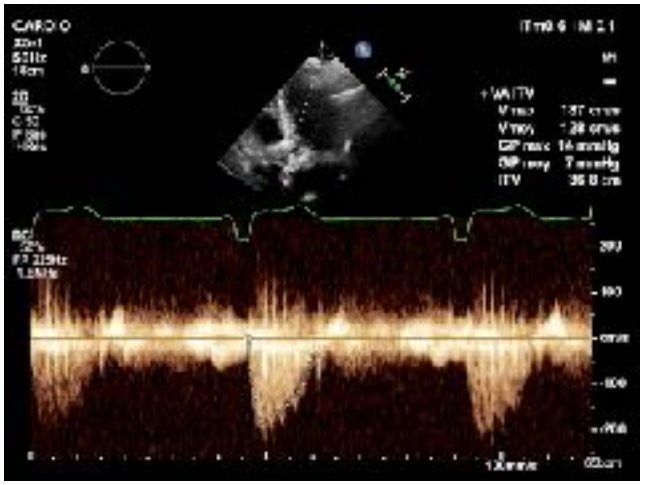




Cas clinique → ACURATE NEO – Aorte Horizontale





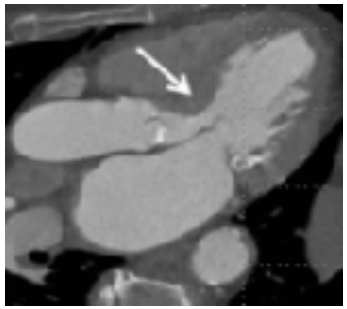


- Le design de la valve et les arches de stabilisation facilitent l'alignement co-axial et le déploiement
- Résultat échographique correct gradient moyen 7 mmHG et microfuite.

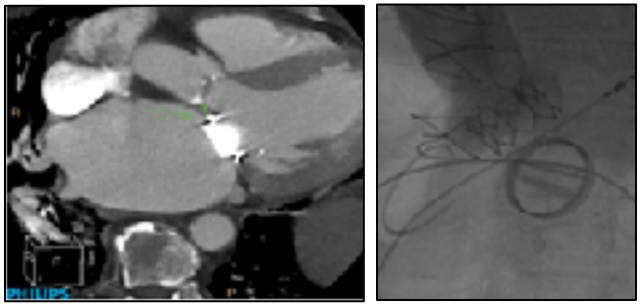
OBSTACLE DANS LA CHAMBRE DE CHASSE VG

➢ PROBLEMATIQUE:

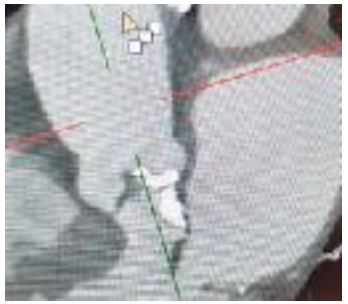
- Déploiement instable (pacing ++)
- Risque d'embolisation (CMH)
- Risque de conflit avec prothèse mitrale



Hypertrophie septale ++



Prothèse mitrale

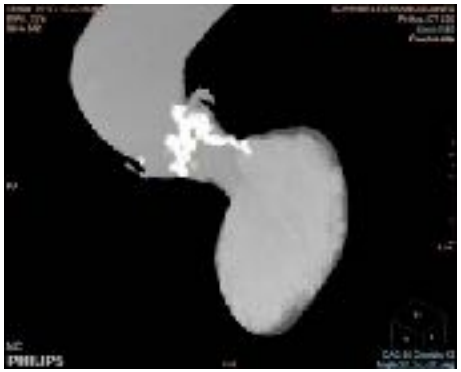
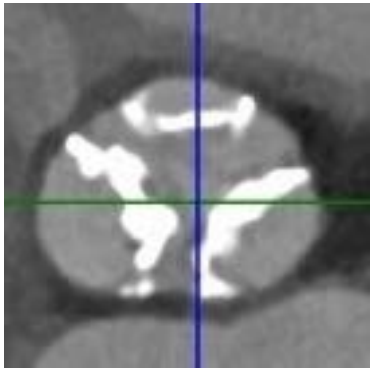
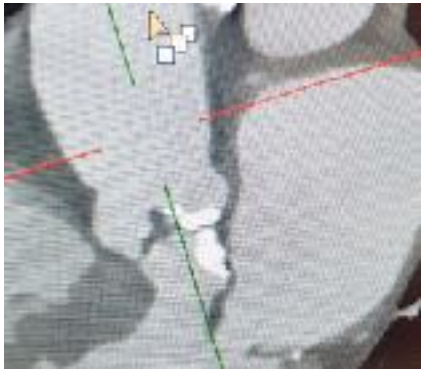
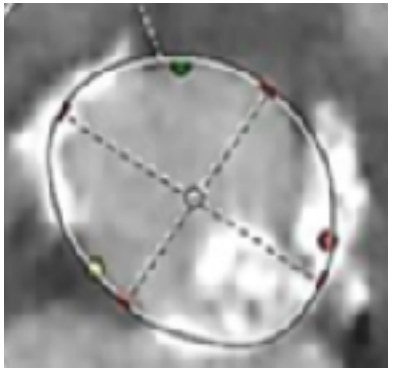


Protrusion calcaire

➢ Privilégier prothèses autoexpansives repositionnables. Acurate Neo?

CALCIFICATIONS VALVES (+/- SOUS VALVE)ET ANNEAU

➢ PROBLEMATIQUE:

- **Rupture d'anneau** (plus fréquent avec balloon expandable)
  - Antoexpandable ++ avec prédilatation adaptée. <u>PAS DE POST DILATATION</u>

- **Fuites paravalvulaires**
  - Antoexpandable Evolut PRO > Evolut R > balloon expandable ES3

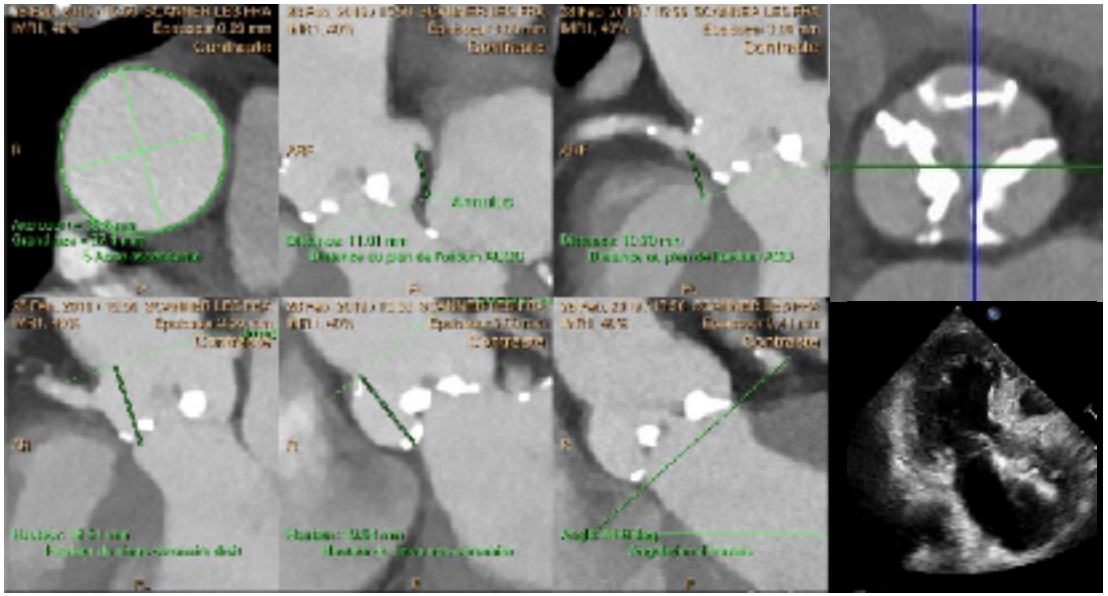
- **Risque d'occlusion coronaire** (plus fréquent avec petit valsalva)
  - Antoexpandable si coulée calcaire et balloon expandable si petit sinus

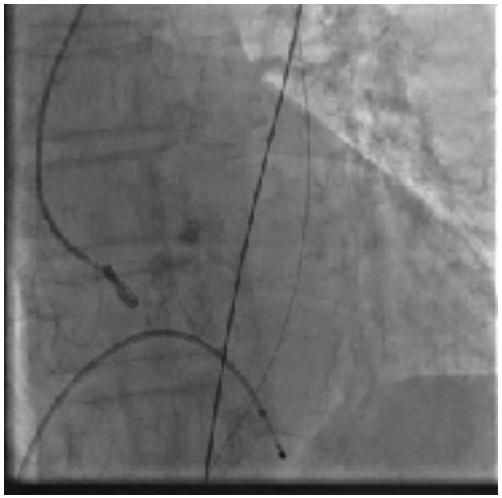
Cas clinique → Valve calcifiée + bourrelet septal

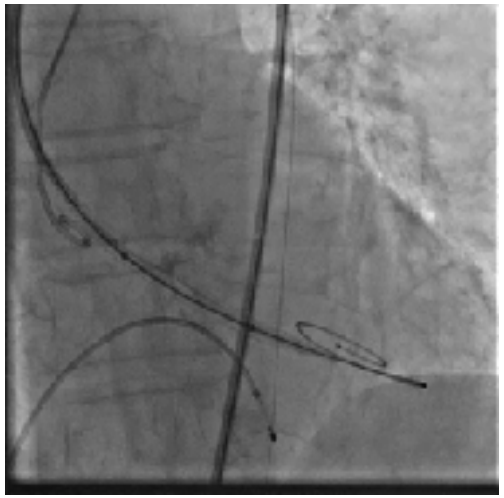
- Femme 87 ans, IMC 19, NYHA 3. Rao serré, Gr moyen 60 mmHg. FE= 60%. HTAP avec PAPS=56 mmHg.

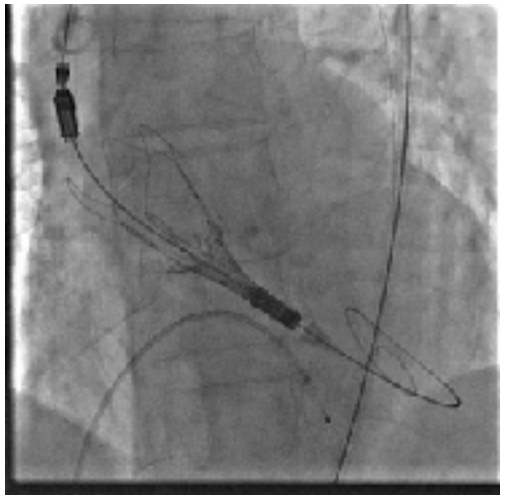
- **TDM préTAVI**: valve calcifiée avec surface anneau 460 mm, périmètre 77 mm. Bourrelet septal sous Ao. AAA 35 mm.

