

Anomalies mitrales

2026

Dr Xavier IRIART

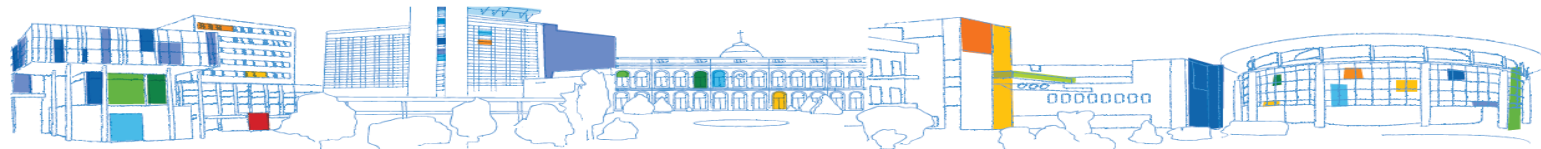


Epidémiologie

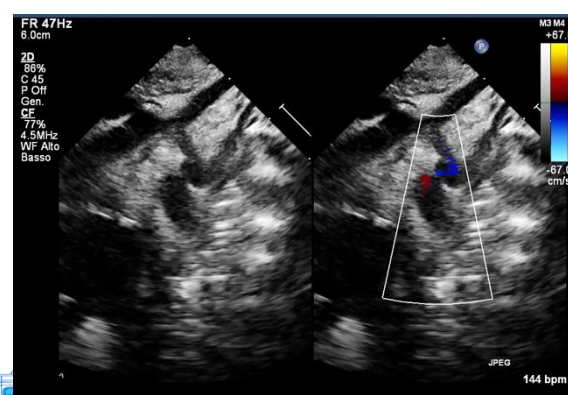
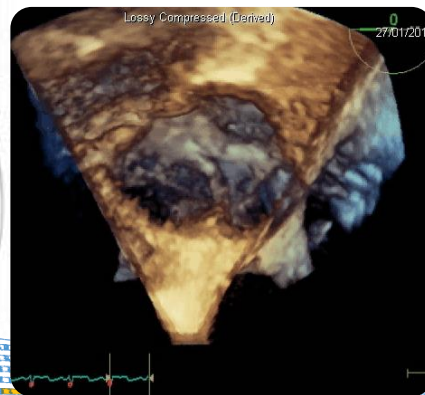
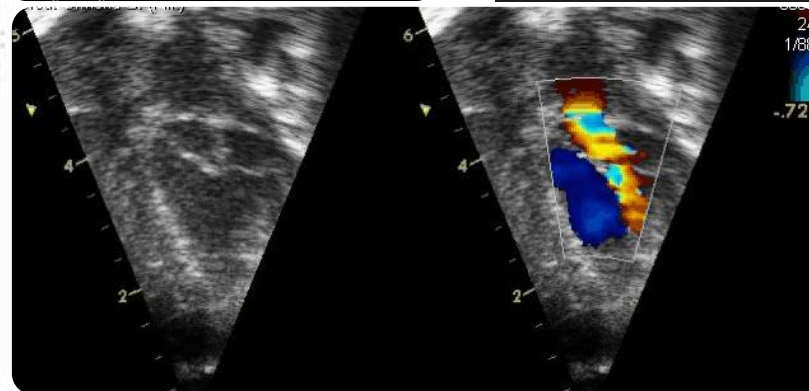
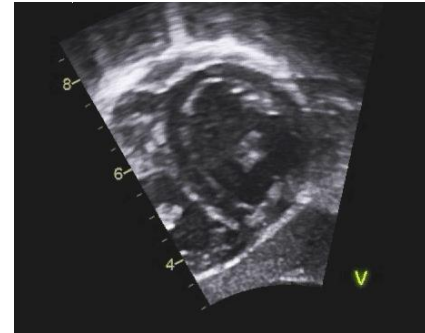
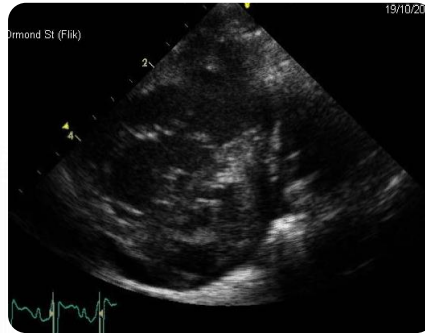
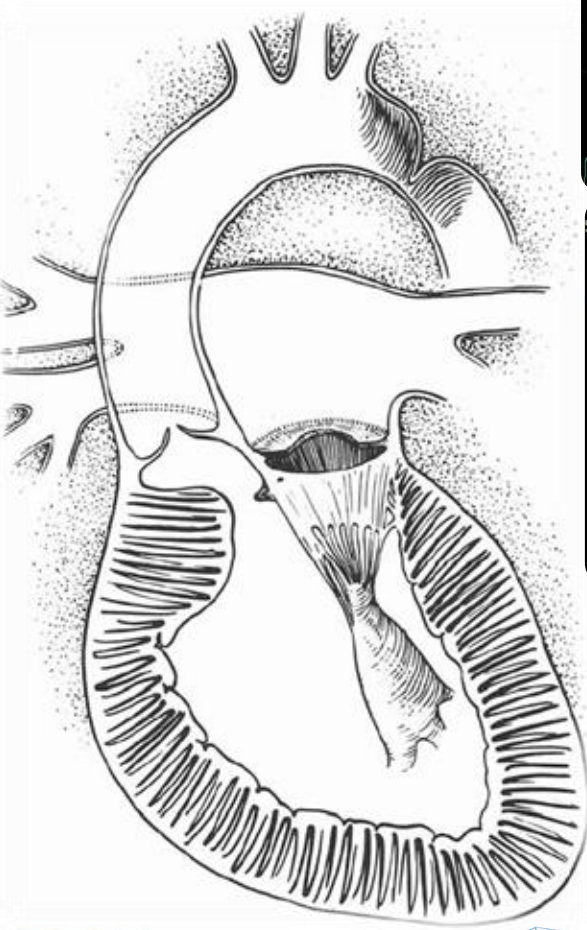
- Prévalence: 0.5%
 - Parachute: 0.17%
 - Anneau supra-mitral: 0.15%
 - Cleft: 0.07%
 - double orifice: 0.05%
- Rarement isolées +++
 - Syndrome de Shone: 35%
 - Anomalies du cœur gauche: 76%
- Physiopathologie:
 - IM:72%
 - Sténose:13%
 - IM + Sténose: 15%

Fuller et al. Semin Thorac Cardiovasc Surg Pediatr Card Surg Ann 2009

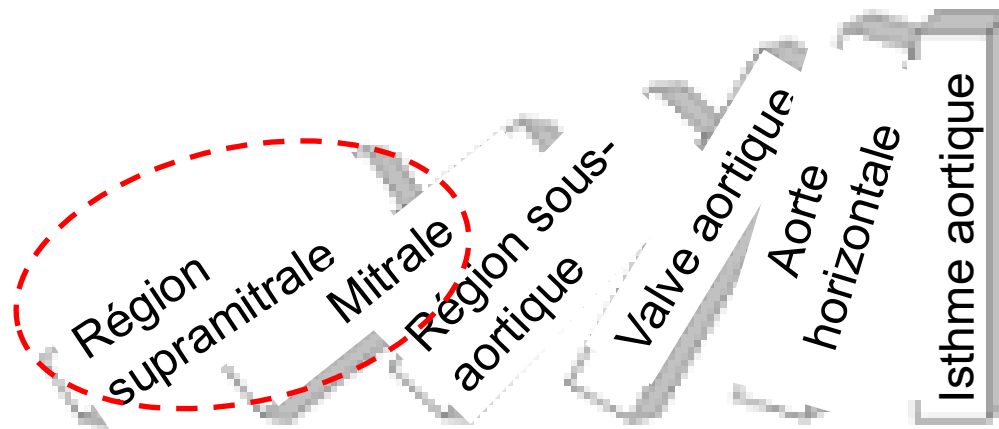
Banerjee et al. Am J Cardiol 1995



Shone complex



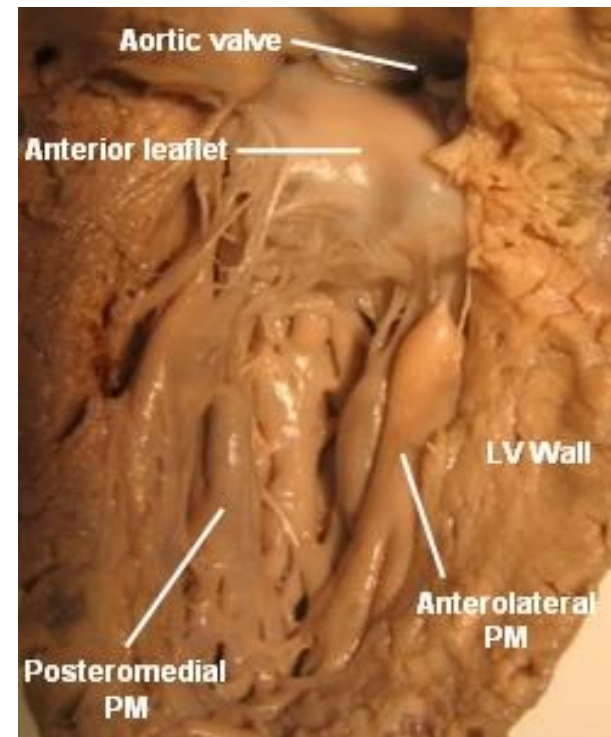
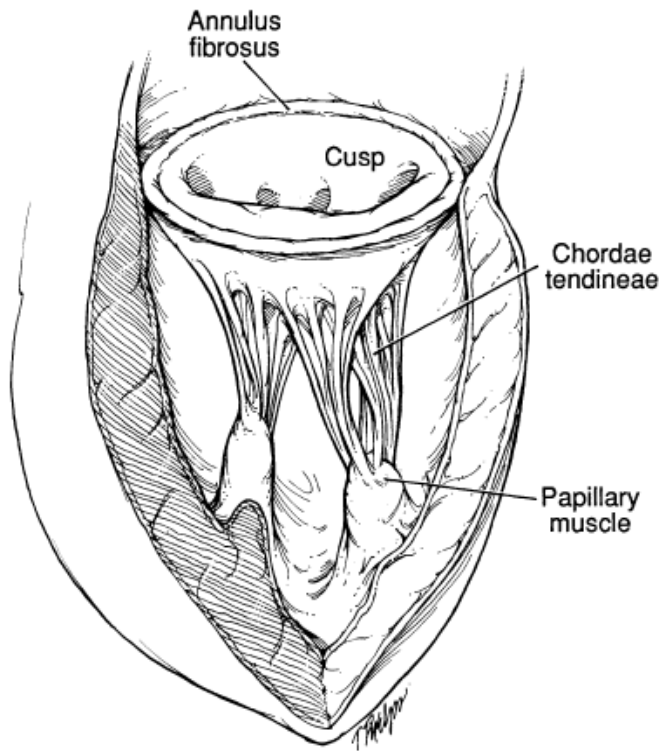
Anomalies supra mitrales et mitrales et théorie des flux



Cardiopathies de «flux»

Physiopathologie : approche holistique

- Sténose/régurgitation mitrale peut impliquer plusieurs niveaux du complexe valvulaire mitral+++

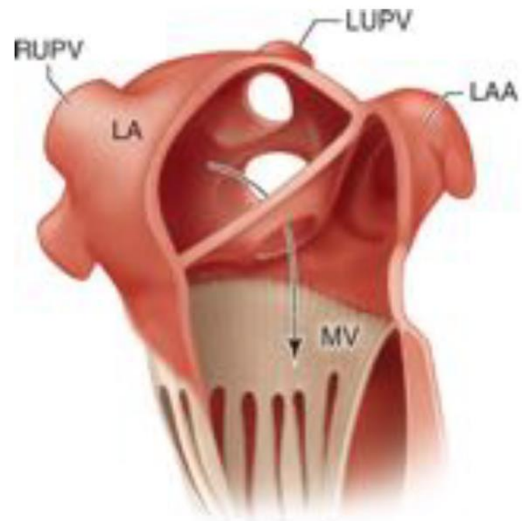


Sténoses supra-valvulaires mitrales

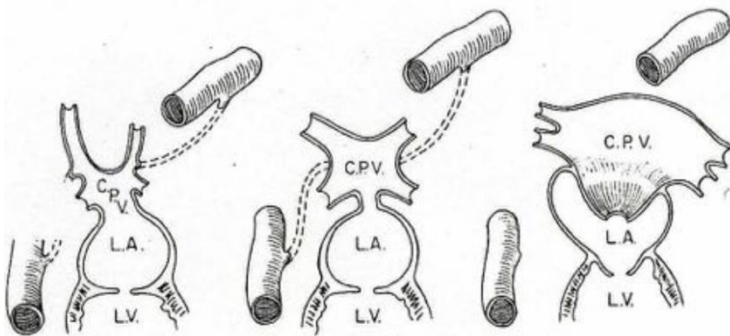
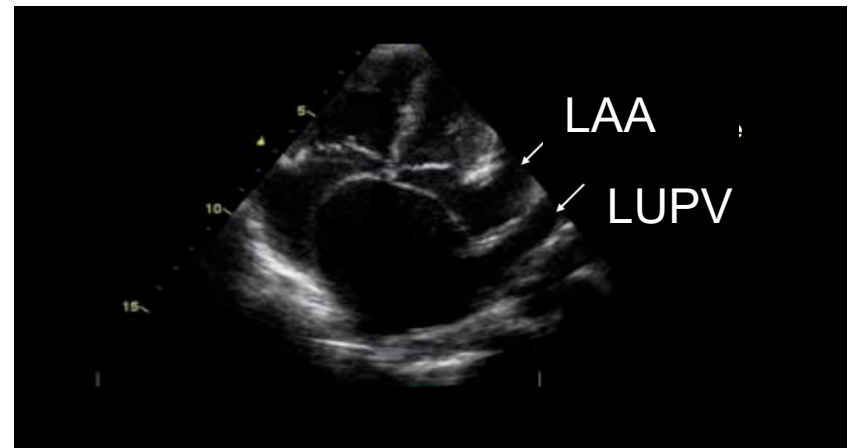
- Classification déterminée par la position de la membrane par rapport à l'AG.



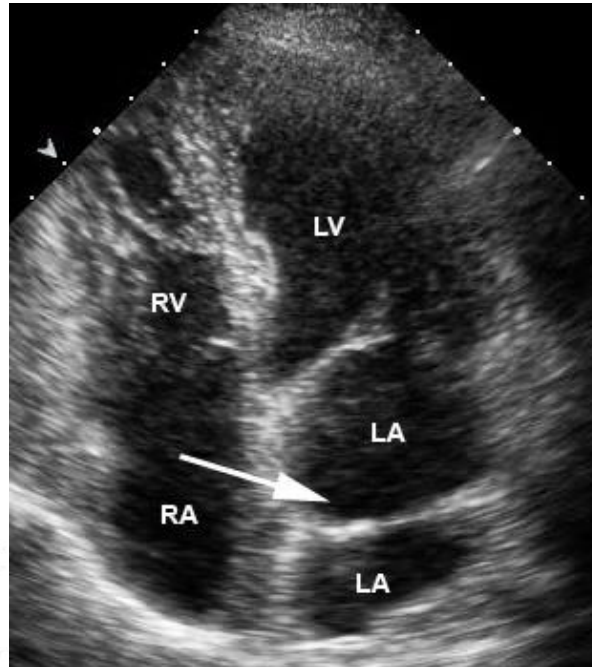
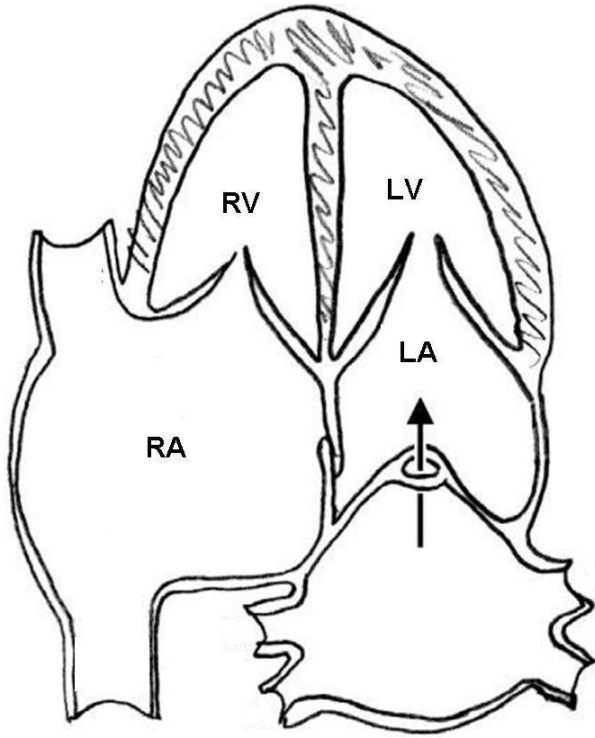
Supravalvular stenosis: cor triatrium



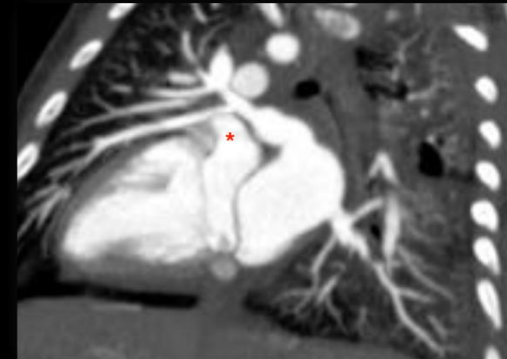
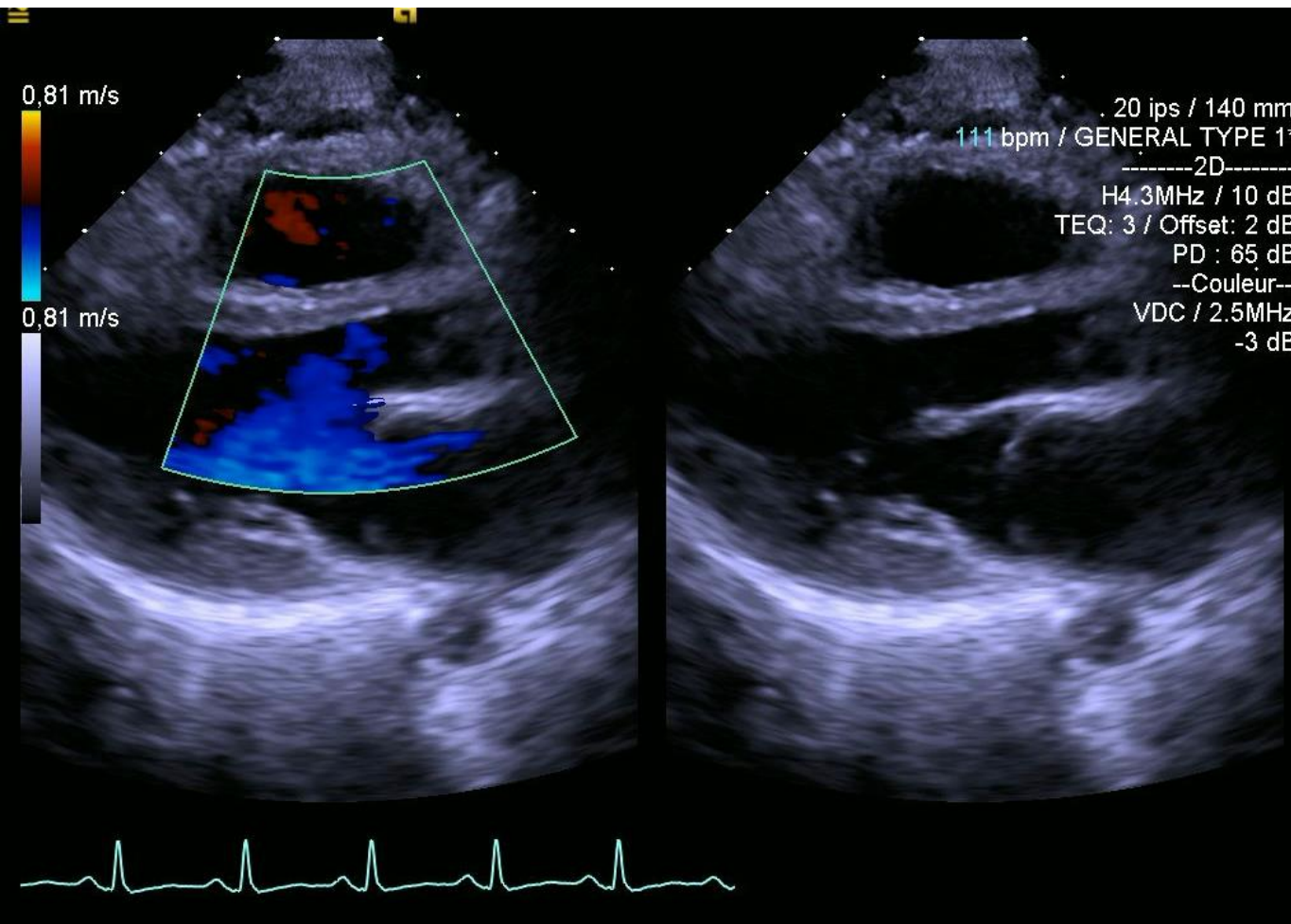
Cor triatriatum



