



Dysfonction de prothèse valvulaire

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TUSAR

Objectifs de la présentation

- (Fonctionnement normal d'une prothèse)
- Illustrer les dysfonctions de prothèses valvulaires.
- Distinguer les fuites intraprothétiques normales vs pathologiques.
- Identifier une fuite périprothétique.
- Distinguer la thrombose obstructive et non obstructive



Recommendations for the imaging assessment of prosthetic heart valves: a report from the European Association of Cardiovascular Imaging endorsed by the Chinese Society of Echocardiography, the Inter-American Society of Echocardiography, and the Brazilian Department of Cardiovascular Imaging[†]

Patrizio Lancellotti^{1,2*}, Philippe Pibarot^{3,4}, John Chambers⁵, Thor Edvardsen⁶, Victoria Delgado⁷, Raluca Dulgheru¹, Mauro Pepi⁸, Bernard Cosyns⁹, Mark R. Dweck¹⁰, Madalina Garbi¹¹, Julien Magne^{12,13}, Koen Nieman^{14,15}, Raphael Rosenhek¹⁶, Anne Bernard^{17,18}, Jorge Lowenstein¹⁹, Marcelo Luiz Campos Vieira^{20,21}, Arnaldo Rabischoffsky²², Rodrigo Hernández Vyhmeister²³, Xiao Zhou²⁴, Yun Zhang²⁵, Jose-Luis Zamorano²⁶, and Gilbert Habib^{27,28}

Généralités

2 types de prothèse

Mécanique



Biologique

Chirurgicale



TAVI



Complications globalement communes ...mais quelques spécificités

Généralités

2 types de prothèse

Mécanique



Biologique

Chirurgicale



TAVI

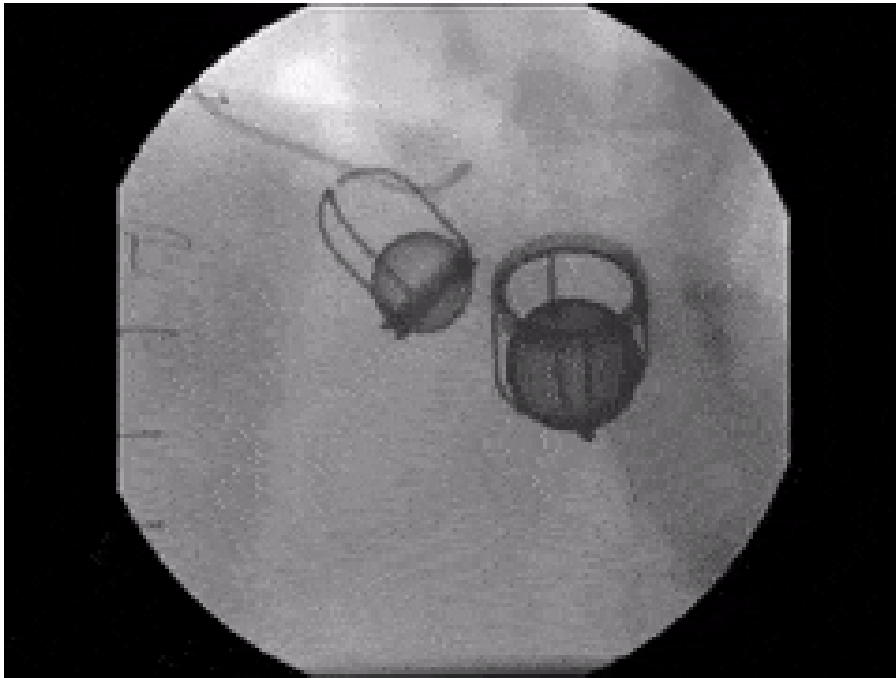


Complications globalement communes ...mais quelques spécificités

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Complications globalement communes ...mais quelques spécificités

Fonctionnement normal

Prothèses mécaniques

Table 3 Designs and models of mechanical replacement heart valve

Bileaflet mechanical replacement valves

- St Jude Medical: standard, HP, Masters, and Regent
- Carbomedics: standard, reduced cuff, Optiform, Orbis, and supra-annular (Top Hat) Carboseal includes a woven aortic graft
- Edwards Tekna
- Sorin Bicarbon
- Edwards Mira
- ATS
- On-X
- Medtronic Advantage
- Jyros

Tilting disk replacement valves

- Bjork-Shiley monostrut^a
- Sorin Monoleaflet Allcarbon
- Medtronic-Hall
- Omnicarbon
- Ultracor

Caged ball

- Starr-Edwards
- Smeloff-Cutter

^aIndicates withdrawn from market.



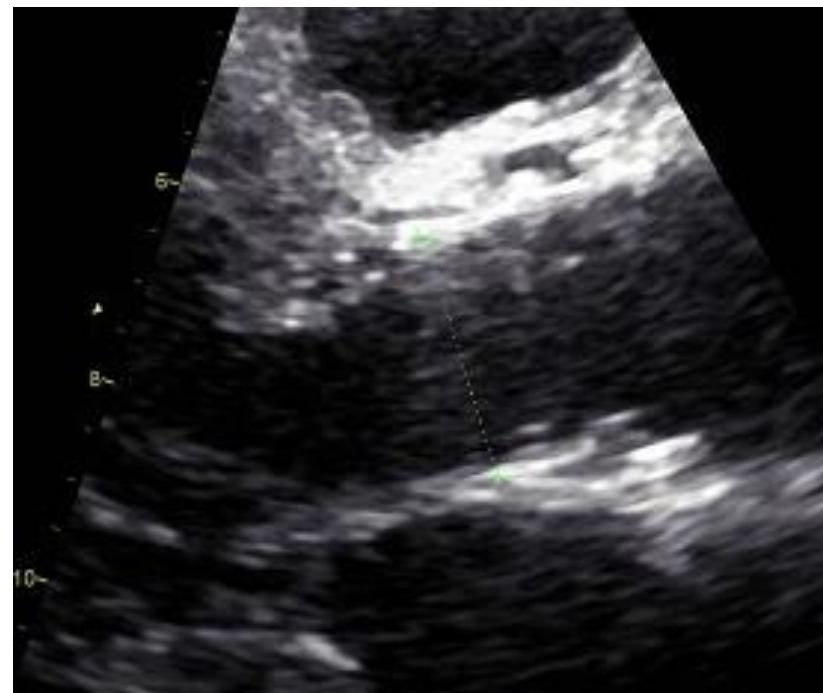
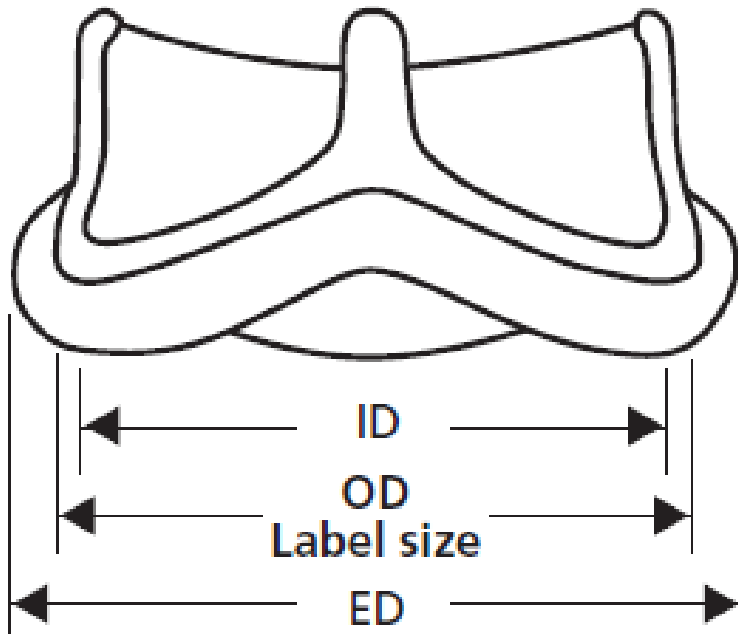
Généralités

- Taille, poids, surface corporelle
- TA, FC
- Carte de la prothèse
 - Valeurs de références de la prothèse (type et taille)
- Informations sur la chirurgie :
 - Date ?
 - Indication ?
 - Geste associé ?
- ETT post-opératoire et subséquente(s)

SFC SFCTCV		Chirurgie valvulaire
Date : _____		
Lieu : _____		
Nom du chirurgien : _____		
Aortique	Mitrale	Autres
<input type="checkbox"/> Mécanique	<input type="checkbox"/> Mécanique	<input type="checkbox"/> Mécanique
<input type="checkbox"/> Biologique	<input type="checkbox"/> Biologique	<input type="checkbox"/> Biologique
<input type="checkbox"/> Réparation	<input type="checkbox"/> Réparation	<input type="checkbox"/> Réparation
Modèle/ref. : _____	Modèle/ref. : _____	Modèle/ref. : _____
N° de série : _____	N° de série : _____	N° de série : _____
Diamètre : _____	Diamètre : _____	Diamètre : _____

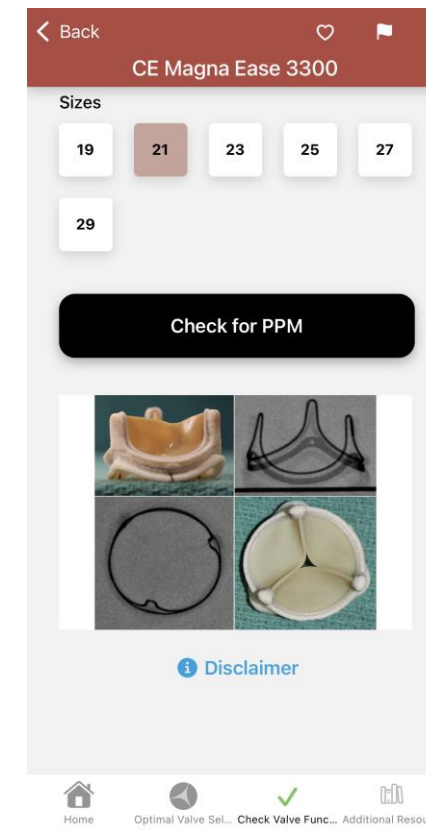
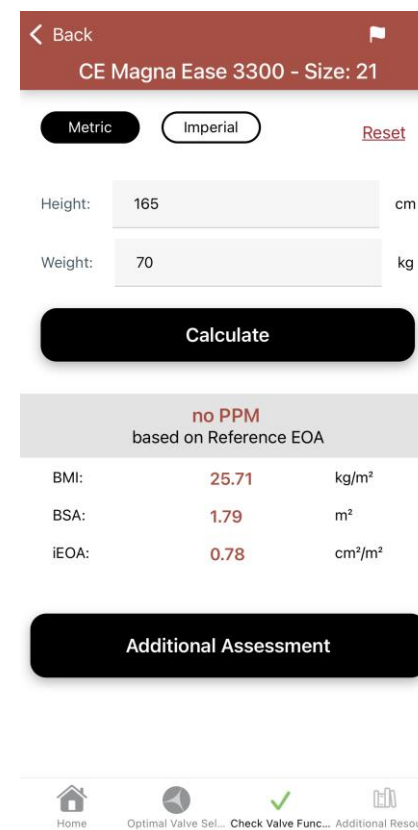
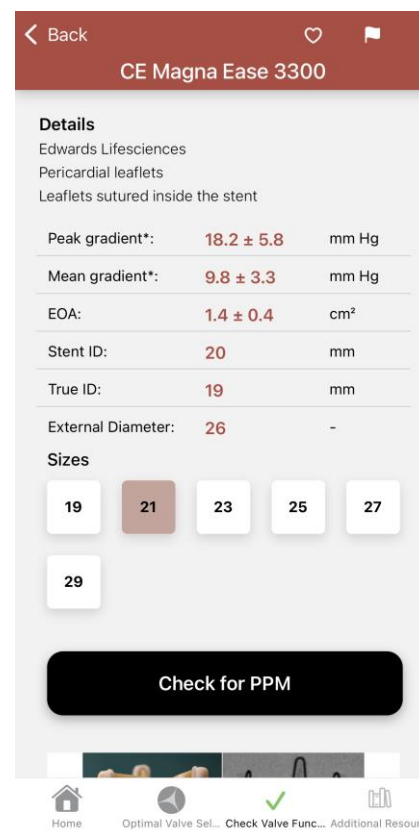
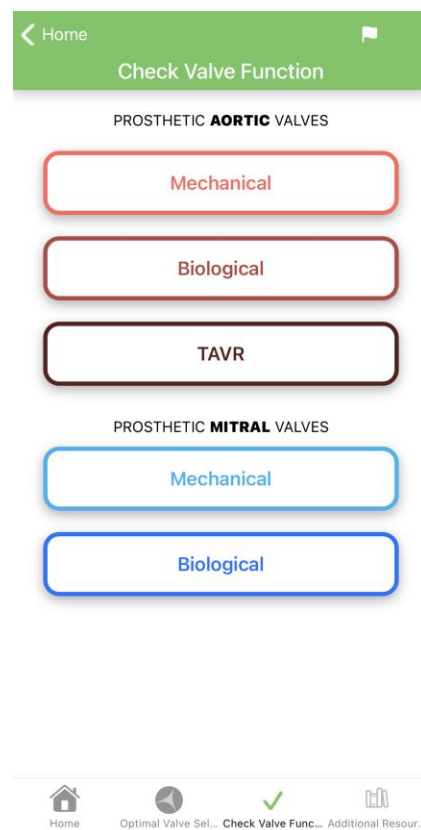
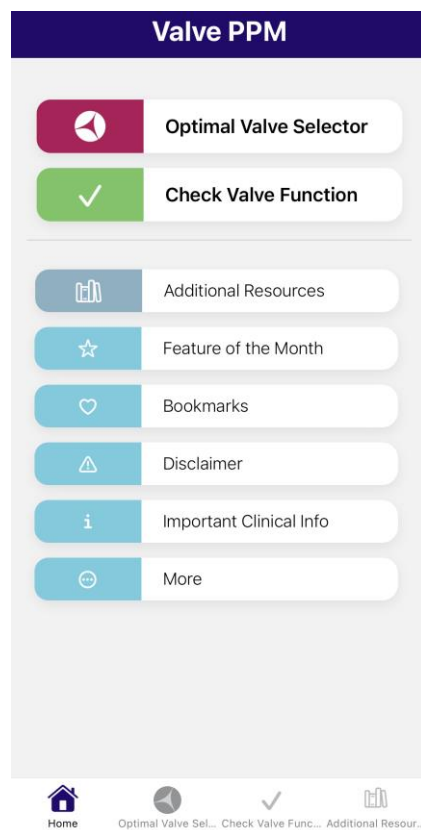
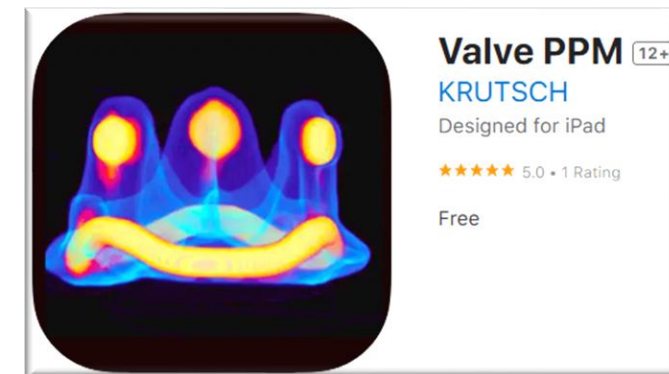
Généralités : taille de la prothèse

- ID : Diamètre interne (sans feuillets) → True ID : avec feuillets
- OD : Diamètre externe ou « taille label » de la prothèse
- ED : Diamètre de l'anneau externe de suture : correspond à ce qui peut vraiment être implanté



Généralités : taille de la prothèse

- Tableaux des valeurs de référence
- Application Valve PPM



EOA de référence : aortique

Table 7 Normal reference values of effective orifice areas for the prosthetic aortic valves

Prosthetic valve size (mm)	19	21	23	25	27	29
Stented bioprosthetic valves						
Mosaic	1.1 ± 0.2	1.2 ± 0.3	1.4 ± 0.3	1.7 ± 0.4	1.8 ± 0.4	2.0 ± 0.4
Hancock II	–	1.2 ± 0.2	1.3 ± 0.2	1.5 ± 0.2	1.6 ± 0.2	1.6 ± 0.2
Carpentier-Edwards Perimount	1.1 ± 0.3	1.3 ± 0.4	1.5 ± 0.4	1.8 ± 0.4	2.1 ± 0.4	2.2 ± 0.4
Carpentier-Edwards Magna	1.3 ± 0.3	1.5 ± 0.3	1.8 ± 0.4	2.1 ± 0.5	–	–
Biocor (Epic)	1.0 ± 0.3	1.3 ± 0.5	1.4 ± 0.5	1.9 ± 0.7	–	–
Mitroflow	1.1 ± 0.2	1.2 ± 0.3	1.4 ± 0.3	1.6 ± 0.3	1.8 ± 0.3	–
Trifecta	1.4	1.6	1.8	2.0	2.2	2.4
Stentless bioprosthetic valves						
Medtronic Freestyle	1.2 ± 0.2	1.4 ± 0.2	1.5 ± 0.3	2.0 ± 0.4	2.3 ± 0.5	–
St Jude Medical Toronto SPV	–	1.3 ± 0.3	1.5 ± 0.5	1.7 ± 0.8	2.1 ± 0.7	2.7 ± 1.0
Prima Edwards	–	1.3 ± 0.3	1.6 ± 0.3	1.9 ± 0.4	–	–
Mechanical valves						
Medtronic-Hall	1.2 ± 0.2	1.3 ± 0.2	–	–	–	–
St Jude Medical Standard	1.0 ± 0.2	1.4 ± 0.2	1.5 ± 0.5	2.1 ± 0.4	2.7 ± 0.6	3.2 ± 0.3
St Jude Medical Regent	1.6 ± 0.4	2.0 ± 0.7	2.2 ± 0.9	2.5 ± 0.9	3.6 ± 1.3	4.4 ± 0.6
MCRI On-X	1.5 ± 0.2	1.7 ± 0.4	2.0 ± 0.6	2.4 ± 0.8	3.2 ± 0.6	3.2 ± 0.6
Carbomedics Standard and Top Hat	1.0 ± 0.4	1.5 ± 0.3	1.7 ± 0.3	2.0 ± 0.4	2.5 ± 0.4	2.6 ± 0.4
ATS Medical ^a	1.1 ± 0.3	1.6 ± 0.4	1.8 ± 0.5	1.9 ± 0.3	2.3 ± 0.8	–

Effective orifice area is expressed as mean values available in the literature. Further studies are needed to validate these reference values.

^aFor the ATS medical valve, the label valve sizes are 18, 20, 22, 24, and 26 mm. High velocities are common in size 19 or 21 prostheses. Adapted with permission from Ref. 7.

EOA de référence : mitrale

Table 8 Normal reference values of effective orifice areas for the prosthetic mitral valves

Prosthetic valve size (mm)	25	27	29	31	33
Stented bioprosthetic valves					
Medtronic Mosaic	1.5 ± 0.4	1.7 ± 0.5	1.9 ± 0.5	1.9 ± 0.5	–
Hancock II	1.5 ± 0.4	1.8 ± 0.5	1.9 ± 0.5	2.6 ± 0.5	2.6 ± 0.7
Carpentier-Edwards Perimount	1.6 ± 0.4	1.8 ± 0.4	2.1 ± 0.5	–	–
Mechanical valves					
St Jude Medical Standard	1.5 ± 0.3	1.7 ± 0.4	1.8 ± 0.4	2.0 ± 0.5	2.0 ± 0.5
MCRI On-X ^a	2.2 ± 0.9	2.2 ± 0.9	2.2 ± 0.9	2.2 ± 0.9	2.2 ± 0.9

Effective orifice area is expressed as mean values available in the literature. Further studies are needed to validate these reference values.

^aThe On-X valve has just 1 size for 27 to 29 and 31 to 33 mm prostheses. In addition, the strut and leaflets are identical for all sizes (25 to 33 mm); only the size of the sewing cuff is different. Adapted with permission from Ref. 7.

- Calculer la valeur indexée **avant** la chirurgie : mismatch ?