- **<u>Valve ACURATE NEO M (Boston)</u>**

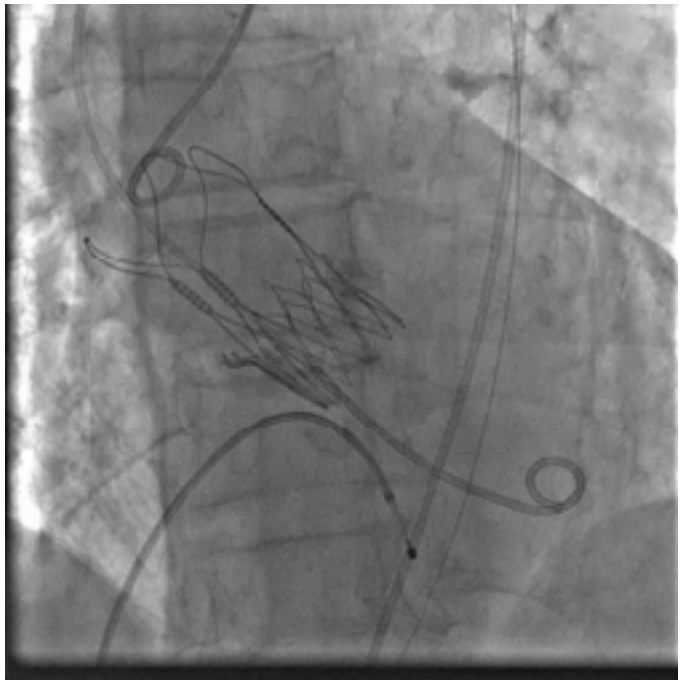


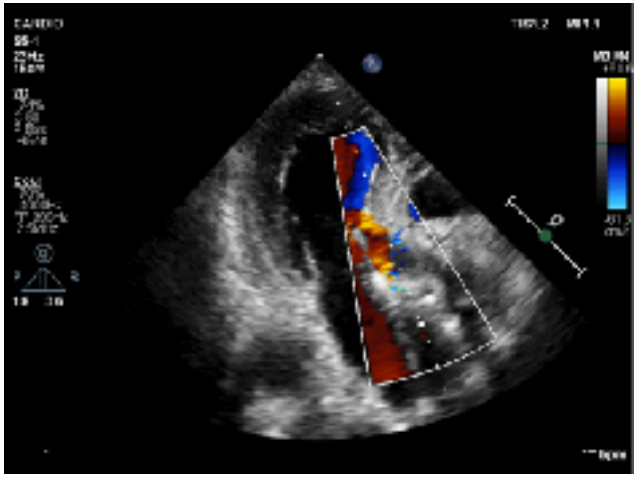


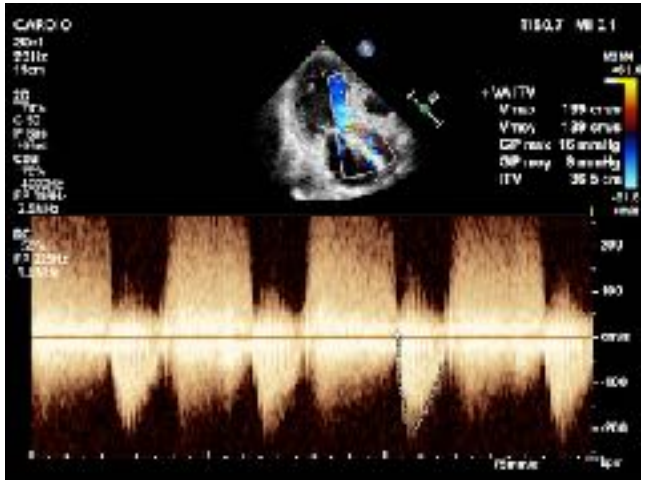




Cas clinique → ACURATE NEO – VALVE CALCIFIEE







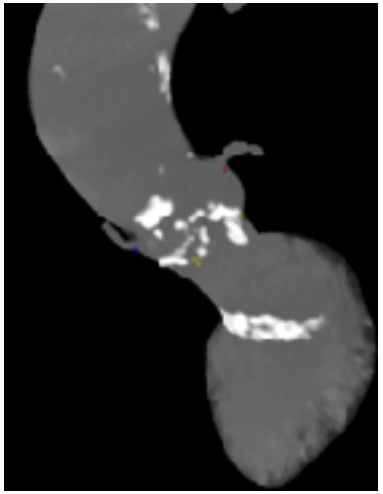
- Le design supra-annulaire de la valve permet d'obtenir des gradients faibles malgré les contraintes liées aux calcifications

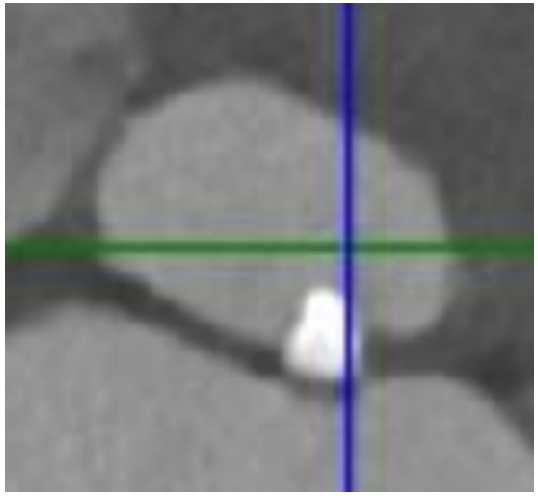
- Résultat échographique correct avec gradient moyen=9 mmHG et fuite aortique de faible grade

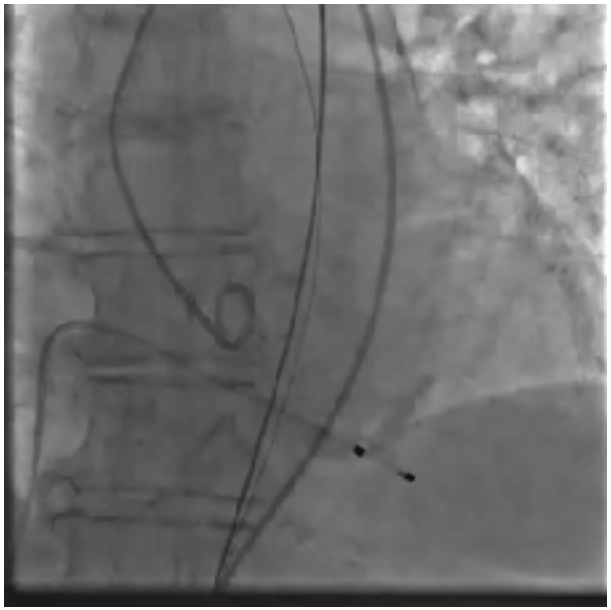
Cas clinique → ACURATE NEO – PROTRUSION CALCAIRE

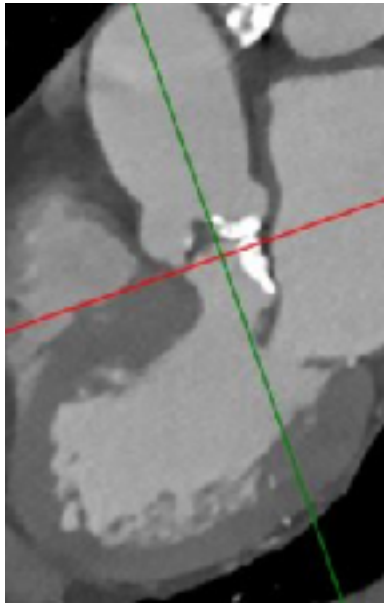
- Femme 85 ans, NYHA 3. Rao serré, Gr moyen 55 mmHg. FE= 60%.
- **TDM préTAVI**: valve Ao calcifiée avec surface anneau= 350 mm2, périmètre 67 mm. Bourrelet septal sous Ao. Protrusion calcaire +++ annulaire post et CCVG.
- **<u>Valve ACURATE NEO S (Boston)</u>**

➢ Prothèse autoexpansive

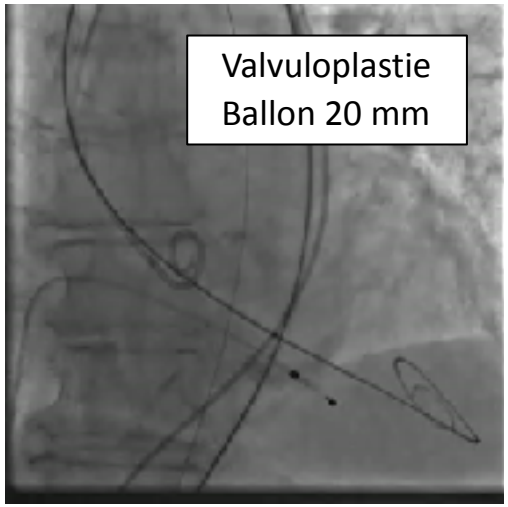


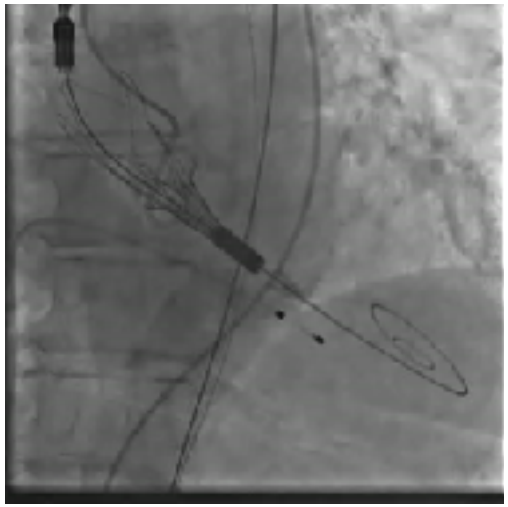


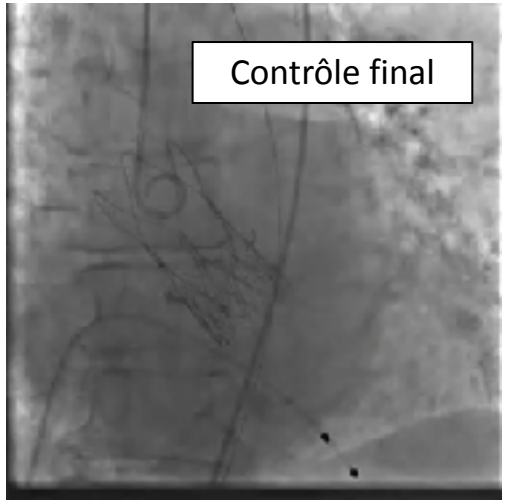


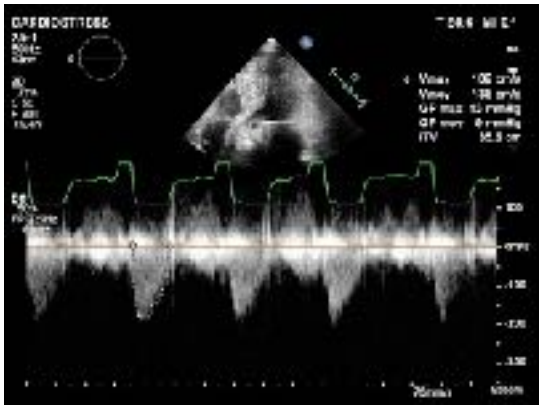


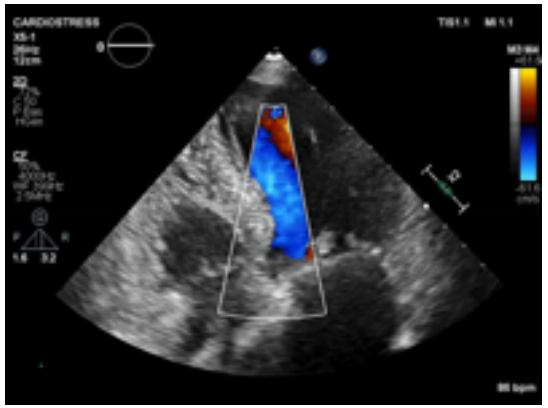
Cas clinique → ACURATE NEO – PROTRUSION CALCAIRE