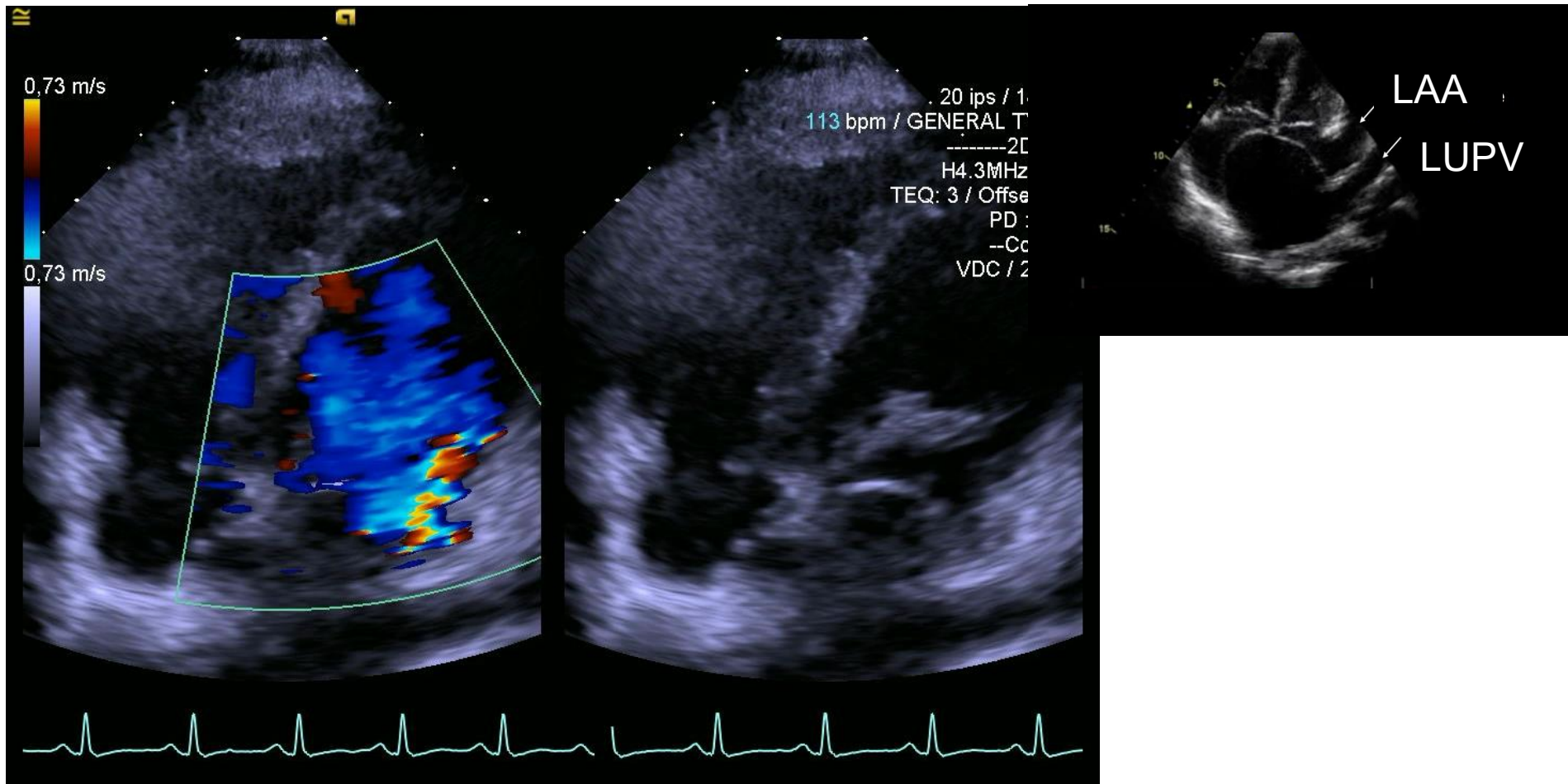
Supravalvular stenosis: cor triatrium



Supravalvar stenosis: cor triatrium



Supravalvar stenosis: cor triatrium

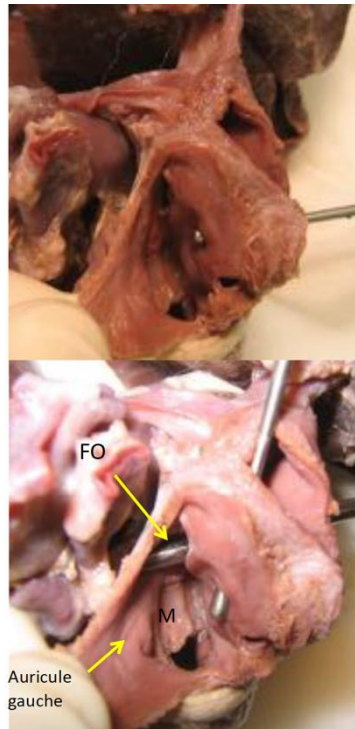


Supravalvar stenosis: cor triatrium

Cœur triatrial

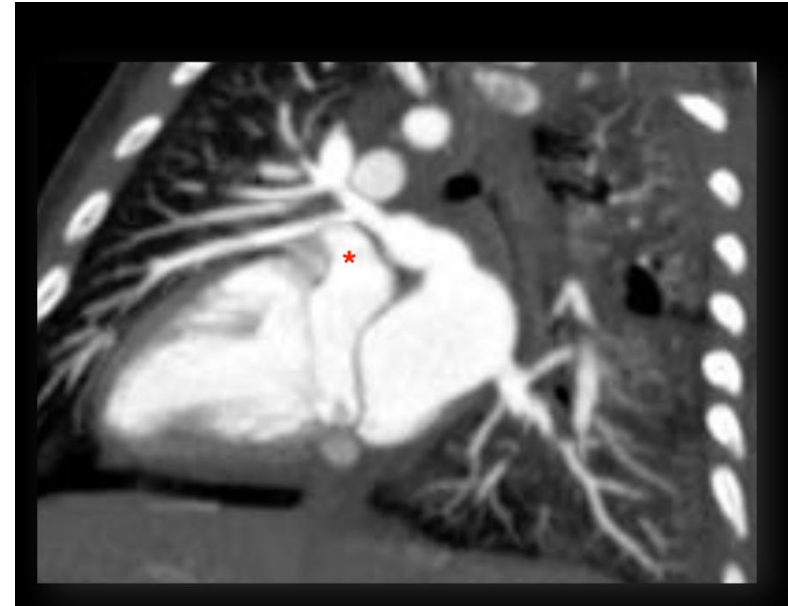


Veine pulmonaire commune

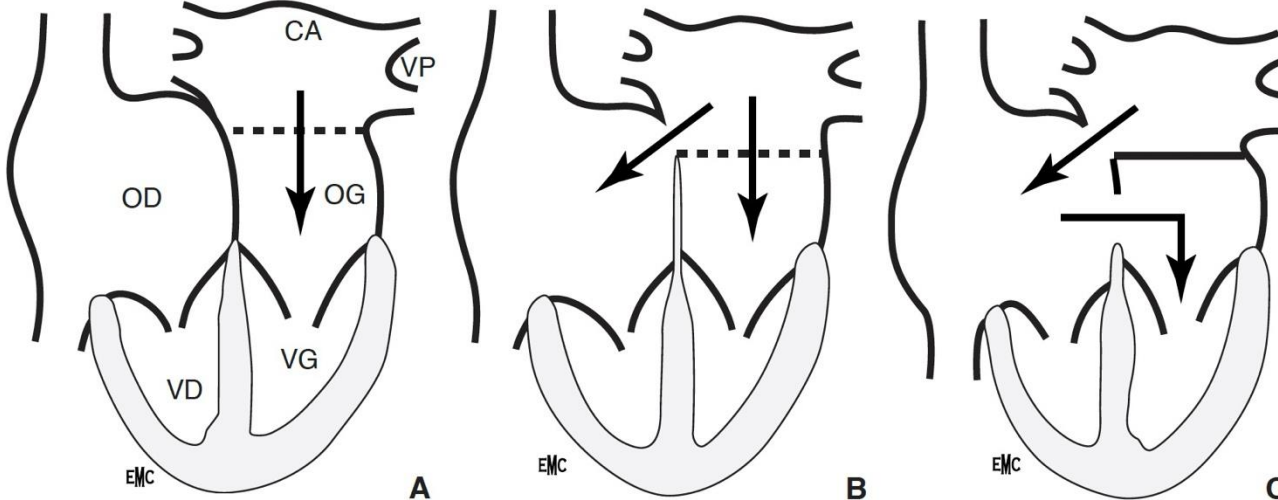


Oreillette gauche

Auricule gauche

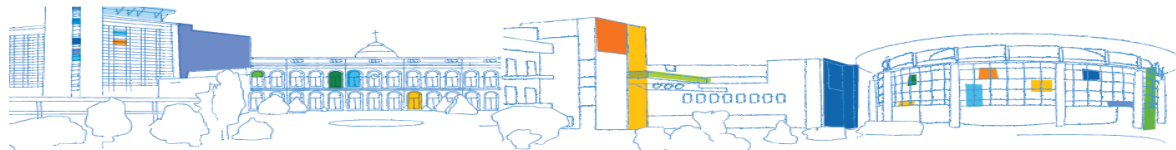
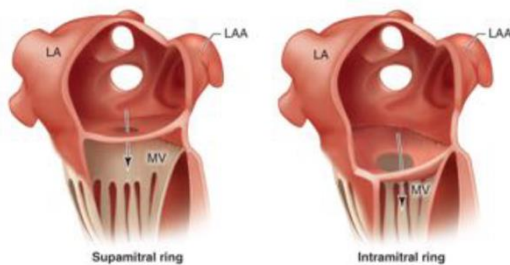
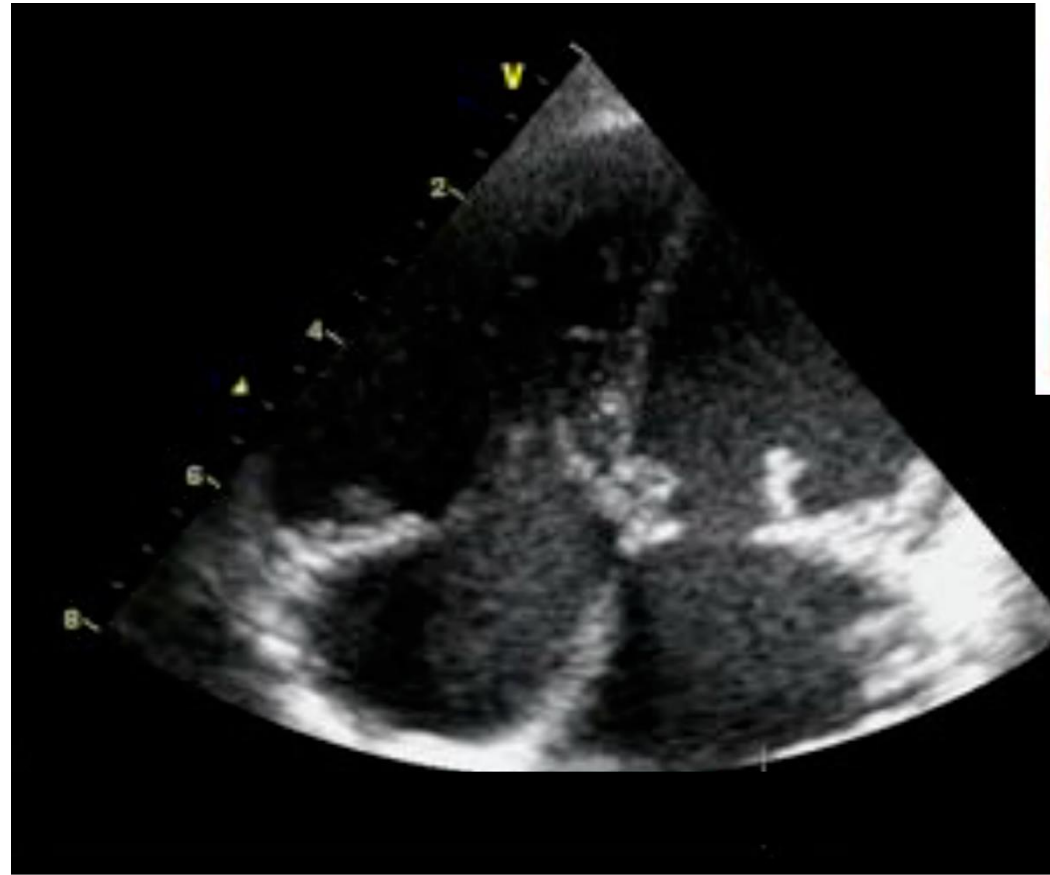


Formes anatomiques de cœur triatrial

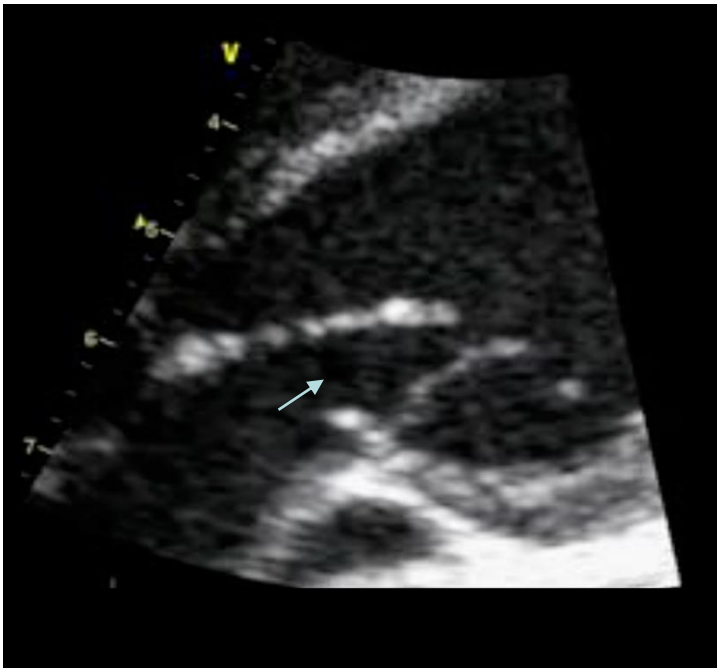


- 16** Différentes variétés de cœur triatrial.
- A. Forme habituelle : la chambre accessoire (CA) reçoit les veines pulmonaires (VP) et communique avec l'oreillette gauche (OG) au travers la membrane.
 - B. Forme avec communication de la chambre accessoire avec l'oreillette droite (OD).
 - C. Forme avec membrane imperforée ; la chambre accessoire ne communique qu'avec l'oreillette droite : communication interauriculaire ou foramen ovale assurant le remplissage de l'OG.

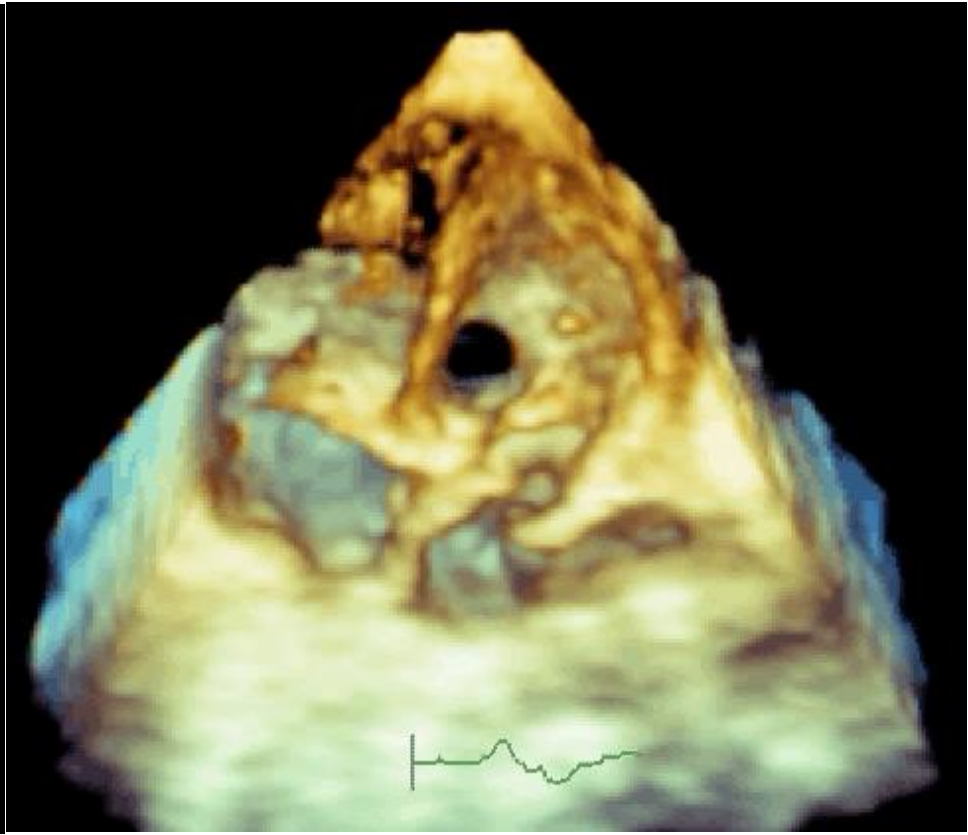
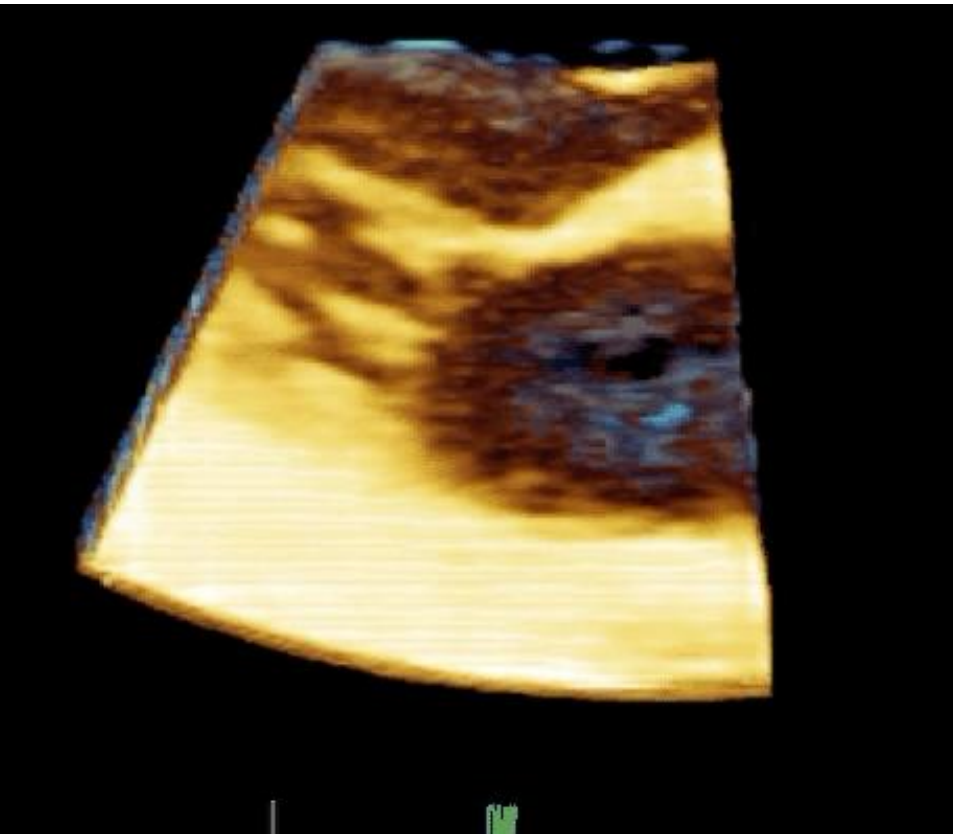
Supravalvular stenosis: supra mitral ring



Supravalvular stenosis: supra mitral ring

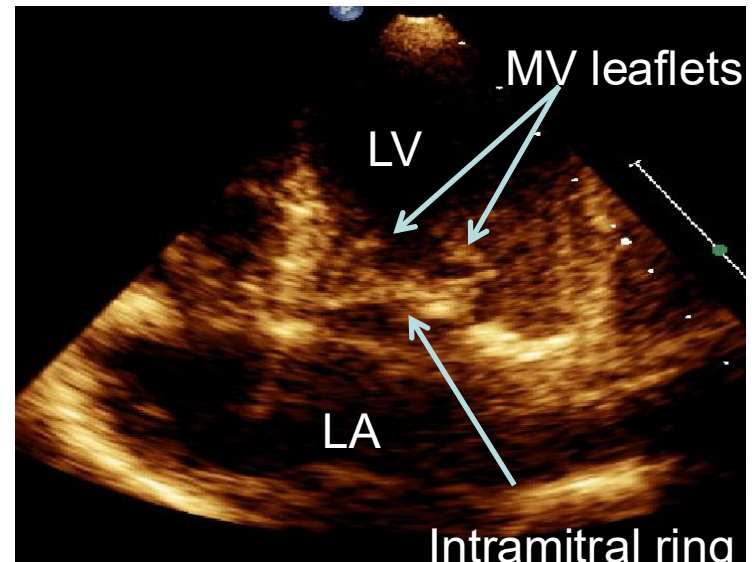
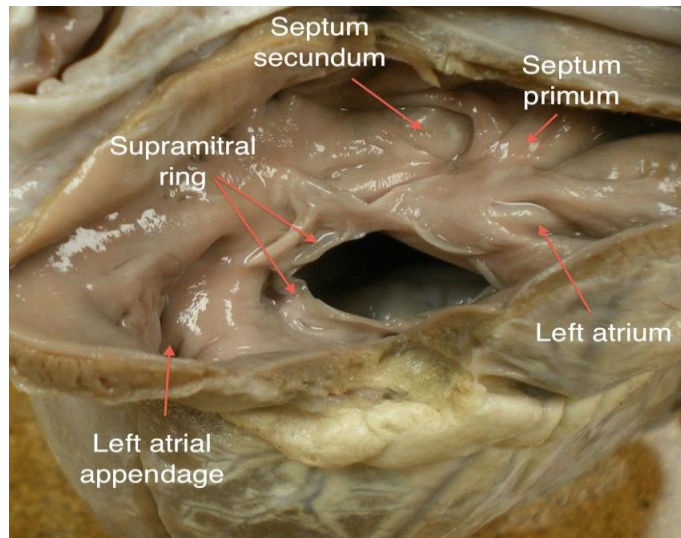


Supravalvular stenosis: supra mitral ring

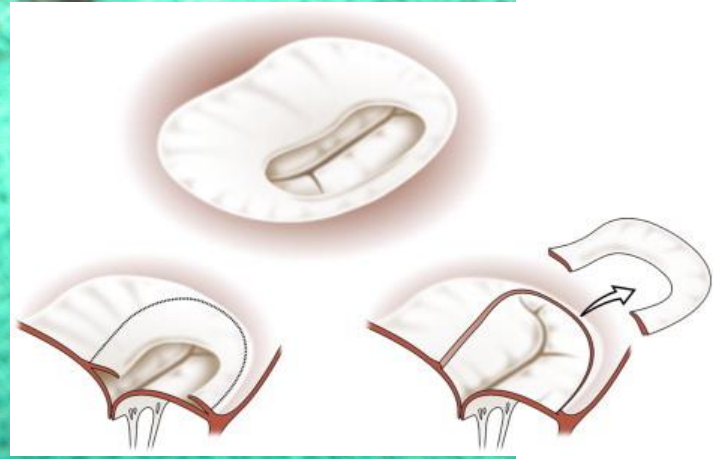
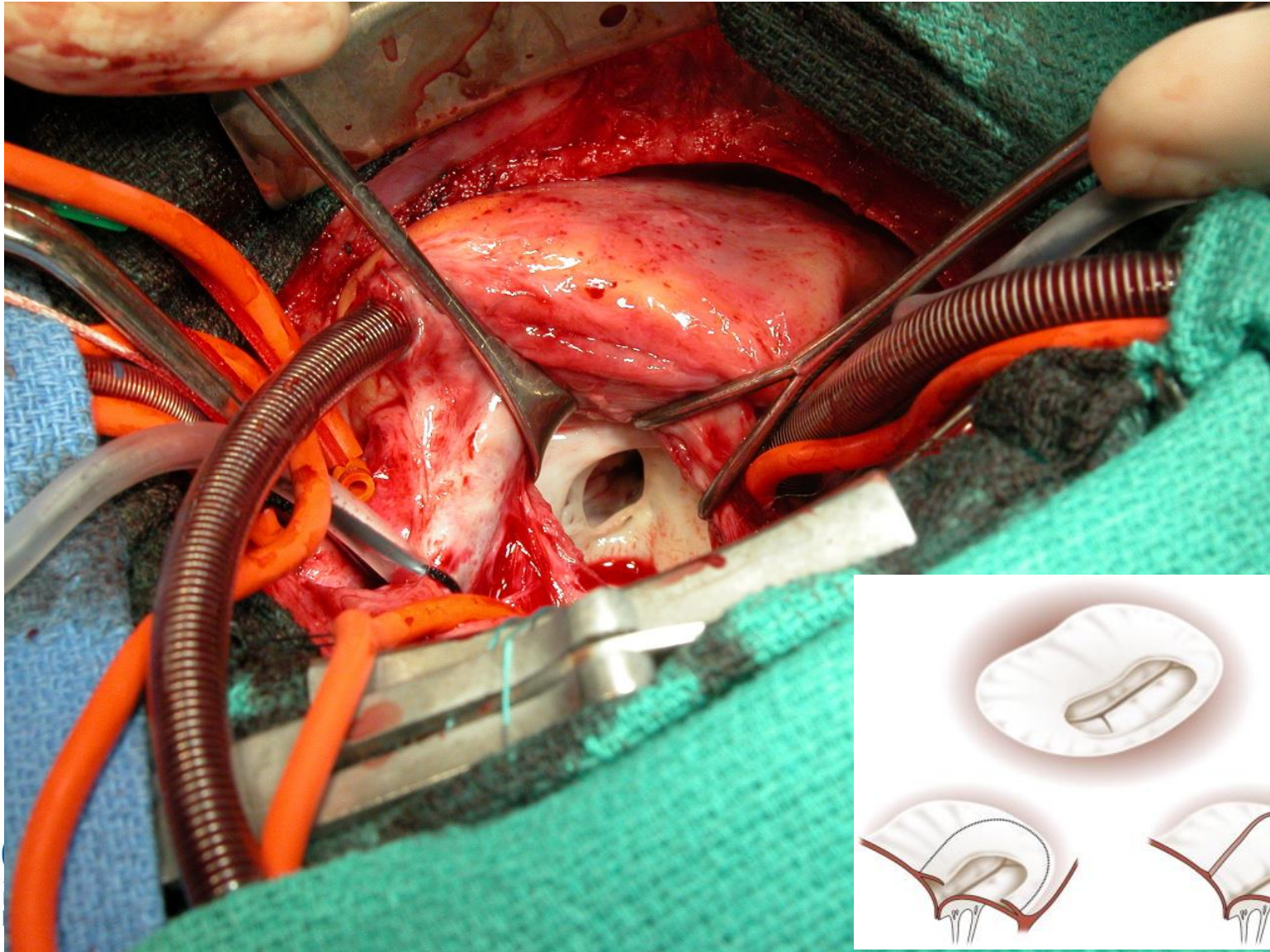