Généralités : évaluation

Étude morphologique

Aortique vs Mitral

Mode BD et doppler couleur

mécanique

biologique



Etude hémodynamique

Mécanique vs Biologique

Doppler continu et pulsé

aortique

mitrale

= évaluation d'une valve native

Généralités : évaluation

Étude morphologique

Aortique vs Mitral

Mode BD et doppler couleur

mécanique

biologique



Etude hémodynamique

Mécanique vs Biologique

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aortique

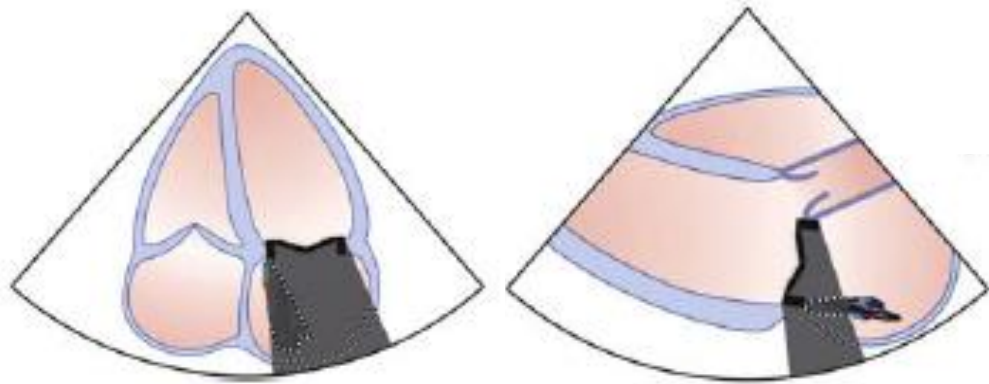
mitrale

= évaluation d'une valve native

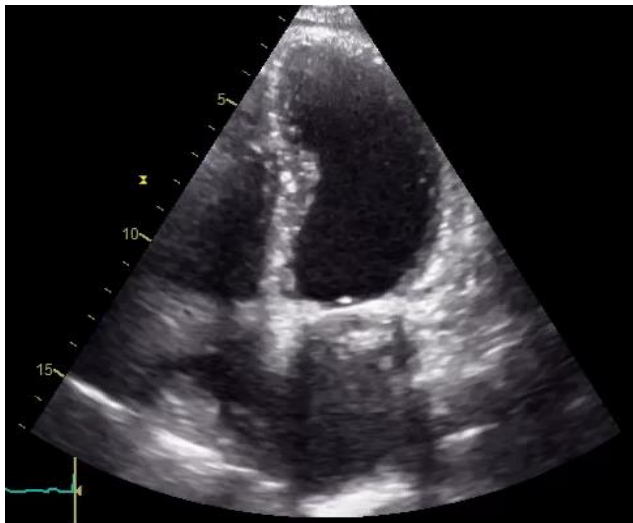
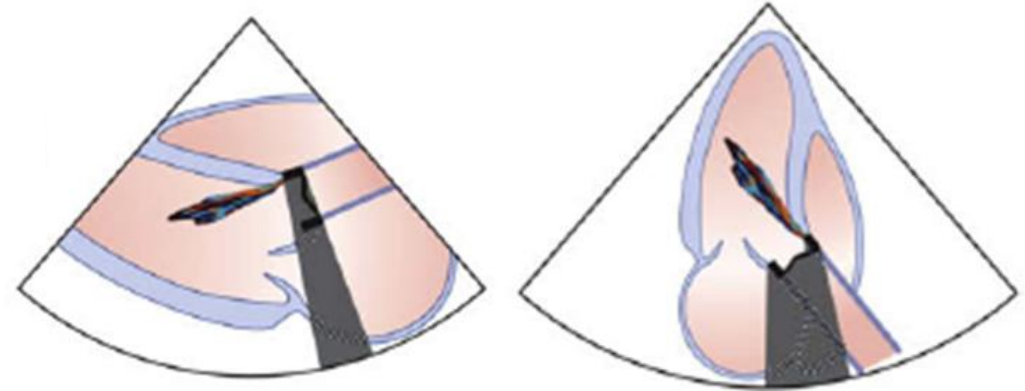
Morphologie

Généralités : cônes d'ombre

Mitral

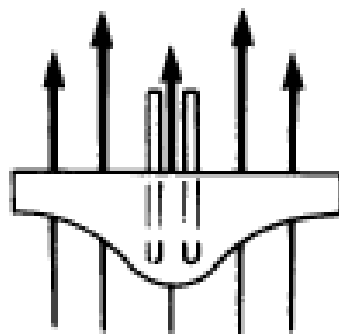


Aortique



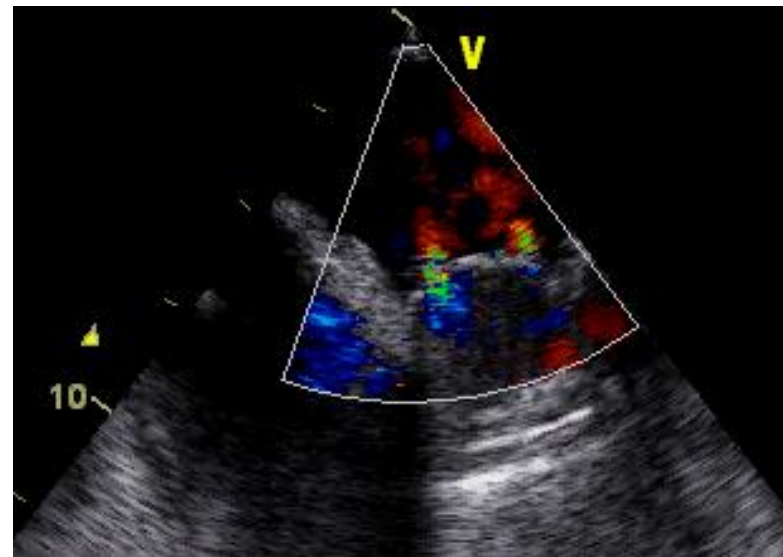
Valve mécanique à double ailettes

Jeu des ailettes symétrique



Double ailette

Fuites de lavage



Valve mécanique

Cavitations (microbulles normales)

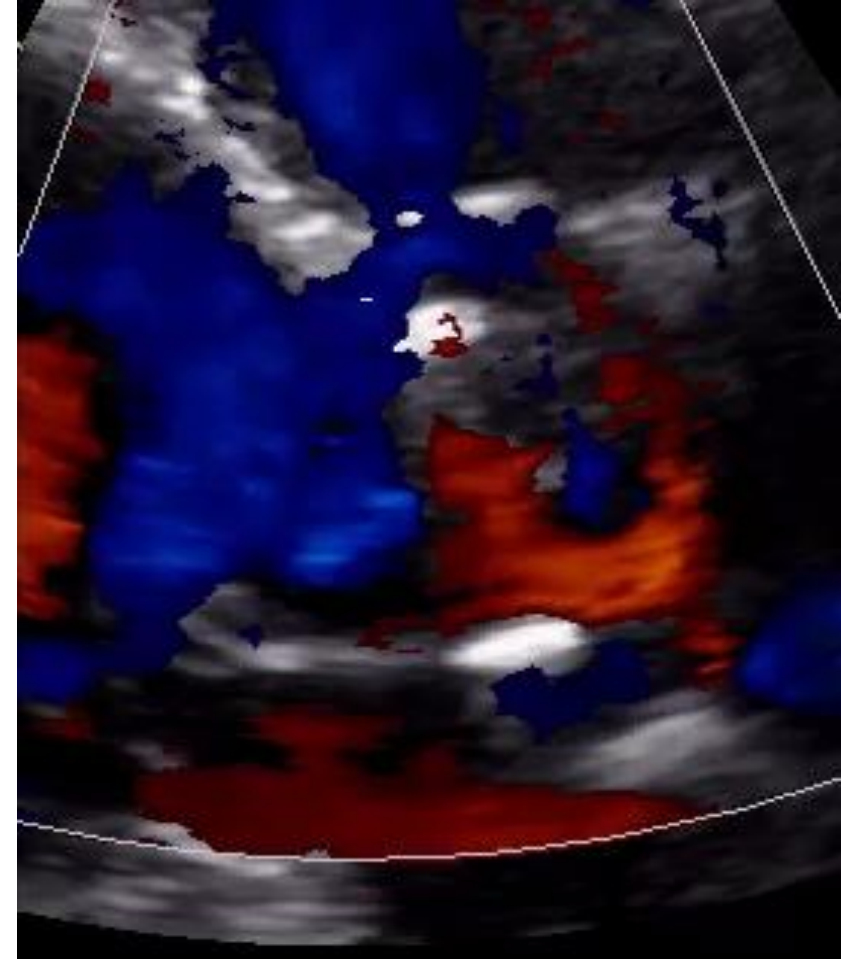
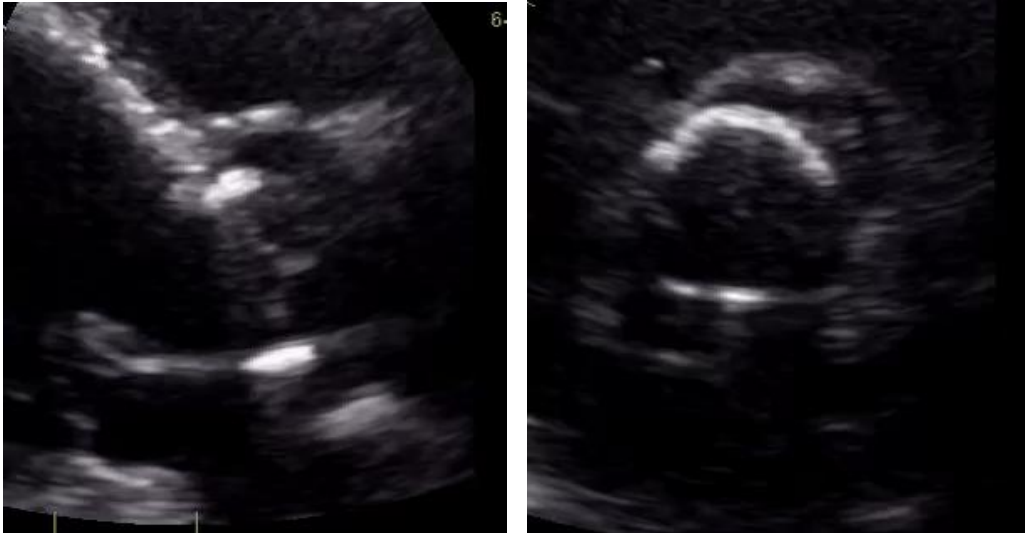


Valve biologique

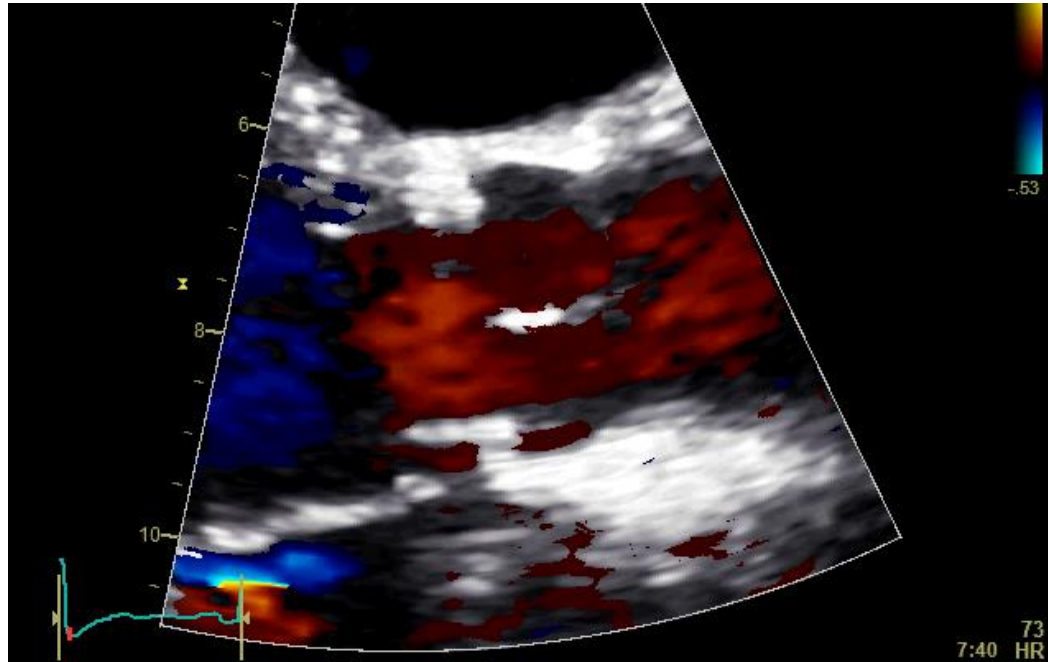
Jeu des cusps normal
Cusps fines



Pas de fuite (ou trace)



Valve biologique aortique : fuites « physiologique »

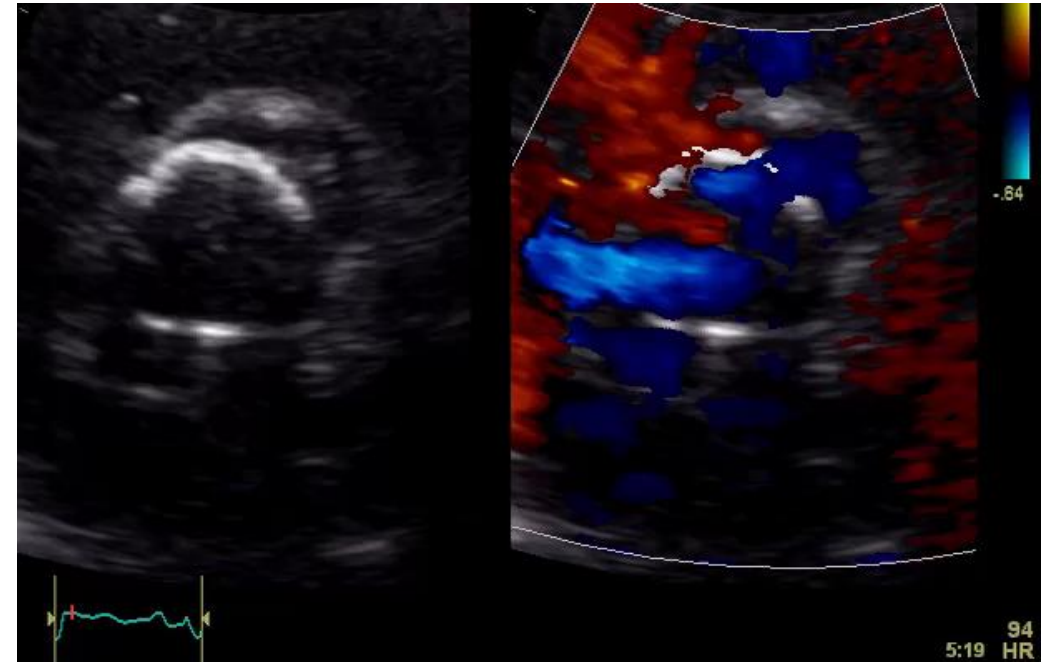


Physiologique intraprothétique

Centrale faible énergie

Petite taille

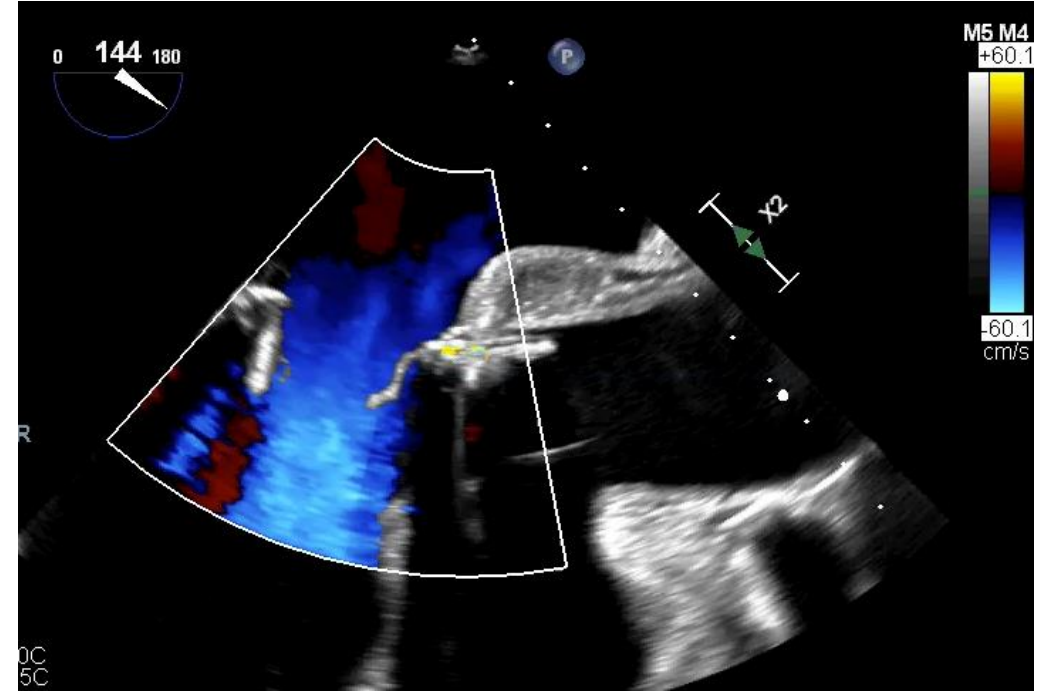
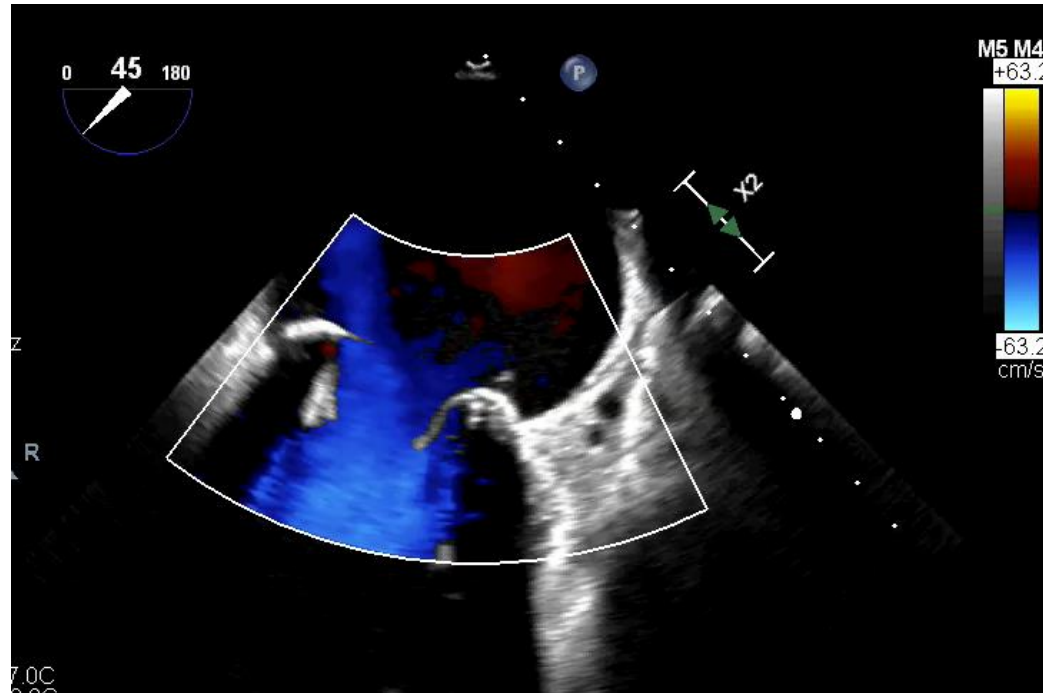
$V_{max} < 1,5 \text{ m/s}$



Microfuite périprothétique post opératoire

(Endothélialisation)

Valve biologique mitrale : fuites « physiologique »



Physiologique intraprothétique

Centrale faible énergie

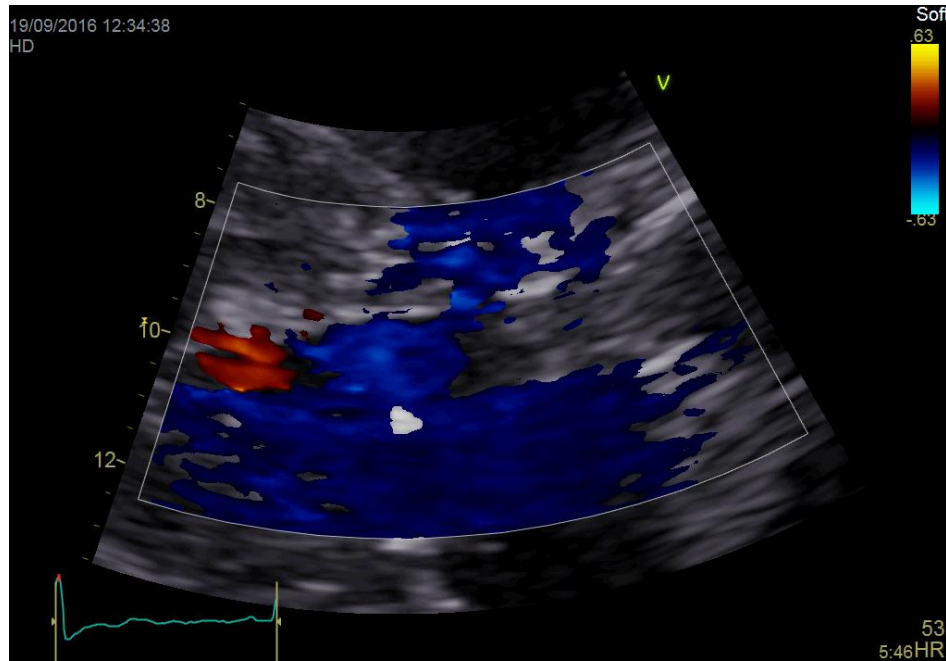
Petite taille

$V_{max} < 2 \text{ m/s}$

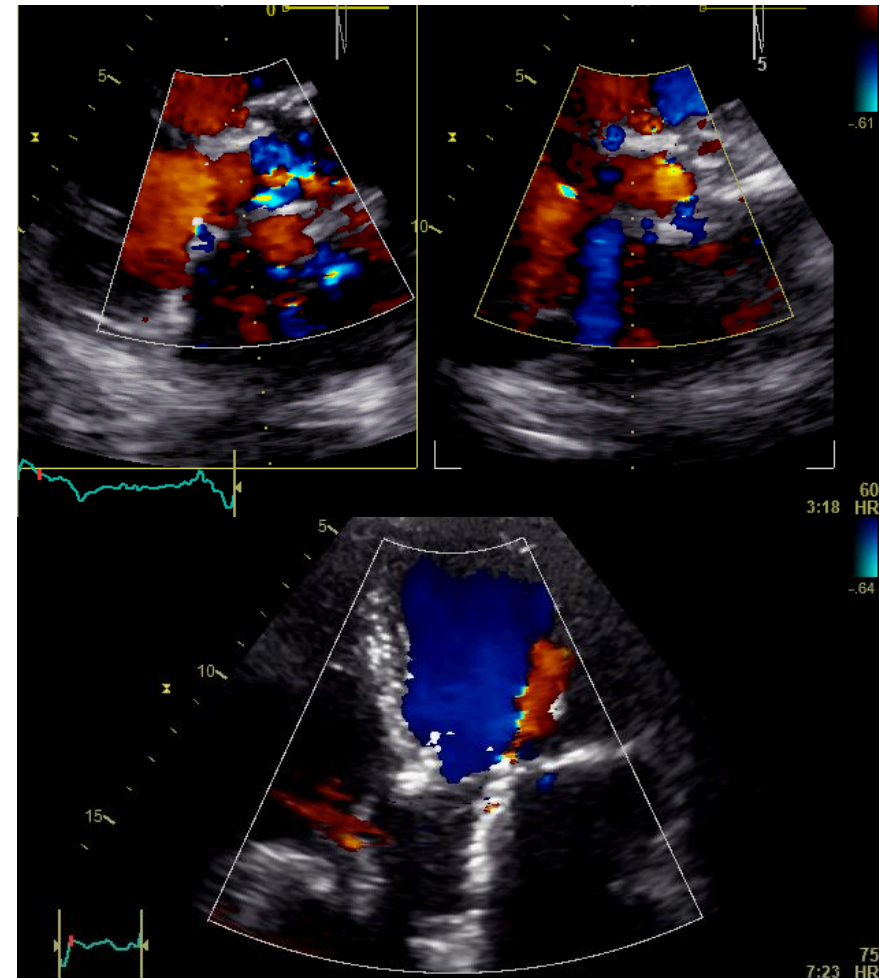
Valve biologique : TAVI

Normale

Anormale



Jeu de cusps normal
Cusps fines
Fuite périprothétique 1/4



Fuite périprothétique > 1/4

Évaluation hémodynamique

Évaluation hémodynamique

Prothèse aortique

- V max
- Gradient transprothétique moyen
- Temps d'accélération
- Index de perméabilité (ITV CCVG/VA)
- Surface valvulaire effective (SVE / EOA)

Fuite physiologique < 1,5 m/s

Prothèse mitrale

- V max de l'onde E
- Gradient transprothétique moyen
- Temps de demi-pression (PHT)
- Rapport des ITV (ITV VM/CCVG)
- Surface valvulaire effective (SVE / EOA)

Fuite physiologique < 2,0 m/s

*Evaluation doppler d'une prothèse = évaluation d'une valve native
Optimisation de l'alignement pour le recueil.
Prothèses plus obstructives que les valves natives*

Évaluation hémodynamique : aortique

Table 13 Grading aortic prosthetic valve obstruction

	Normal	Possible obstruction	Significant obstruction
Qualitative			
Valve structure and motion	Normal	Often abnormal ^a	Abnormal ^a
Transvalvular flow envelope ^b	Triangular, early peaking	Triangular to intermediate	Rounded, symmetrical
Semi-quantitative			
Acceleration time (ms) ^b	< 80	80–100	> 100
Acceleration time/LV ejection time ratio	< 0.32	0.32–0.37	> 0.37
Quantitative			
Flow dependent			
Peak velocity (m/s) ^{c,d}	< 3	3–3.9	≥ 4
Mean gradient (mmHg) ^{c,d}	< 20	20–34	≥ 35
Increase in mean gradient during stress echo	< 10	10–19	≥ 20
Increase in mean gradient during follow-up	< 10	10–19	≥ 20
Flow independent			
Effective orifice area (cm ²) ^{c,e}	> 1.1	0.8–1.1	< 0.8
Measured EOA vs. normal reference value ^c	Reference ± 1SD	< Reference – 1SD	< Reference – 2SD
Difference (reference EOA – measured EOA) (cm ²) ^c	< 0.25	0.25–0.35	> 0.35
Doppler velocity index ^{c,e}	≥ 0.35	0.25–0.34	< 0.25

See Table 7 to obtain the normal reference values of effective orifice area for the different models and sizes of prostheses.