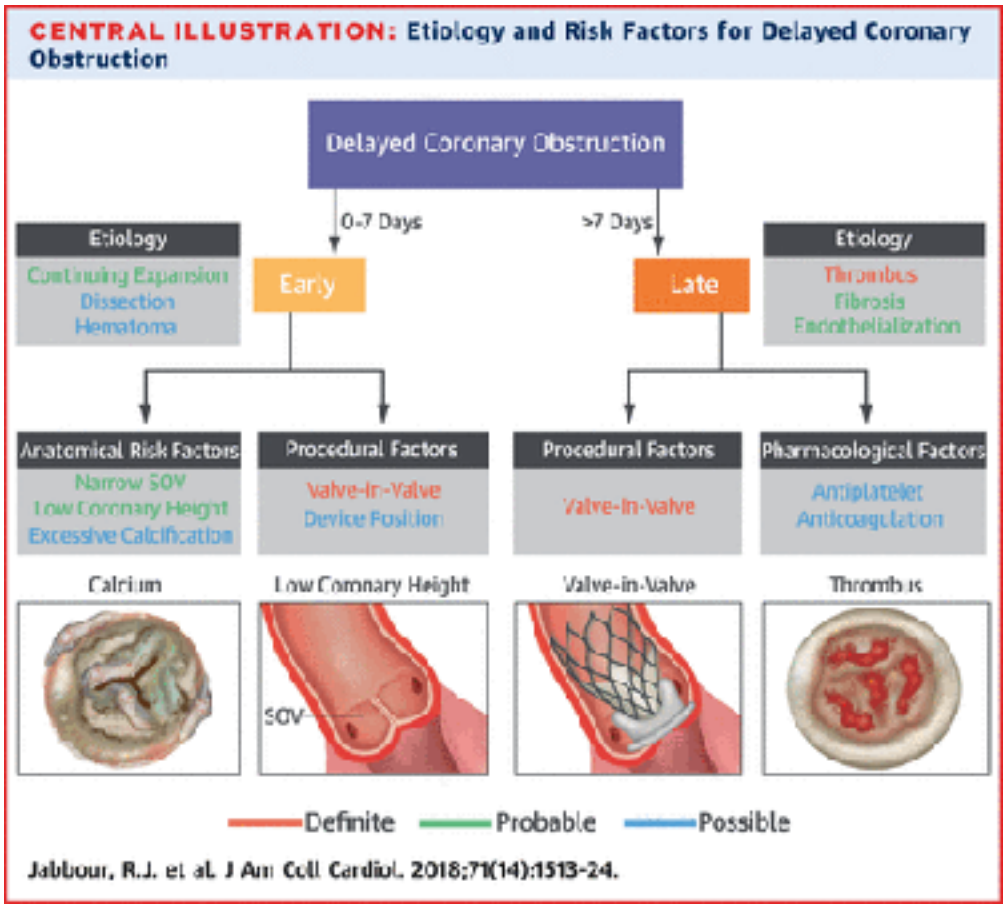


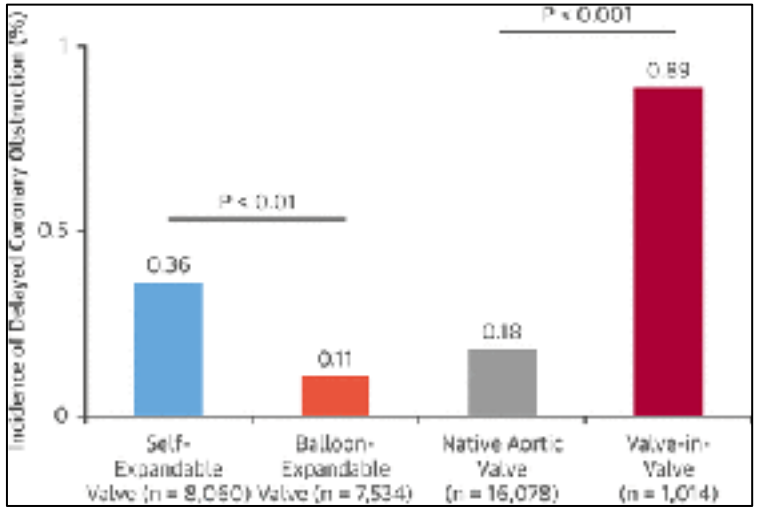




- Résultat échographique correct avec gradient moyen=9 mmHG et microfuite aortique

Risque d'occlusion coronaire

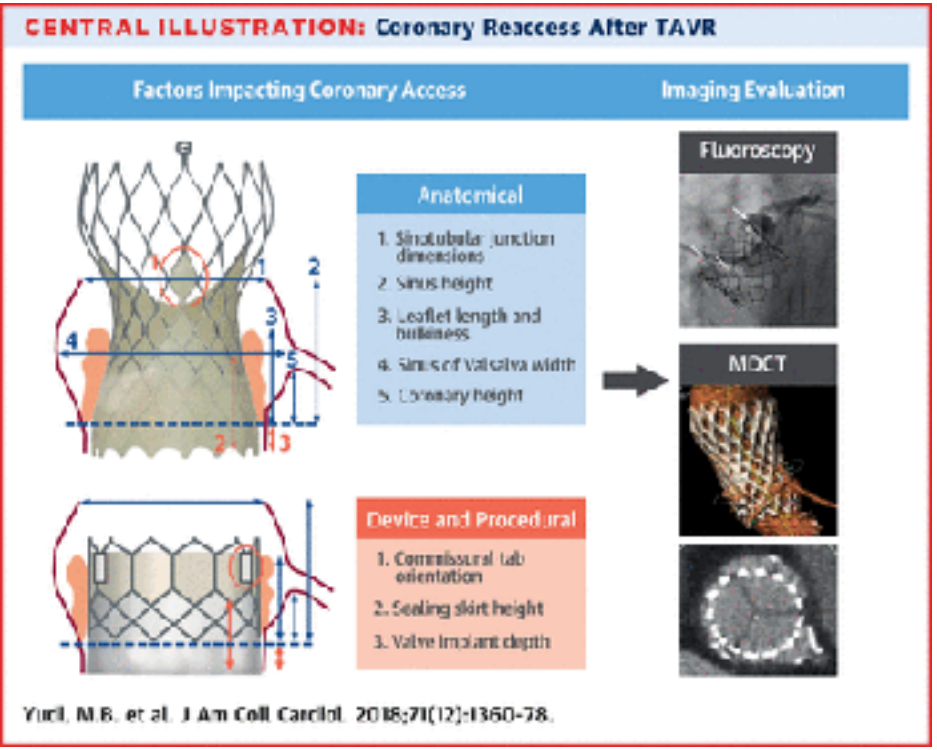


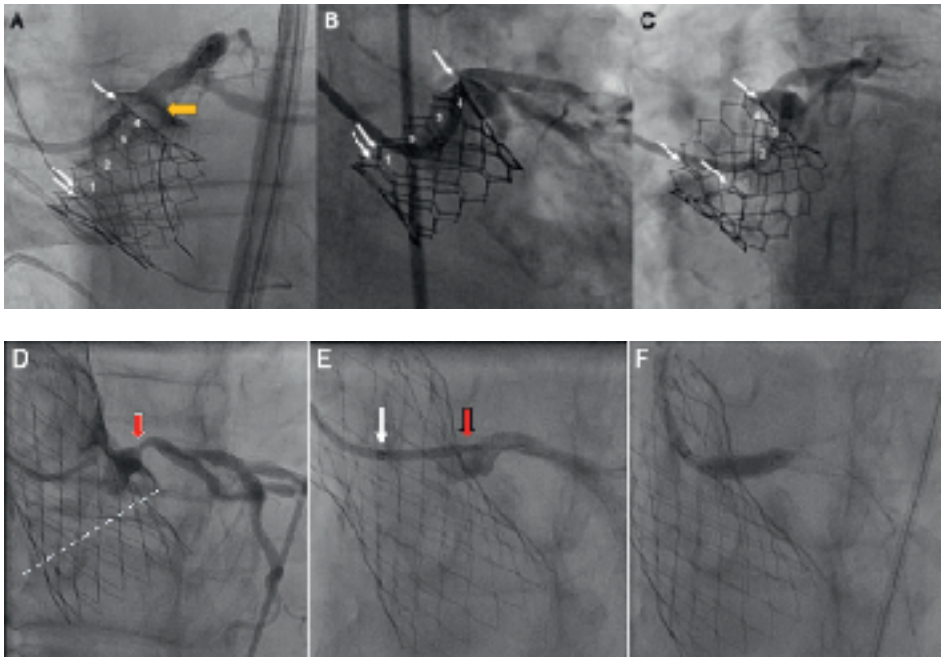


➢ PROBLEMATIQUE:

- Incidence augmentée avec procédures V in V mais aussi avec Self-expandable Valve
- Intêret +++ à une évaluation d' Acurate Neo dans indication V in V et valsalva étroit

Accès aux coronaires



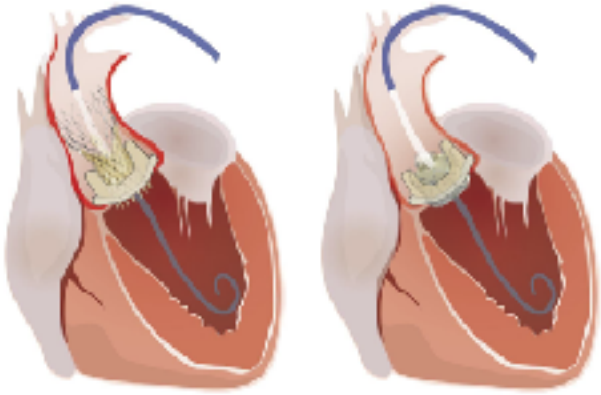


- Opacification coronaire plus simple avec ES3 qu'avec Evolut
- Acurate Neo ⇨ perfusion coronaire facilitée par larges arches de stabilisation

VALVE IN VALVE

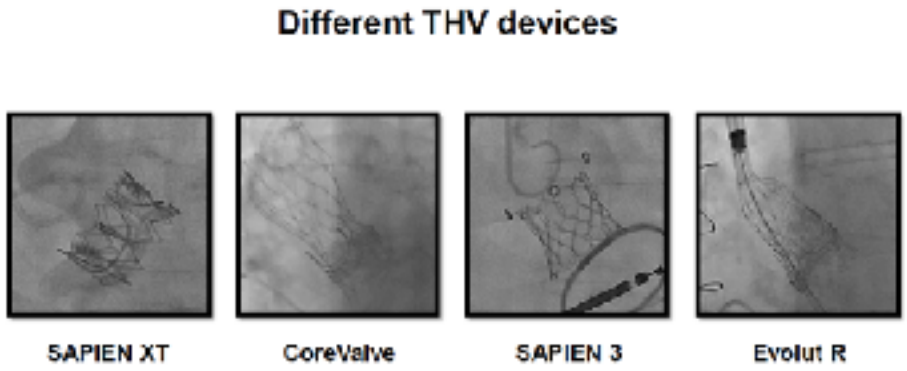
➢ PROBLEMATIQUE:

- **Gradients post implantation élevés** (small ou intermediate surgical valve)
- **Risque d'occlusion coronaire** (Mitroflow ++)
- **Evaluation CT pré-procédure +++**



➢ Quelle prothèse choisir ?