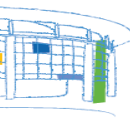
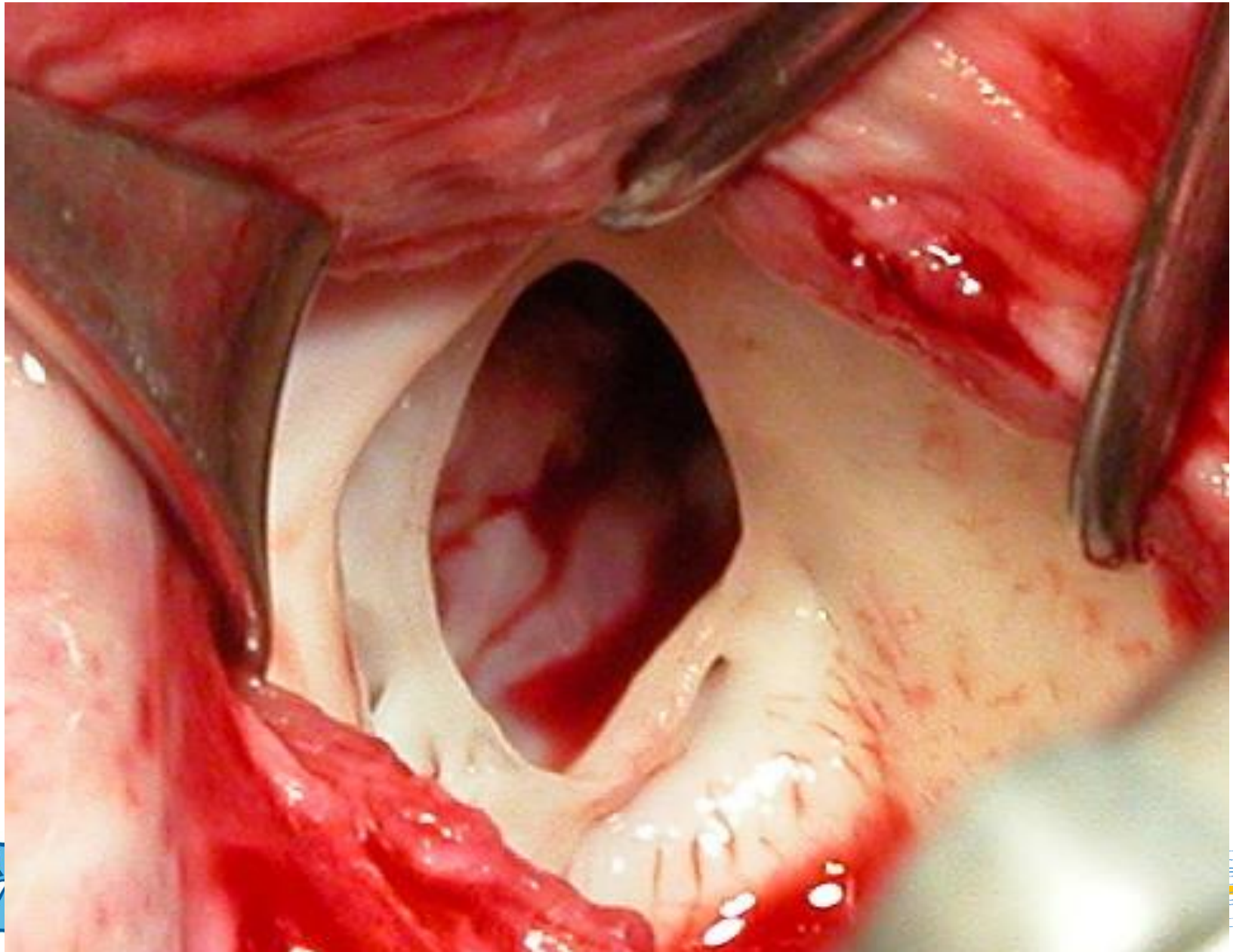
Anneau supra-valvulaire mitral

- Supra-valvulaire ou intra-valvulaire !
- Rarement isolé (obstacles du cœur gauche (Shone))

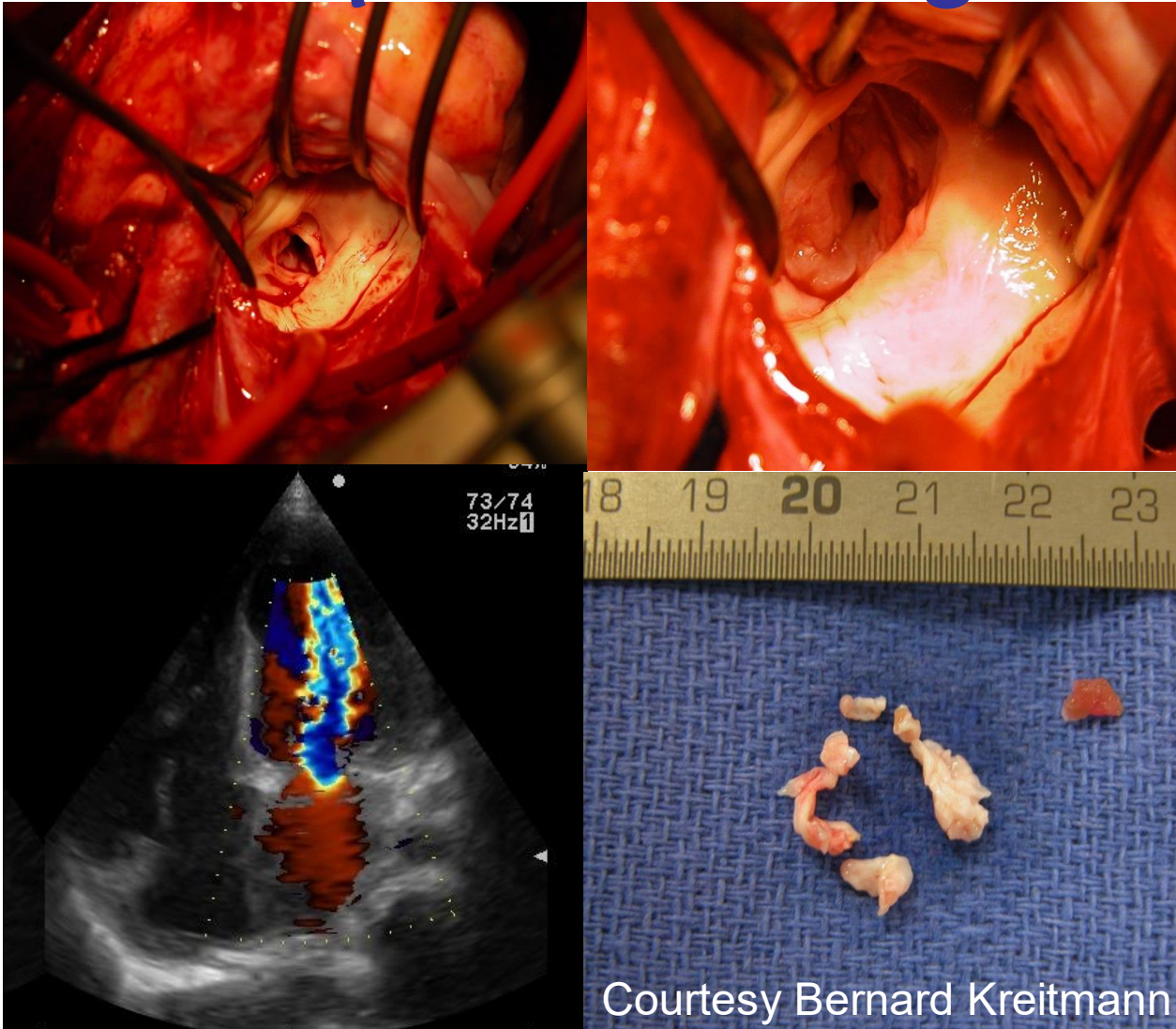


Supravalvular stenosis: supra mitral ring

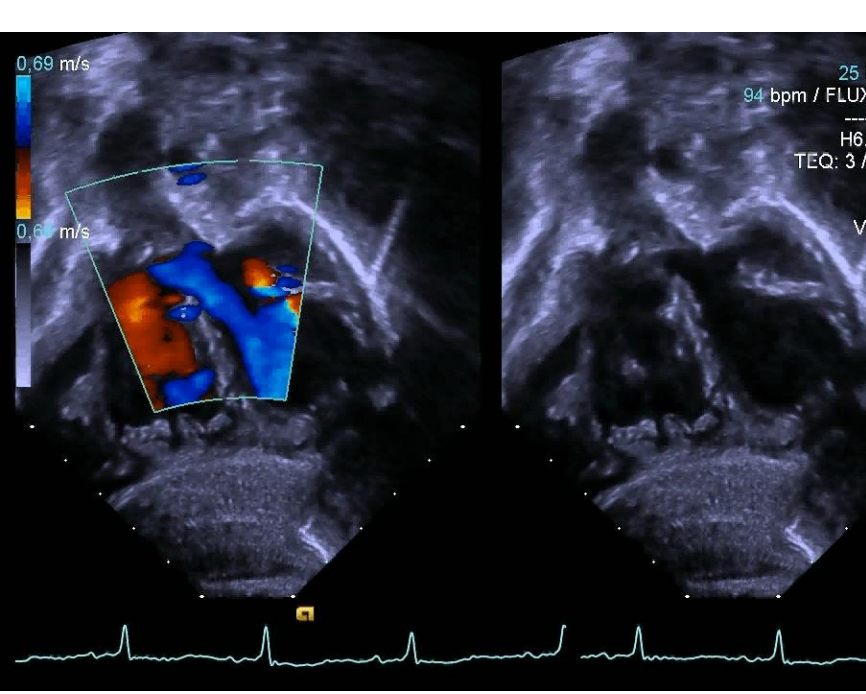




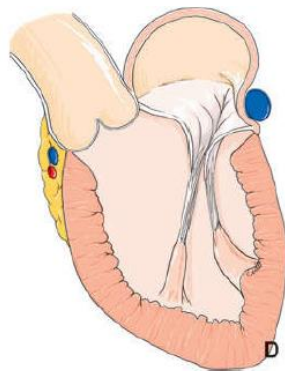
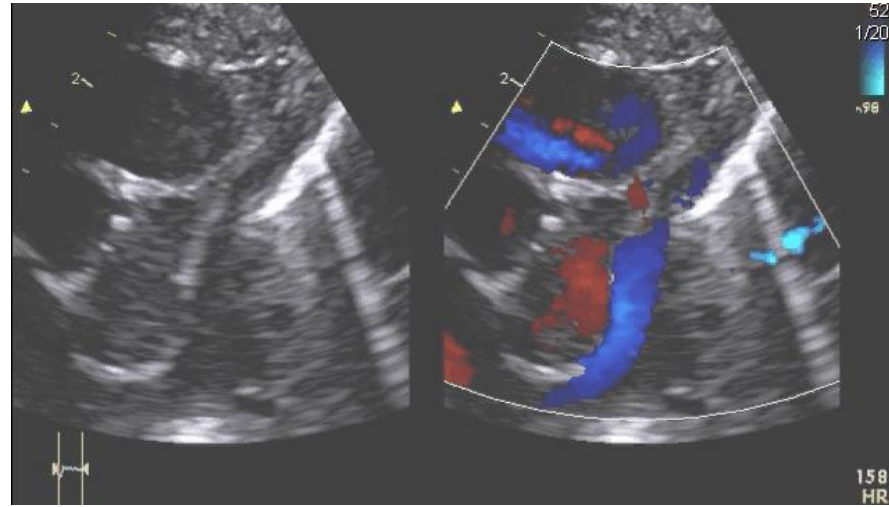
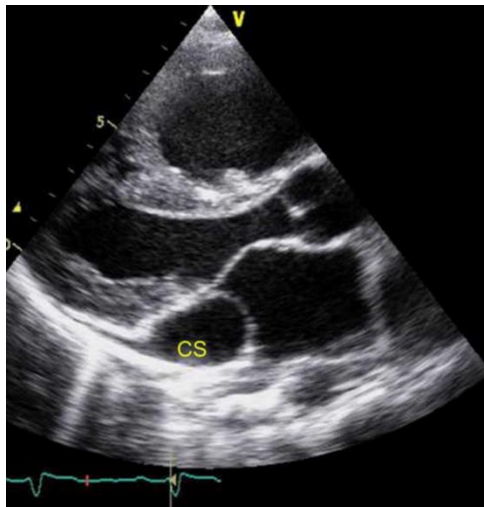
Supra mitral ring



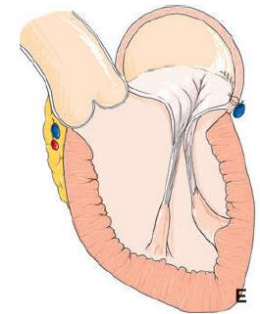
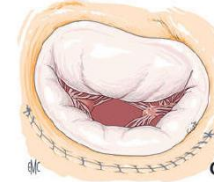
Sténose supramitrale: membrane intramitrale



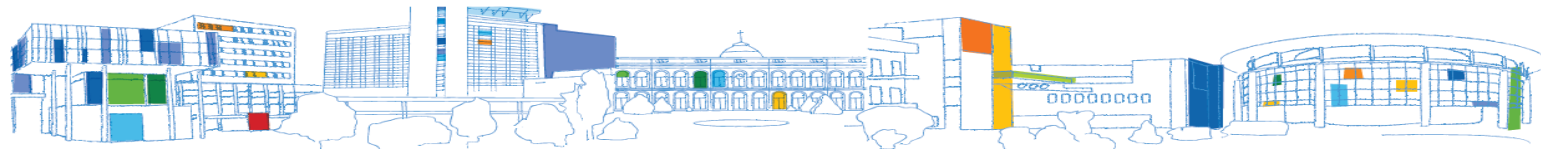
Sténose supramitrale: Sinus coronaire obstructif avec veine cave supérieure gauche

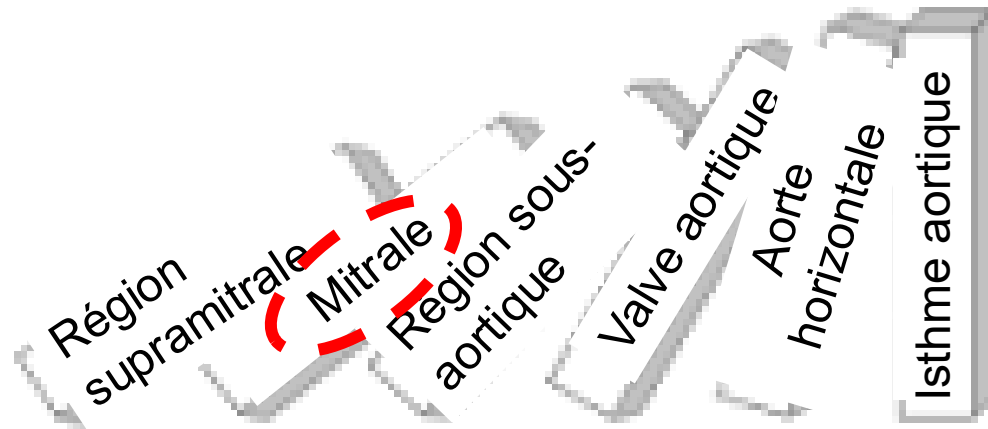


Chirurgie

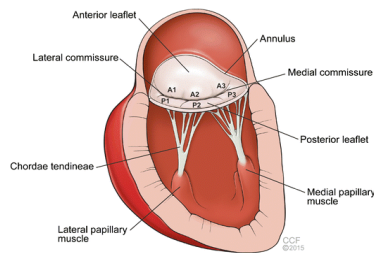


- A. Saillie du sinus coronaire à la partie postérieure de l'anneau mitral.
- B. Résection du toit du sinus coronaire dans l'oreillette gauche.
- C. Suture bord à bord.

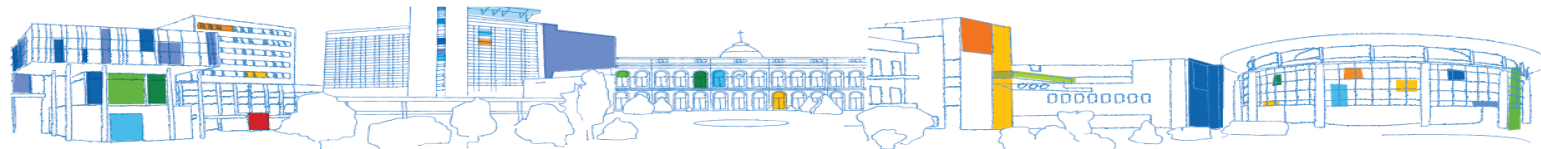




Analyse segmentaire impérative:



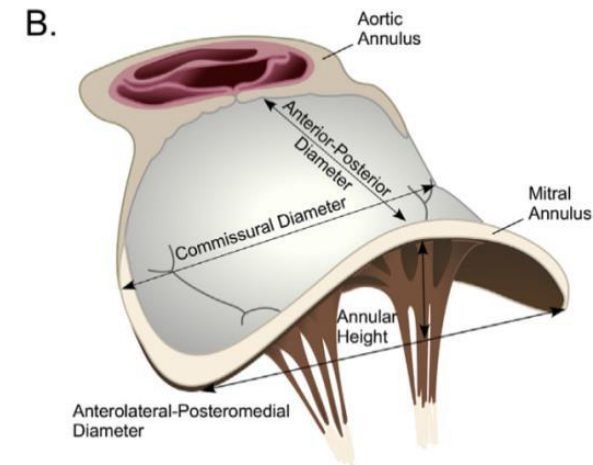
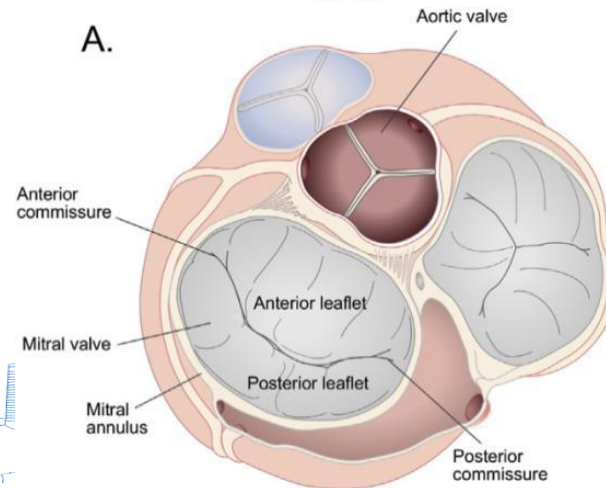
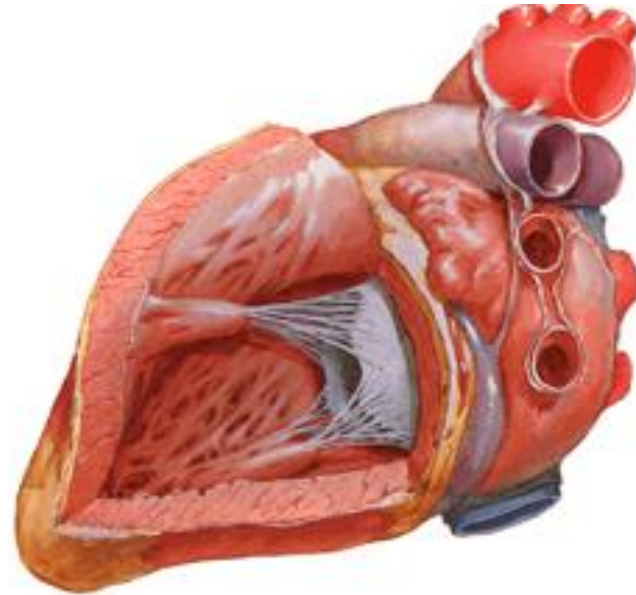
- Anneau
- Feuilles valvulaires
- Cordages
- Piliers mitraux



ANATOMIE NORMALE

Complexe valvulaire mitral

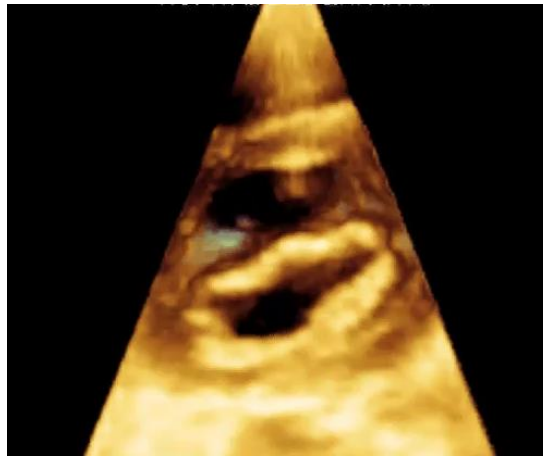
- Anneau
- Feuillet
- Cordages
- Muscles papillaires



COMPLEXE VALVULAIRE MITRAL NORMAL



Courtesy Pr Kreitmann

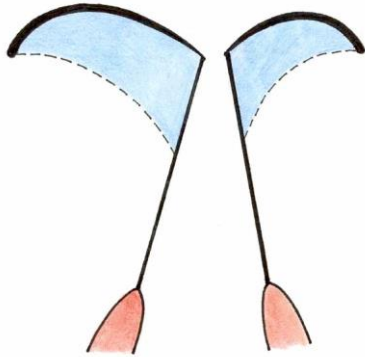


Courtesy Dr Séguéla



COMPLEXE VALVULAIRE MITRAL NORMAL: approche fonctionnelle

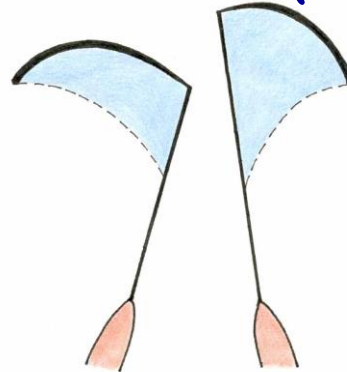
Classification des IM (CARPENTIER)