SD, standard deviation.

^aAbnormal mechanical valves: occluder that is immobile or with restricted mobility, thrombus, or pannus; abnormal biologic valves: leaflet thickening/calcification, thrombus, or pannus.

^bThese parameters are affected by LV function and heart rate.

^cThe criteria proposed for these parameters are valid for near normal or normal stroke volume (50–90 mL) and flow rate (200–300 mL/s).

^dThese parameters are more affected by low or high flow states including low LV output and concomitant aortic regurgitation.

^eThis parameter is dependent on the size of the LV outflow tract.

Prothèse aortique : gradients

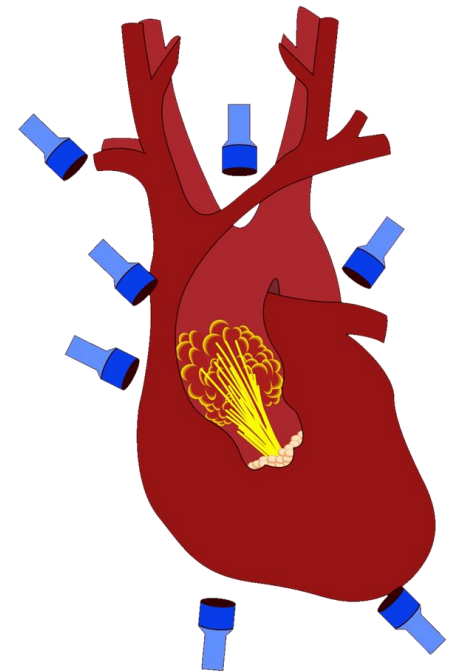
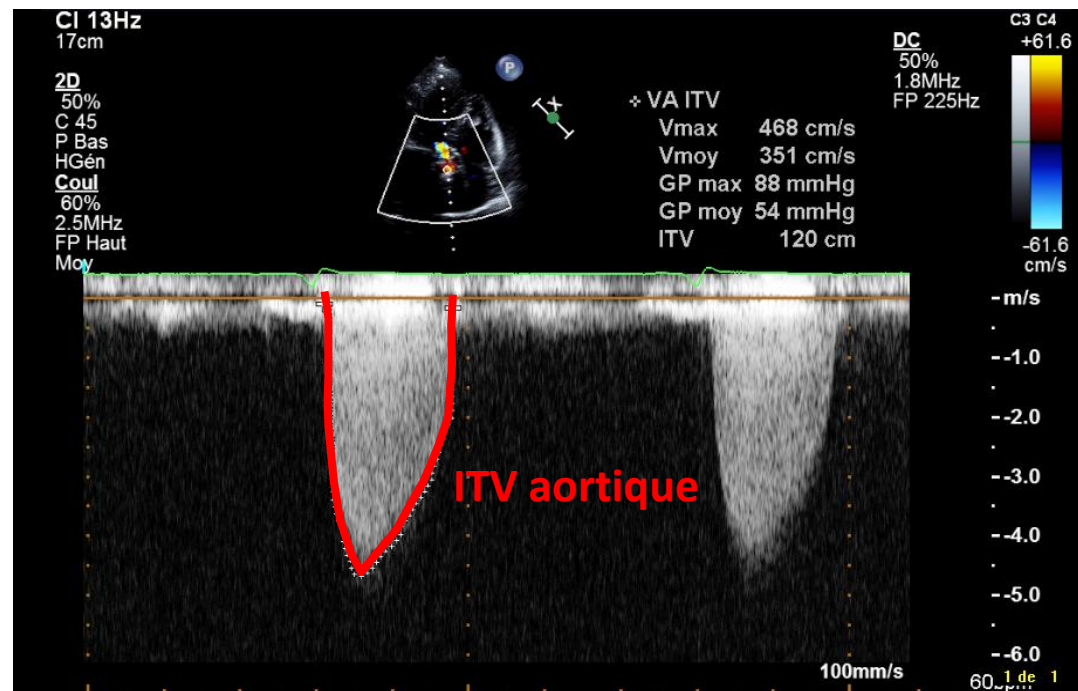
- Doppler continu : A5C, A3C, parasternal droit en décubitus latéral D
- Valeurs attendues / normales pour le type et la taille de prothèse
- Variations selon plusieurs facteurs (à rechercher et rapporter) :
 - FC, débit cardiaque (IP = ratio ITV CCVG/VA plus fiable), anémie

V max Aortique

N < 3 m/s

Gradient moyen aortique

N < 20 mmHg

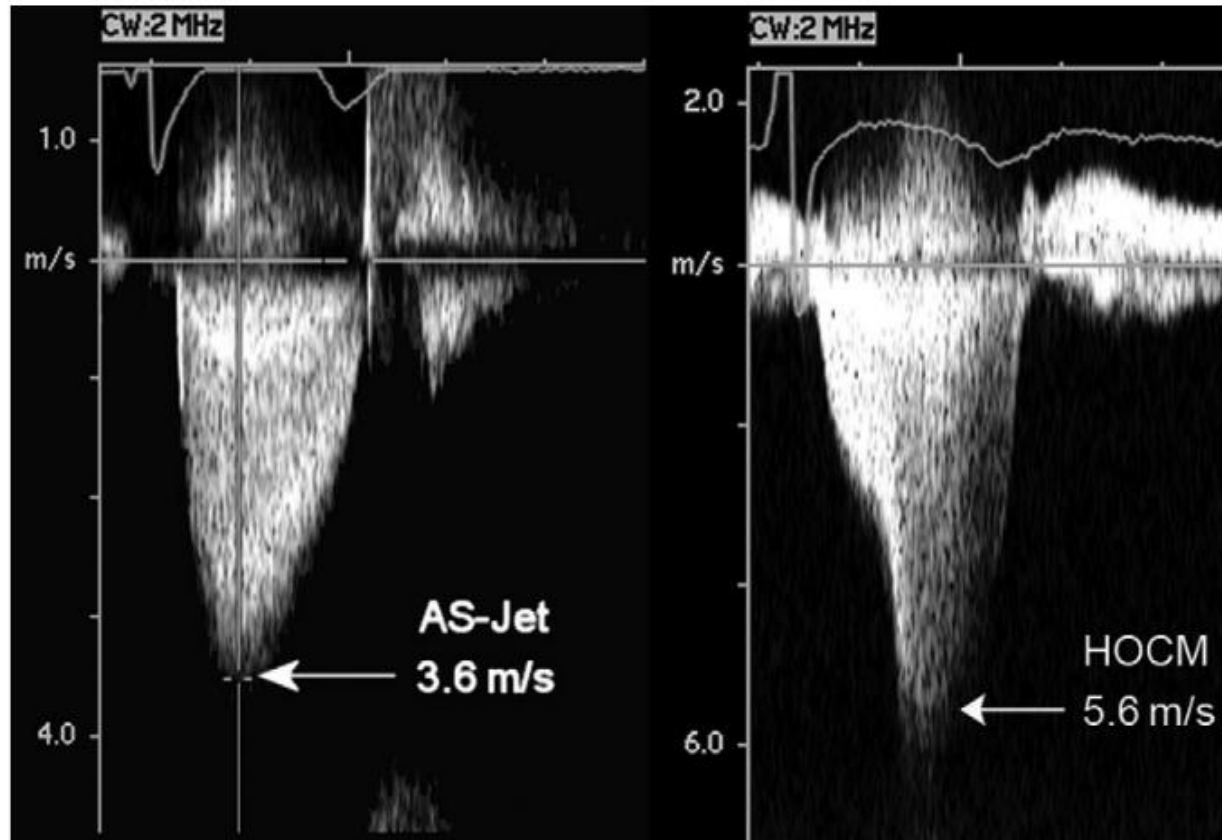


Prothèse aortique : gradients

Attention aux gradients intraVG

****Fréquent en post-opératoire****

Cas typique du post-op de RAC serré avec petite cavité sur HVG



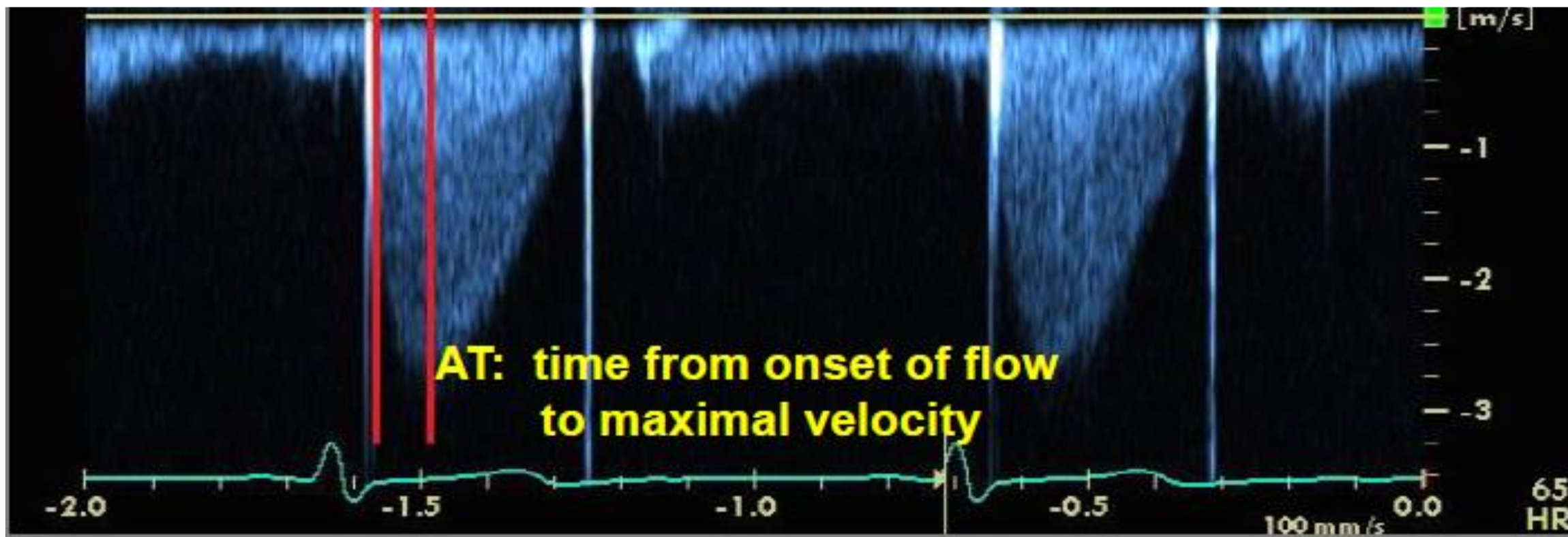
« Dagger shape »

↑ volémie

↓ inotrope

Prothèse aortique : analyse du flux

*****Temps d'accélération*****



Prothèse aortique : analyse du flux

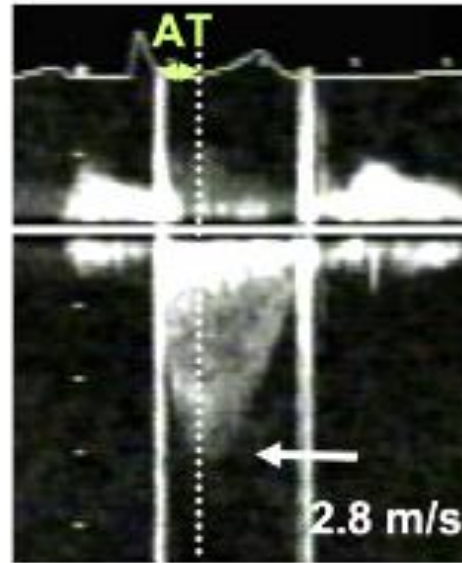
Temps d'accélération

Normal : < 80 – 100 msec

Triangulaire

Pic précoce

Temps d'accélération court



MG = 22 mmHg

DVI = 0.4

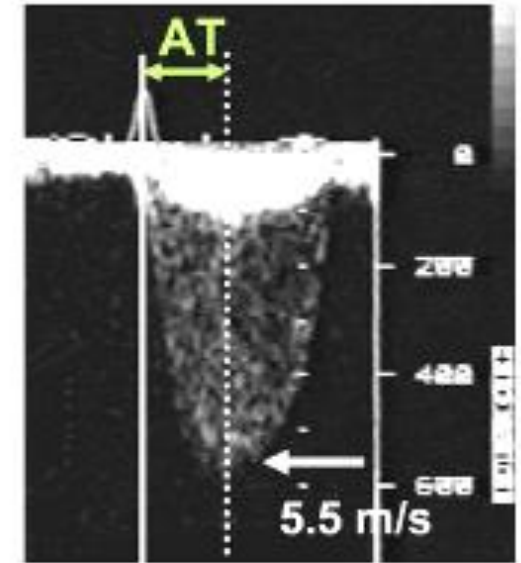
AT = 75 ms

Anormal : > 100 msec

En doigt de gant, arrondi

Contours symétriques

Temps d'accélération long



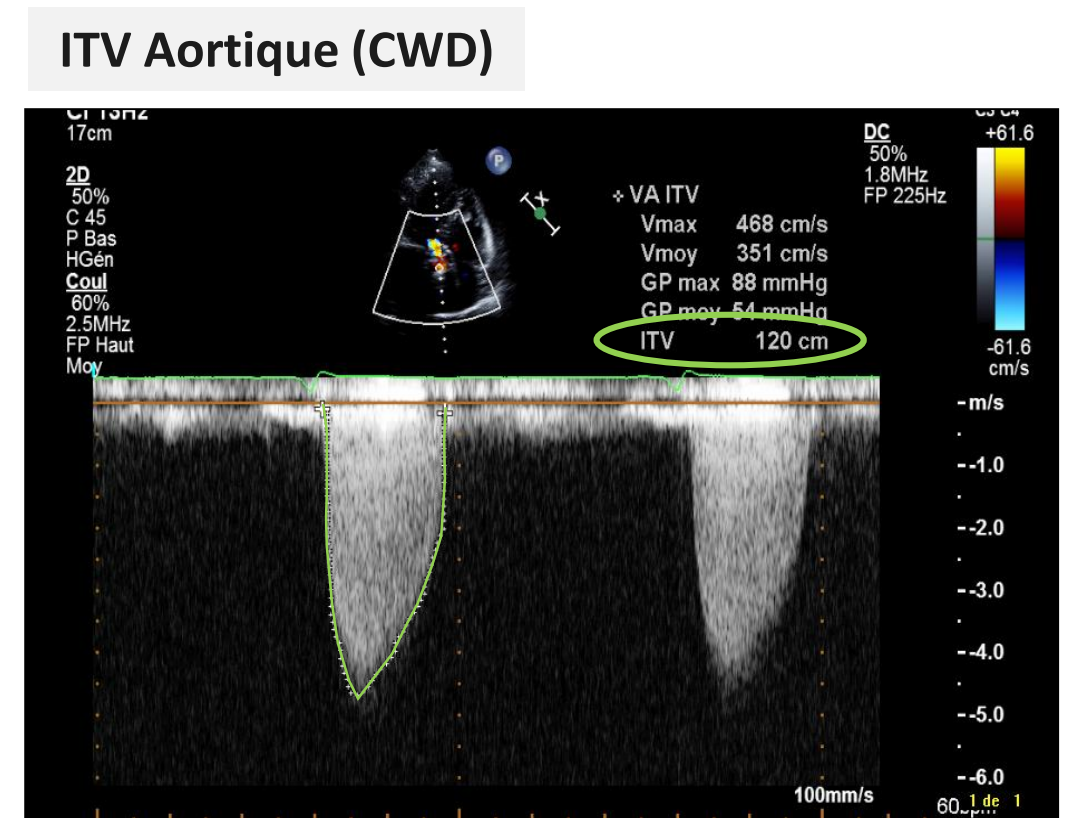
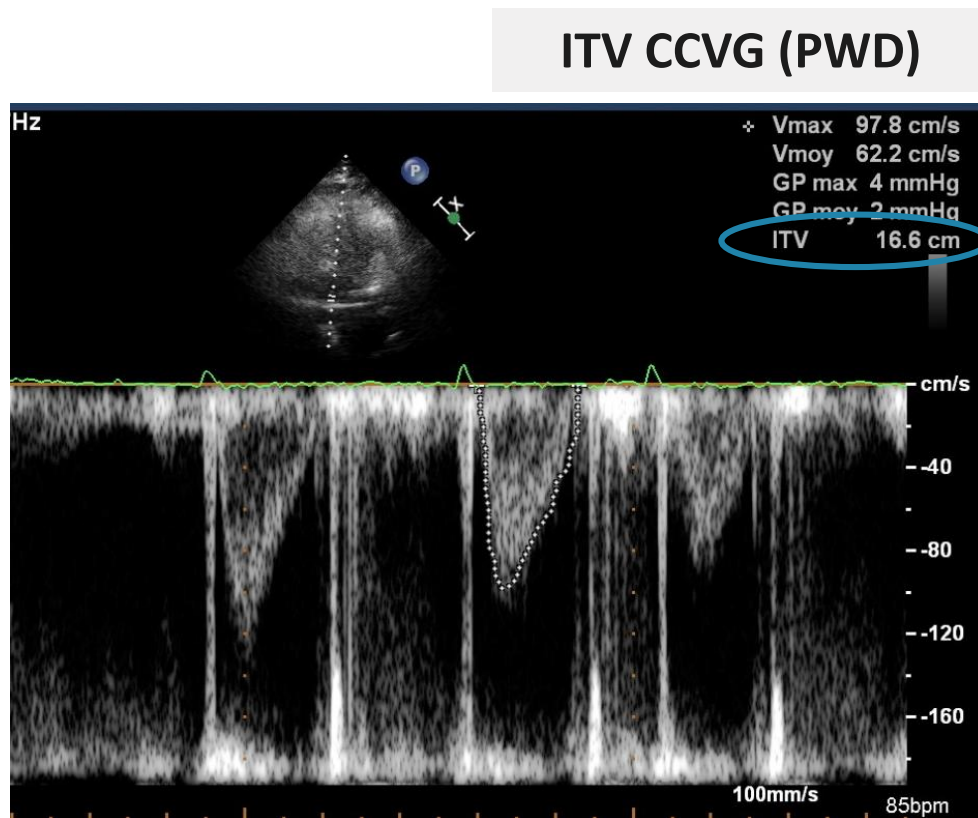
MG = 80 mmHg