- <u>Privilégier valves autoexpansives supra-annulaires.</u>
- <u>Acurate Neo ?</u>



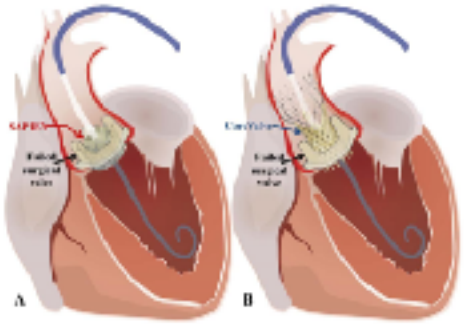
Transcatheter Aortic Valve Implantation in Failed Bioprosthetic Surgical Valves

Danny Dvir, MD; John G. Webb, MD; Sabine Bleiziffer, MD; et al

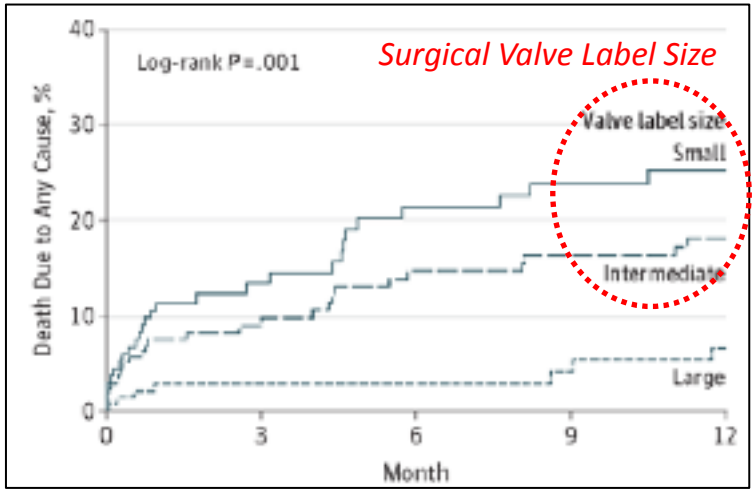
Author Affiliations | Article Information

JAMA. 2014;312(2):162-170. doi:10.1001/jama.2014.7246

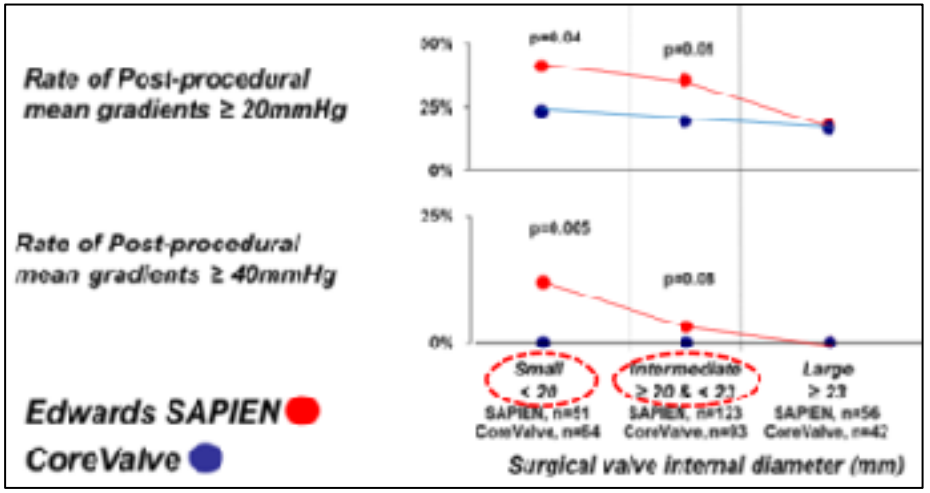
- 459 patients with **degenerated bioprosthetic valves** undergoing valve-in-valve implantation between 2007 and May 2013 in 55 centers
- Implanted devices included both **balloon- and self-expandable valves**.
- Surgical Valve Label Size (Small ≤ 21; Intermediate > 21 & < 25 mm; Large ≥ 25 mm)



Mortality after Aortic V in V



Residual stenosis : problem of Vin V



Listen
Original Research

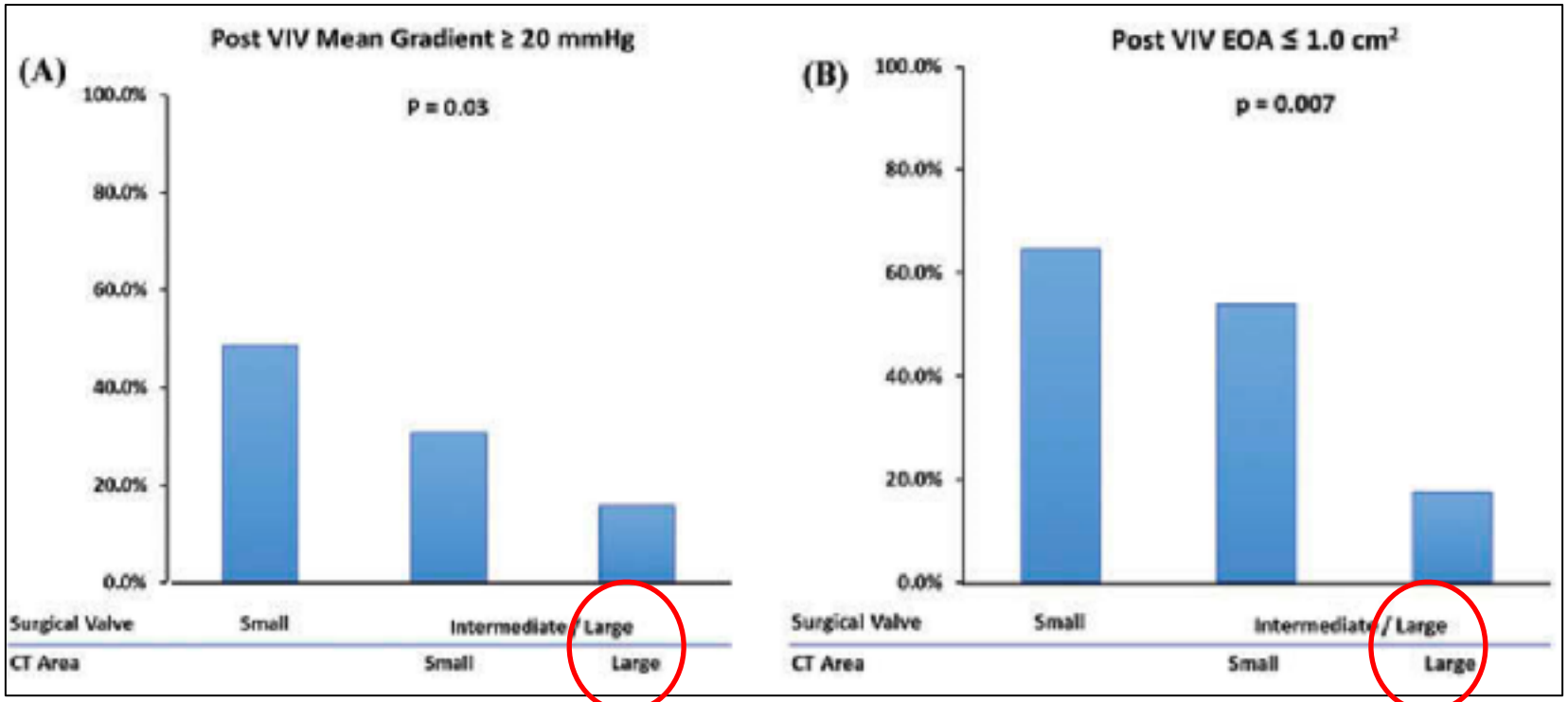
Structural Heart
The Journal of the Heart Team

Transcatheter Aortic Valve Replacement for Failed Surgical Bioprostheses: Insights from the PARTNER II Valve-in-Valve Registry on Utilizing Baseline Computed-Tomographic Assessment

Danny Dvir , MD, John G. Webb , MD, Philipp Blanke , MD, Jong K. Park , MD, Michael Veck , MD, Philippe Pibarot , DVM, PhD, ...show all

Pages 34-39 | Received 29 Mar 2017, Accepted 07 May 2017, Published online 31 May 2017

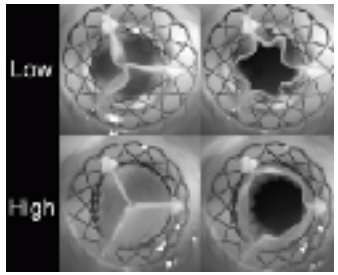
- 84 patients with **degenerated bioprosthetic valves** undergoing valve-in-valve implantation (PARTNER 2 V in V Registry)
- **Pre-procedure CT assessment** could identify cases at risk for having residual stenosis after the procedure.



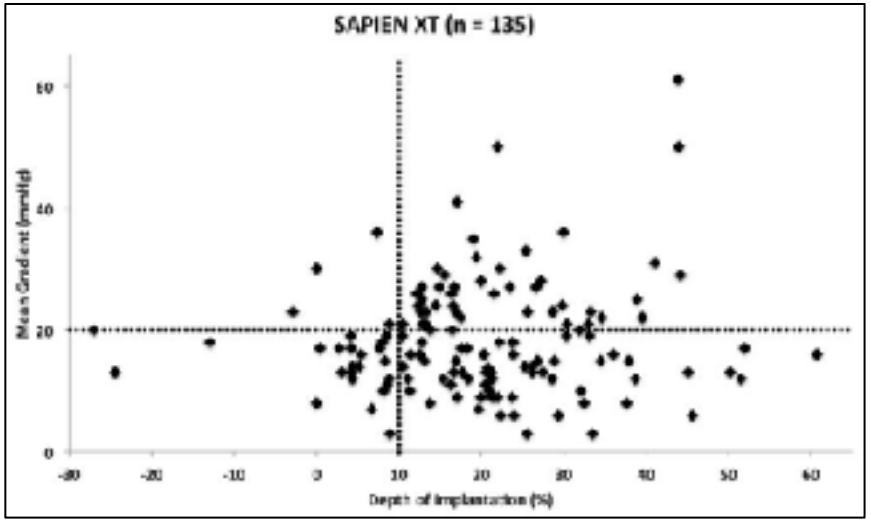
Transcatheter Replacement of Failed Bioprosthetic Valves

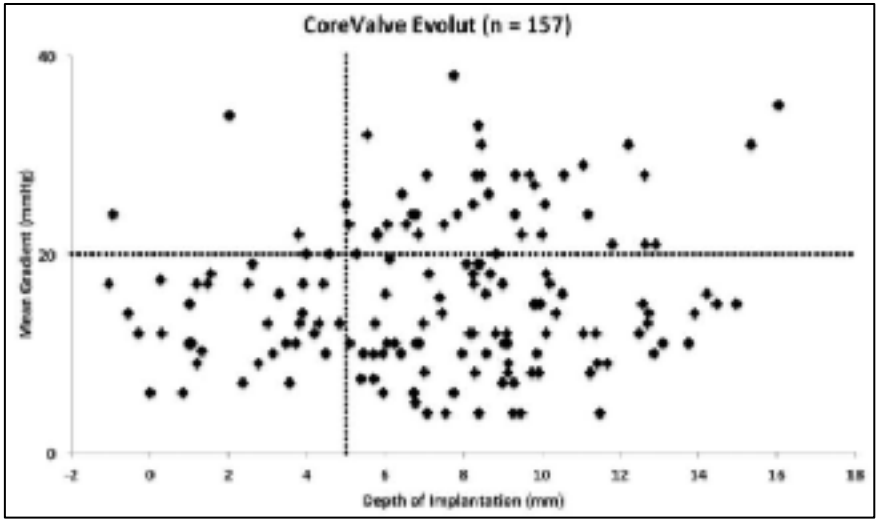
Large Multicenter Assessment of the Effect of Implantation Depth on Hemodynamics After Aortic Valve-in-Valve

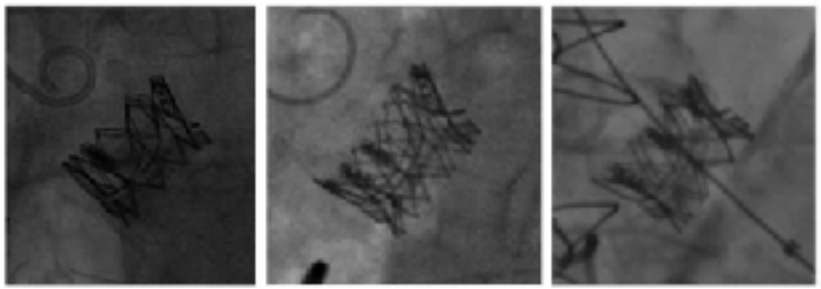
Circ Cardiovasc Interv. 2016;9:e003651.