1. Mobilité normale

- Dilatation de l'anneau
- Cleft
- Double orifice

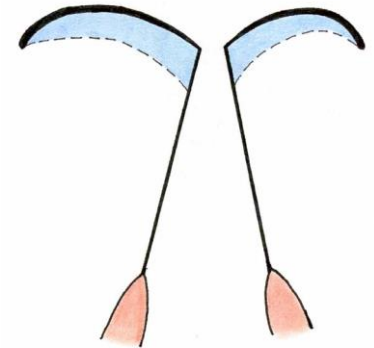
⇒ IM



2. Mobilité exagérée

- Prolapsus

⇒ IM



3. Mobilité restreinte

Muscles papillaires normaux

- Ring

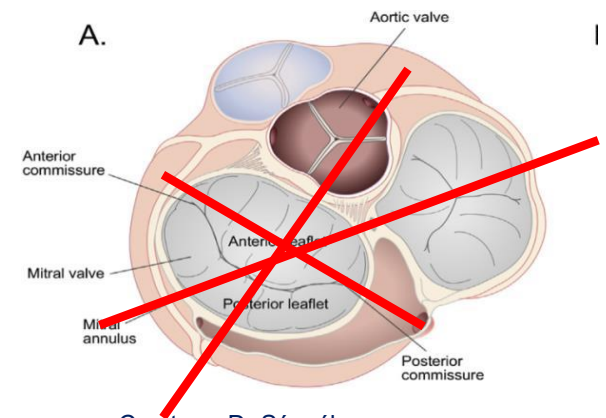
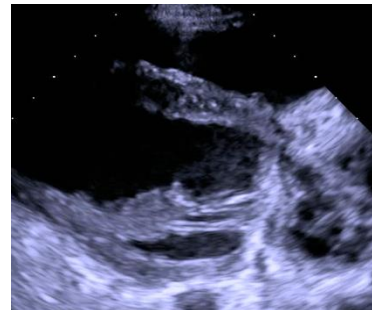
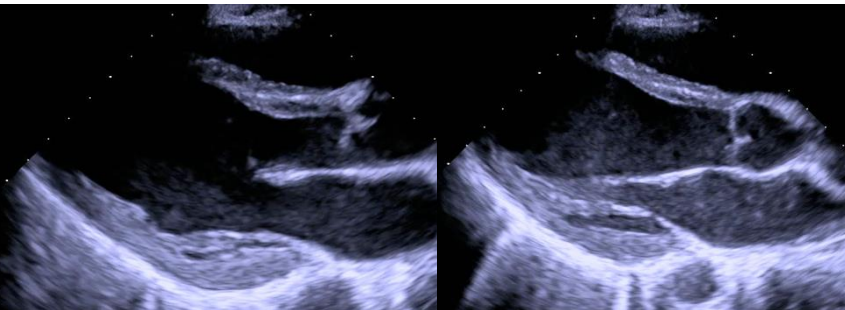
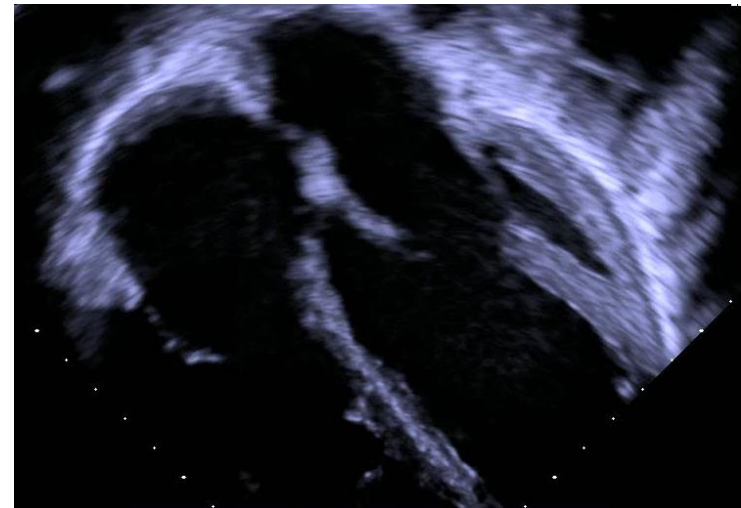
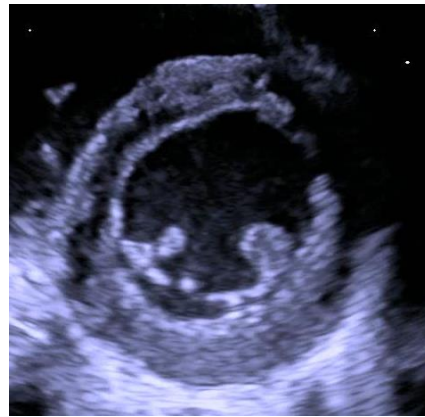
Muscles papillaires anormaux

- Parachute
- Hamac

⇒ IM et/ou Sténose



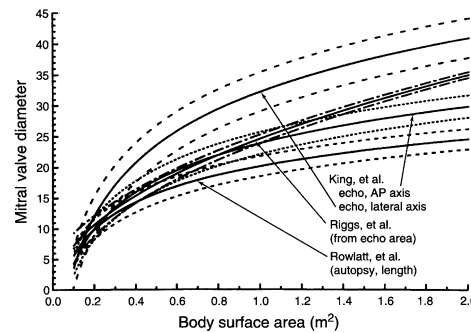
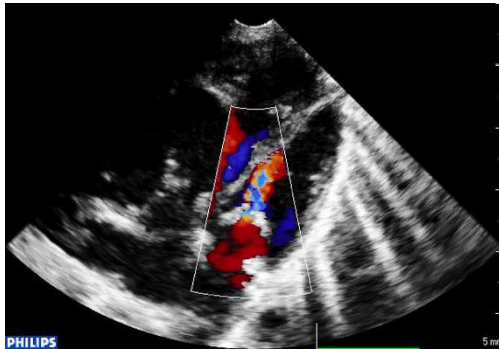
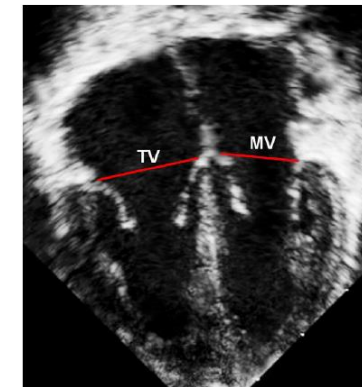
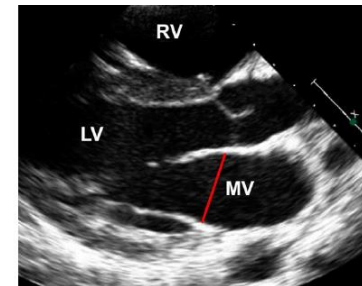
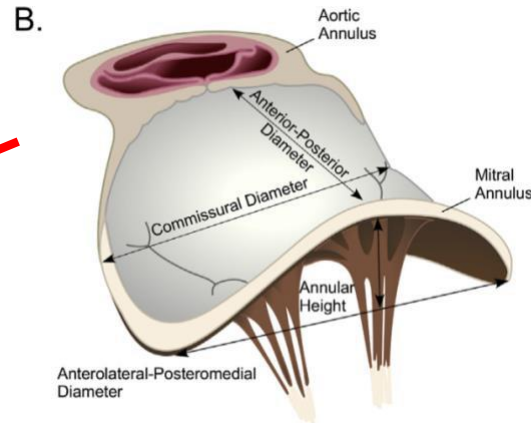
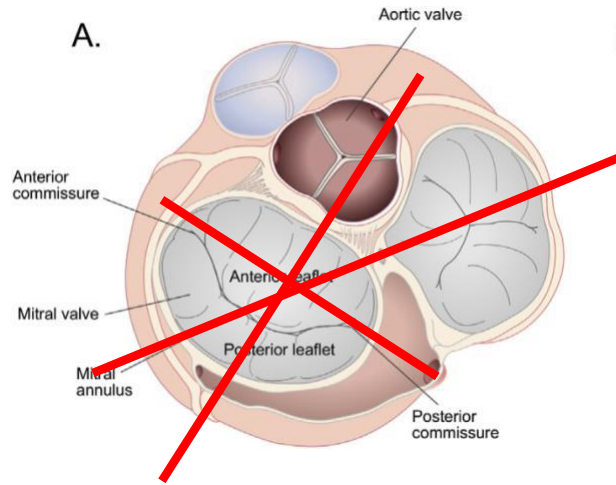
COMPLEXE VALVULAIRE MITRAL NORMAL: approche échographique



Courtesy Dr Séguéla

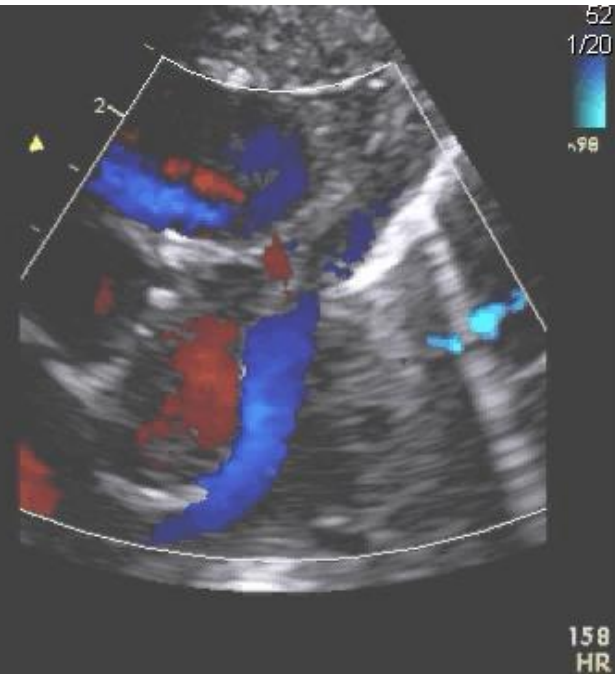
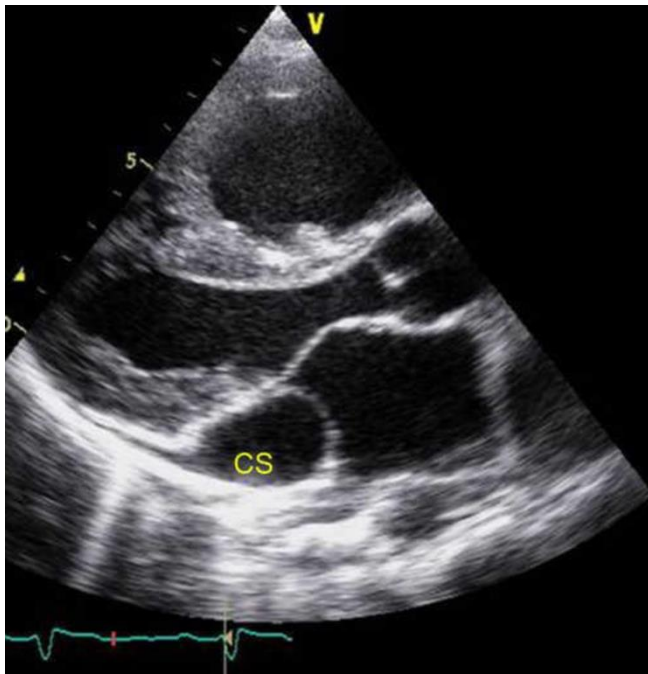


Anomalies de l'anneau



Z score < 2. Cut off de 9mm dans les hypoVG limites

Anomalies de l'anneau: VCSCG



Anneau mitral

GUIDELINES AND STANDARDS

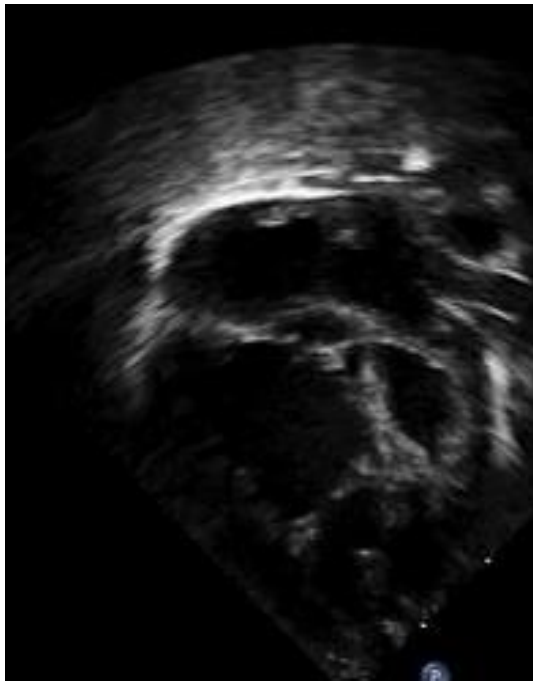
Guidelines for Performing a Comprehensive Pediatric Transthoracic Echocardiogram: Recommendations From the American Society of Echocardiography



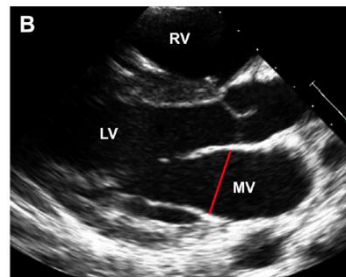
Leo Lopez, MD, FASE (Chair), Daniel L. Saurers, RCS, RDCS, FASE (Co-Chair), Piers C. A. Barker, MD, FASE, Meryl S. Cohen, MD, MScd, FASE, Steven D. Colan, MD, FASE, Jeanine Dwyer, BS, RDCS, FASE, Daniel Frenkel, MD, MHS, FASE, Mark K. Friedberg, MD, PhD, FASE, Wynnan W. Lai, MD, MPH, MBA, FASE, Beth F. Printz, MD, PhD, FASE, Ritu Sachdeva, MBBS, FASE, Neha R. Soni Patel, MEd, BSME, RDCS, RDSCS, FASE, Dongngan T. Truong, MD, MSCI, FASE, Luciana T. Young, MD, FASE, and Carolyn A. Altman, MD, FASE (Co-Chair), Palo Alto, Irvine, Orange, and San Diego, California; Nashville, Tennessee; Durham, North Carolina; Philadelphia, Pennsylvania; Boston, Massachusetts; Aurora, Colorado; Kansas City, Missouri; Toronto, Ontario, Canada; Atlanta, Georgia; Cleveland, Ohio; Salt Lake City, Utah; Seattle, Washington; and Houston, Texas

Hypoplasie: Z-score <

Dilatation: Z-score > +2



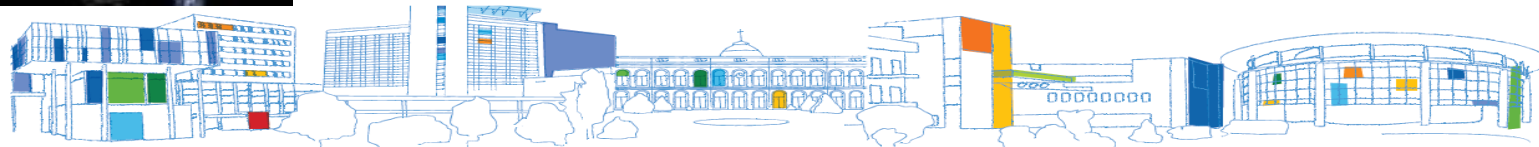
2024



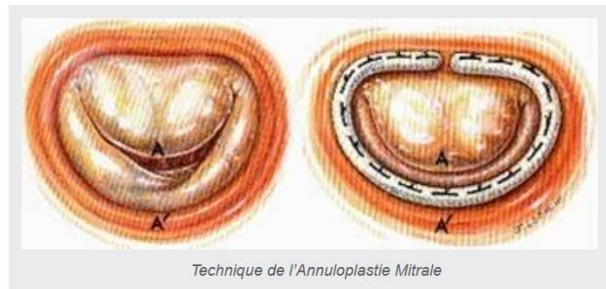
Normal, closed

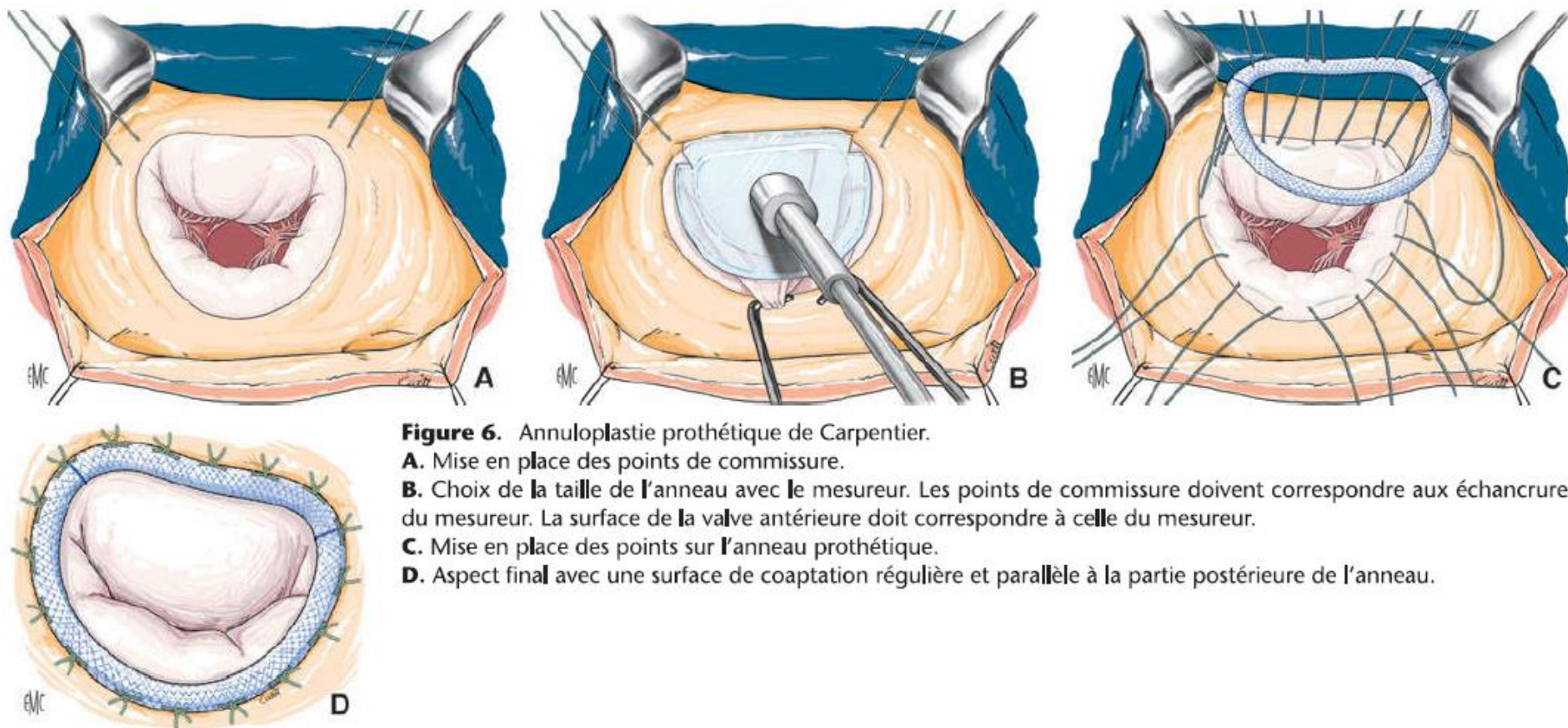


MR, dilated annulus

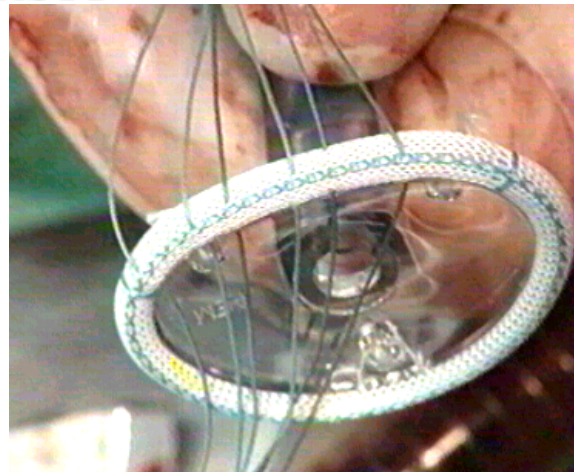
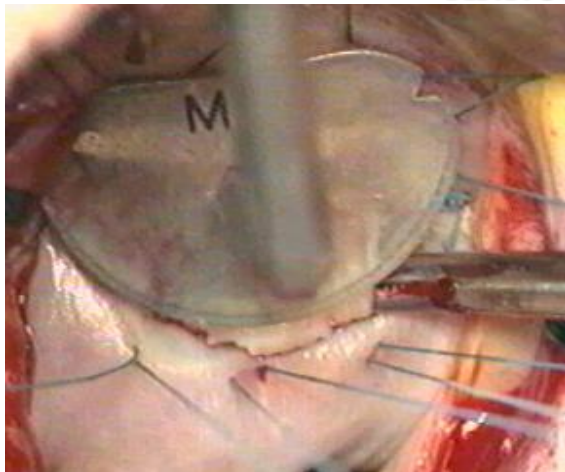


Dilatation Annuloplastie





ANNULOPLASTY



Feuillets valvulaires: Fente («cleft») mitrale isolée

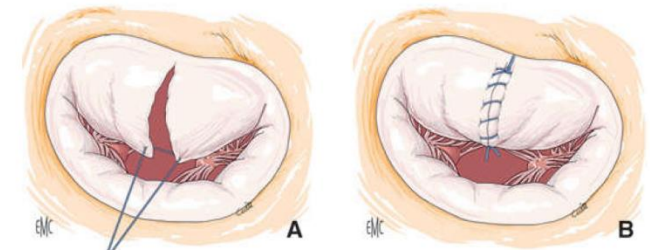
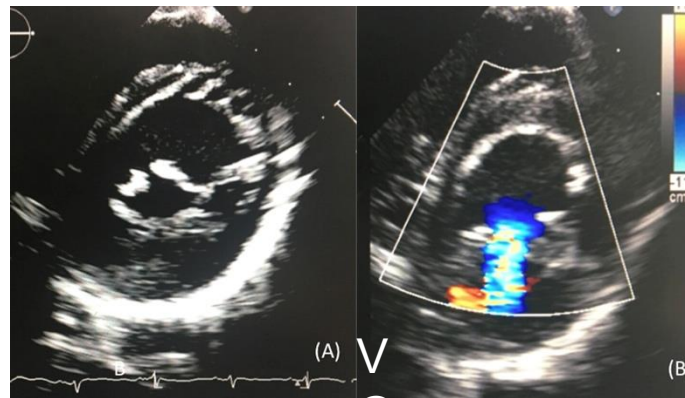
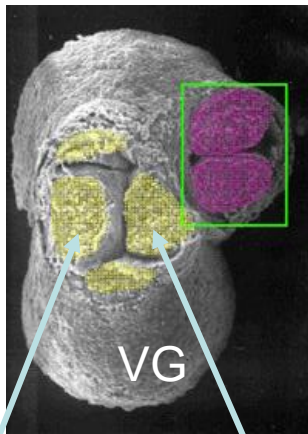


Figure 7. Fente valvulaire antérieure complète.