DVI = 0.18

AT = 180 ms

Prothèse aortique : index de perméabilité

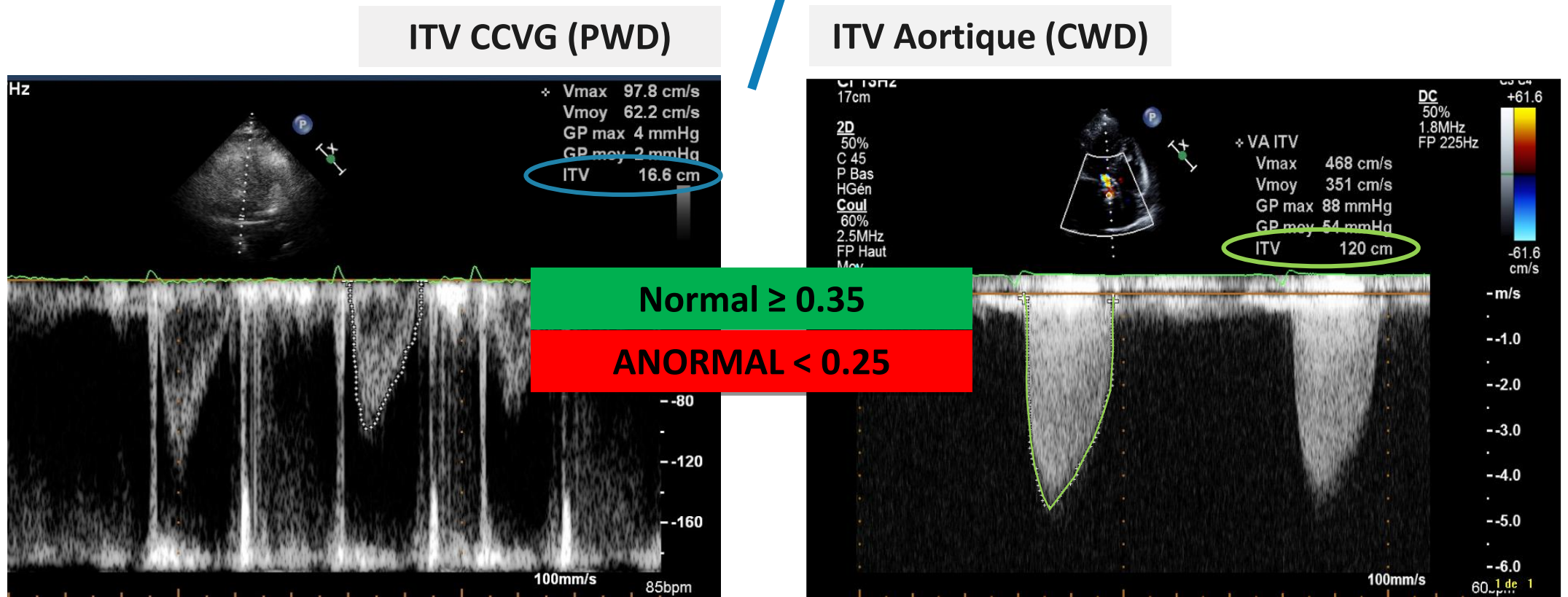
- Ratio de l'ITV CCVG (pulsé sous-aortique) / ITV Aortique (continu)



- *Indépendant de la FC, du débit cardiaque et de la mesure de la CCVG*

Prothèse aortique : index de perméabilité

- Ratio de l'ITV CCVG (pulsé sous-aortique) / ITV Aortique (continu)

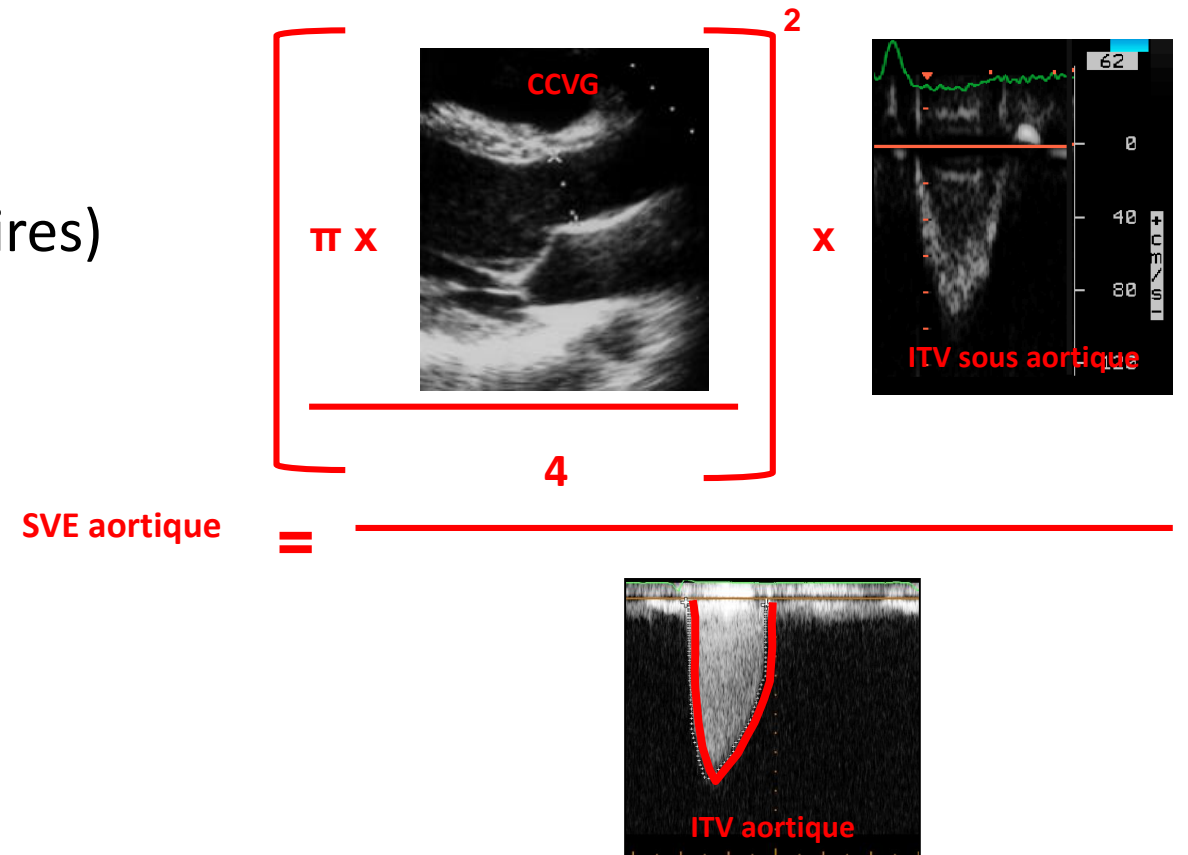


- Indépendant de la FC, du débit cardiaque et de la mesure de la CCVG*

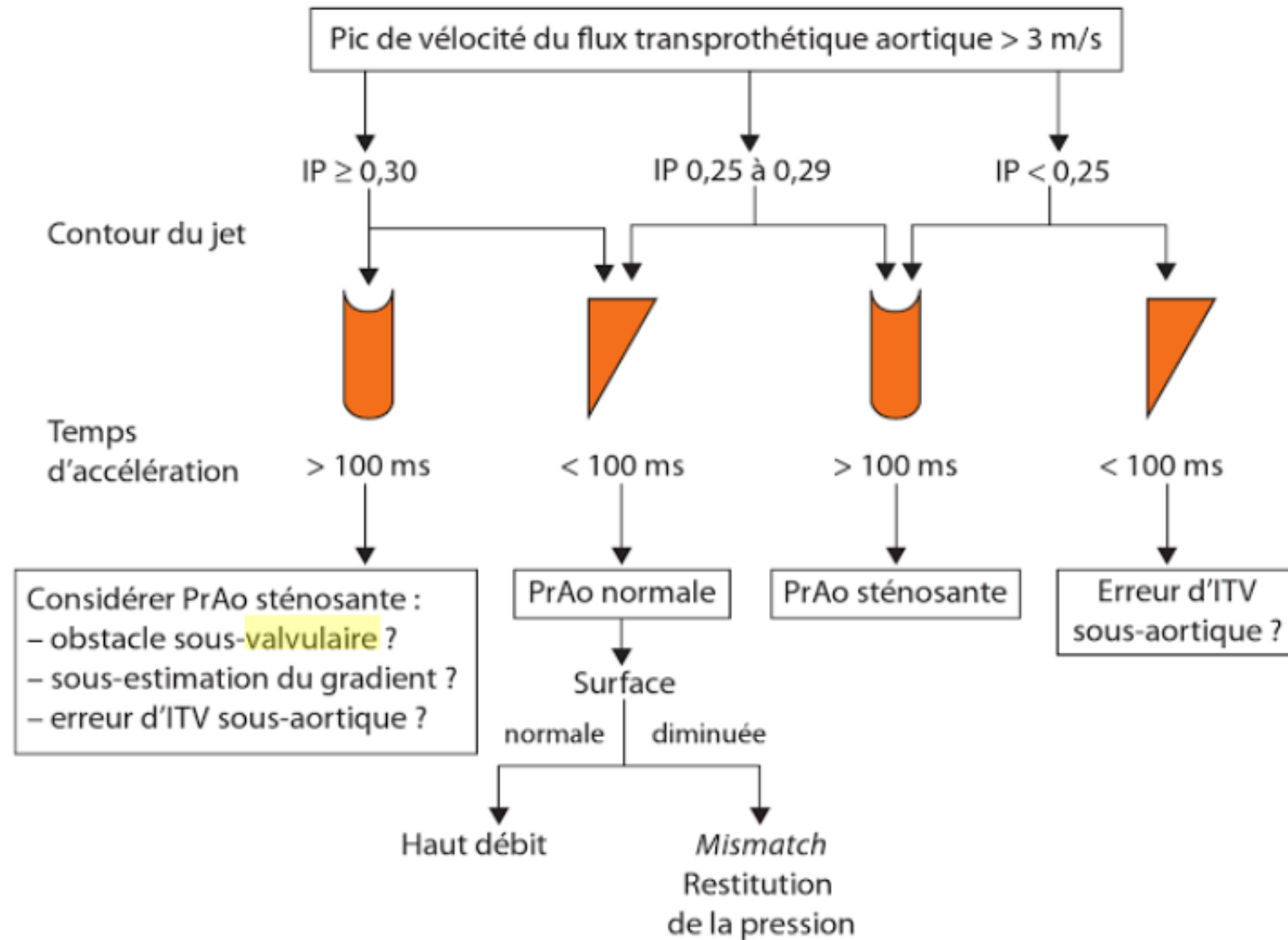
Prothèse aortique : surface valvulaire effective (SVE / EOA)

- ÉQUATION DE CONTINUITÉ ($S1 \cdot V1 = S2 \cdot V2$)
- Inconvénients :
 - nombreuses sources d'erreurs (mesures, tracés, ...)
- Non fiable si :
 - IA associée
 - FA (moyenne de 3-5 tracés R-R similaires)

Normale > 1,1 cm²



Prothèse aortique : évaluation multiparamétrique



Évaluation hémodynamique : mitrale

Table 15 Grading mitral prosthetic valve obstruction

	Normal	Possible obstruction	Significant obstruction
Qualitative			
Valve structure and motion	Normal	Often abnormal ^a	Abnormal ^a
Semi-quantitative			
Pressure half time (ms) ^b	<130	130–200	>200
Quantitative			
Flow dependent			
Peak velocity (m/s) ^{c,d,f}	<1.9	1.9–2.5	≥2.5
Mean gradient (mmHg) ^{c,d,f}	≤5	6–10	≥10
Increase in mean gradient during stress echo	<5	5–12	>12
Follow-up increase in mean gradient	<3	3–5	>5
Flow independent			
Effective orifice area (cm ²) ^{c,g}	≥2	1–2	<1
Effective orifice area vs. normal reference value ^{c,g}	Reference ± 1SD	<Reference – 1SD	<Reference – 2SD
Difference (reference EOA – measured EOA) (cm ²) ^c	<0.25	0.25–0.35	>0.35
Doppler velocity index ^{c,d,e,g}	<2.2	2.2–2.5	>2.5

See Table 8 to obtain the normal reference values of effective orifice area for the different models and sizes of prostheses.

PHT, pressure half time; SD, standard deviation.

^aAbnormal mechanical valves: occluder that is immobile or with restricted mobility, thrombus or pannus; abnormal biologic valves: cusps thickening/calcification, thrombus, or pannus.

^bThis parameter is influenced by heart rate, left atrial compliance, and left ventricular compliance. This parameter should not be measured during tachycardia, first atrioventricular block, or circumstances that cause fusion between the E and A velocities or shorten the diastolic filling period.

^cThe criteria proposed for these parameters are valid for near normal or normal diastolic volume (i.e. stroke volume: 50–90 mL) and heart rate (50–80 bpm).

^dThese parameters are also abnormal in the presence of significant mitral prosthesis regurgitation.

^eThis parameter is dependent on the size of the LV outflow tract. In atrial fibrillation, the VTI_{PMV} and the VTI_{LVOT} should be measured in matched cardiac cycles.

^fThese parameters are more affected by flow and heart rate.

^gThese parameters are not valid when > mild concomitant aortic or mitral regurgitation is present.

Prothèse mitrale : gradients

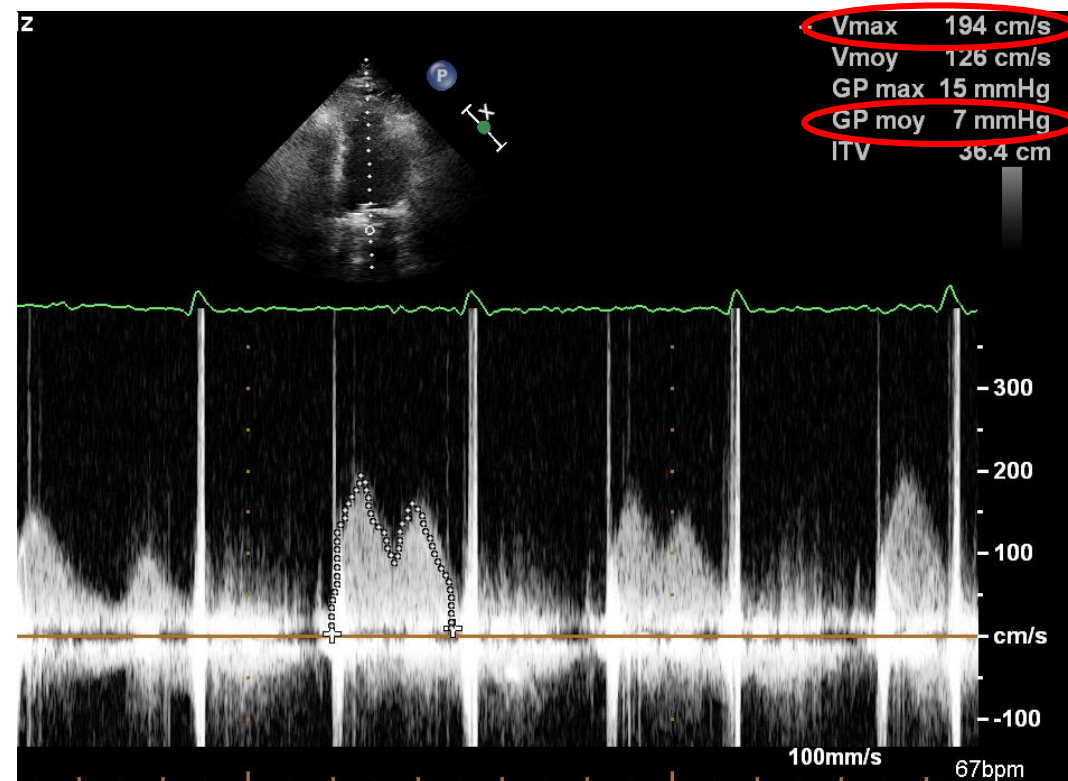
- Doppler continu : A4C (+/- A2C, A3C)
- Valeurs attendues / normales pour le type et la taille de prothèse
- Variations selon plusieurs facteurs (à rechercher et rapporter) :
 - FC, débit cardiaque (IP = ratio ITV VM/CCVG plus fiable), anémie, ...
 - Insuffisance mitrale associée

V max onde E mitrale

N < 1,9 m/s

Gradient moyen mitral

N ≤ 5 mmHg



Prothèse mitrale : analyse du flux

*****Temps de demi-pression (PHT)***
N < 130 ms**

Normal : < 130 msec

Non affecté par IM

Anormal : > 200 msec

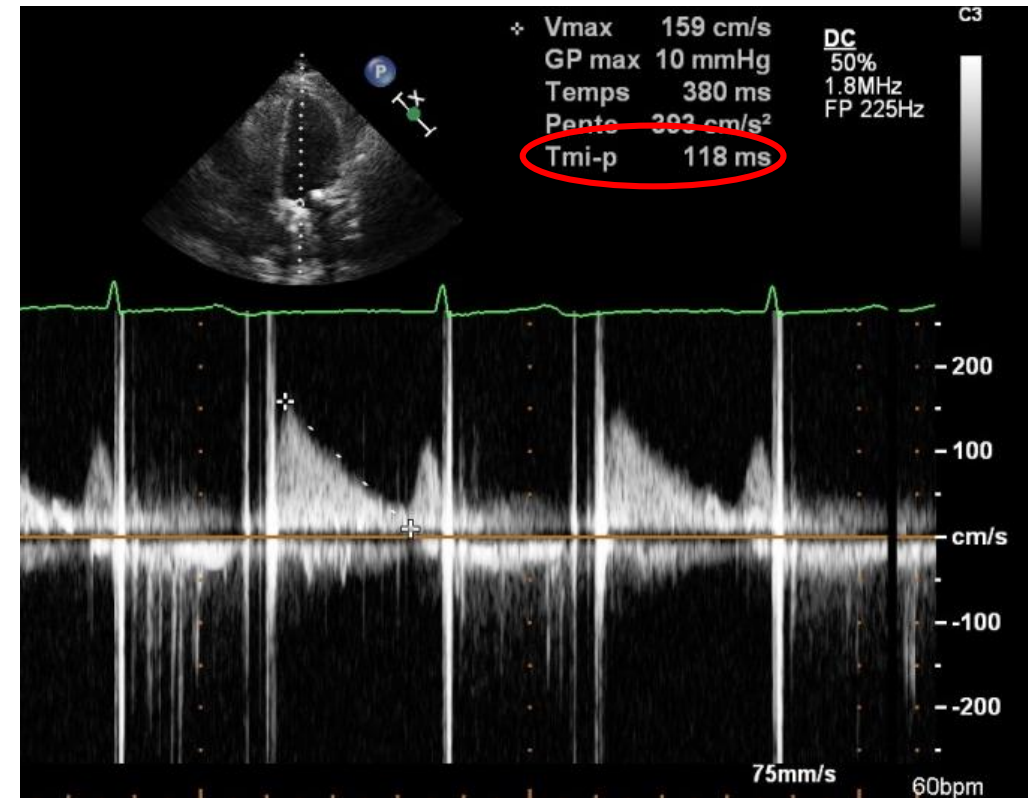
Non fiable si :

Tachycardie

Bloc AV 1^{er}

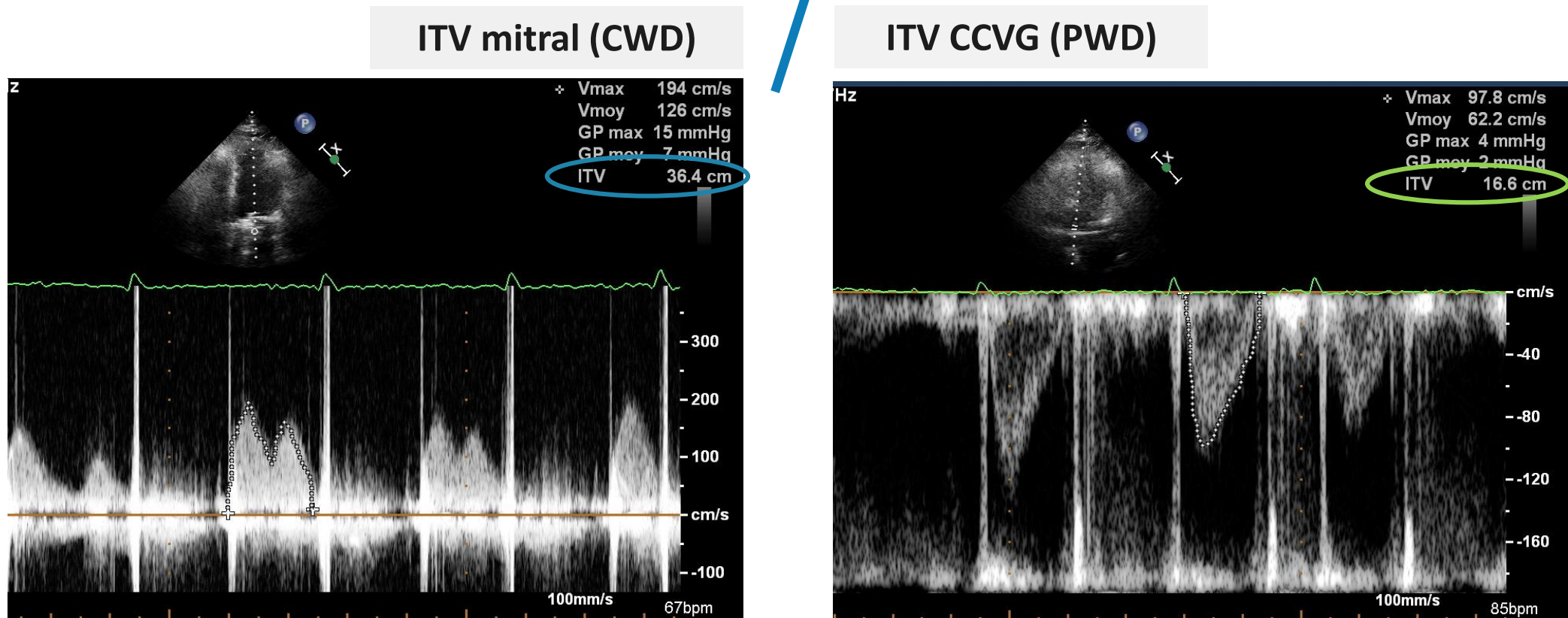
Fusion E/A

Dépend de la FC, compliance VG/OG



Prothèse mitrale : ratio des ITV

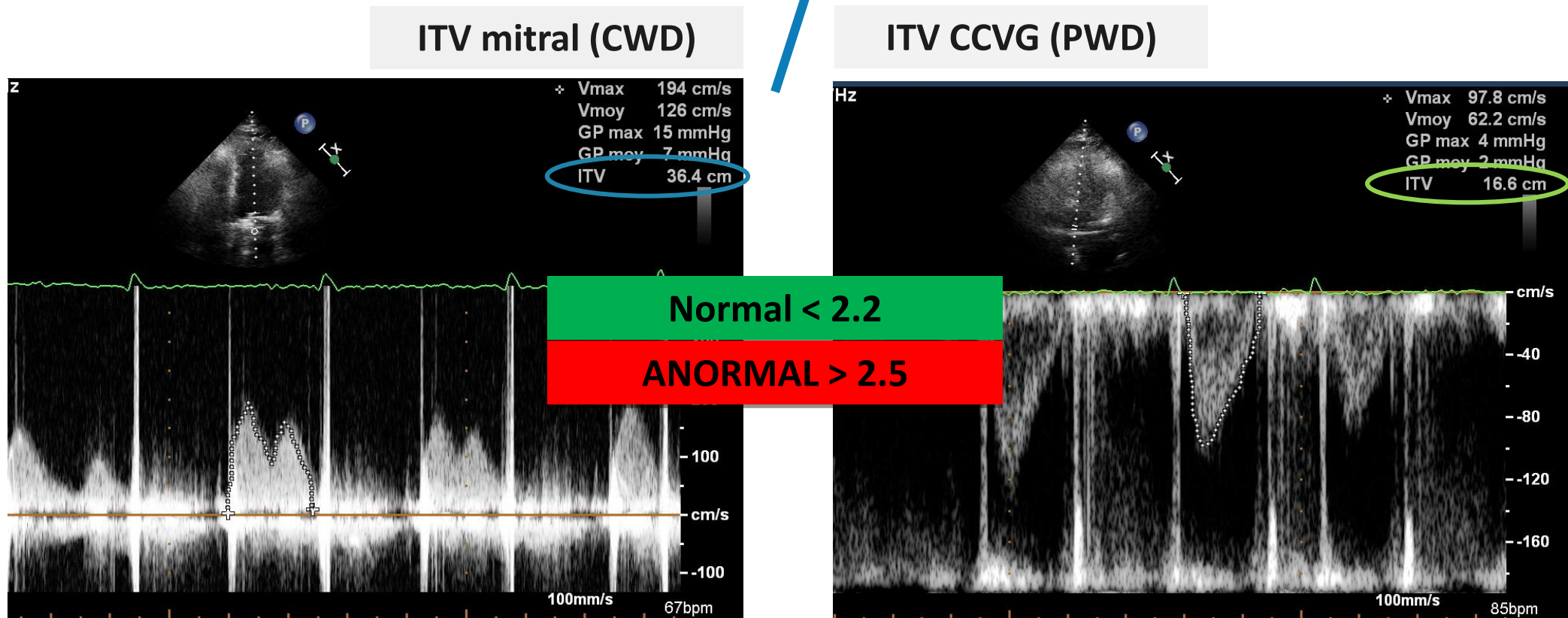
- Ratio de l'ITV mitral (continu) / ITV CCVG (pulsé sous-aortique)