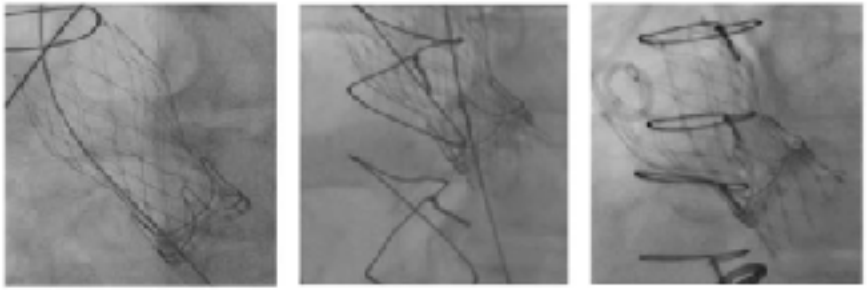
Implantation Depth and Gradients: VIVID Registry







HIGH LOW



HIGH LOW

ESC European Society of Cardiology
European Heart Journal (2013) 34, 607–615
doi:10.1093/eurheartj/ehs483
CLINICAL RESEARCH
Valvular heart disease

Incidence, predictors, and clinical outcomes of coronary obstruction following transcatheter aortic valve replacement for degenerative bioprosthetic surgical valves: insights from the VIVID registry

- 582 PTS (Edwards or Medtronic)
- 85 % TF, 4 % TA, 10% TDAo, 1% TSCL
- CT Assessment of Aortic Root Angulation
- Impact of increased AA on success following TAVR

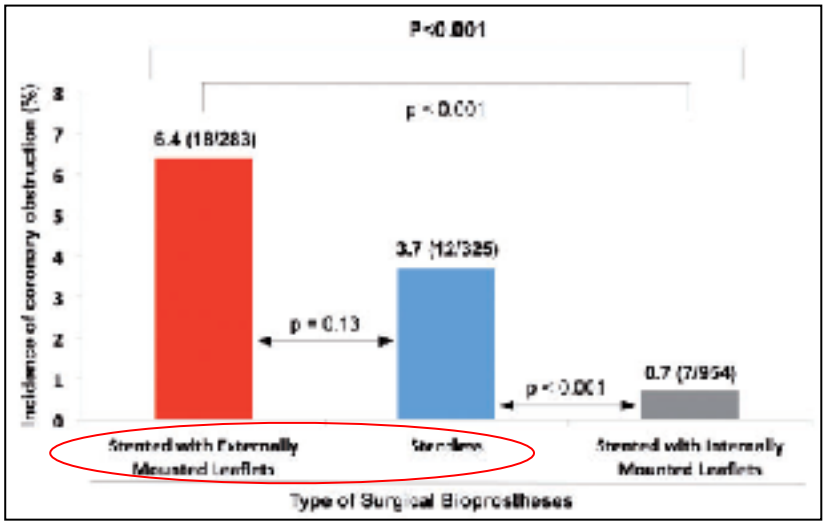
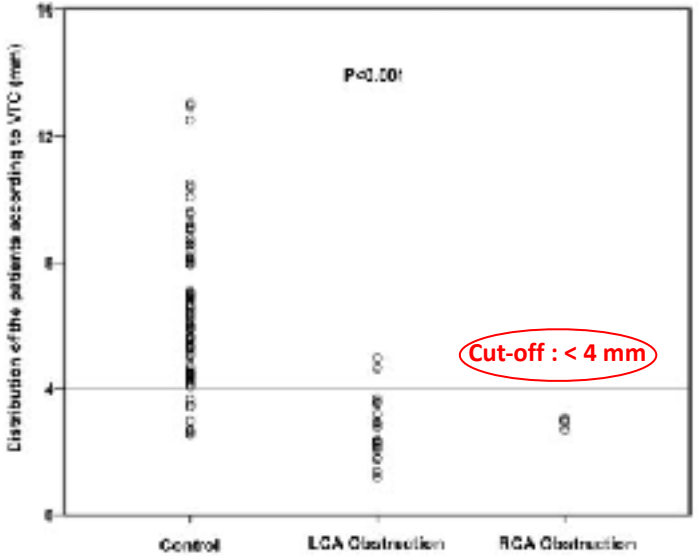


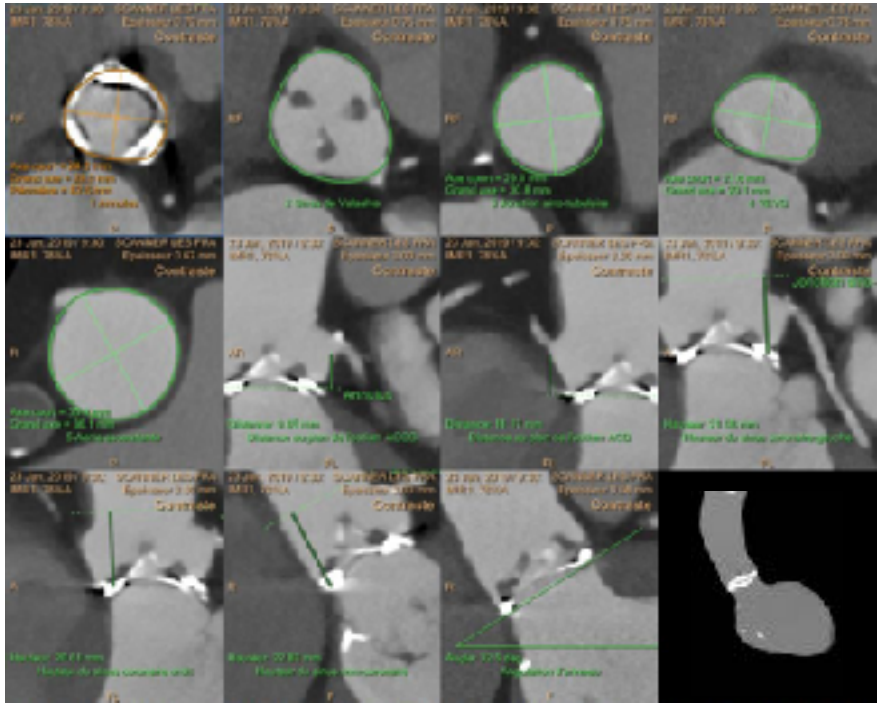
Table 4 Predictors of coronary obstruction following valve-in-valve procedures

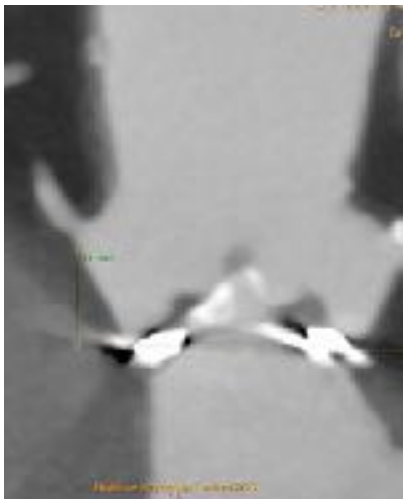
	Multivariable model OR (95% CI)	P-value
Model for the overall population (n = 1612)		
CABG to the left system	0.38 (0.13–1.09)	0.07
STS-PROM	1.02 (0.99–1.05)	0.21
Post-dilatation	1.82 (0.8–4.14)	0.15
Stented with external mounted leaflet or stentless bioprosthesis	7.67 (3.14–18.7)	<0.001
Model for the computed tomography cohort (n = 110)		
VTC* virtual transcatheter valve to coronary ostium distance (VTC)	0.22 (0.09–0.51)	<0.001
Sinus of Valsalva mean diameter	0.95 (0.72–1.25)	0.71
Stented with external mounted leaflet or stentless bioprosthesis	4.30 (0.85–21.7)	0.08

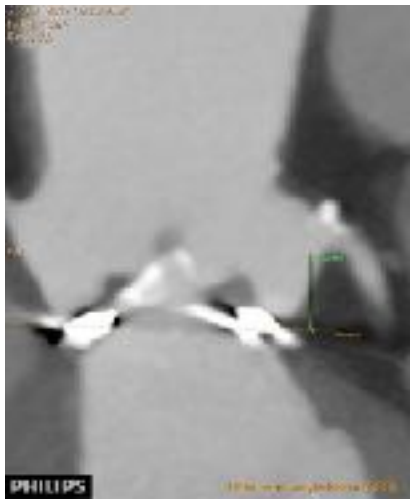


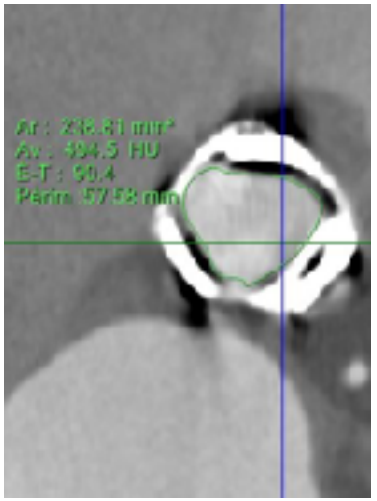
Cas clinique → Valve in Valve – ACURATE NEO

- Homme 77 ans, ATCD RVAo Mitroflow 23 mm + pontages coronaires LIMA IVA , SVG D1 et MG. NYHA 3.
- **ETT:** bioprothèse Ao dégénérée. Gr moyen 64 mmHg + Iao. FE= 65 %
- **TDM préTAVI**: surface interne= 238 mm2, périmètre 57 mm. Distance anneau CD et TCG à 9.5 et 11 mm.
- **Valve ACURATE NEO S (Boston)**