A. Fente valvulaire à bords souples.

B. Suture bord à bord

EMC
2020

2 autres types de fente:

- *Fente conotroncale (non perpendiculaire au septum IV et dirigée vers v*
- *Fente du feuillet postérieur (ou agénésie feuillet postérieur)*



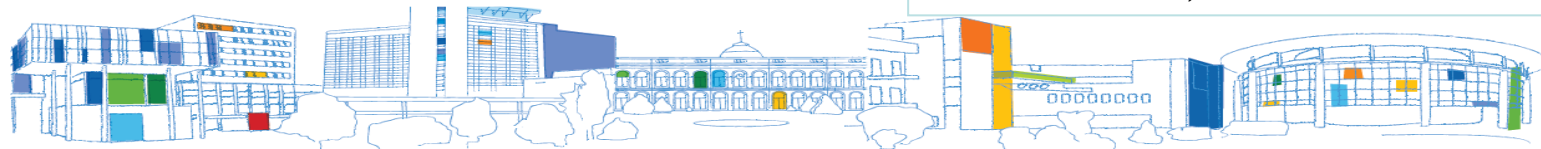
Anomalies des feuillets valvulaires

Fente mitrale isolée

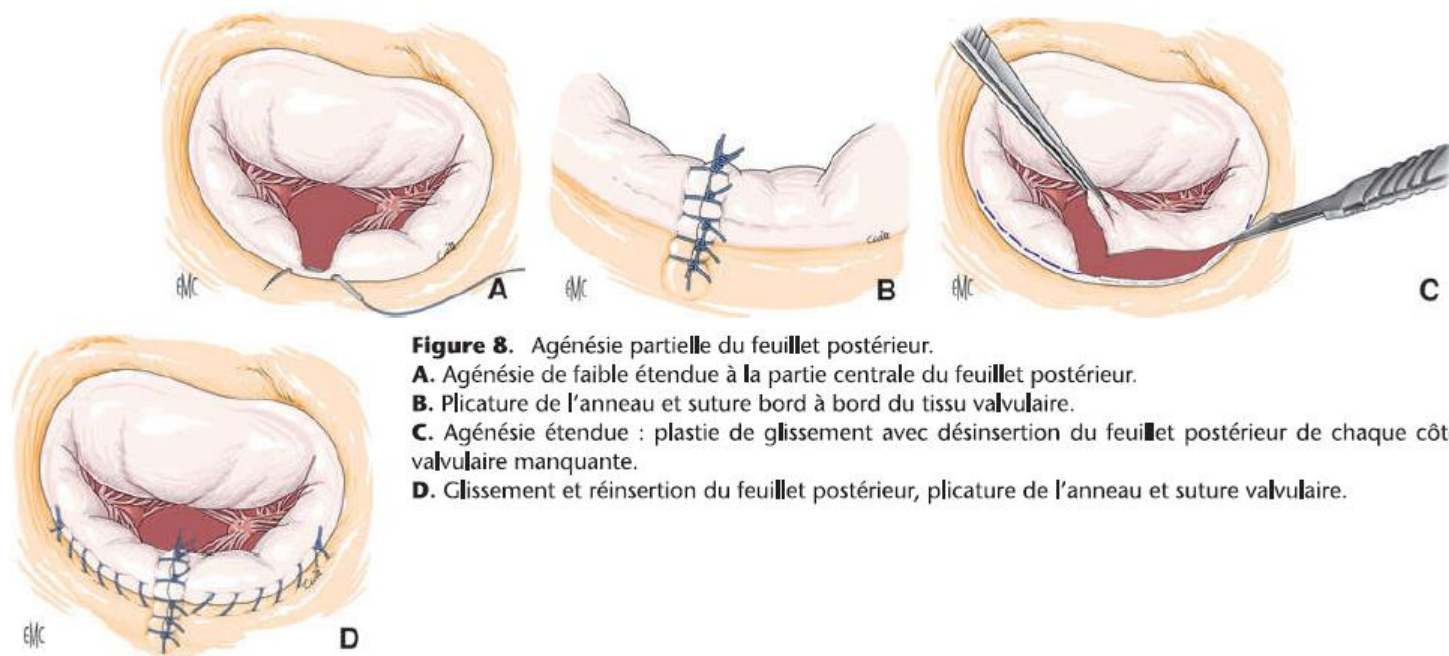


- Fente = division du feuillet antérieur, chaque segment inséré sur un pilier différent ($\neq$ commissure)
- CAV : « fente » = espace entre les composants gauches des deux hémivalves (bridging leaflets).
 - Forme mineure de CAV, perpendiculaire au septum IV, inlet < outlet , CIV d'admission)
- Fente avec malposition des gros vaisseaux
 - Parallèle au septum IV, inlet = outlet, CIV de la voie d'éjection par malalignement du septum conal
 - Possible attaches septales obstructives

Van Praagh S. et al. Ann Thorac Surg 2003
Anderson RH et al, JTCS 1985

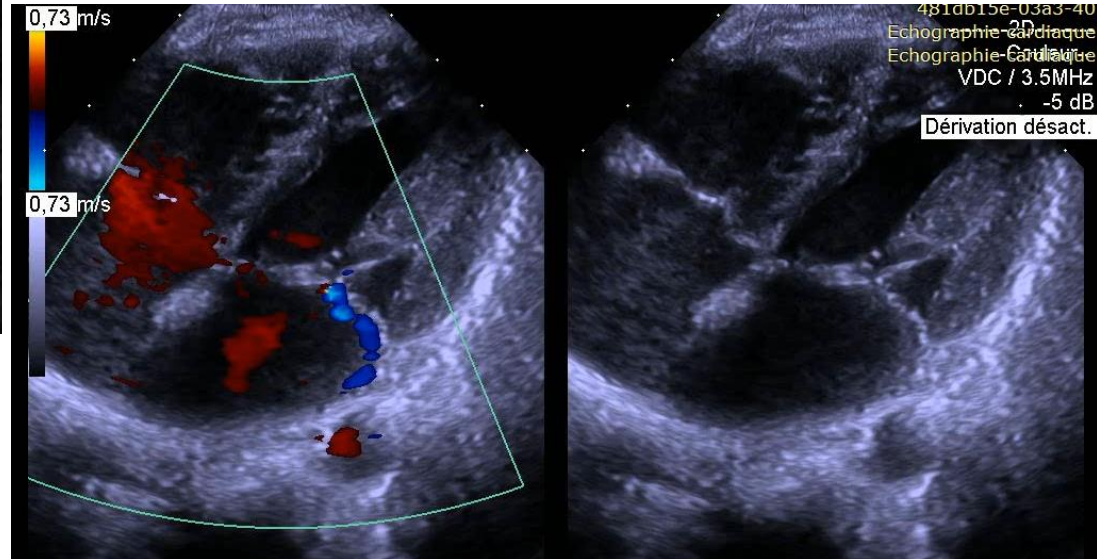


Feuillets valvulaires: Fente («cleft») mitrale isolée

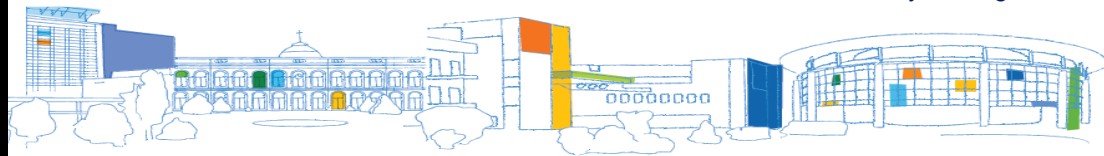


- *Fente du feuillet postérieur (ou agénésie feuillet postérieur)*

FENTE (CLEFT) ANTÉRIEURE ISOLÉE

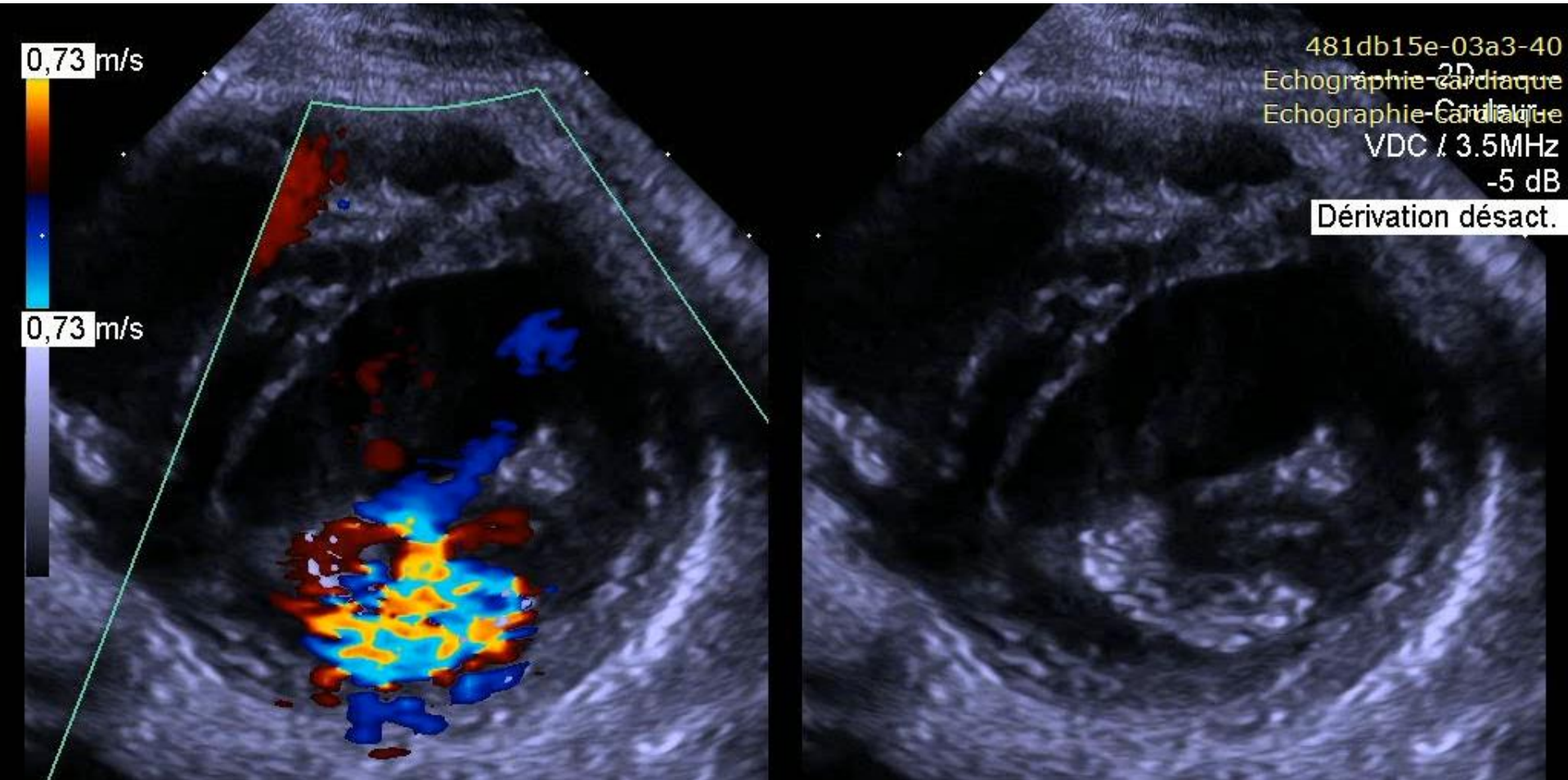


Courtesy Dr Séguéla

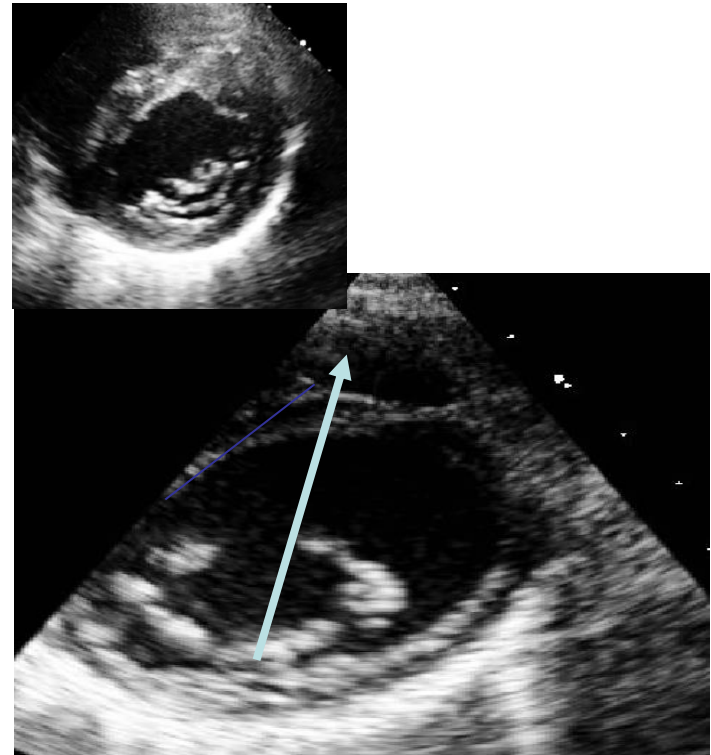
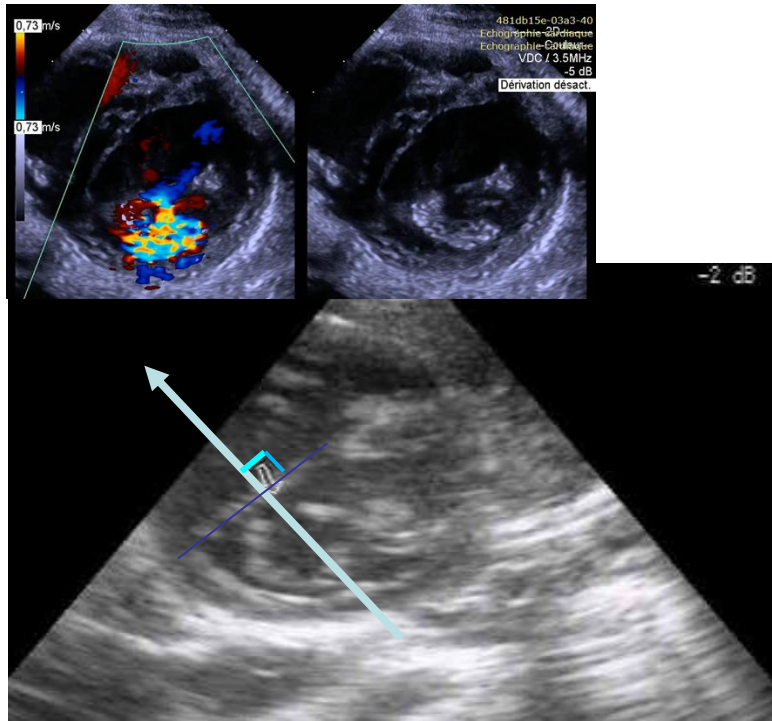


ANOMALIES DES FEUILLETS

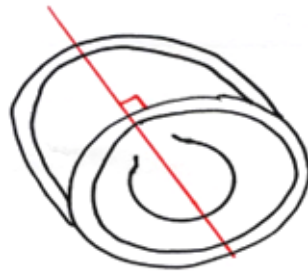
FENTE DU CAV



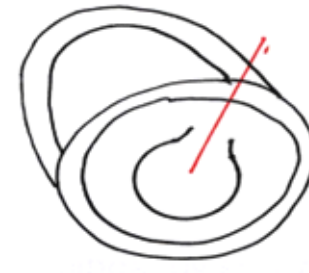
Fente mitrale VS CAV



Type CAV

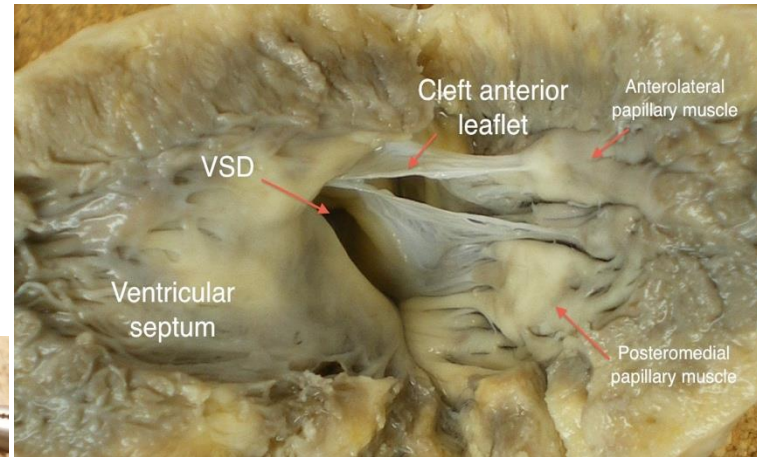
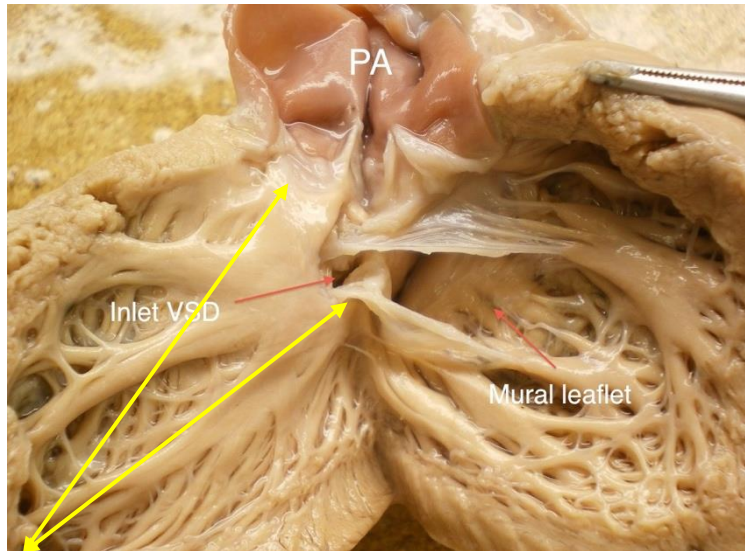


Type malposition



Fentes et pseudo fentes

Ventricule droit à double issue
La fente est dirigée vers la voie
d'éjection du ventricule gauche



CIV d'admission
La fente est perpendiculaire au
septum, inlet < outlet



Courtesy Pr Houyel

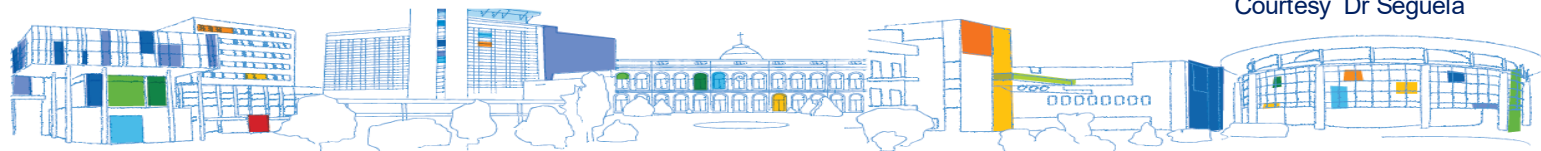


ANOMALIES DES FEUILLETS

FENTE (CLEFT) POSTÉRIEURE ISOLÉE

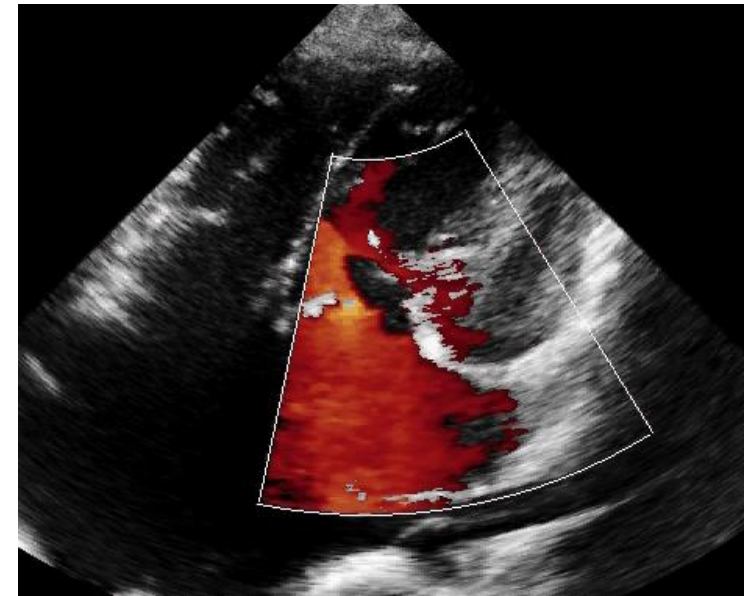
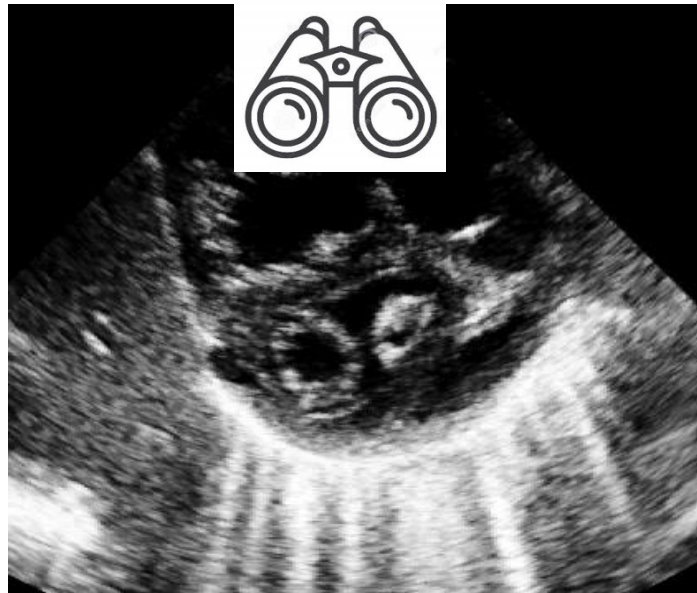
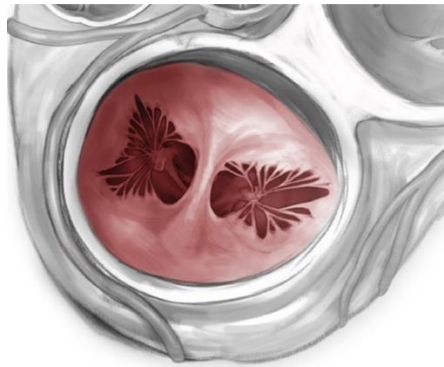


Courtesy Dr Séguéla

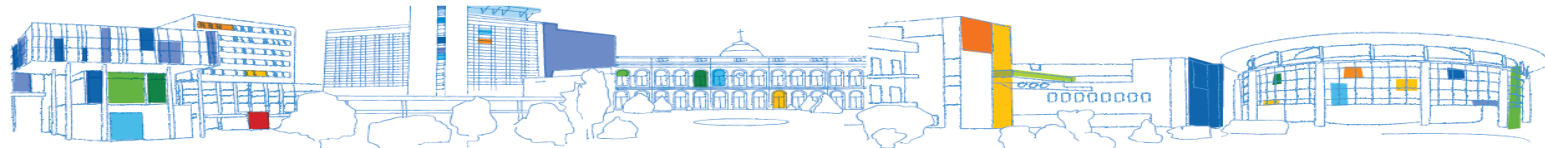


ANOMALIES DES FEUILLETS

DOUBLE ORIFICE MITRAL



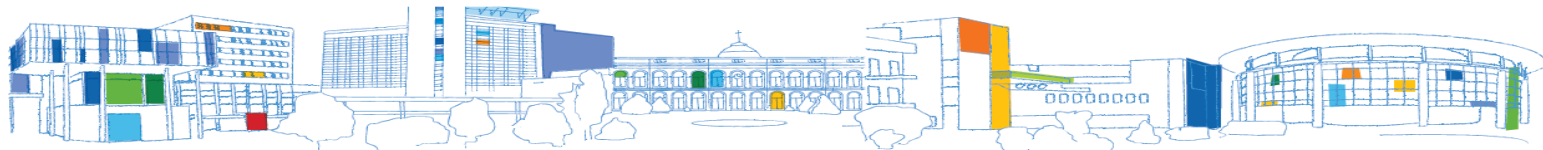
Courtesy Dr Séguéla



Double orifice mitral

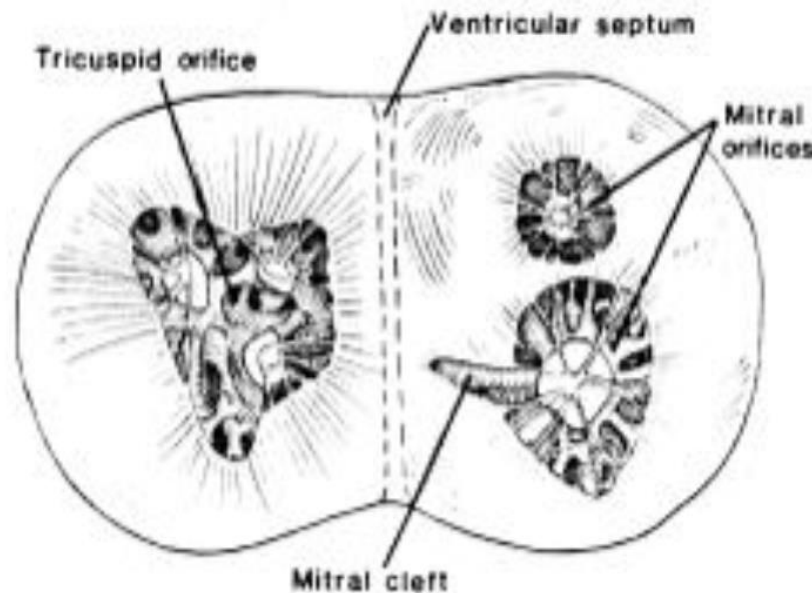
- Presque jamais isolé
- CAV (>50%), obstacles du cœur gauche, cardiopathies cyanogènes, non-compaction du ventricule gauche
- Anomalie de l'appareil sous-valvulaire
- 3 types
 - « Incomplete bridge »
 - « Complete bridge »
 - « hole type » or double-parachute MV