Indépendant de la FC, du débit cardiaque et de la mesure de la CCVG

Prothèse mitrale : ratio des ITV

- Ratio de l'ITV mitral (continu) / ITV CCVG (pulsé sous-aortique)



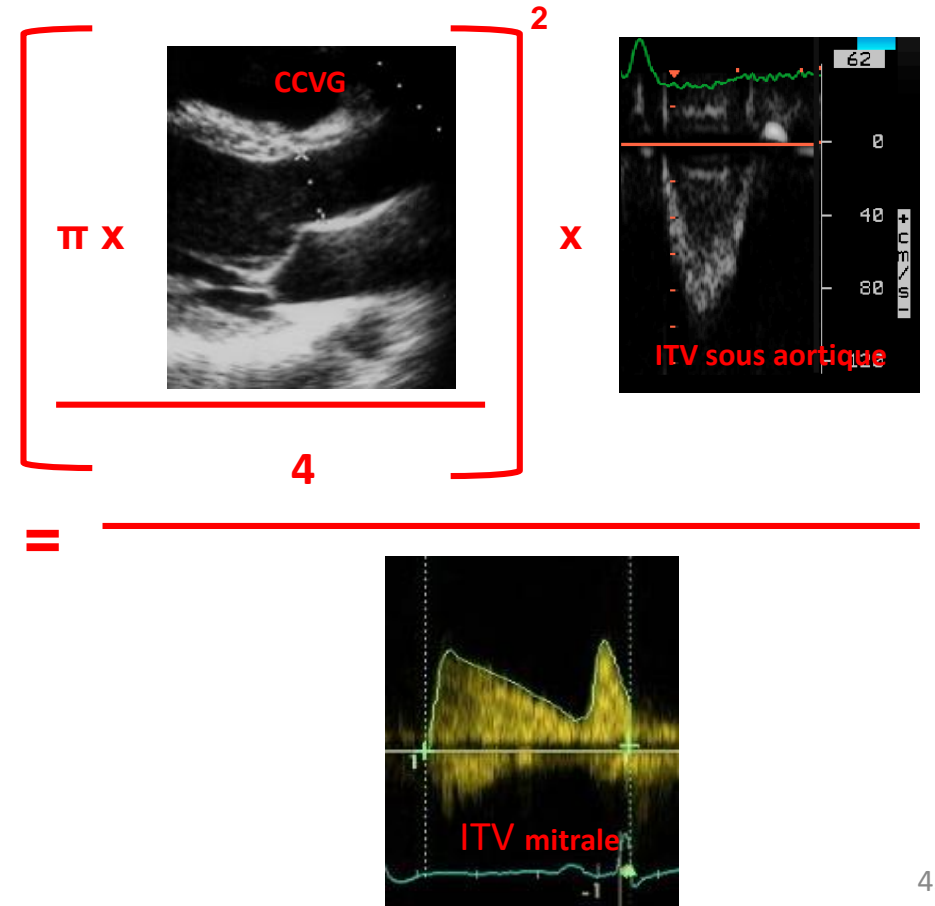
Indépendant de la FC, du débit cardiaque et de la mesure de la CCVG

Prothèse mitrale : surface valvulaire effective (SVE / EOA)

- ÉQUATION DE CONTINUITÉ ($S1 \cdot V1 = S2 \cdot V2$)
- Inconvénients :
 - nombreuses sources d'erreurs (mesures, tracés, ...)
- Non fiable si :
 - IA ou IM associée(s)
 - FA (moyenne de 3-5 tracés R-R similaires)

Normale $\geq 2.0 \text{ cm}^2$

SVE mitrale



Prothèse mitrale : évaluation multiparamétrique

Vélocité onde E < 1.9m /s
Gradient moyen < 5-6 mmHg
ITV mitrale/ ITV CCVG < 2.2
PHT < 130 ms

Fonction Normale 98%

Vélocité onde E > 1.9m /s
Gradient moyen \geq 6 mmHg
ITV mitrale/ ITV CCVG \geq 2.2

PHT < 130 ms
= Régurgitation

PHT > 200 ms
= Obstruction

Dysfonction de prothèse

Mismatch patient prothèse

***N'est pas une dysfonction de prothèse
mais fait partie du diagnostic différentiel***

- Définition:
 - Surface valvulaire effective INFÉRIEURE à celle de la valve humaine normale
- Conséquences:
 - Persistance d'un gradient anormalement haut après chirurgie
 - Risque de dégénérescence précoce
 - Pronostic altéré (surtout si ↓ FEVG)
- Identifier le risque en préopératoire et suivi des gradients post-op

Table 12 Imaging criteria or the identification and quantitation of prosthesis-patient mismatch

	Mild or not clinically significant	Moderate	Severe
Aortic prosthetic valves			
Indexed EOA (projected or measured)			
BMI < 30 kg/m ²	>0.85	0.85–0.66	≤0.65
BMI ≥ 30 kg/m ²	>0.70	0.70–0.56	≤0.55
Measured EOA vs. normal reference value ^a	Reference ± 1SD	Reference ± 1SD	Reference ± 1SD
Difference (reference EOA – measured EOA) (cm ²) ^a	<0.25	<0.25	<0.25
Valve structure and motion	Usually normal	Usually normal	Usually normal
Mitral prosthetic valves			
Indexed EOA (projected or measured)			
BMI < 30 kg/m ²	>1.2	1.2–0.91	≤0.90
BMI ≥ 30 kg/m ²	>1.0	1.0–0.76	≤0.75
Measured EOA vs. normal reference value ^a	Reference ± 1SD	Reference ± 1SD	Reference ± 1SD
Difference (reference EOA – measured EOA) (cm ²) ^a	<0.25	<0.25	<0.25
Valve structure and motion	Usually normal	Usually normal	Usually normal

See Tables 7 and 8 to obtain the normal reference values of effective orifice area for the different models and sizes of prostheses.

EOA, effective orifice area; BMI, body mass index; SD, standard deviation.

^aThe criteria proposed for these parameters are valid for near normal or normal stroke volume (50–90 mL).

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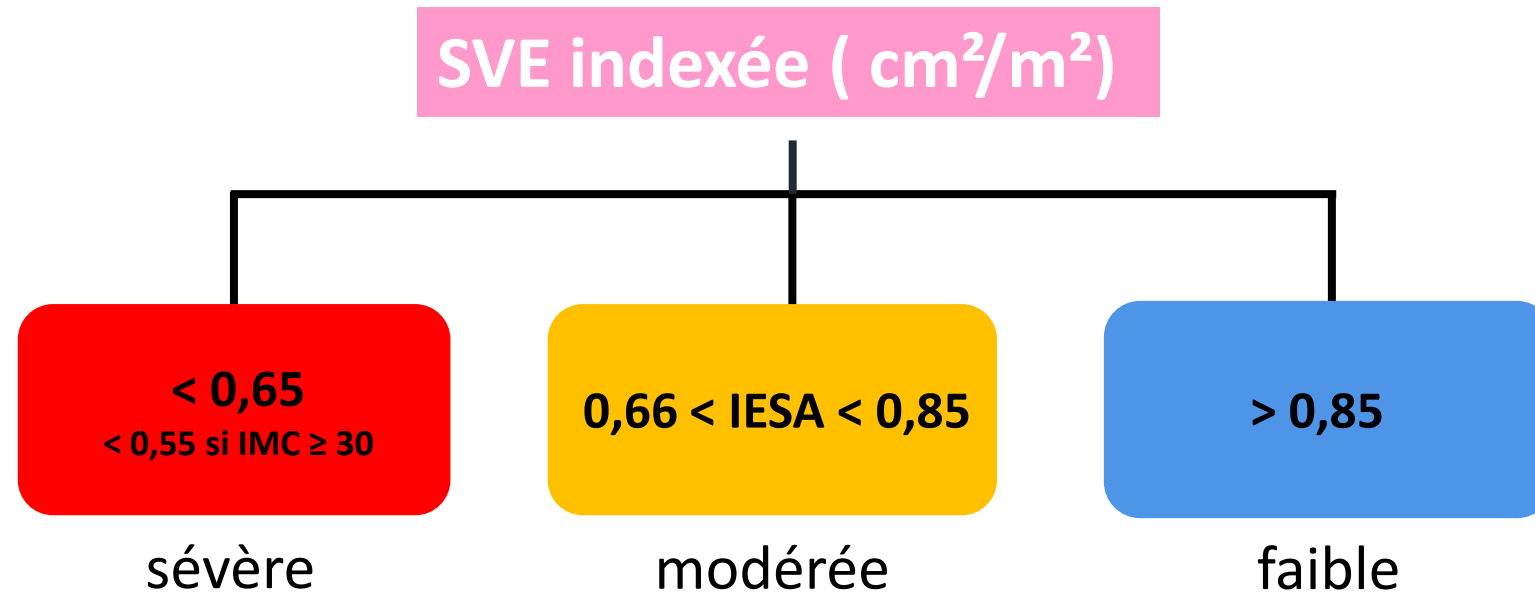
See Tables 7 and 8 to obtain the normal reference values of effective orifice area for the different models and sizes of prostheses.

EOA, effective orifice area; BMI, body mass index; SD, standard deviation.

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Mismatch patient prothèse

Sévérité du mismatch prothétique aortique



Dysfonction de prothèse

Table 9 Definitions of morbidity after heart valve replacement surgery^a

Complication	Definition	Examples or notes
Structural valve deterioration	Deterioration or dysfunction of the operated valve caused by changes intrinsic to the valve	(1) Mechanical valve—wear, fracture, poppet escape (2) Biological valve—calcification, leaflet tear, stent creep (3) Both—disruption of components of a prosthetic valve
Non-structural dysfunction	Any abnormality not intrinsic to the valve that results in stenosis or regurgitation of the valve or haemolysis	(1) Entrapment by pannus, tissue, or suture (2) Paravalvular leak (3) Inappropriate sizing or positioning (4) Residual leak or obstruction after valve implantation (5) Clinically important intravascular haemolysis (6) Dilatation of aorta or aortic annulus causing aortic regurgitation (for stentless valves)
Valve thrombosis	Any thrombosis not caused by infection that occludes part of the blood flow path, interferes with valve function, or is sufficiently large to warrant treatment	
Embolism	An embolic event that occurs in the absence of infection after the immediate perioperative period	(1) Stroke (>72 h neurological deficit) or non-specific symptoms with brain imaging demonstrating an acute ischaemic event (2) TIA (fully reversible symptoms of short duration with no abnormality on brain imaging) (3) Non-cerebral embolic event (not perioperative myocardial infarct)
Bleeding event	Any episode of major internal or external bleeding that causes death, hospitalization, permanent injury, or blood transfusion	Exclude bleeding associated with major trauma or an operation. Include major unexpected bleeding associated with minor trauma.
Endocarditis	Proved infection of the replacement heart valve	Proof by: (1) Reoperation with evidence of abscess or other local complication (2) Autopsy evidence of abscess, pus, or vegetation (3) Duke criteria positive

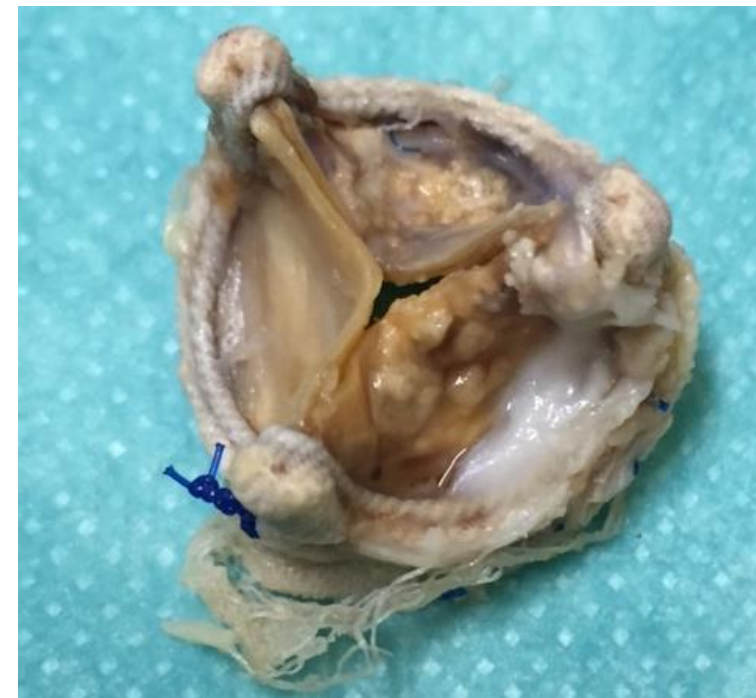
^aBased on definitions in Akins et al.¹¹⁹

Types de dysfonction / complication

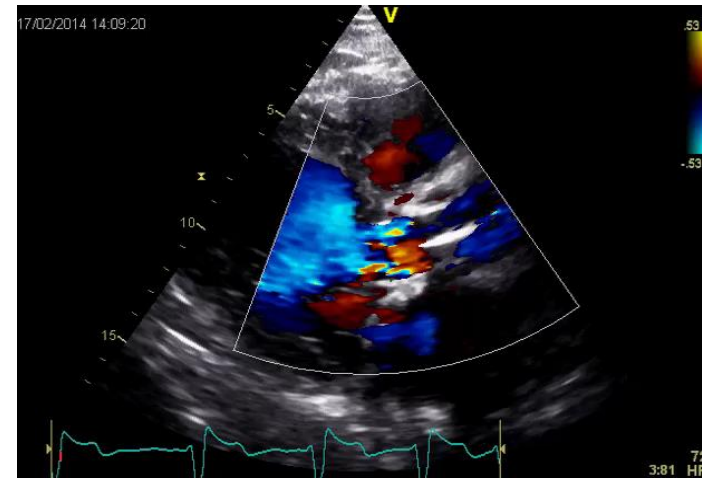
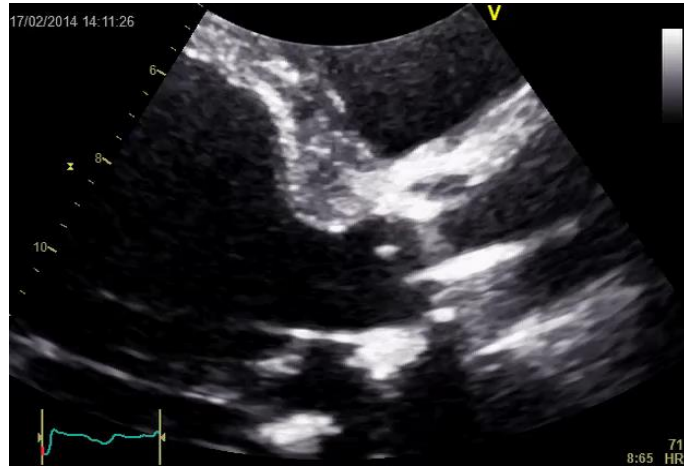
- Dégénérescence structurelle (SVD) = *Atteinte des cusps*
 - Valves biologiques / TAVI +++
- Dégénérescence non structurelle (NSVD) = *Cusps normales*
 - Désinsertion :
 - Lâchage de sutures
 - Endocardite infectieuse
 - Pannus
 - Fuite périprothétique
- Thrombose
 - Valves mécaniques +++
 - Valves biologiques / TAVI +
- Endocardite infectieuse

Dégénérescence structurelle

- Concerne les bioprothèses +++
- Sténosante
- Fuyante :
 - Atteinte restrictive des feuillets
 - Possiblement aigue sur rupture de cusp
- Diagnostics différentiels :
 - Thrombose
 - Endocardite peut se manifester par une sténose...



Dégénérescence structurelle

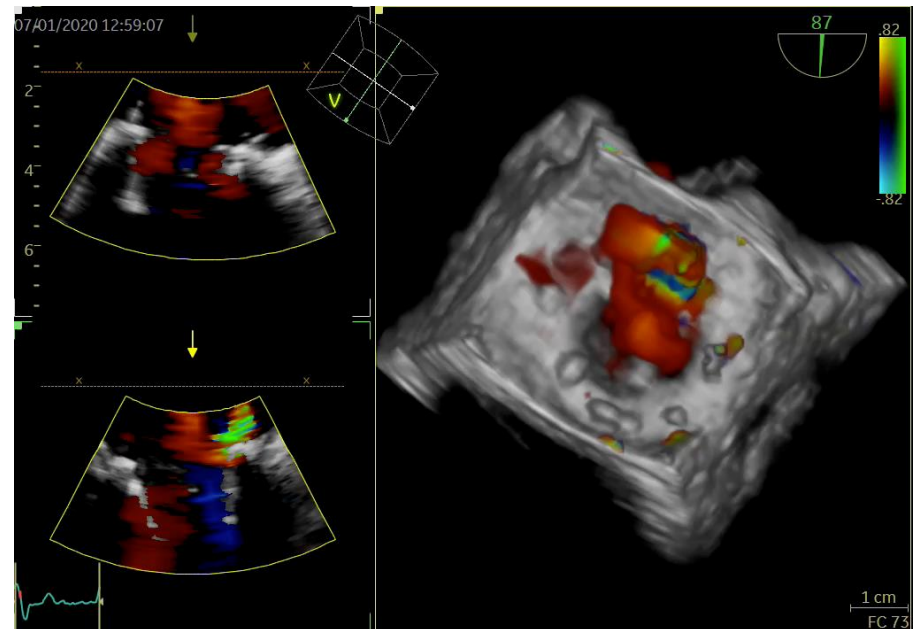
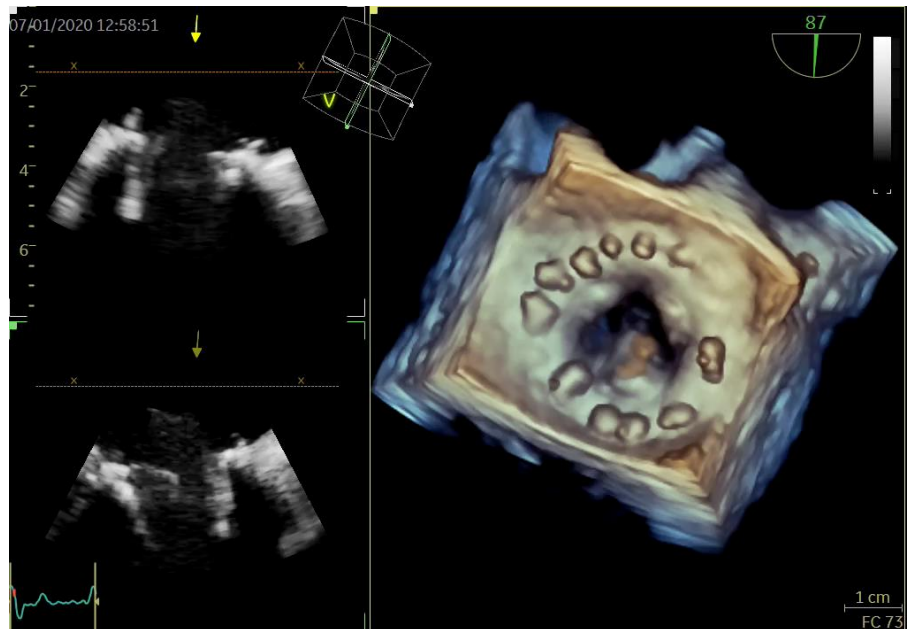
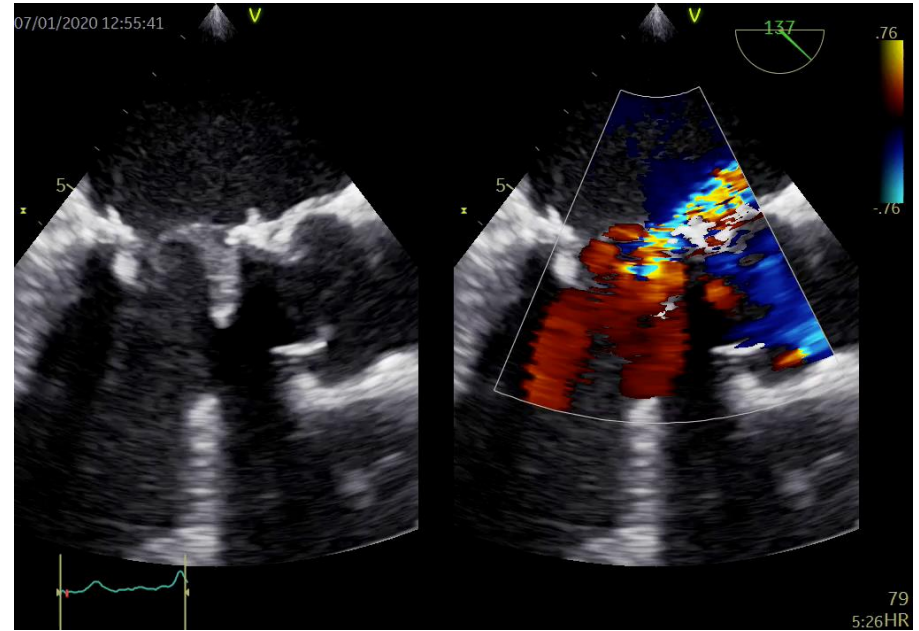
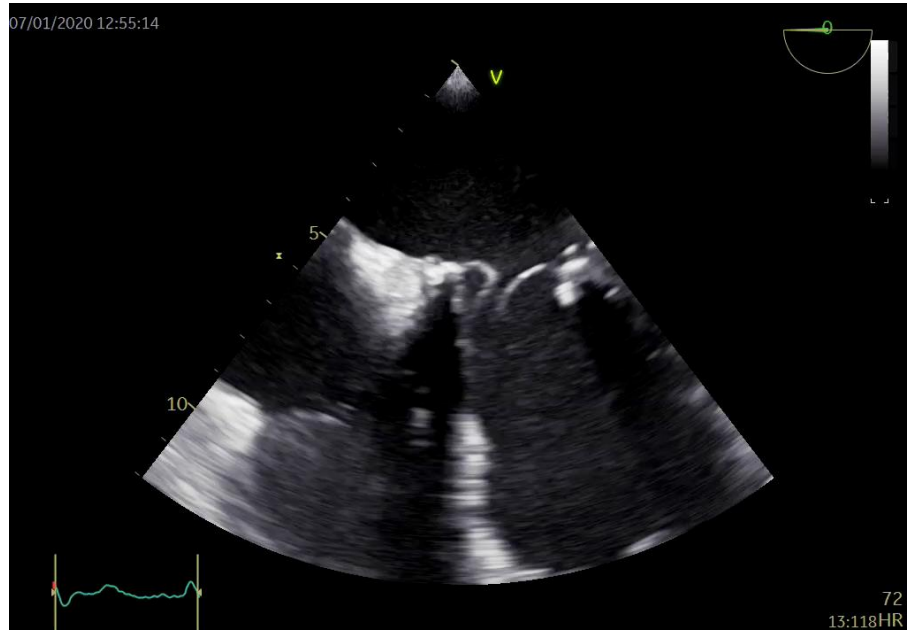