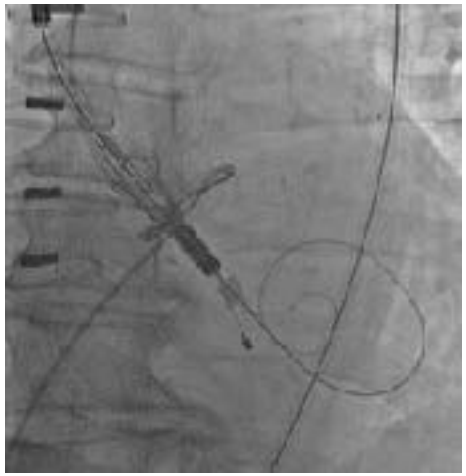


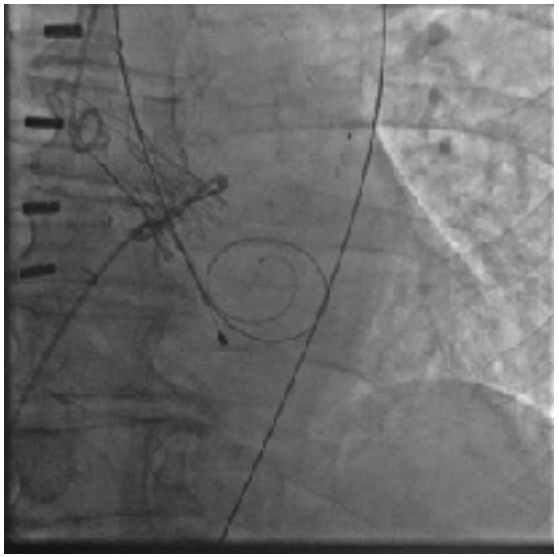


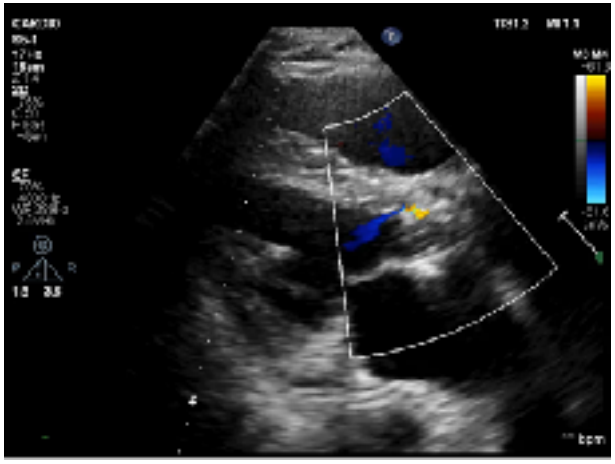


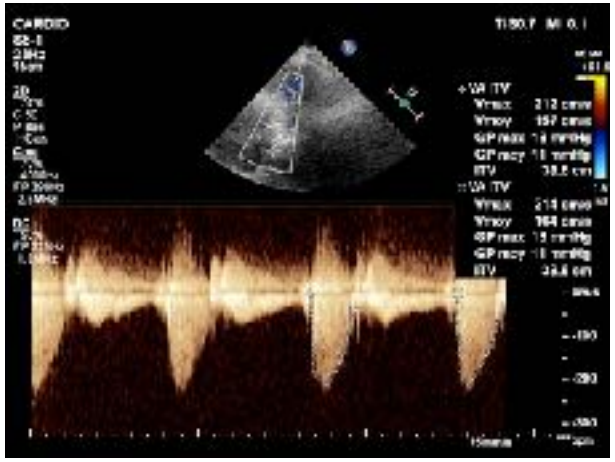


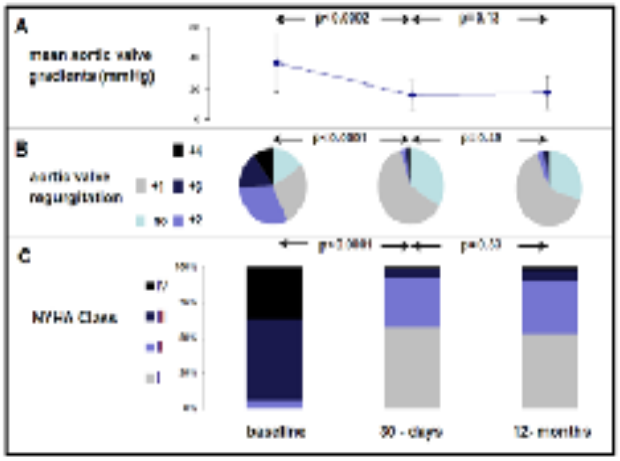
Cas clinique → Valve in Valve – ACURATE NEO











Résultat échographique correct avec gradient moyen=11 mmHG et microfuite aortique

Cas cliniques complexes

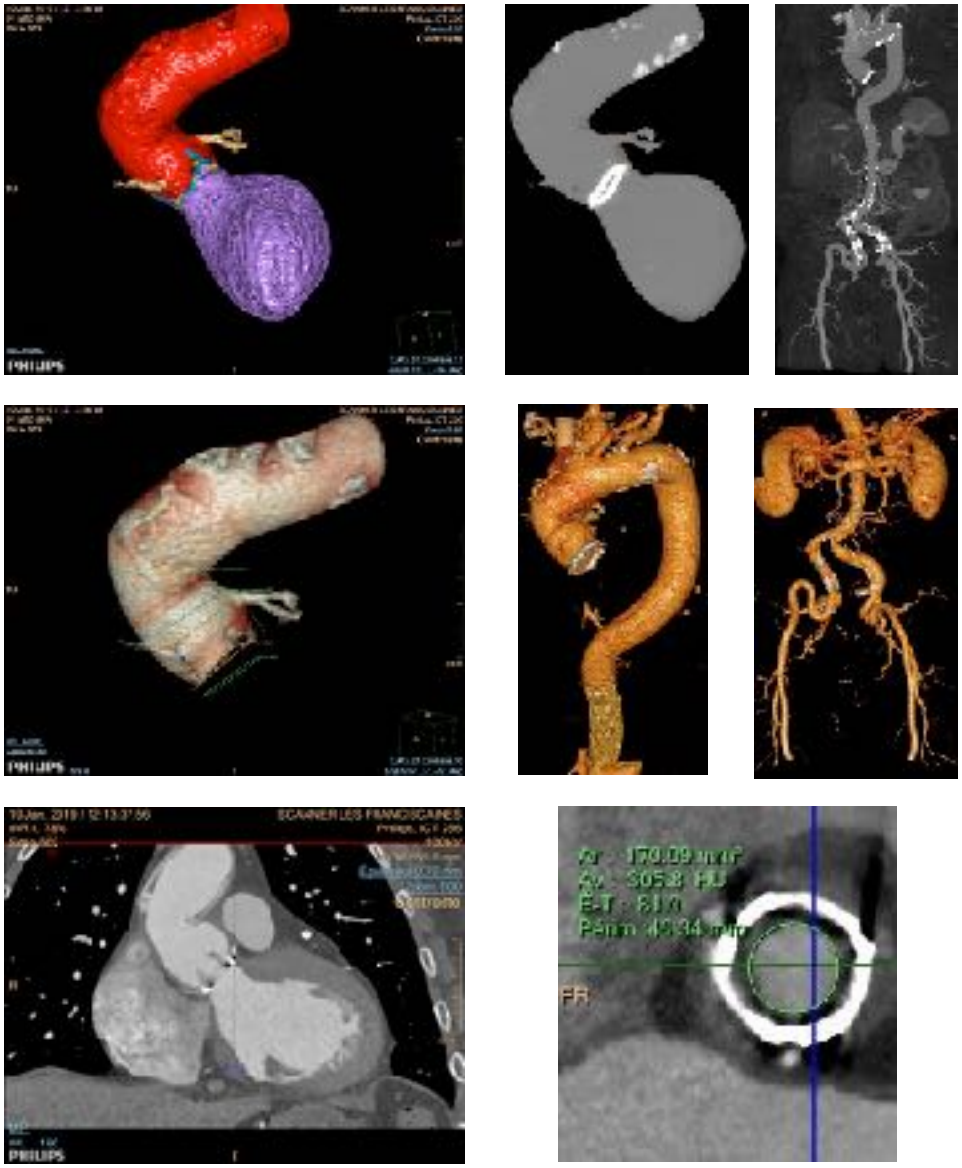
Critères de choix contradictoires

Cas clinique → Angulation aortique + V in V + Accès complexes

- Homme 74 ans, ATCD **Biobentall avec valve Crown 21 mm**. NYHA 3.
- **ETT:** bioprothèse Ao dégénérée. Gr moyen 57 mmHg + IAo 2/4. FE= 54 %.
- **TDM préTAVI**: surface interne= 170 mm2, périmètre 57 mm. Distance anneau CD et TCG à 10 et 11 mm. Angulation crosse aortique et plicature partielle aorte ascendante. Tortuosités iliofémorales sévères
- **Valve MEDTRONIC EVOLUT R 23 mm**

➢ PROBLEMATIQUE:

- Accès vasculaire: introducteur ou non?
- Valve in Valve: ++ autoexpansive
- Angulation Ao: plutôt ES3



Cas clinique → Angulation aortique + V in V + Accès complexes

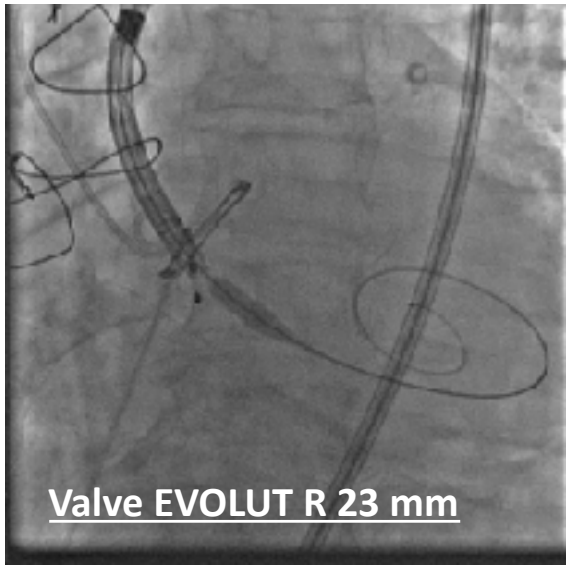
Option choisie: *Valve MEDTRONIC EVOLUT R 23 mm avec introducteur GORE 18Fr*

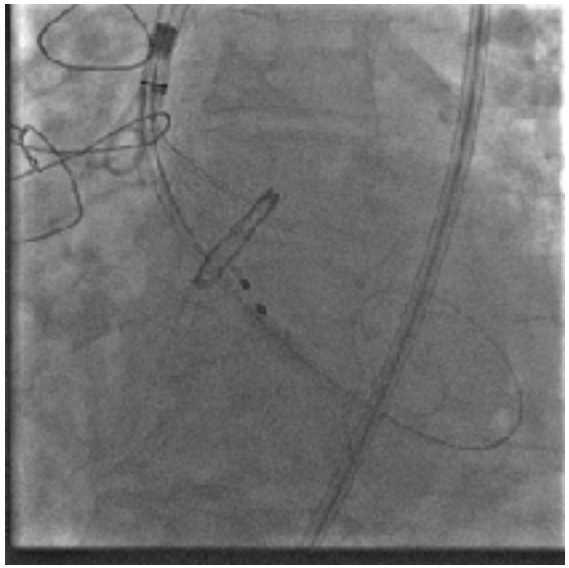
➢ Accès vasculaire

- Introduction d'un guide starter puis sonde JR4. Changement pour un guide Cook Amplatz Extra-Stiff

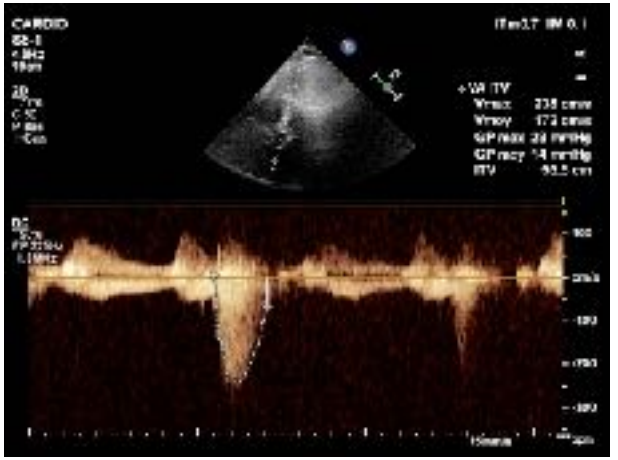
- Introduction difficile d'un **intro GORE 14F** dans aorte abdominale. Changement de guide pour un guide Lunderquist Extra-Stiff puis **intro GORE 18F**.