Bano-Rodrigo, Van Praagh et al. Am J Cardiol 1988;61:152-60

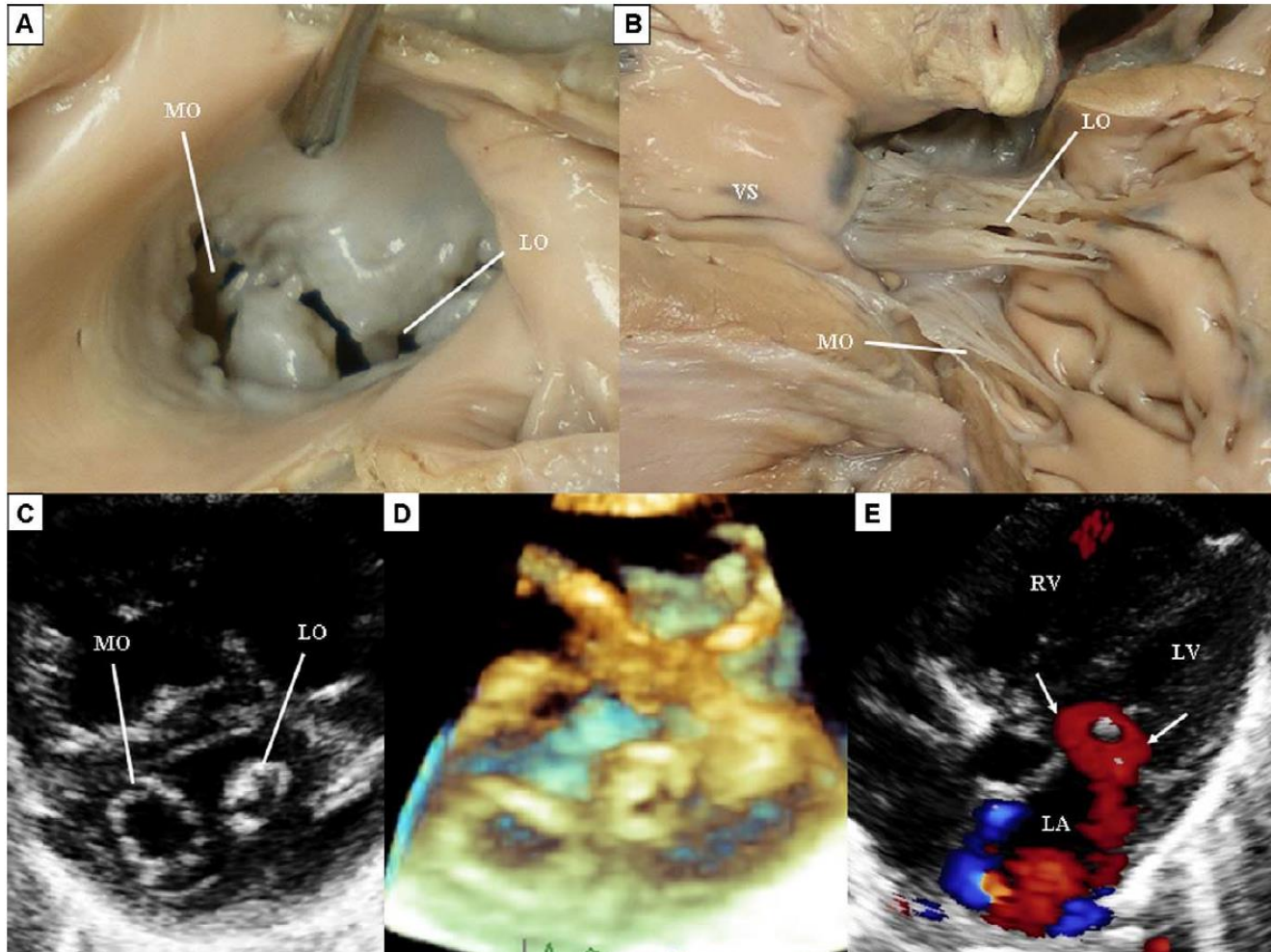


Double mitral orifice: definition

- Definition: an accessory bridge or limbus of tissue partially or completely divide the mitral inlet into two orifices with each suborifice supported by its own chordal apparatus

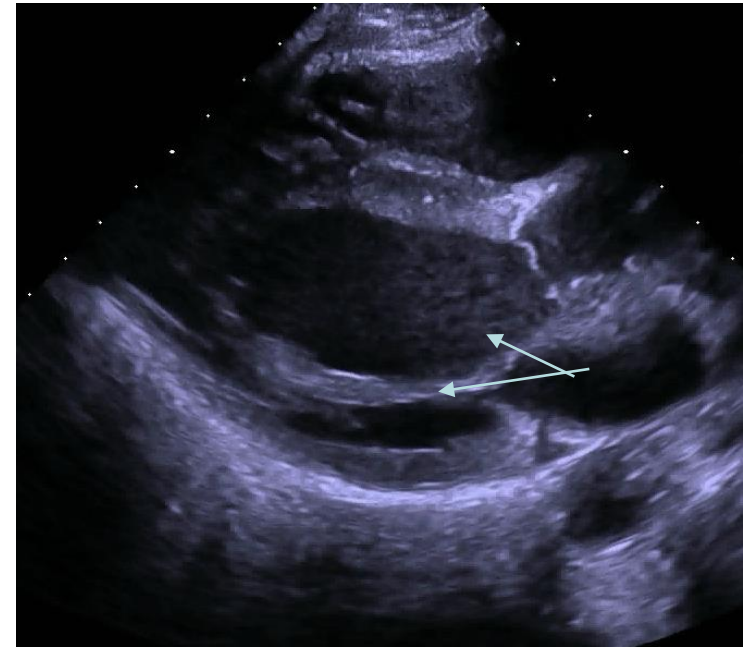
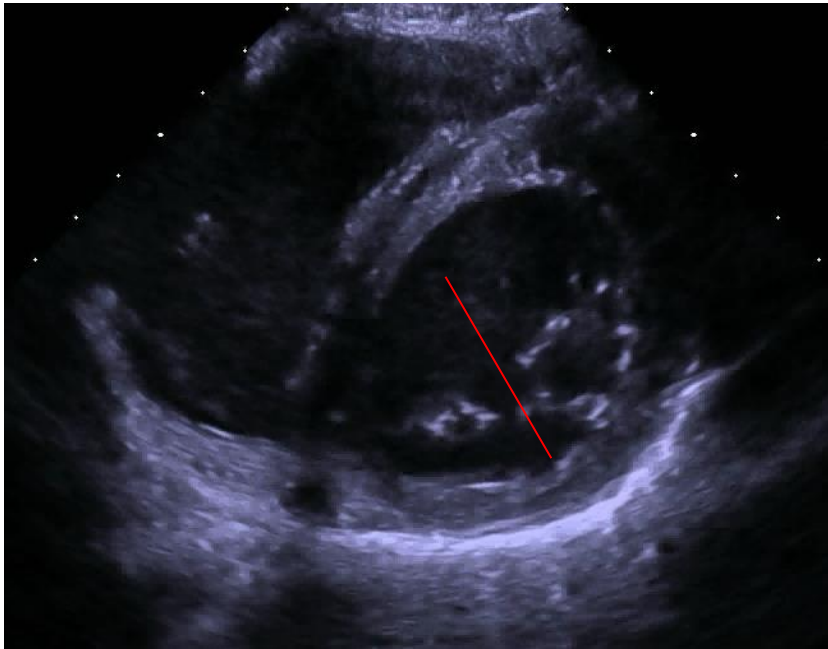
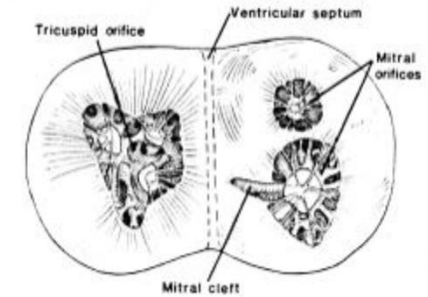


Double mitral orifice

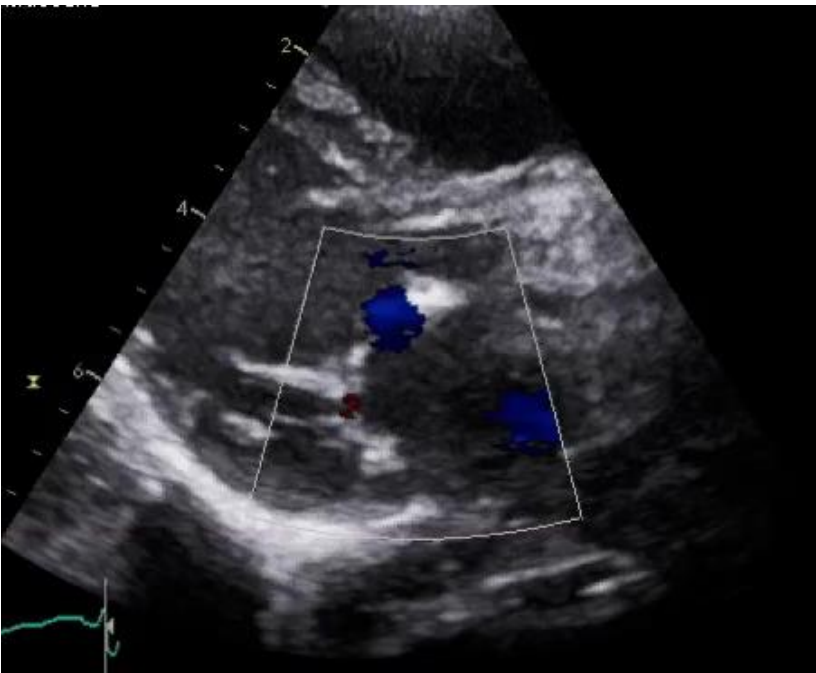


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Double mitral orifice

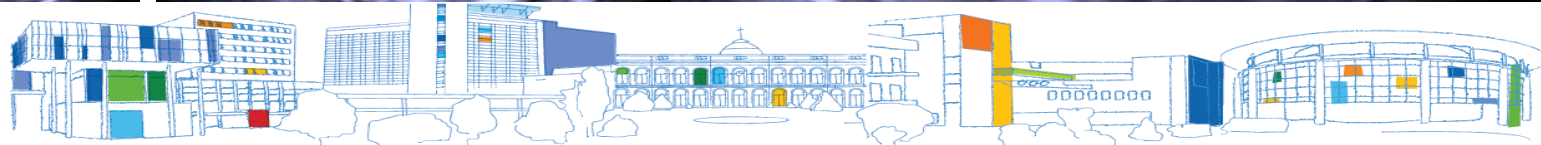
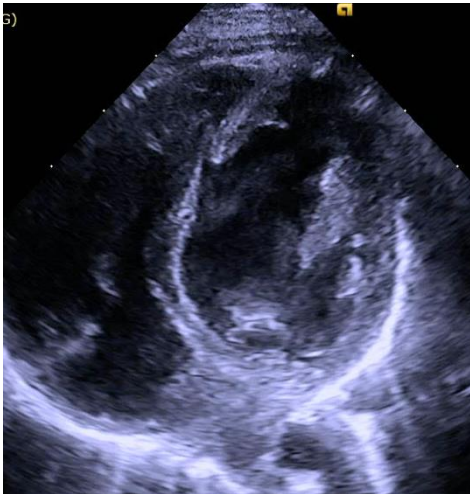
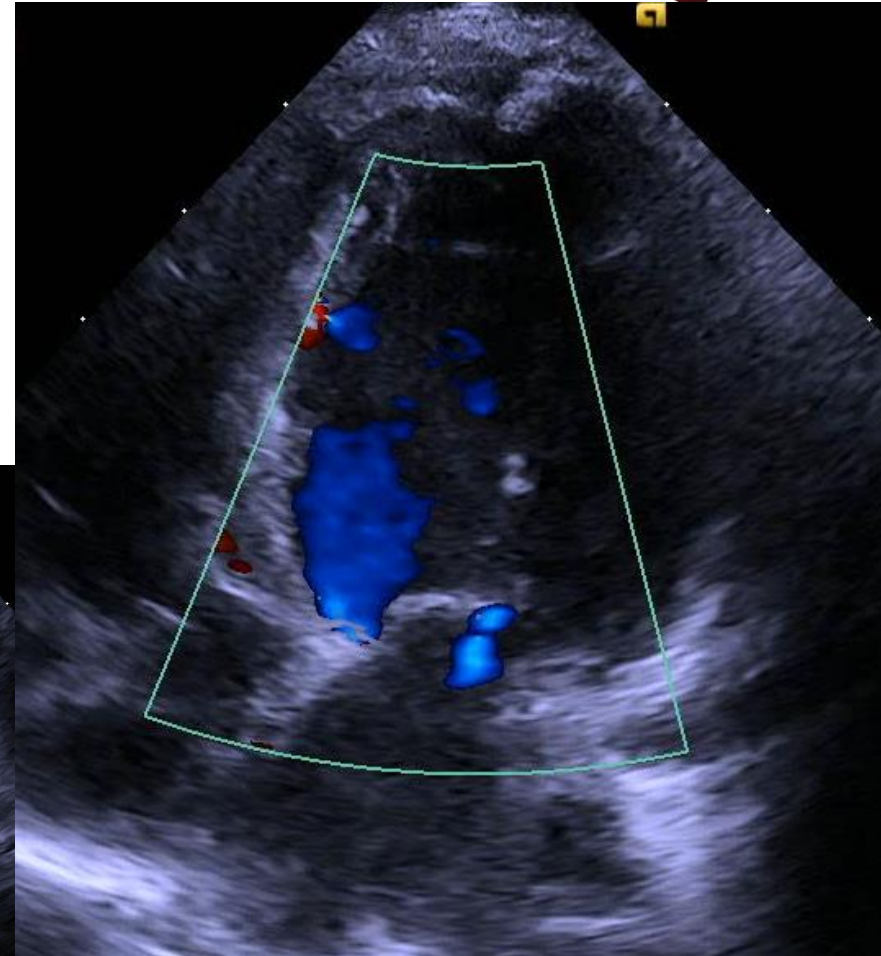
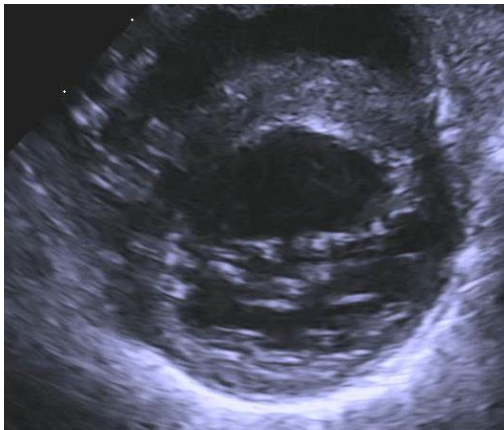


Double mitral orifice



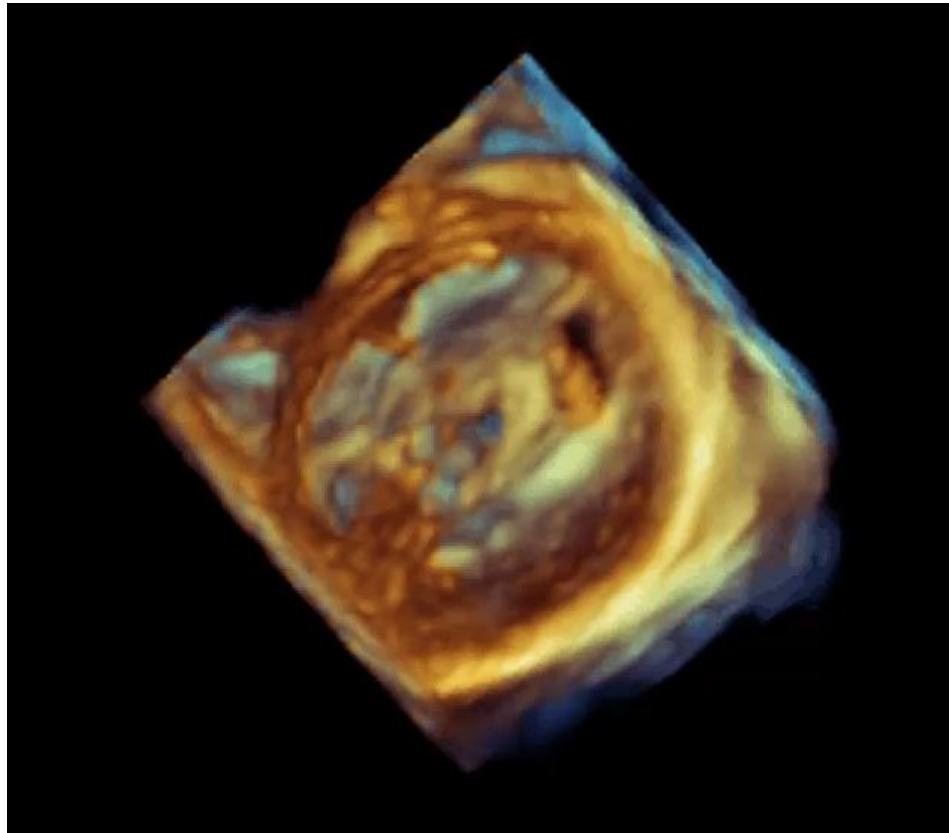
ANOMALIES DES FEUILLETS

DOUBLE ORIFICE MITRAL



ANOMALIES DES FEUILLETS

DOUBLE ORIFICE MITRAL



Feuillets valvulaires: Double orifice

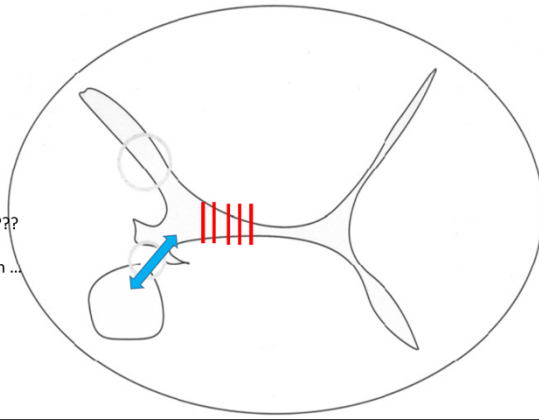
Siège : PBL >> ABL > ML

Fonction :
fuyant ou non

Traitement :
Résection, réunion des deux orifices ????

Et fermeture de la fente : totale, partielle, ou non ...

Fausse bonne idée !!!!!



Courtesy of Pr. Leobon

Table 3. Mayo Clinic Management of DOLAVV

Do not divide the tissue bridge

Cleft closure is routine

Partial or no cleft closure if valve area is small, ie, dysplastic mural leaflet, single papillary muscle

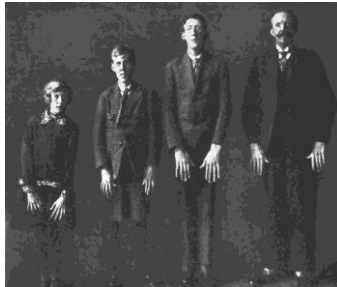
Leave a competent accessory orifice alone

Regurgitant accessory orifice should be closed with a patch

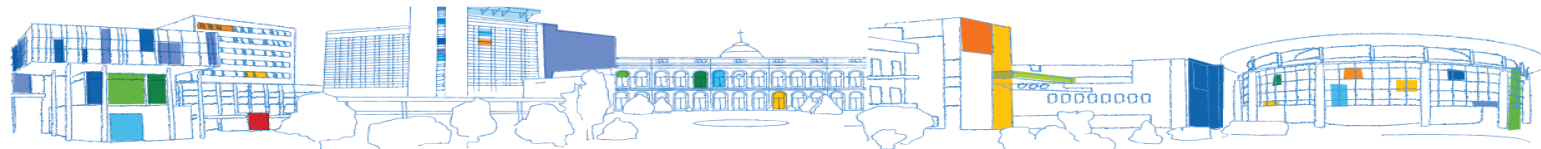
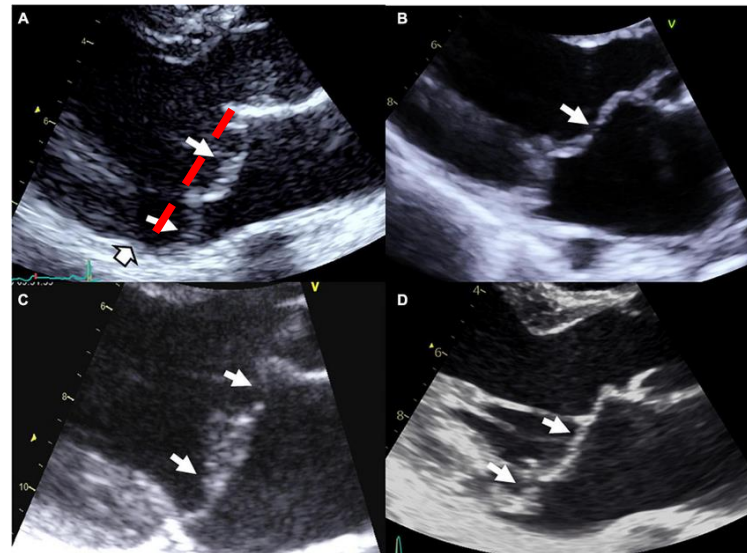
If accessory orifice is closed, do partial cleft closure

V Sharma ATS 201

Feuillets valvulaires: Excès de tissu

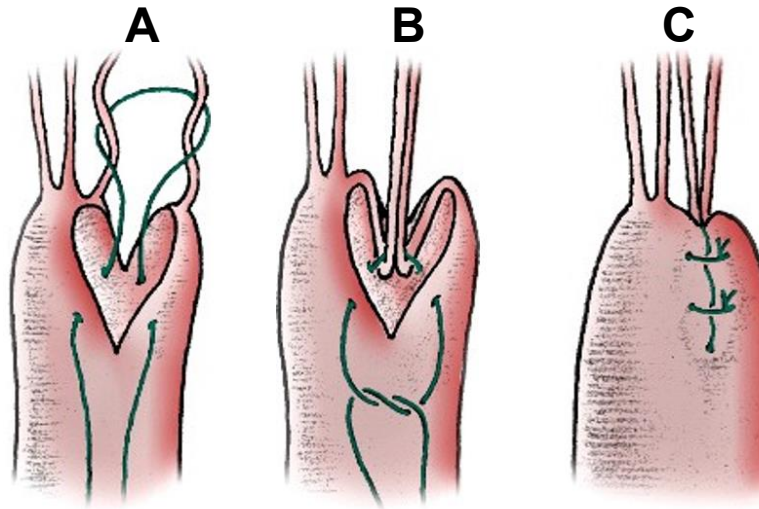


Ex: Marfan syndrom



Stratégies chirurgicales face à un prolapsus VM

SHORTENING of the CHORDAE



Prolapsus du feuillet antérieur par allongement de cordage.
Plastie d'enfouissement.

A. Incision du muscle papillaire. Passage d'un fil autour des cordages et dans le fond de l'incision.

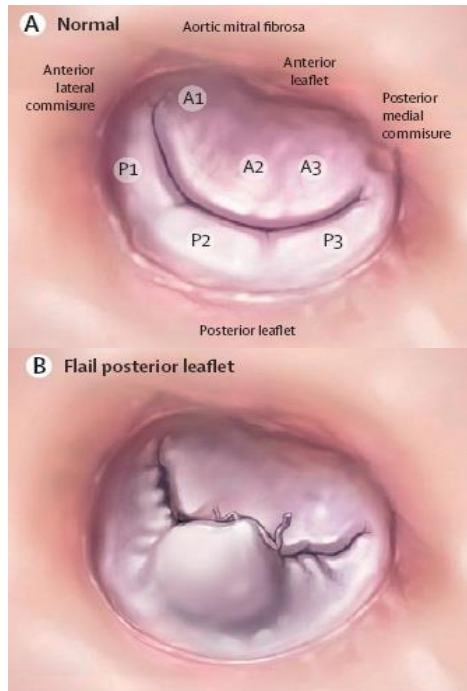
B. Le fil est noué à l'extérieur du pilier.