Dégénérescence fuyante de bioprothèse aortique : prolapsus de cusp



Dégénérescence sténosante de bioprothèse aortique : calcification des cusp

Dégénérescence structurelle

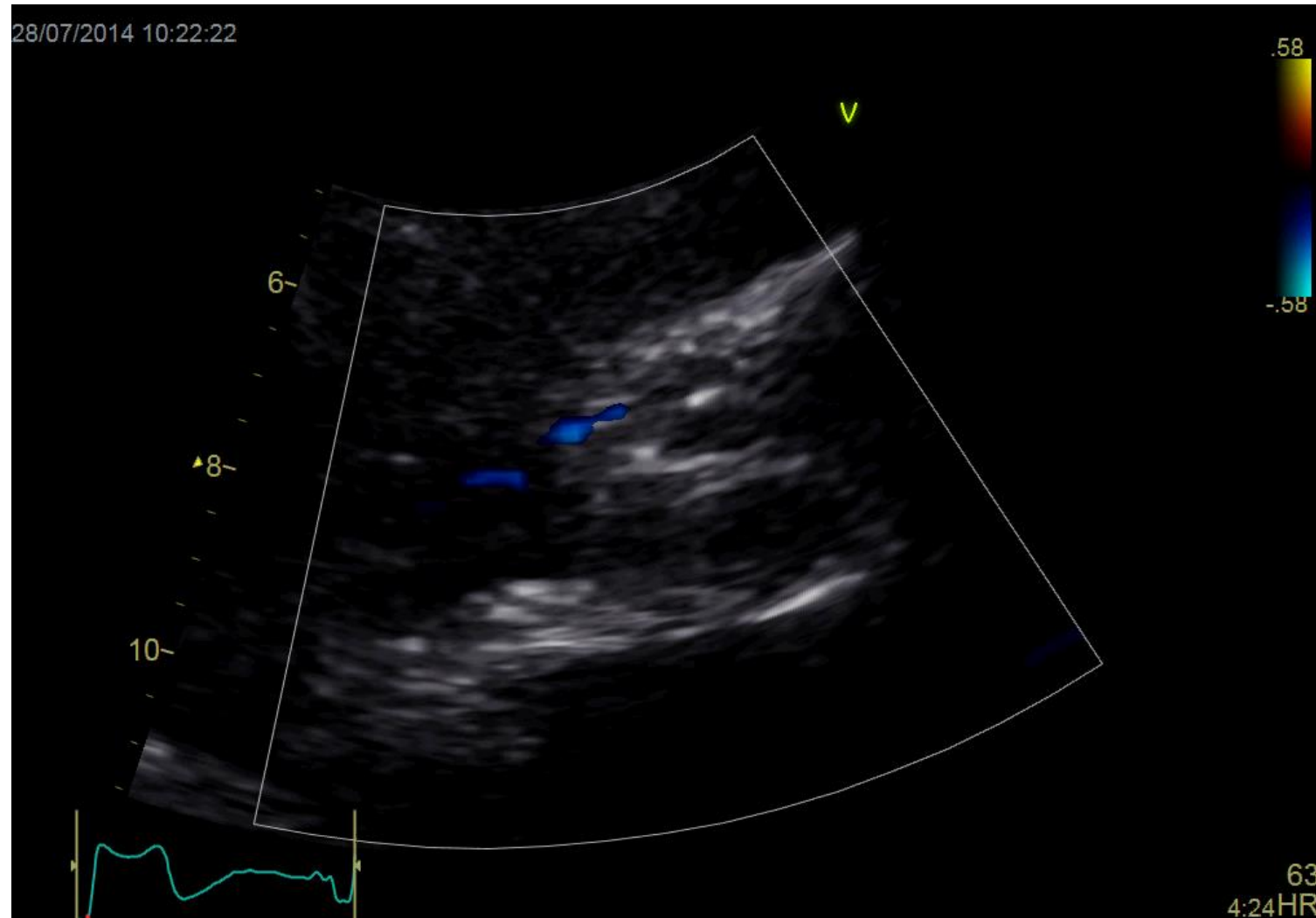


Désinsertion de prothèse

- Caractéristiques communes aux 2 types de prothèses
- Aiguë : apparition d'une fuite aigue, possiblement massive → OAP
- À distance de l'intervention : apparition d'une fuite périprothétique
 - Toujours se méfier de l'endocardite
 - Souvent difficile à mettre en évidence
 - Indices indirects : ↑ gradient avec PHT normal < 130 msec*
 - « Rocking » évident

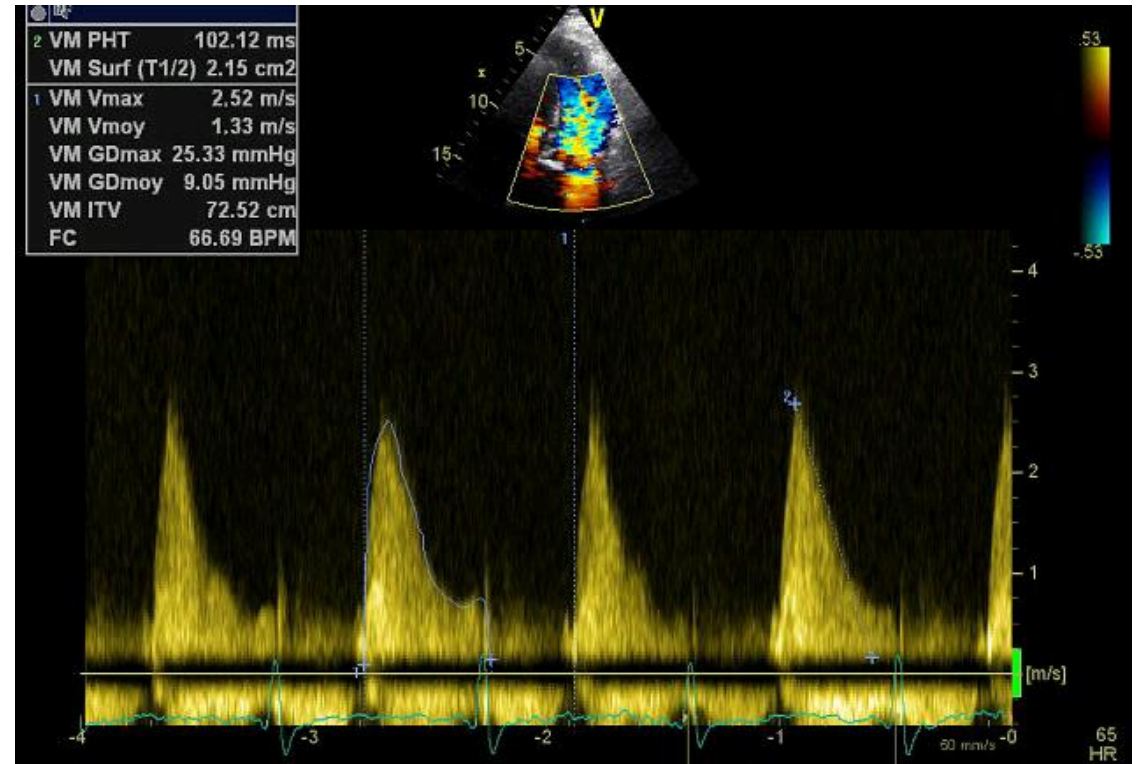
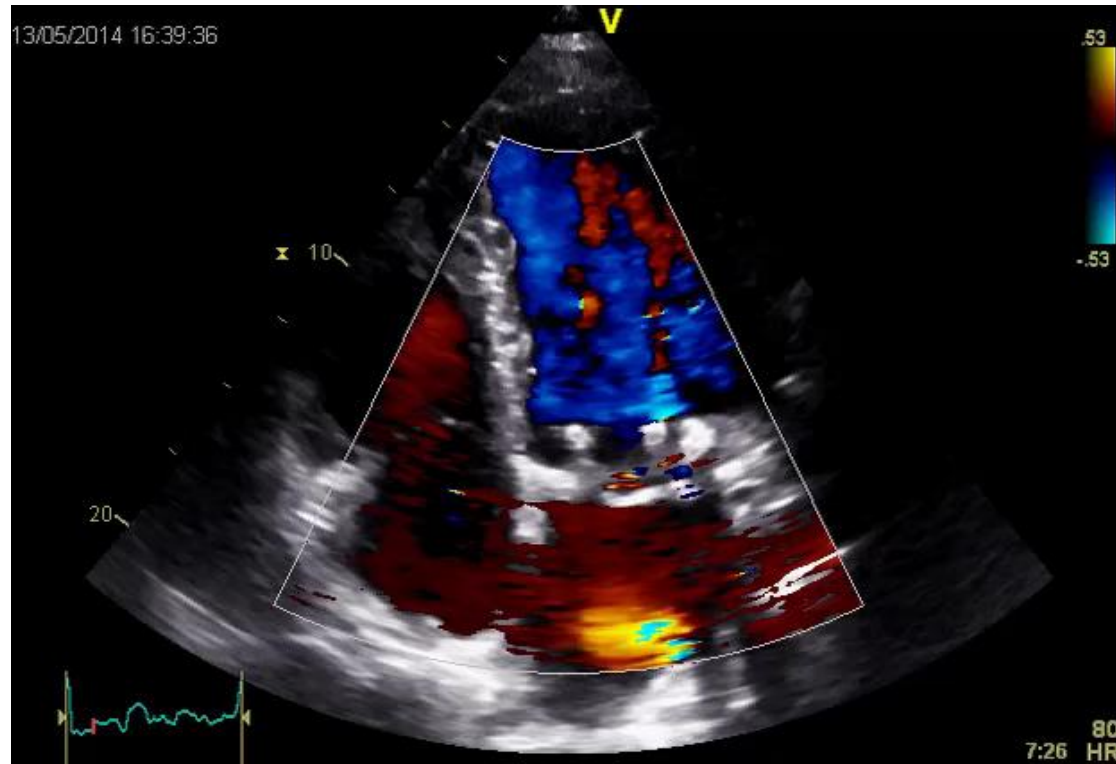
Désinsertion de prothèse

- Fuite périprothétique de novo

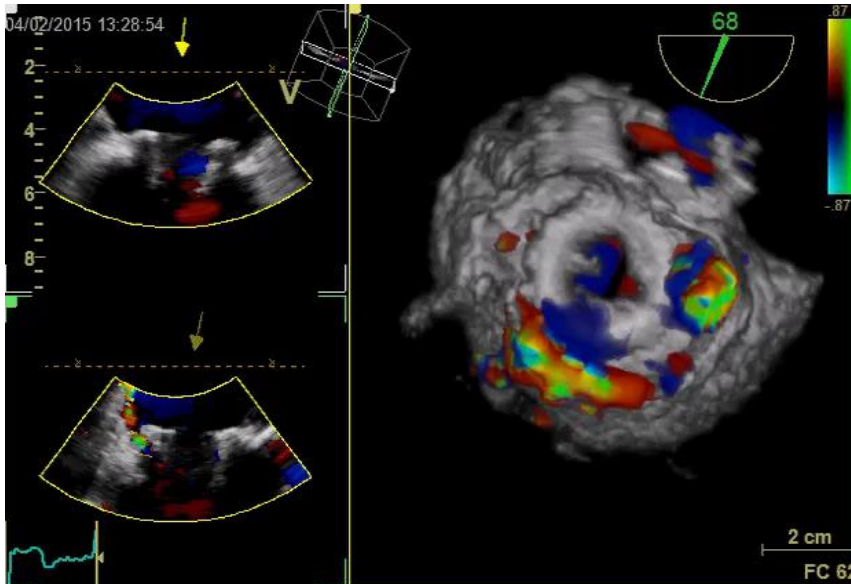
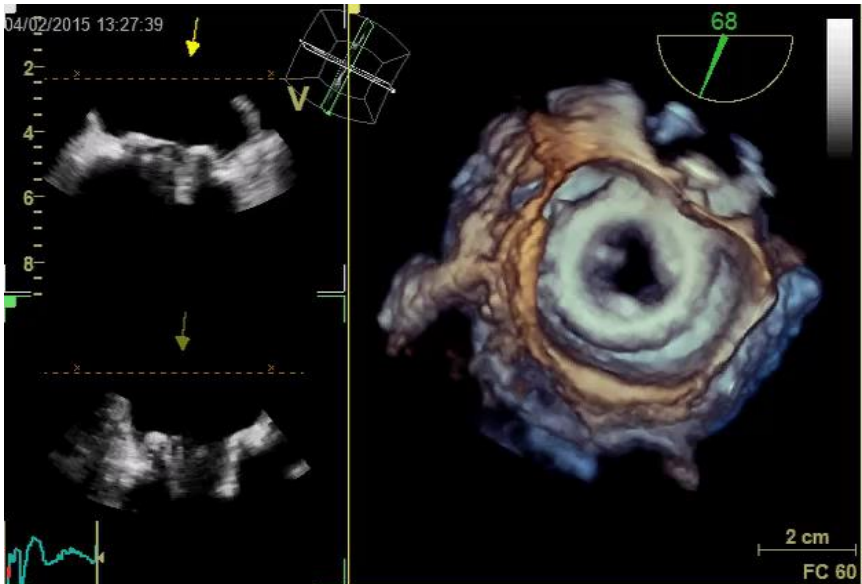
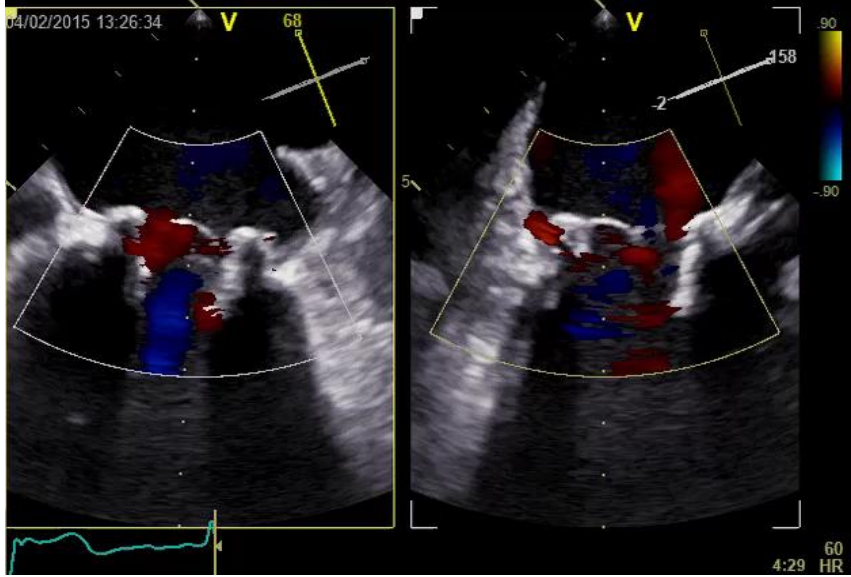
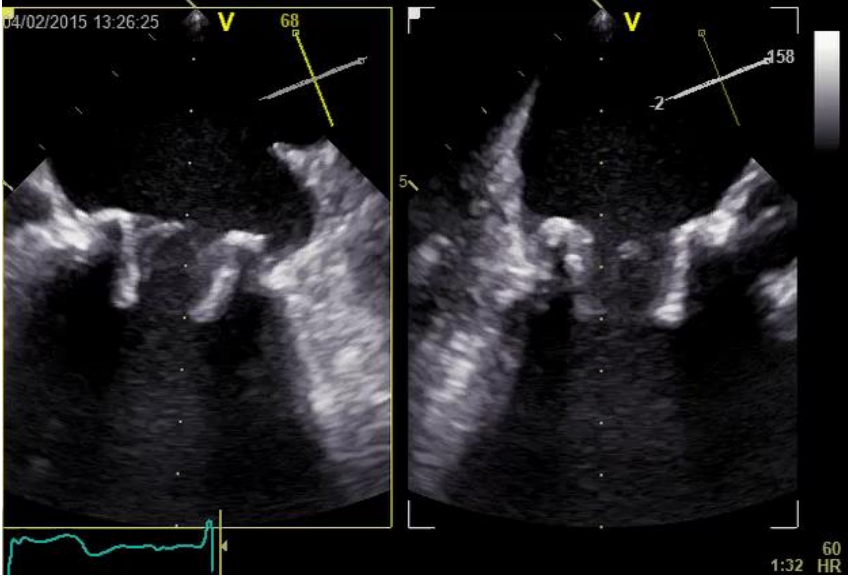


Désinsertion de prothèse

- Élévation du gradient moyen
- Accélération « visuelle » du flux antérograde



Désinsertion de prothèse : fuite périprothétique

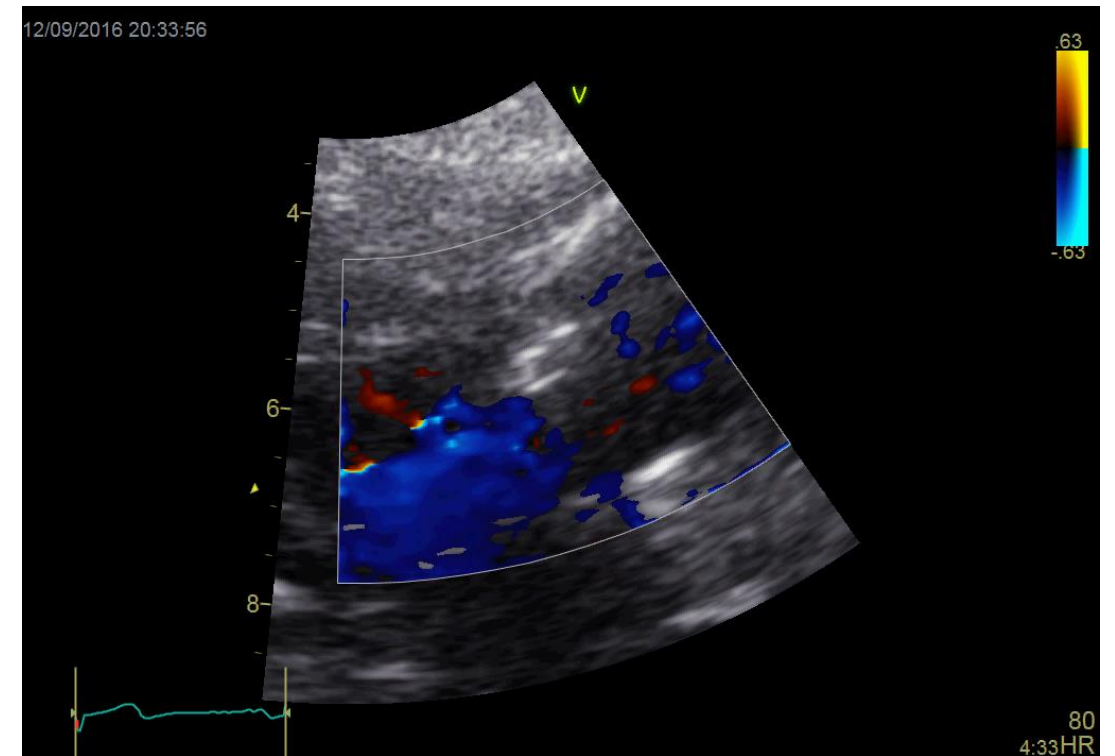
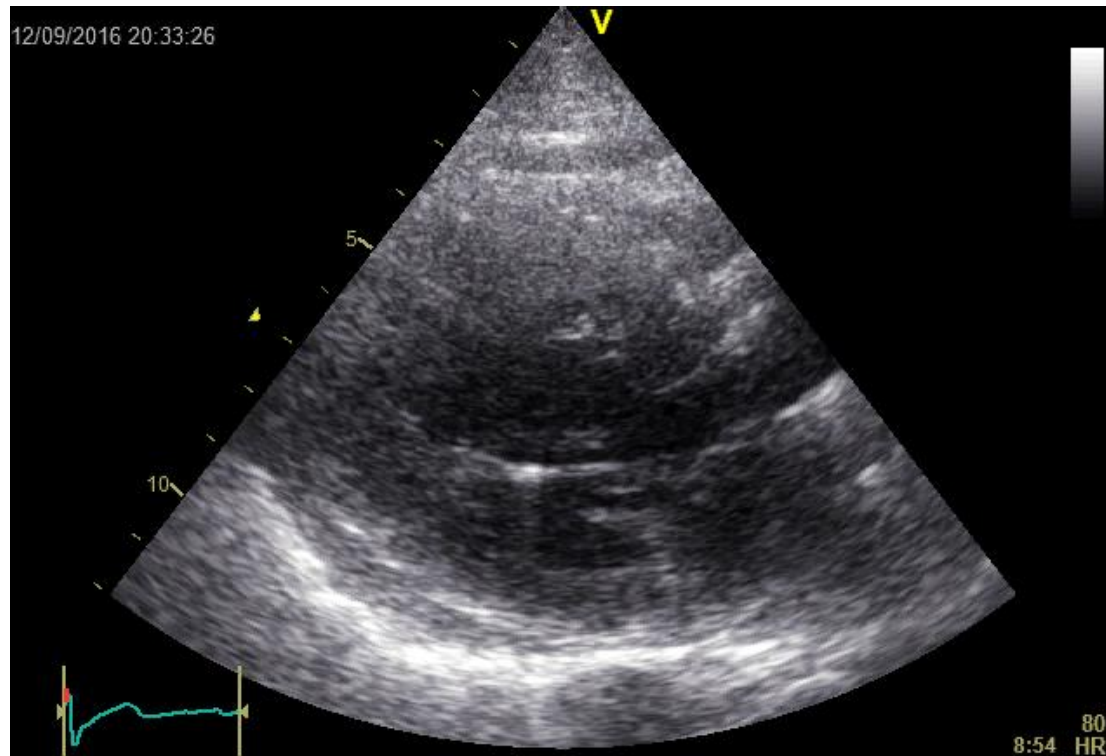


Thrombose de prothèse

- Concerne les valves mécaniques +++, 2 types de manifestation
- Blocage partiel ou complet du jeu de la valve par le thrombus
 - En position ouverte : fuite intra-prothétique
 - En position fermée : sténose
- Embols cérébraux ou périphériques
- Diagnostics différentiels : pannus pour le blocage, endocardite pour les embols...