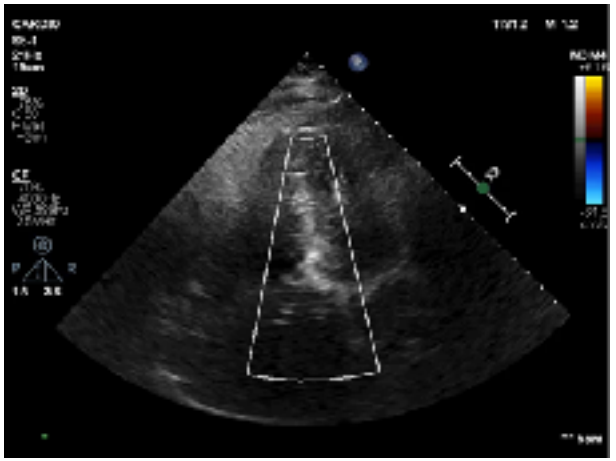
Cas clinique → Angulation aortique + V in V + Accès complexes



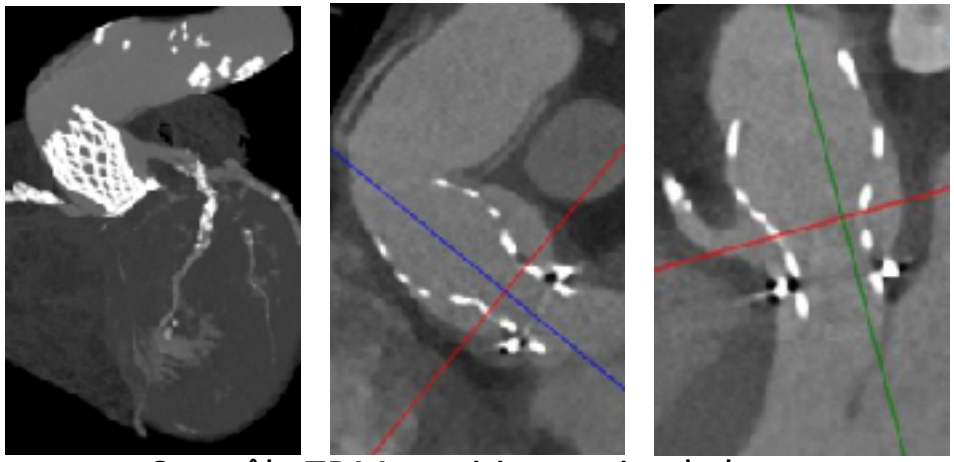


Positionnement difficile (1 recapture partielle) avec contraintes et tensions +++ dans le cathéter





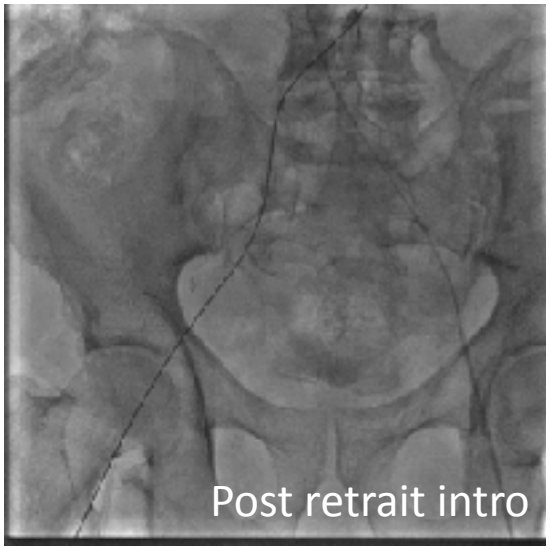
Contrôle ETT: gradient moyen 14 mmHG et microfuite

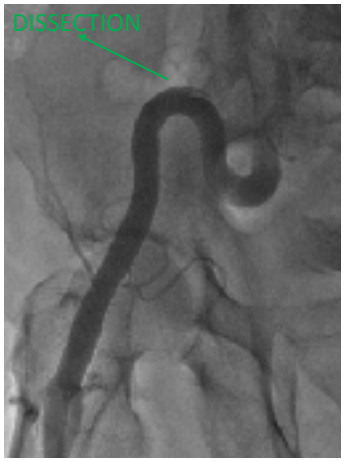


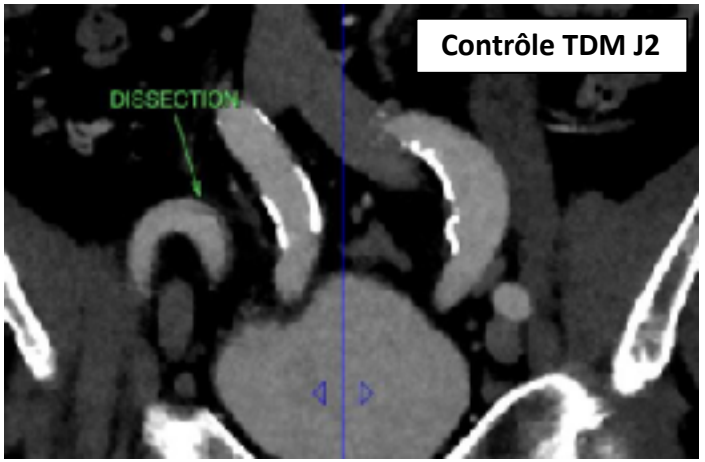
Contrôle TDM: position optimale haute

Cas clinique → Angulation aortique + V in V + Accès complexes

Dissection iliaque localisée
avec évolution secondaire favorable







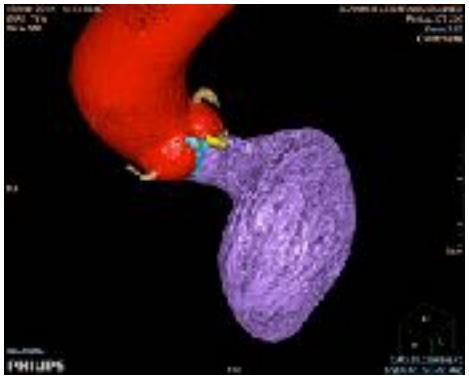
➢ CONCLUSION: ALTERNATIVE POSSIBLE ⇨ ACURATE NEO avec iSLEEVE

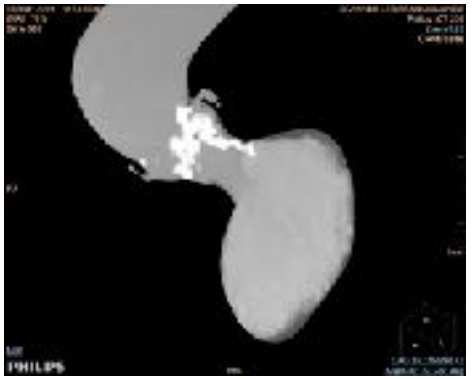
Cas clinique → Ao horizontale et ectasique + calcifications valve, anneau et CCVG + hauteur coronaire + bourrelet septal

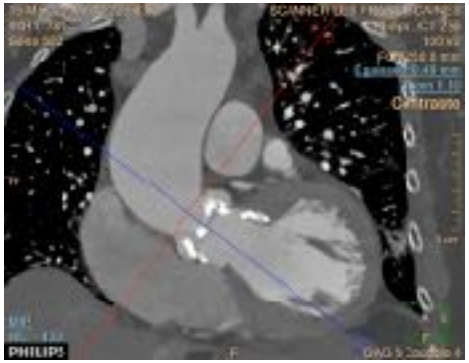
- Femme, 83 ans, NYHA 4, Rao critique avec Gr moyen 70mmHg. FE 25 %. HTAP avec PAPS 70 mmHg. BNP 11000, VEMS 53 %, ECG: BBD et HBASG

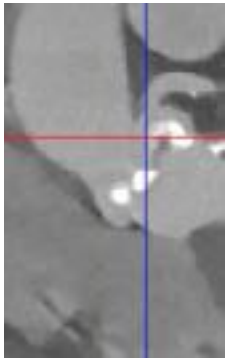
- **TDM préTAVI**: valve aortique pseudobicuspide . Valve et anneau aortique massivement calcifiés avec bourgeon en regard TCG, angulation Ao= 50°. Surface anneau= 590 mm2, périmètre 87 mm, AA Ascendante à 47mm. Bourrelet septal.

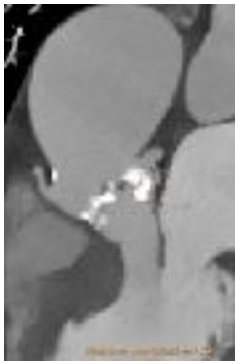
- **<u>Valve ES3 29 mm</u>**









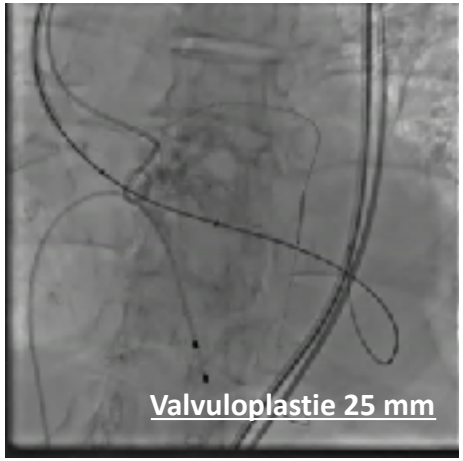


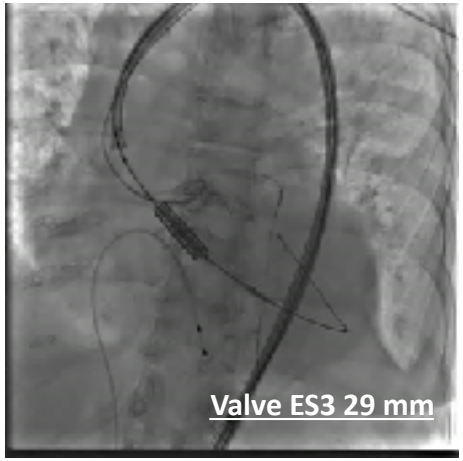
➢ PROBLEMATIQUE:

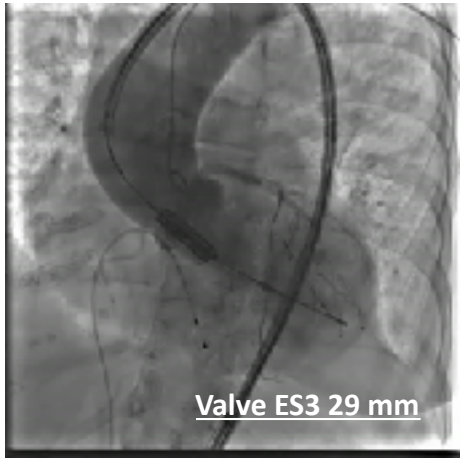
- <u>Aorte ascendante ectasique:</u> plutôt ES3
- <u>Calcifications massives:</u> autoexpansive
- <u>Surface anneau large:</u> Evolut 34 ou ES3 29
- <u>Angulation Ao:</u> ES3
- <u>Bourrelet septal:</u> plutôt autoexpansive

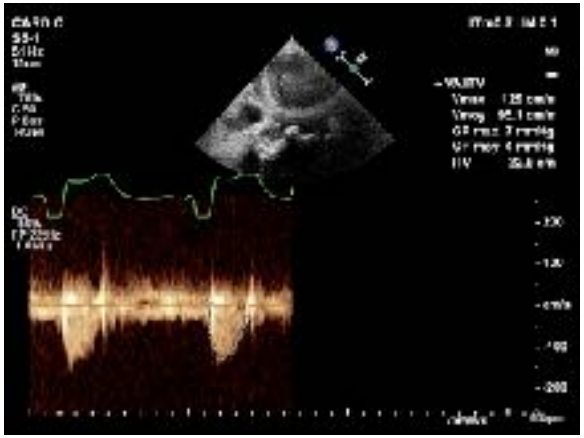
Cas clinique 3 → Ao horizontale et ectasique + calcifications valve, anneau et CCVG +hauteur coronaire + bourrelet septal