C. Fermeture de l'incision du pilier par suture latérale.

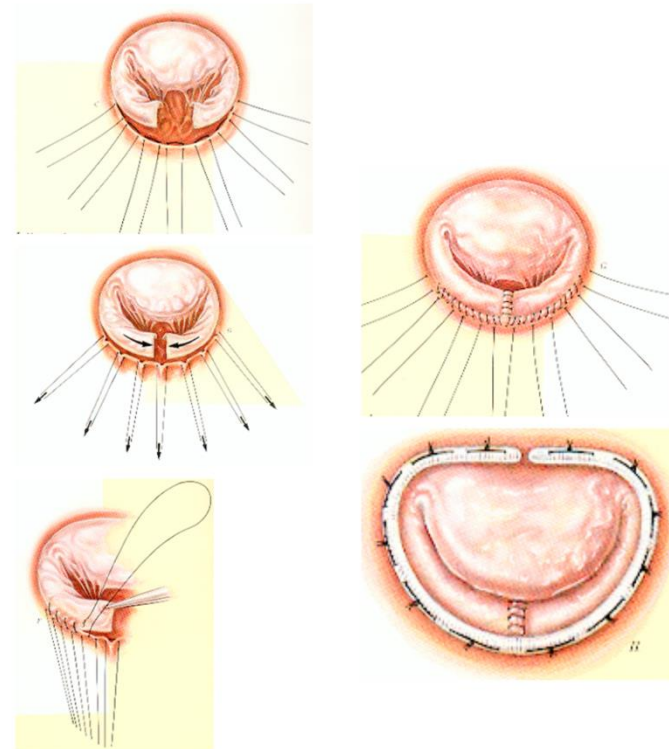
Stratégies chirurgicales face à un prolapsus VM

Résection quadrangulaire - Pr. A. Carpentier

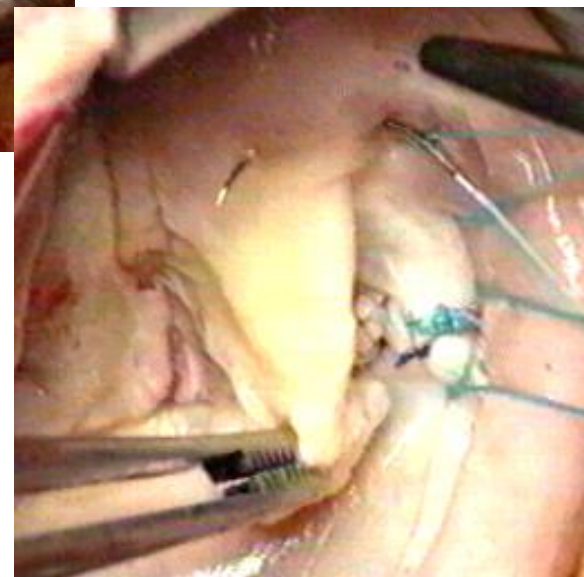
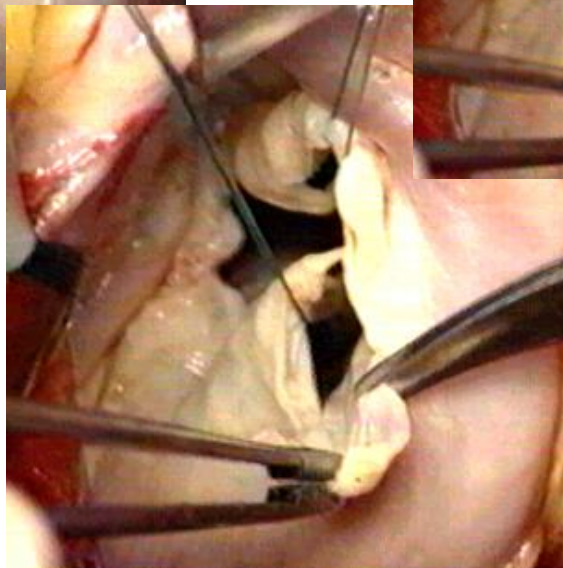
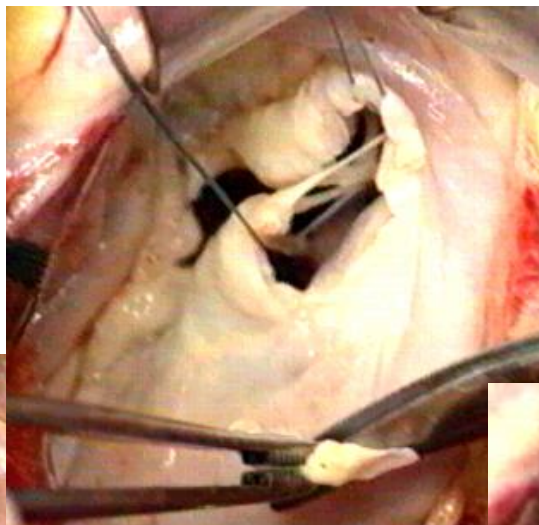
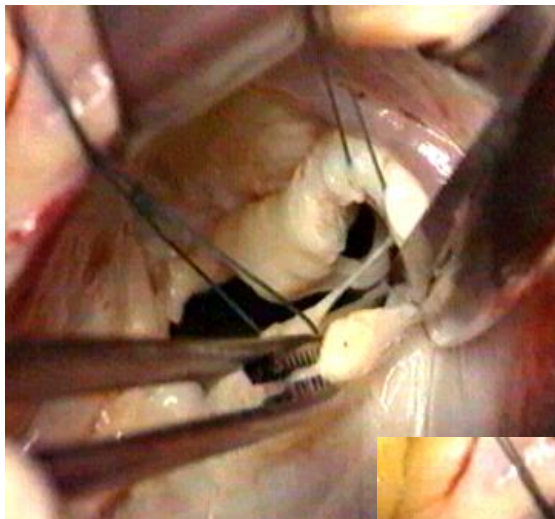
Diagnostic



Chirurgie

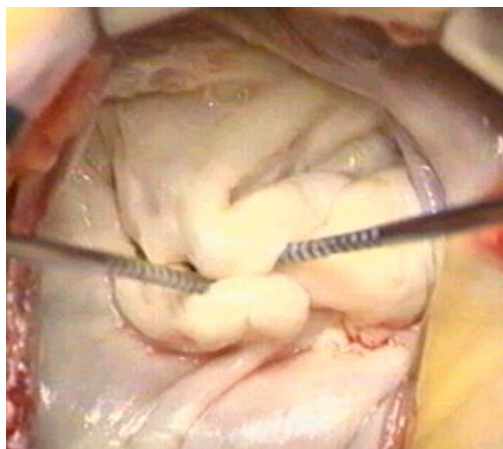
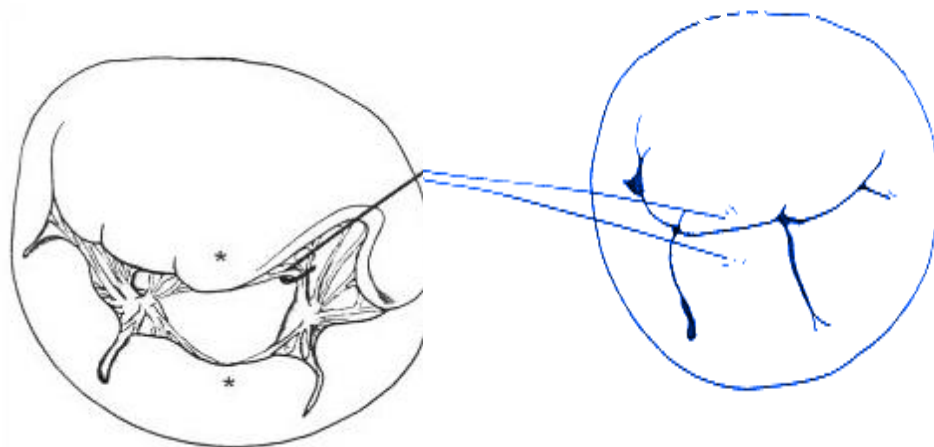


QUADRANGULAR RESECTION

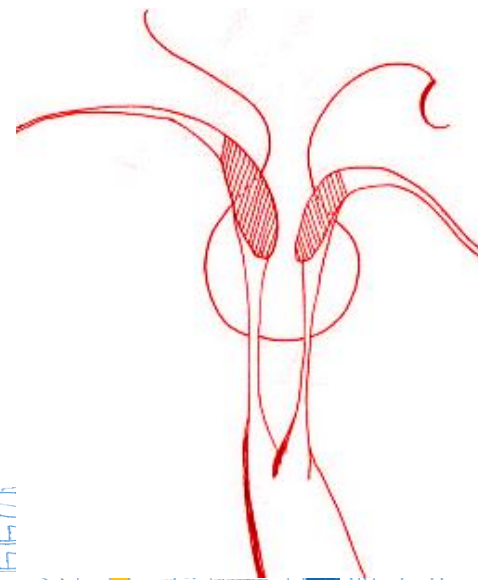
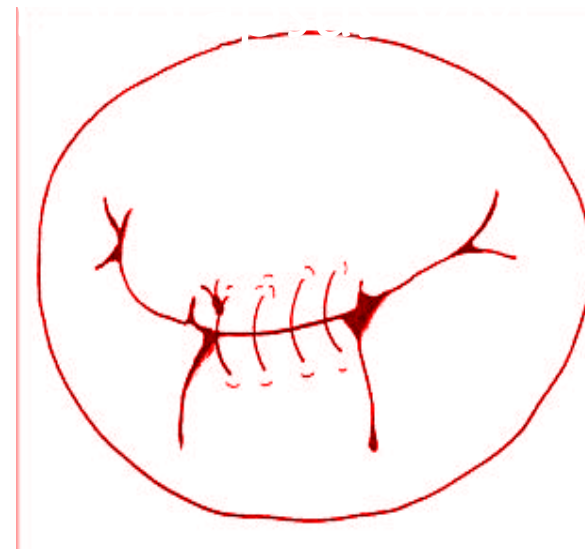


**PROLAPSUS of
P3**

ALFIERI'S TECHNIQUE



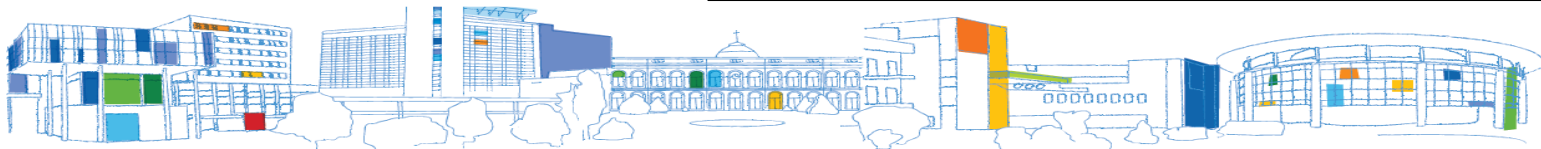
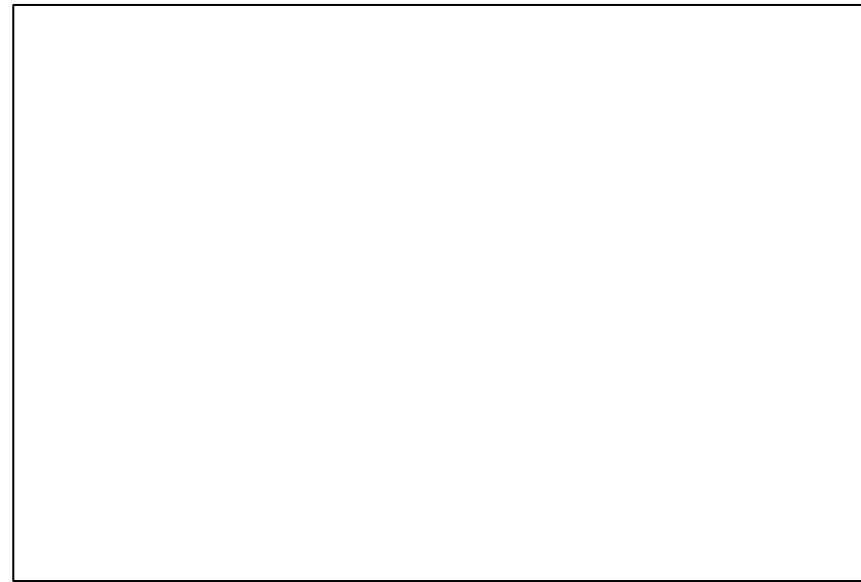
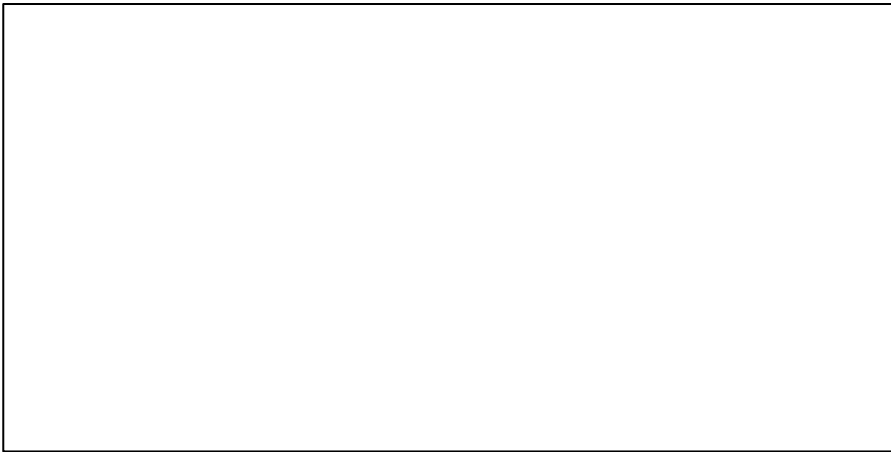
DOUBLE ORIFICE



European J.C.T. SURG, 2000,17:201

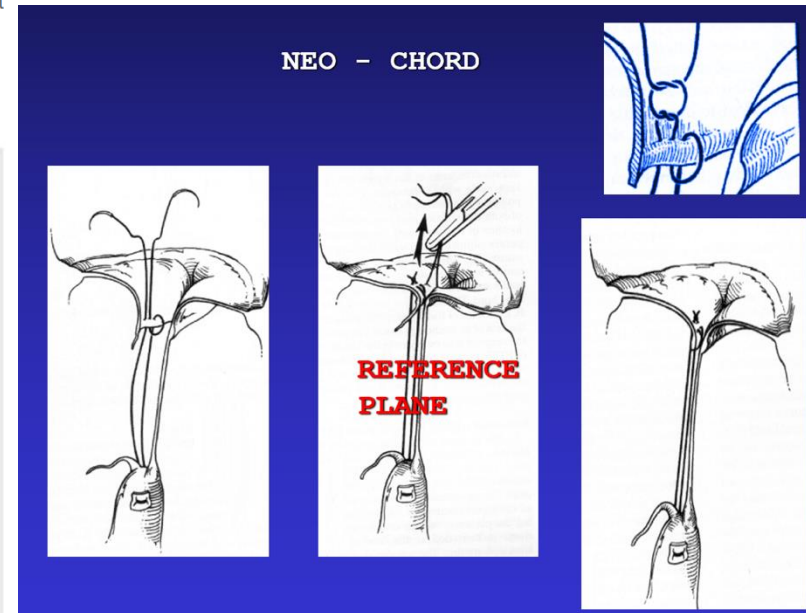
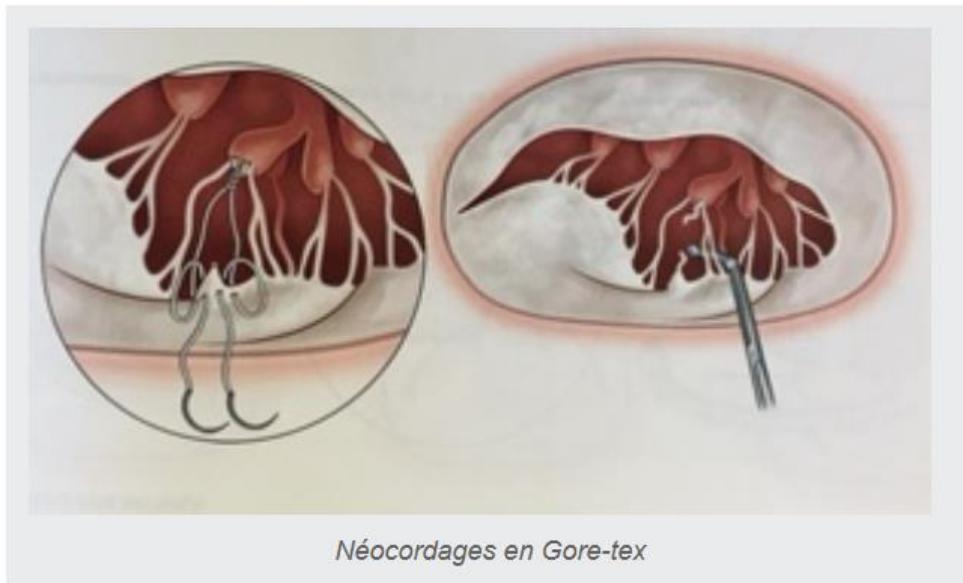
Cordages de la Valve mitrale

Elongation – Prolapsus - Rupture



Neocordage et/ou « transposition »

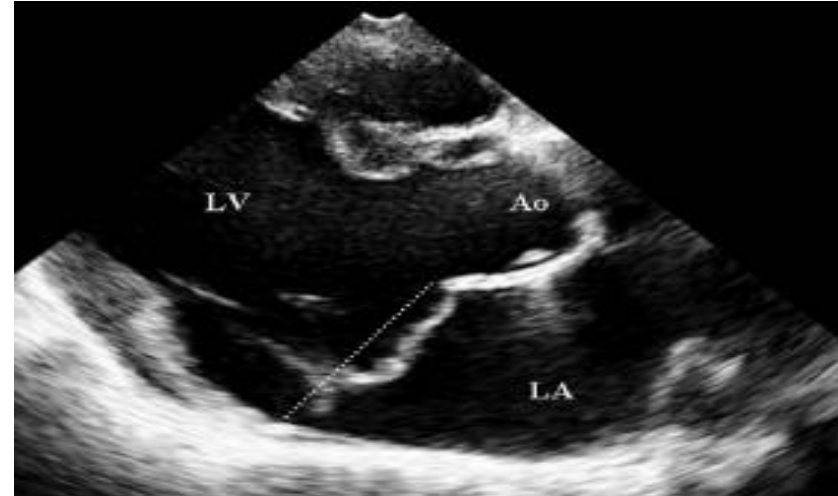
On peut aussi suppléer les cordages allongés ou rompus par « transposition » d'autres cordages de la valve contro-latérale ou encore mettre en place de nouveaux cordages à l'aide de fils en GORE-TEX (néo-cordages en GORE-TEX®). Quand les piliers (muscles papillaires) ou les têtes de piliers sont allongés ou rompus il est possible, dans certains cas, de les réparer en les suturant au pilier restant.



Anomalies des feuillets valvulaires:

Prolapsus valvulaire mitral

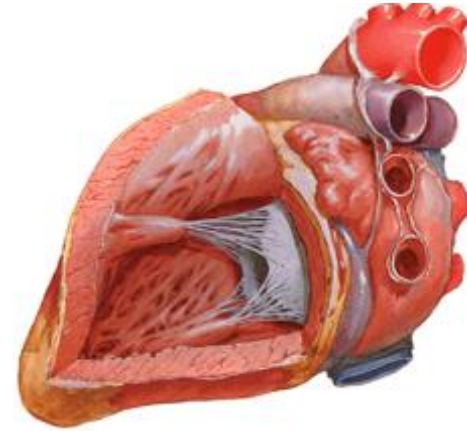
- Définition échocardiographique
 - Extension des feuillets mitraux au-dessus du plan de l'anneau mitral en systole > 2 mm
 - Coupe parasternale grand axe
- Enfants : maladies du tissu conjonctif
 - Marfan, Ehlers-Danlos
 - Osteogenesis imperfecta, pseudoxanthome élastique



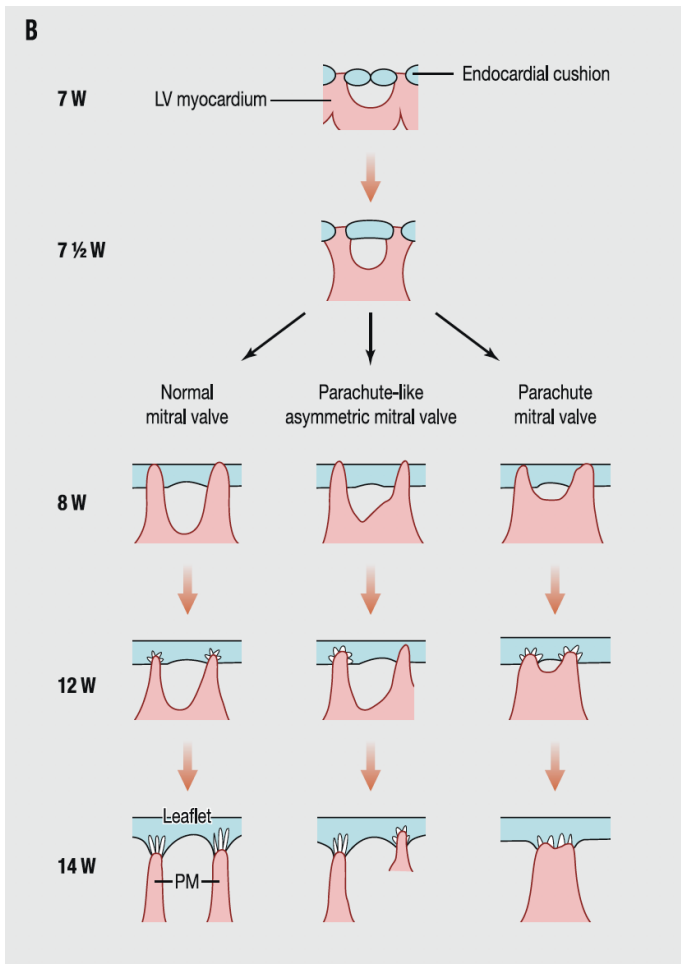
ANATOMIE NORMALE

Complexe valvulaire mitral

- Anneau.....sténose
- Feuillet.....fuite
- Cordages.....Mixte ou sténose
- Muscles papillaires.....mixte ou sténose



Parachute mitral valve



Parachute mitral/Entonnoir



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ANOMALIES DES PILIERS

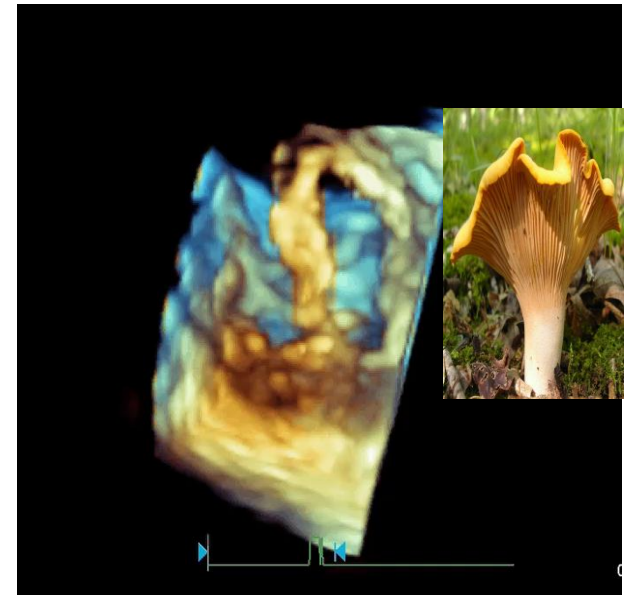
VALVE EN PARACHUTE



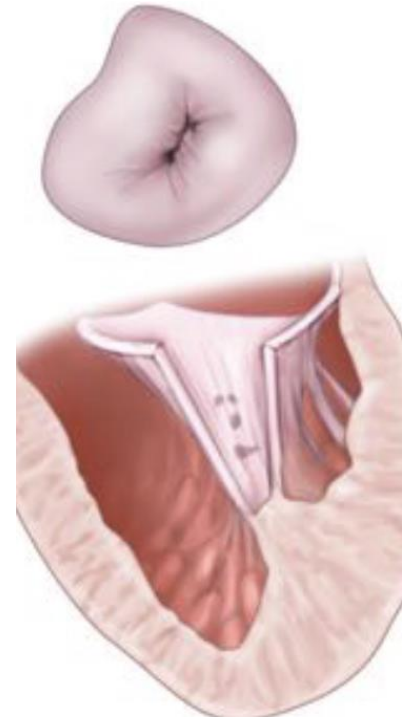
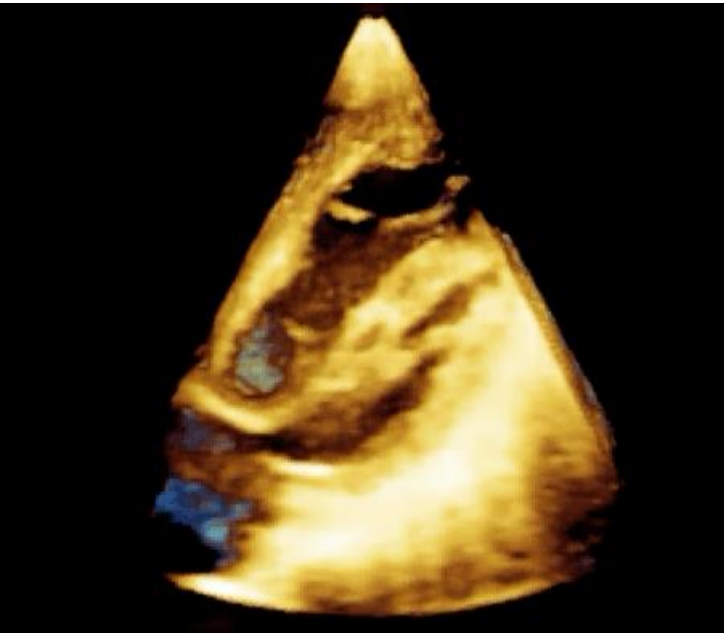
Normal