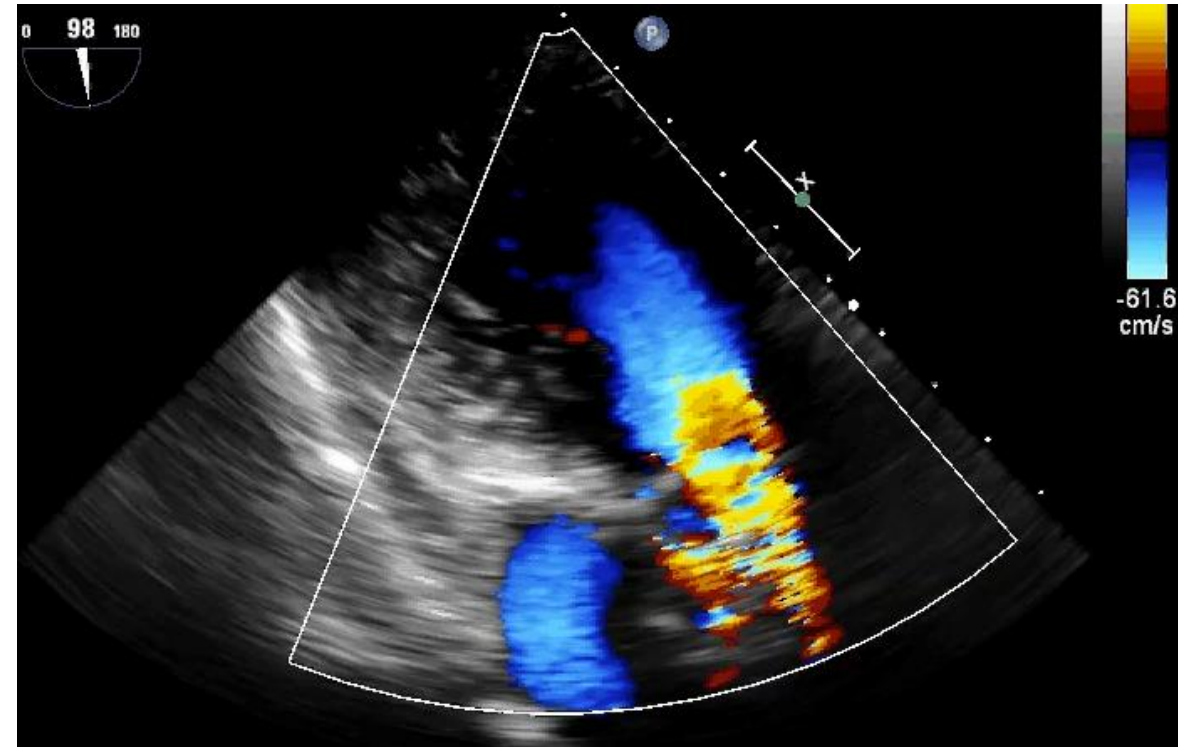
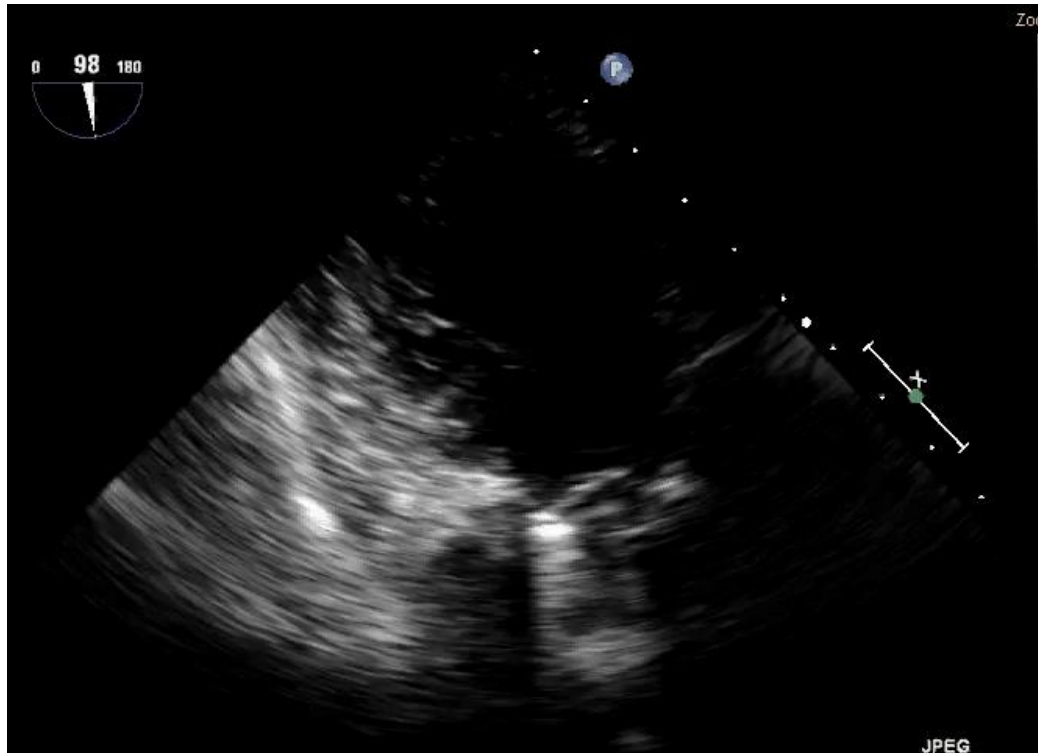
Valve mécanique : quand s'alerter

- Ailette(s) bloquée(s)
- Fuite intraprothétique $> \frac{1}{4}$



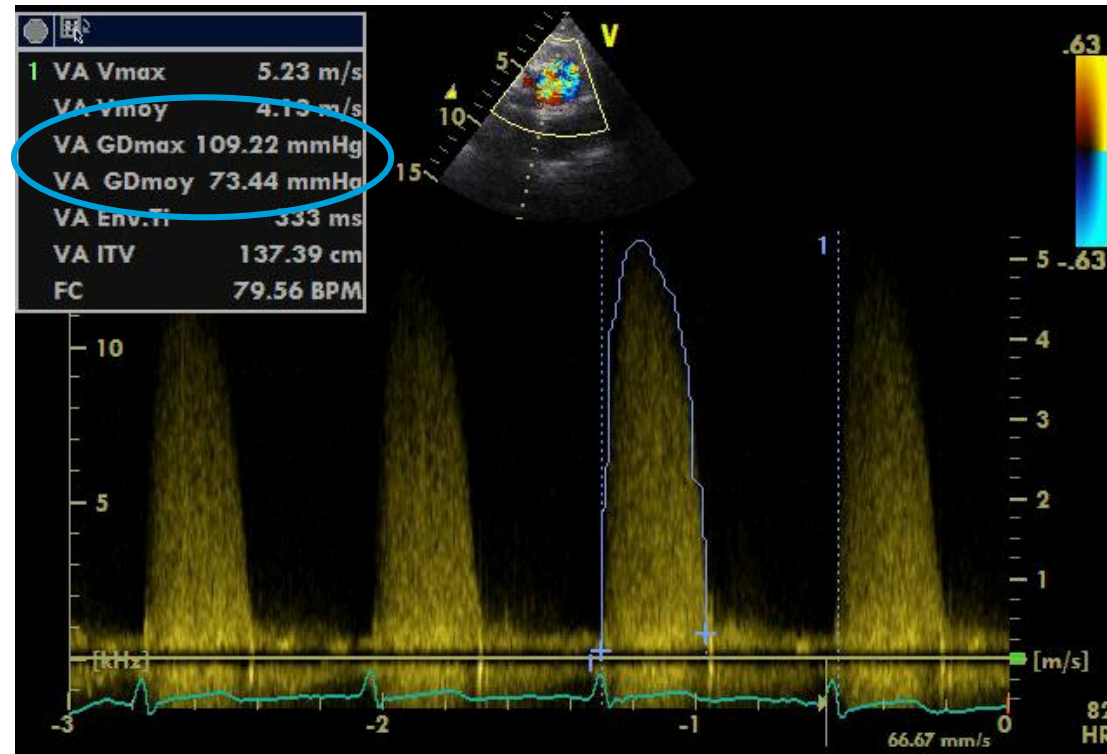
Valve mécanique : quand s'alerter

- Ailette(s) bloquée(s)
- Fuite intraprothétique $> \frac{1}{4}$



Valve mécanique : quand s'alerter

- Augmentation des gradients transprothétiques



Pannus

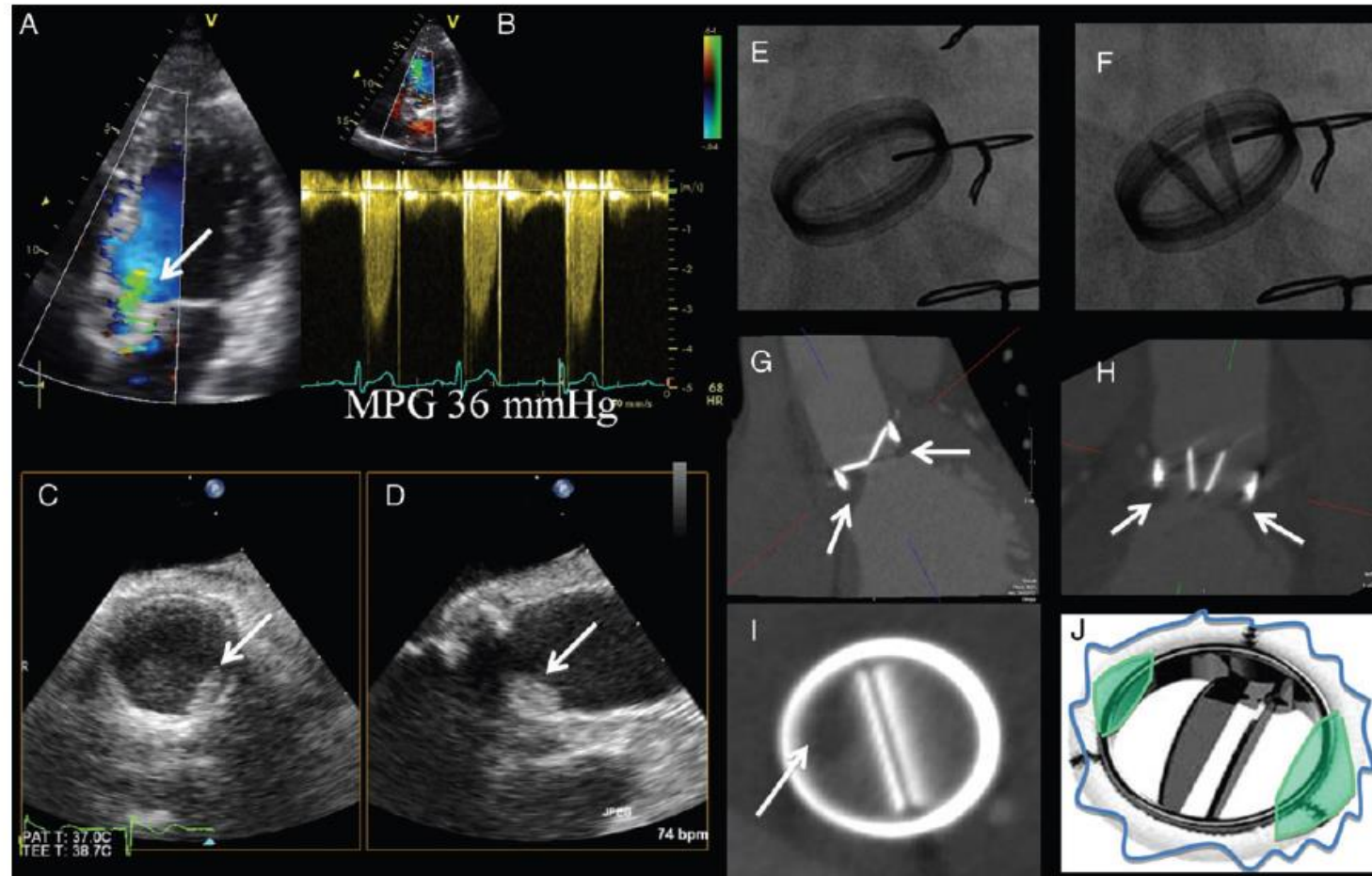
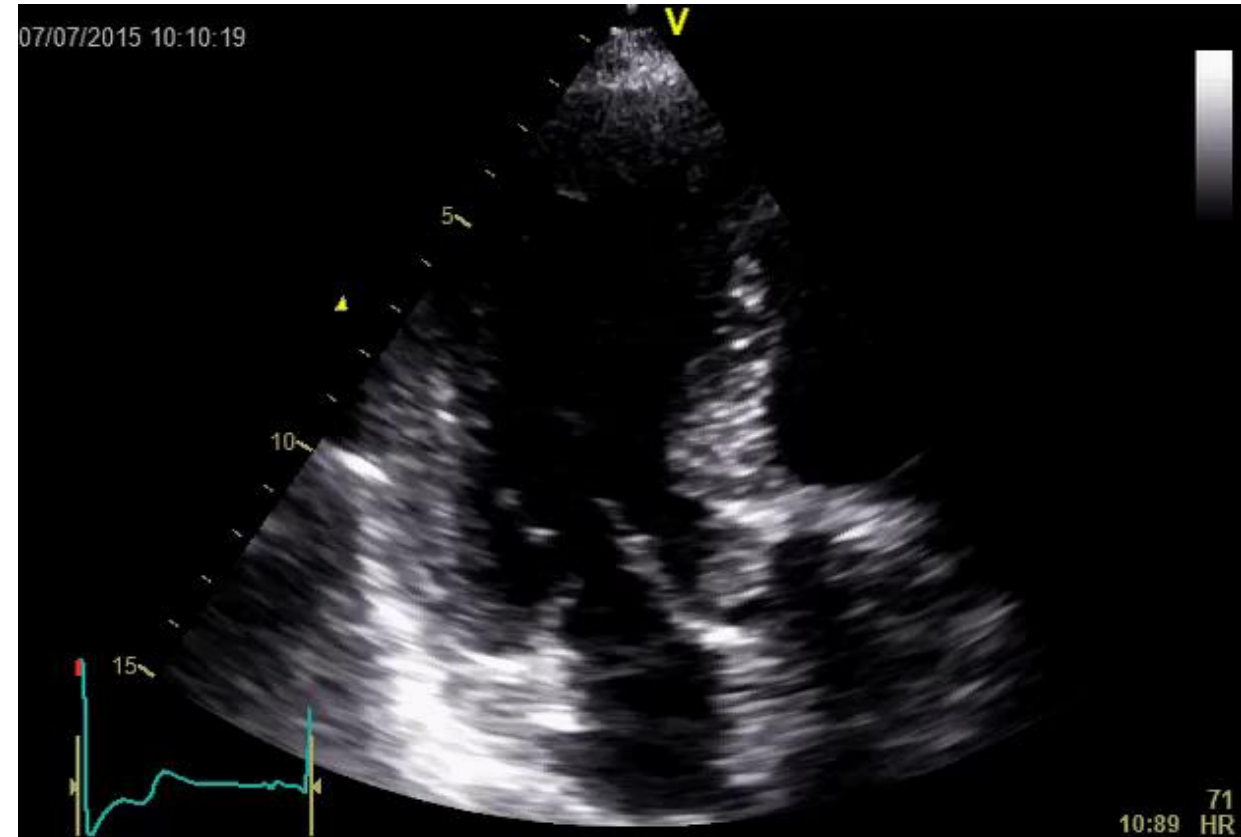
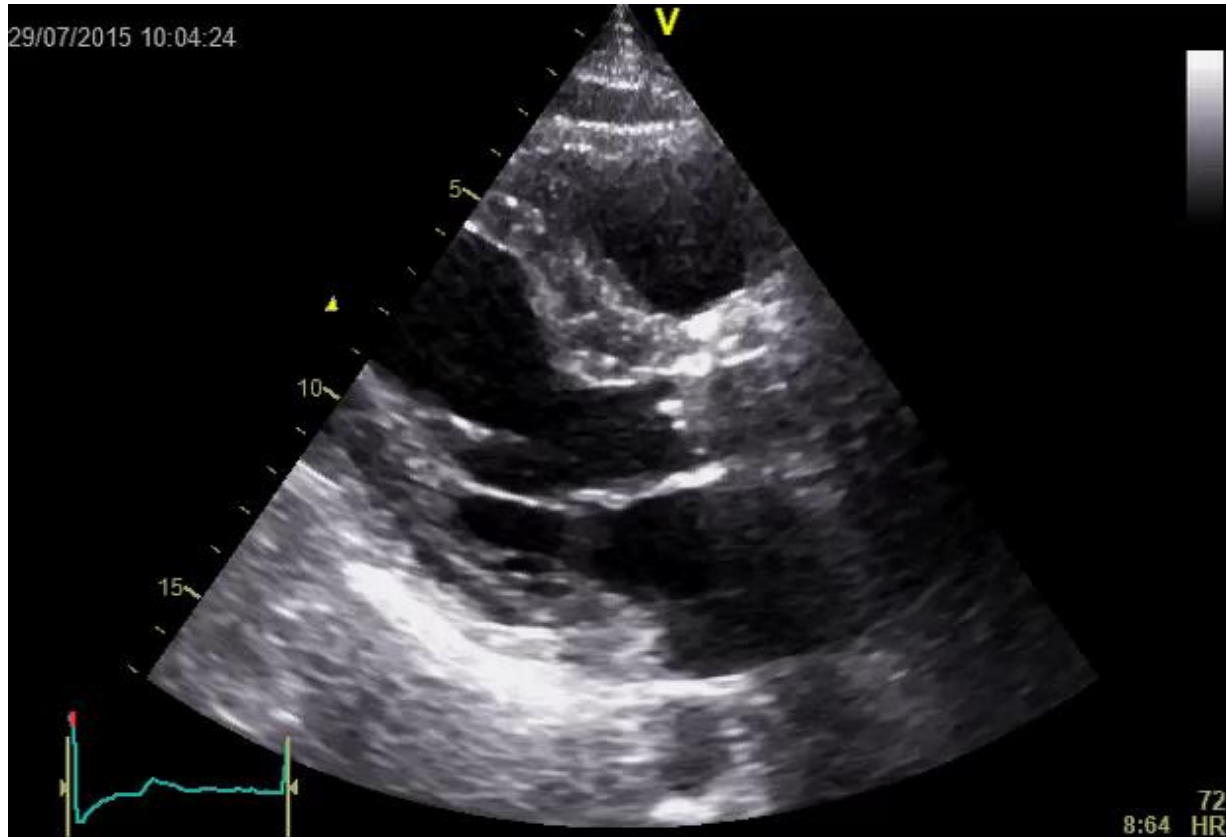


Figure 10 Mechanical valve in aortic position and pannus. Flow acceleration of the anterograde flow is identified with colour flow imaging from the transthoracic apical approach (A). High-pressure gradients are documented with continuous wave Doppler from the same approach, mean pressure gradient (MPG) 36 mmHg (B). 2D transoesophageal echocardiography enforces the suspicion of prosthesis obstruction by revealing a hyperechoic mass on the prosthesis (C and D, white arrows). Cinefluoroscopy shows abnormal opening and closing angle for this type of prosthesis (E and F). Cardiac computed tomography (CT) scan is in favour of a pannus ingrowth on the prosthesis that blocks the normal movement of the tilting disks (G, H, and I, white arrows). A schematic representation is summarized in J.