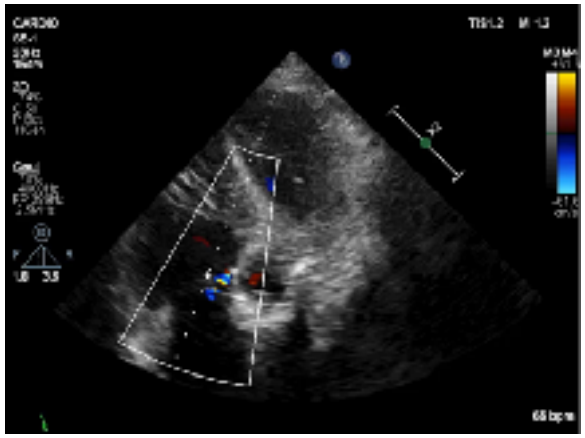
Option choisie: *Valve ES3 de 29 mm*

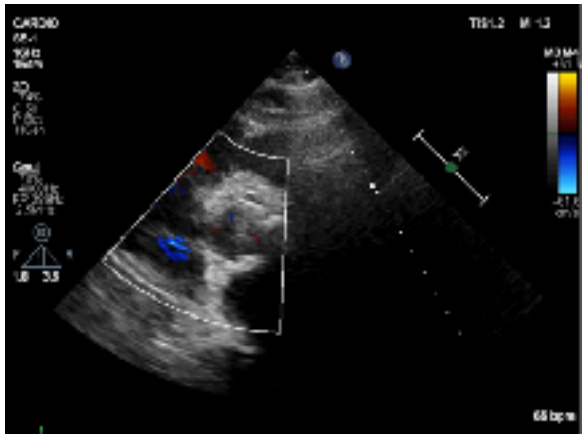












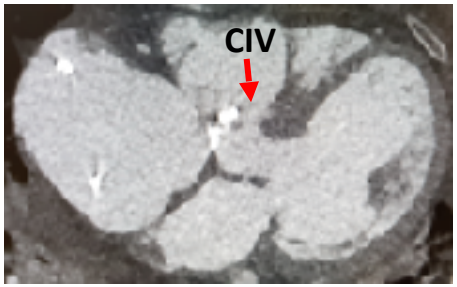
- Résultat échographique correct avec gradient moyen 4 mmHG sans fuite aortique **mais** CIV membraneuse post TAVI

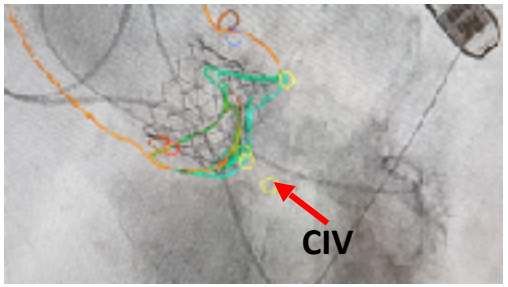
Cas clinique 3 → Ao horizontale et ectasique + calcifications valve, anneau et CCVG +hauteur coronaire + bourrelet septal

Option choisie: *Valve ES3 de 29 mm*

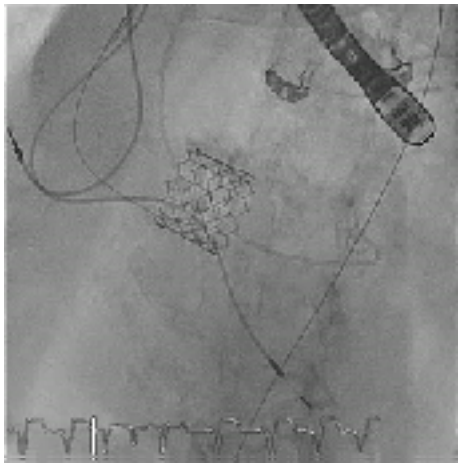
- **3 MOIS PLUS TARD… Admission en réanimation en état de choc**

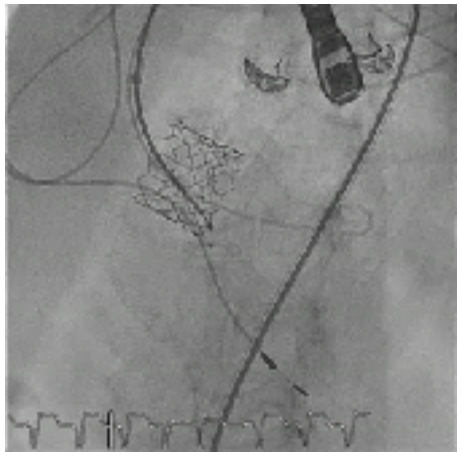
Contrôle ETT: Bonne récupération fonction VG avec FE 55 % **mais…** large CIV 10 mm avec HTAP sévère . PAPS 100 mmHG.

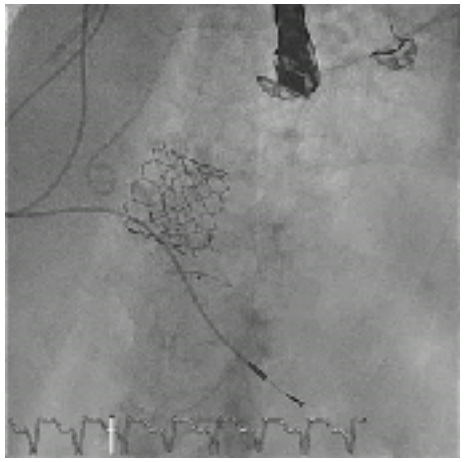




- **Traitement? ⇨ fermeture percutanée**

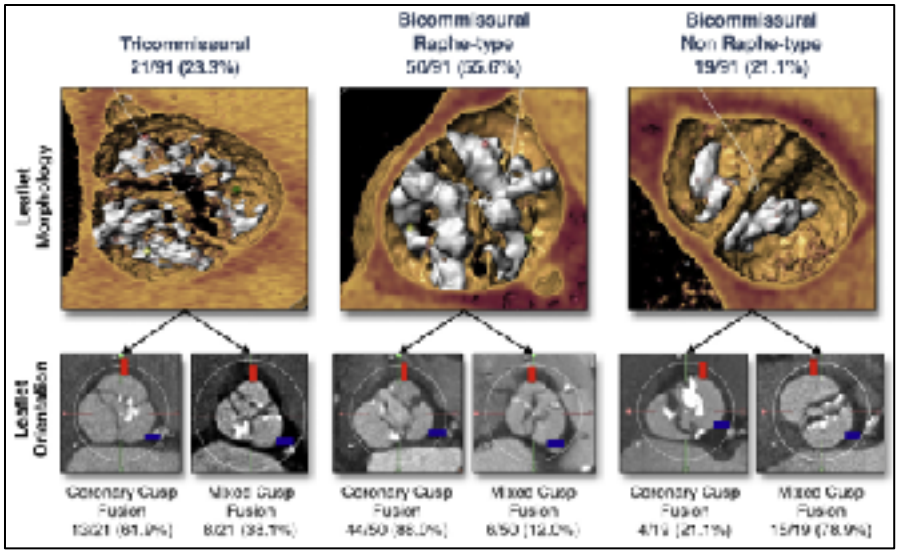


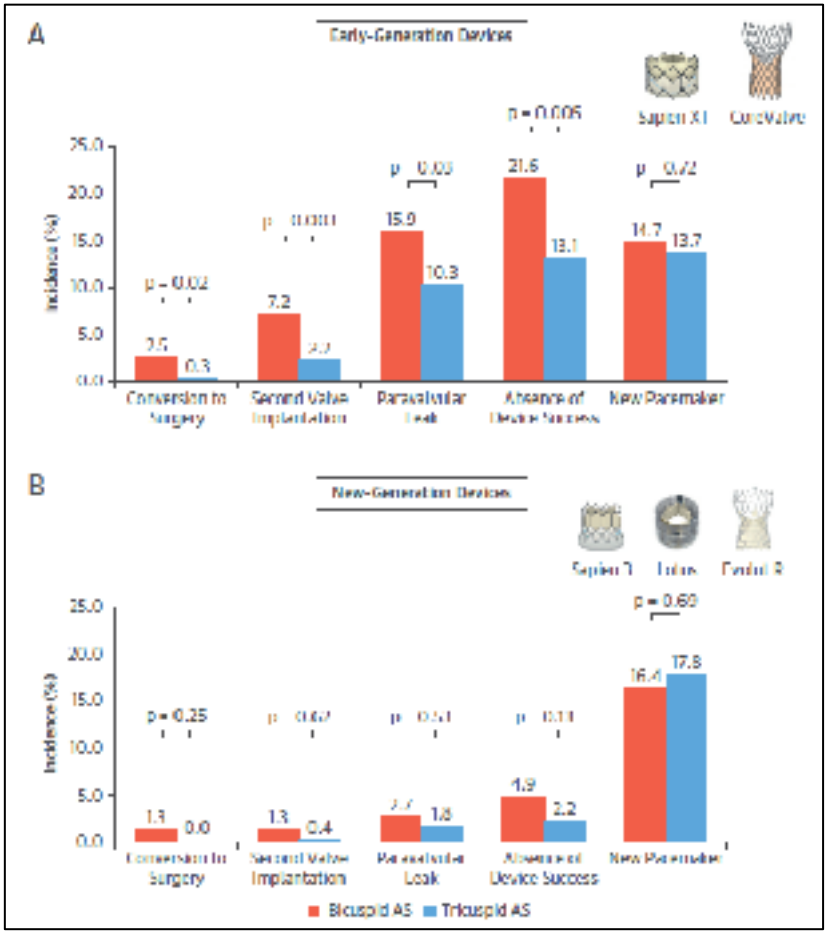




➢ CONCLUSION: ALTERNATIVE POSSIBLE ⇨ ACURATE NEO XL…

Bicuspidie aortique





- **<u>TAVI DEVICES:</u>** prévus pour traiter anneaux aortiques circulaires et non elliptiques
- **<u>RISQUE RUPTURE ANNULAIRE:</u>** si raphé calcifié (moindre si type 0)
- **<u>NOUVEAUX DEVICES:</u>** suivi favorable

➢ **<u>Possible Auto ou Balloon Expandable</u>**

Sung-Han-Yoon, JACC 2017

conclusion

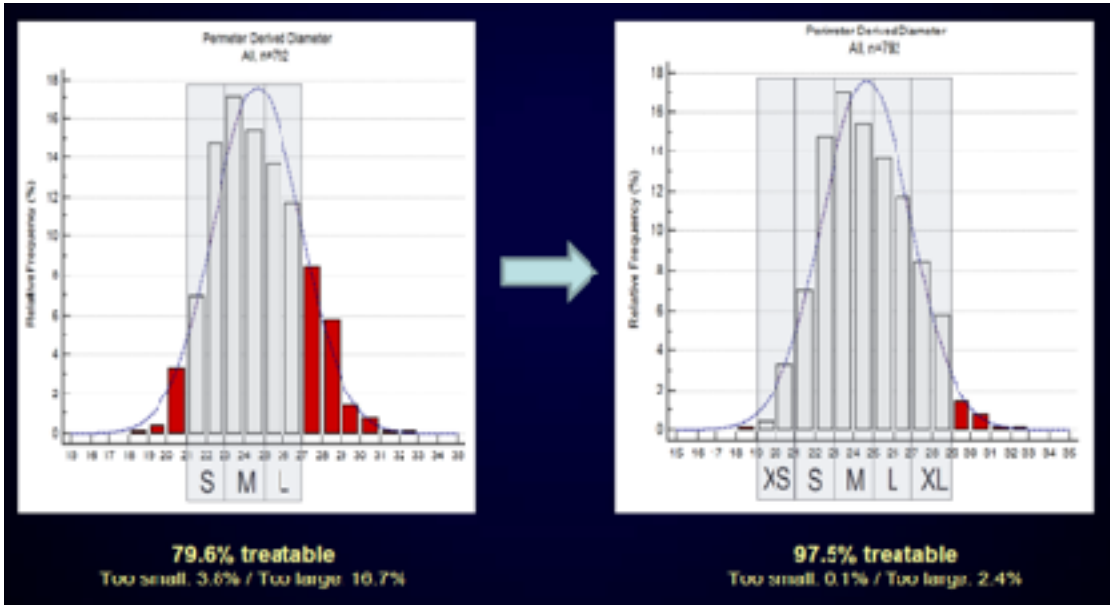
Comment je dois utiliser l'ACURATE NEO

➢ **Choisir une valve en fonction de:**

- critères anatomiques (accès vasculaires , anatomie racine aortique)
- critères liés au patient
- expérience de l'opérateur (bien maîtriser les différents types de prothèse)

ACURATE NEO

- Anatomie tortueuse
- Aorte horizontale
- Petits anneaux
- Accès coronaire critique
- Bicuspidie
- Protrusion calcaire
- Calcifications annulaires
- Valve in Valve
- Haut risque de BAV



Un grand merci à Yves !!!