Endocardite

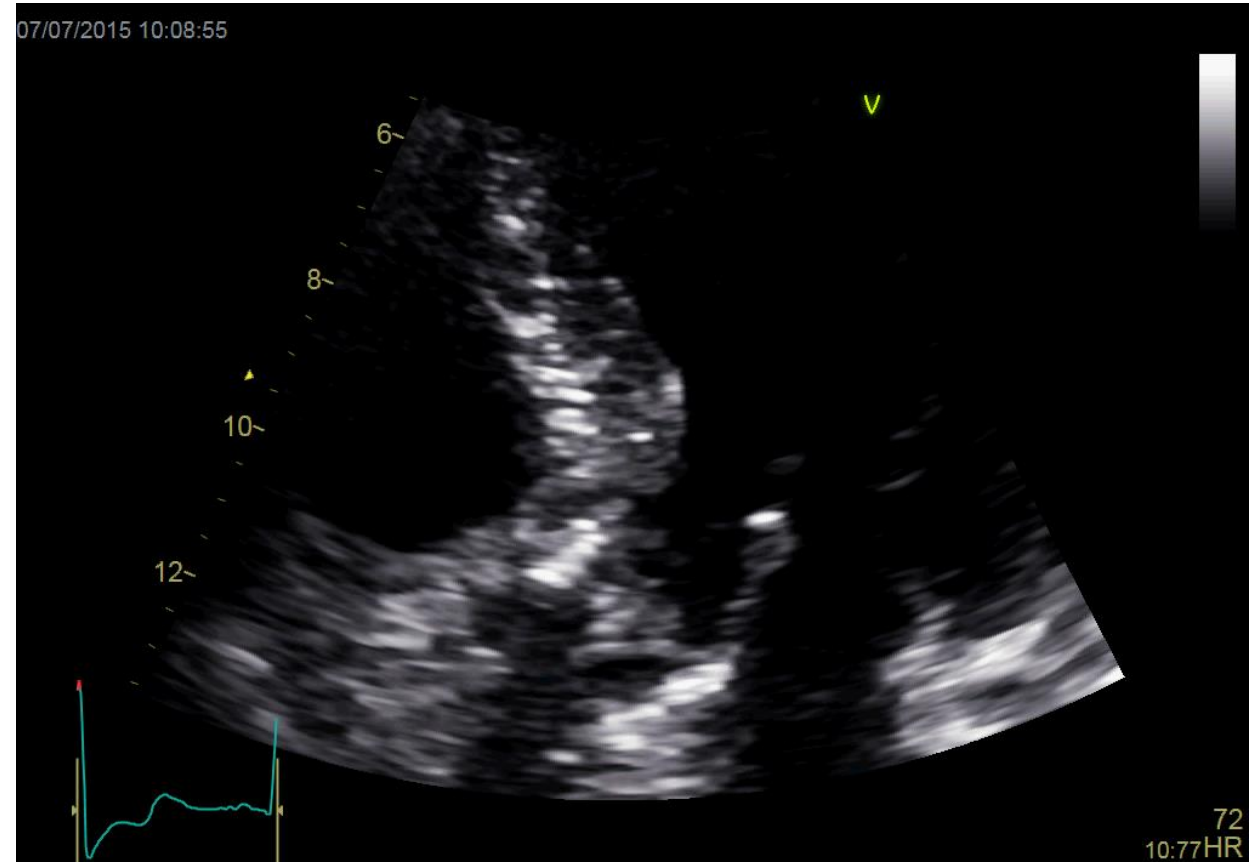
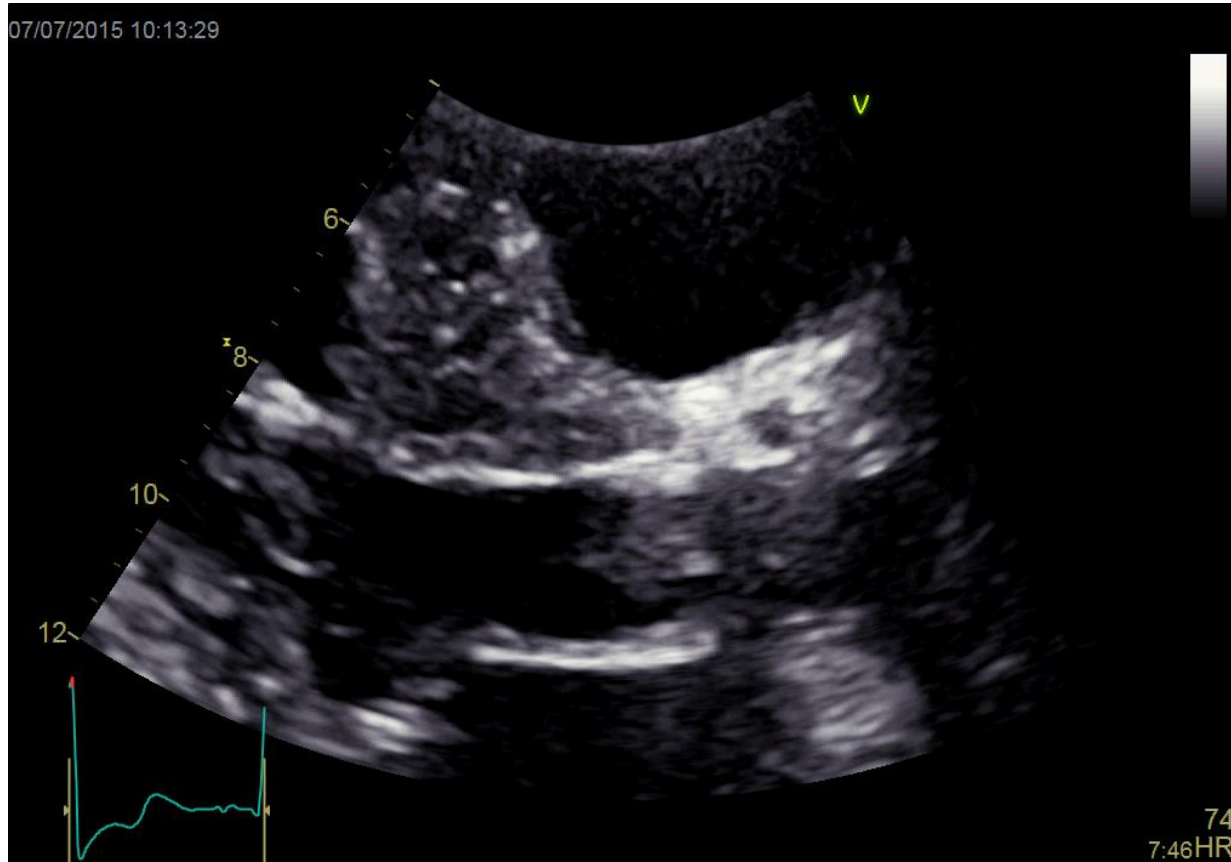
- Polymorphe ++
- Peut se manifester par une végétation, une désinsertion, une sténose, mimer une thrombose...
- Devant une dysfonction de prothèse :
 - Hémocultures systématiques
 - Bilan inflammatoire systémique
 - +/- TEP scan ou Scintigraphie aux leucocytes marqués (p.ex pré-TAVI ViV)

Endocardite : image d'addition



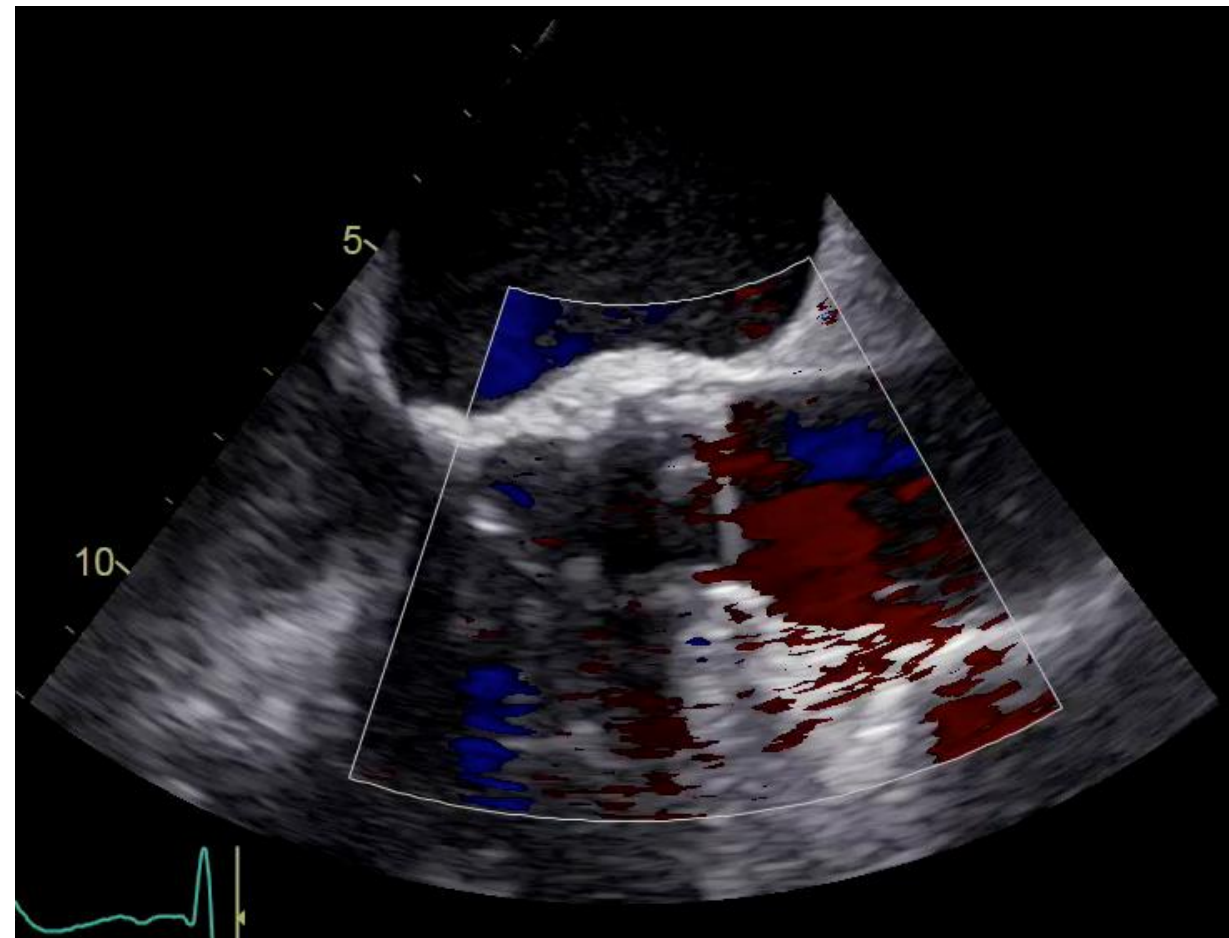
RVA biologique

Endocardite : image d'addition

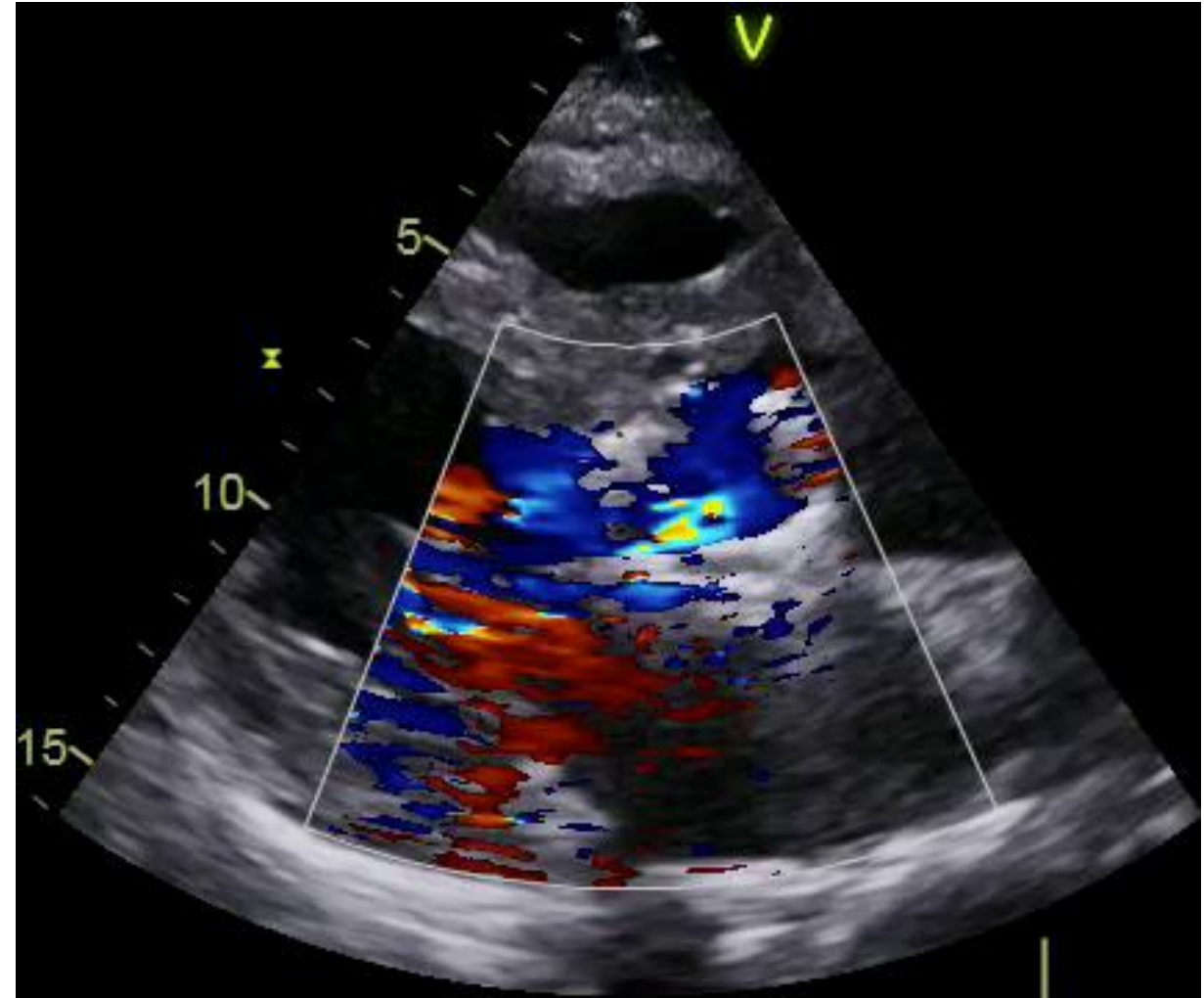
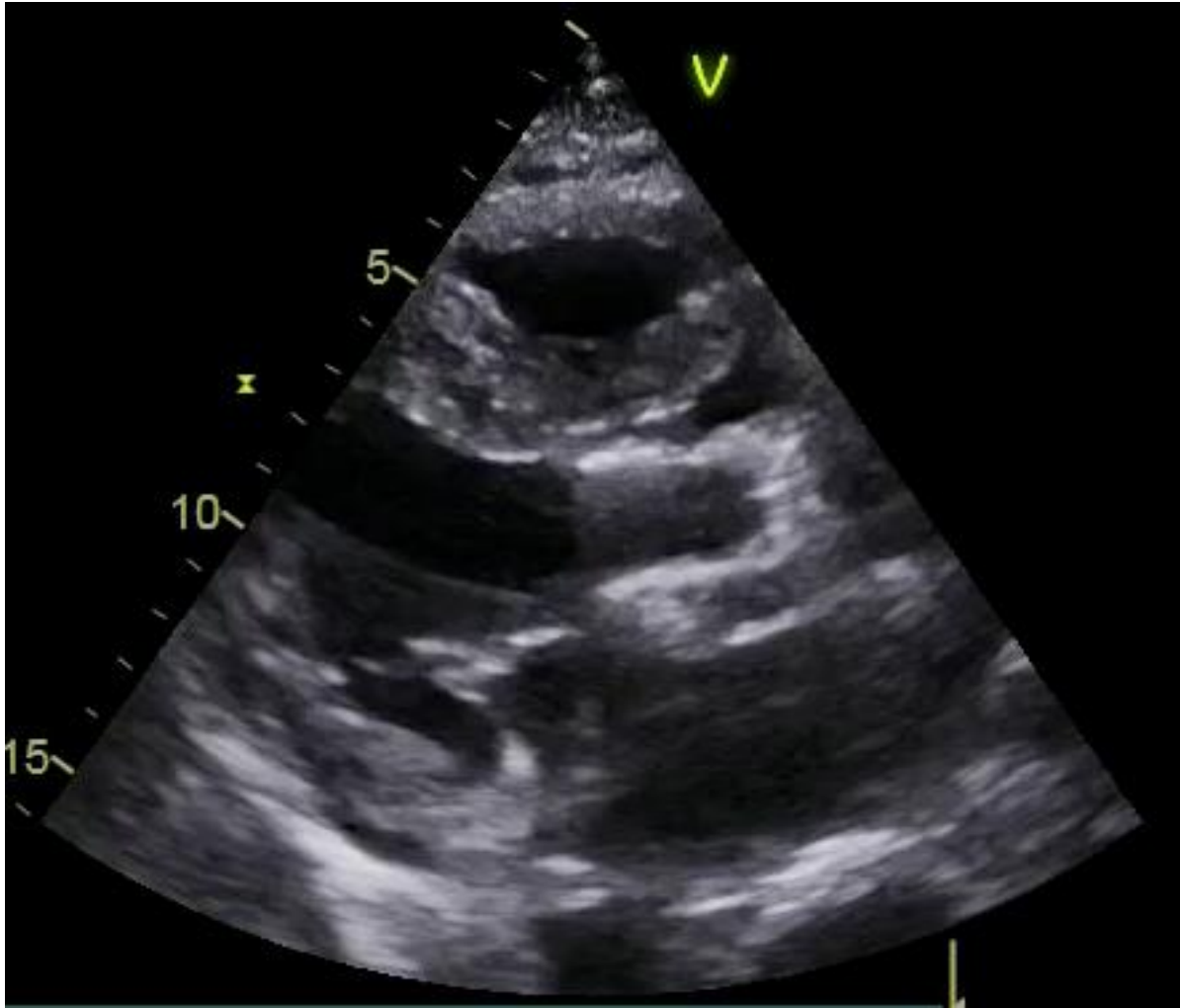


TAVI (SAPIEN)

Endocardite : sténose

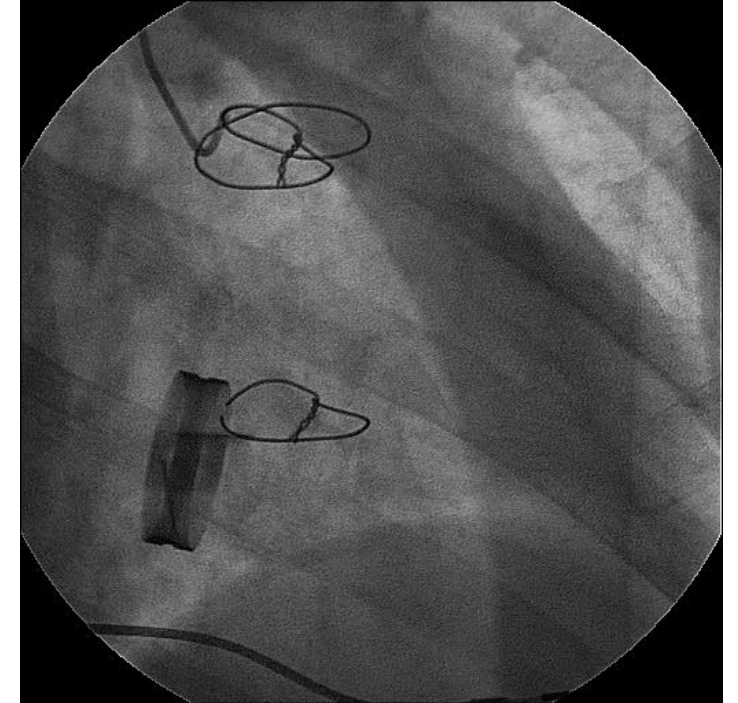


Endocardite : désinsertion et fuite

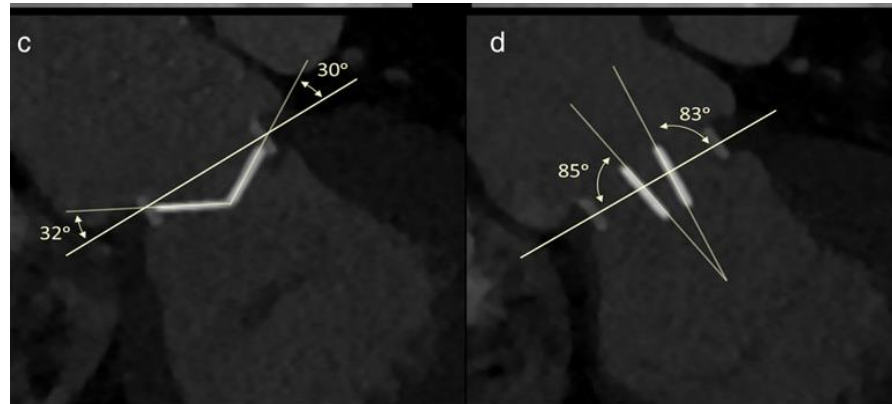


Imagerie multimodale

- Radiociné de valve (valves mécaniques)



- Scanner



- TEP, échographie d'effort, IRM cardiaque

Autres éléments

- Retentissement
 - HTAP
 - Dysfonction VG, HVG...
- Autre valvulopathie
- Comparaison aux résultats antérieurs

Conclusions

- Manifestations polymorphes
- Plusieurs étiologies possibles pour un même phénomène
- ...Plusieurs manifestations pour une même étiologie
- Toujours penser à l'endocardite
- Imagerie multimodale

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Merci pour votre attention



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