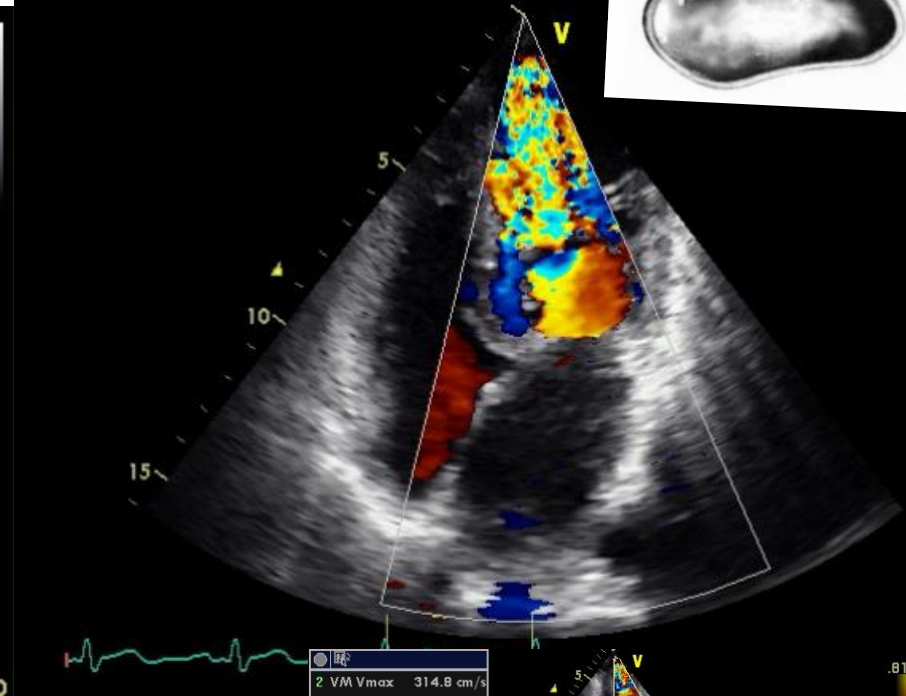
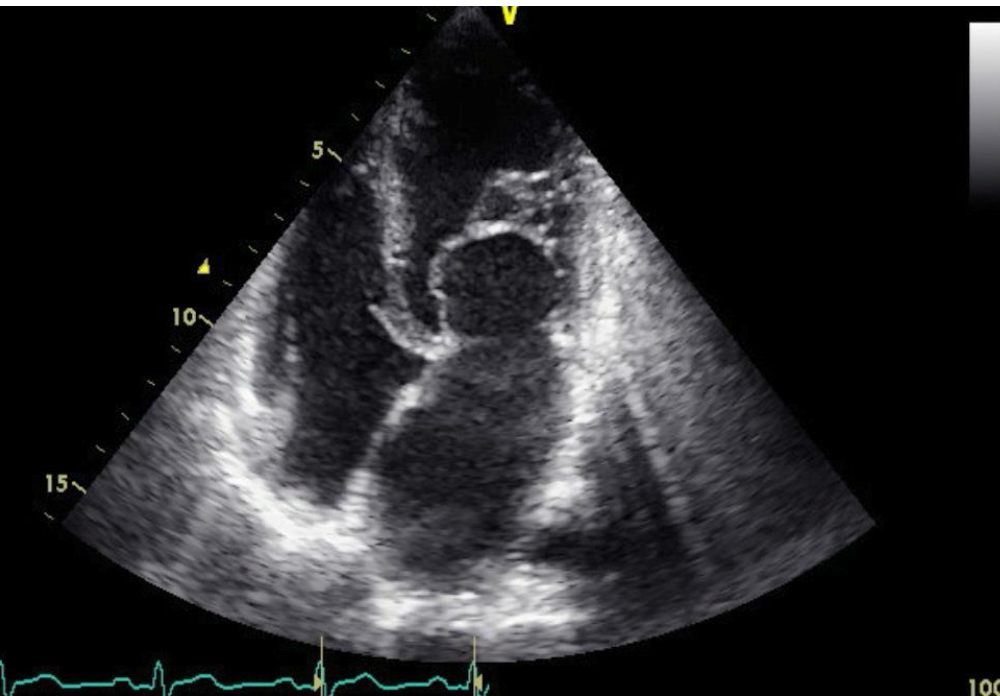
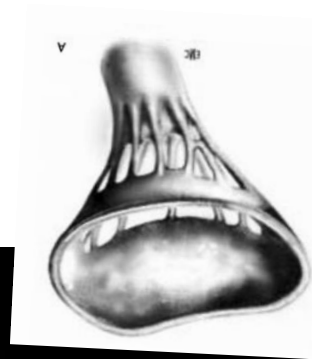
Parachute



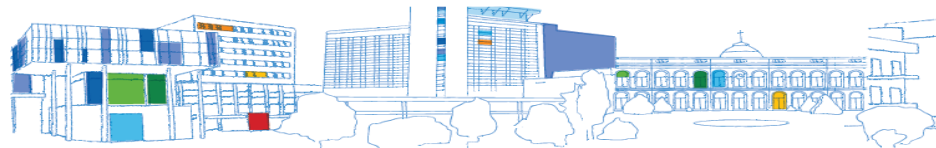
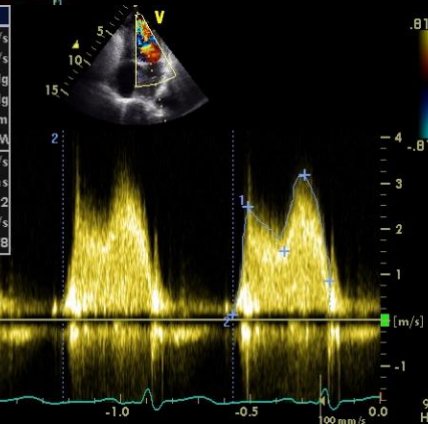
Parachute mitral valve



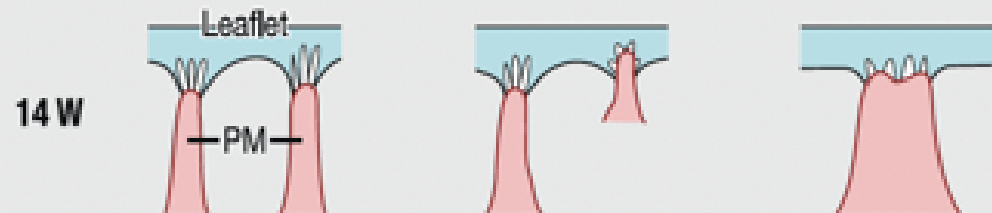
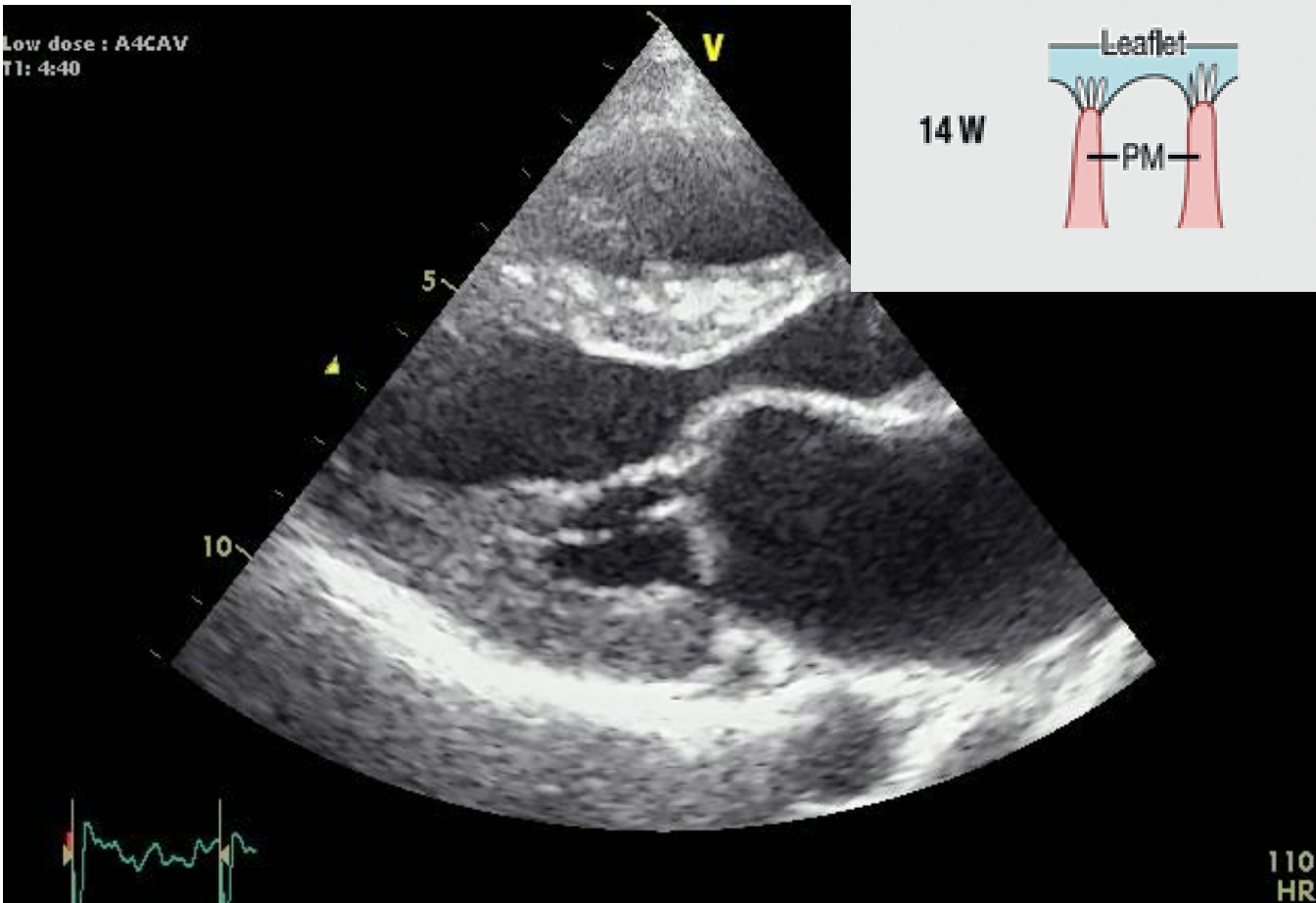
Parachute mitral valve

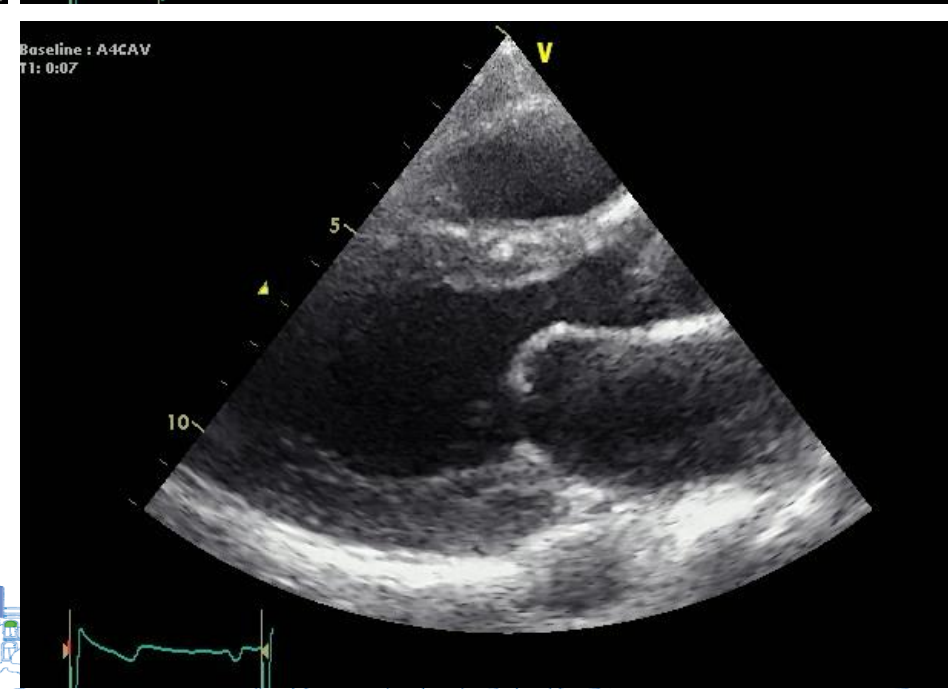
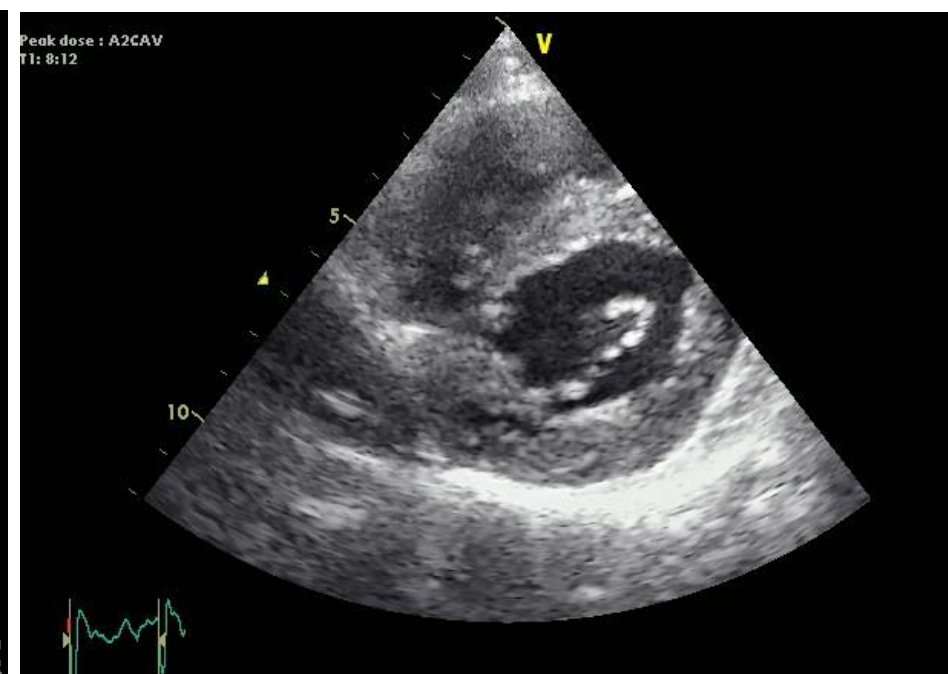


2	VM Vmax	314.8 cm/s
	VM Vmoy	213.8 cm/s
	VM GDmax	39.6 mmHg
	VM GDmoy	20.3 mmHg
	VM ITV	79.8 cm
	FC	91.7 BPM
1	VM E Vlt	247.0 cm/s
	VM T.déc	356.1 ms
	VM Pente Dec	6.9 m/s ²
	VM A Vlt	316.9 cm/s
	VM E/A Ratio	0.78



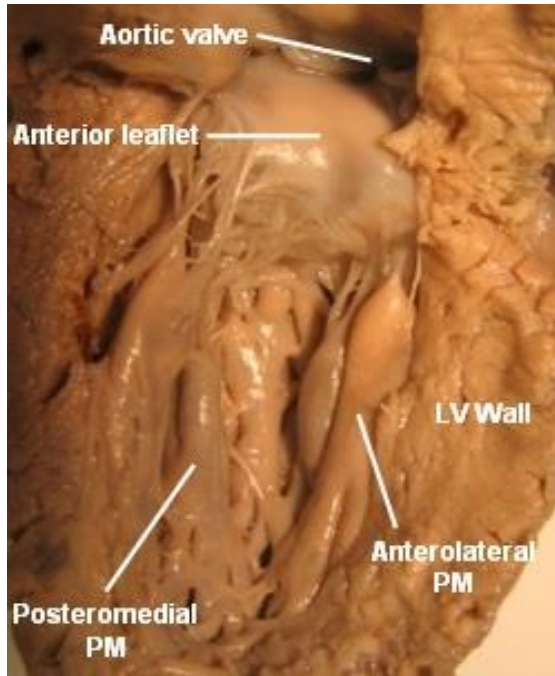
Parachute-like mitral valve







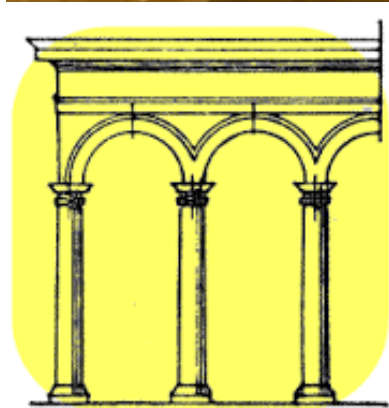
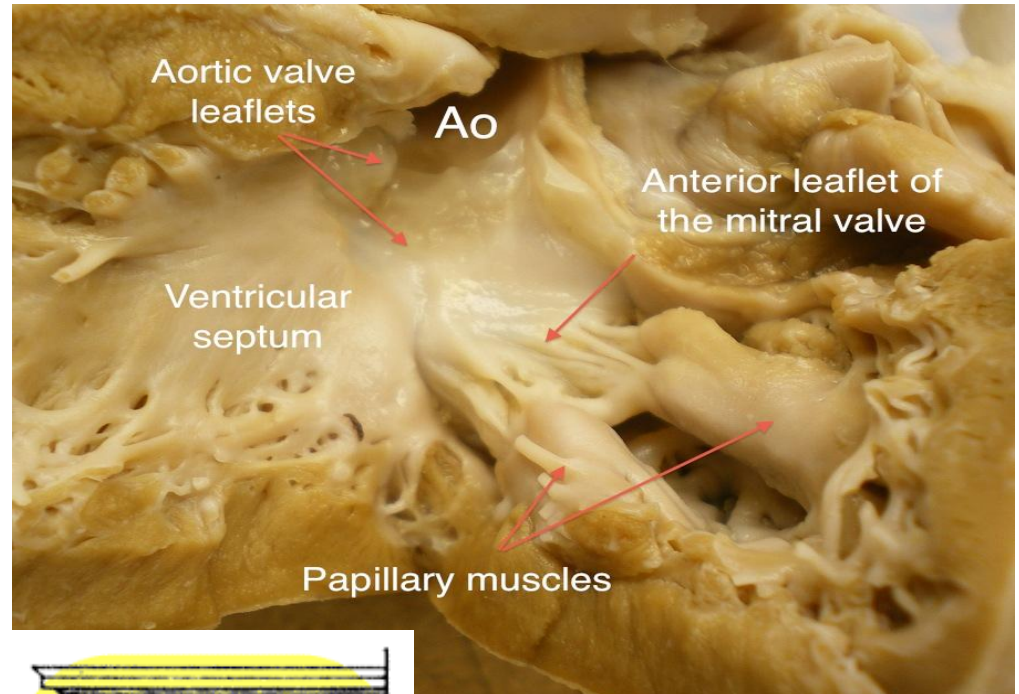
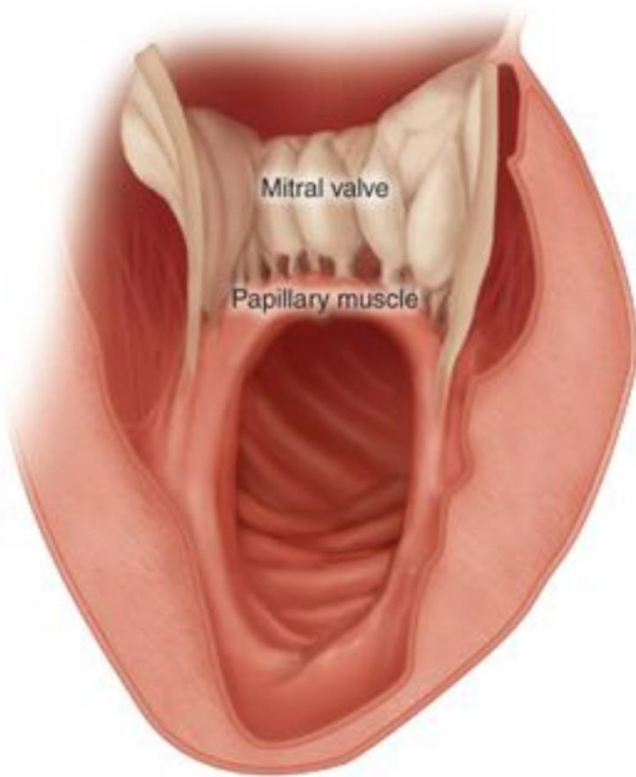
Normal mitral valve



Parachute-like asymmetric mitral valve

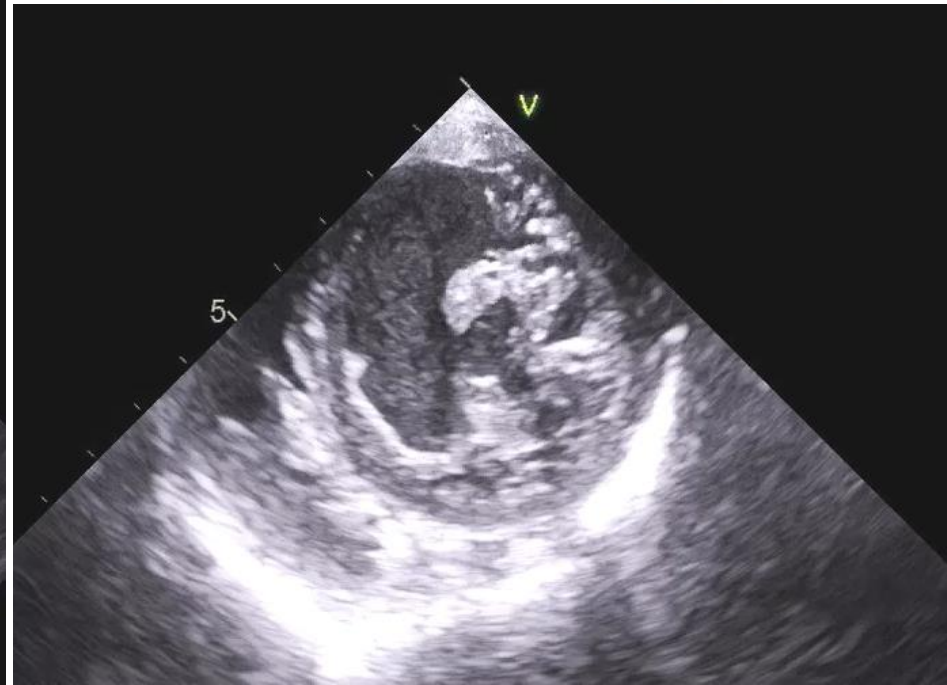
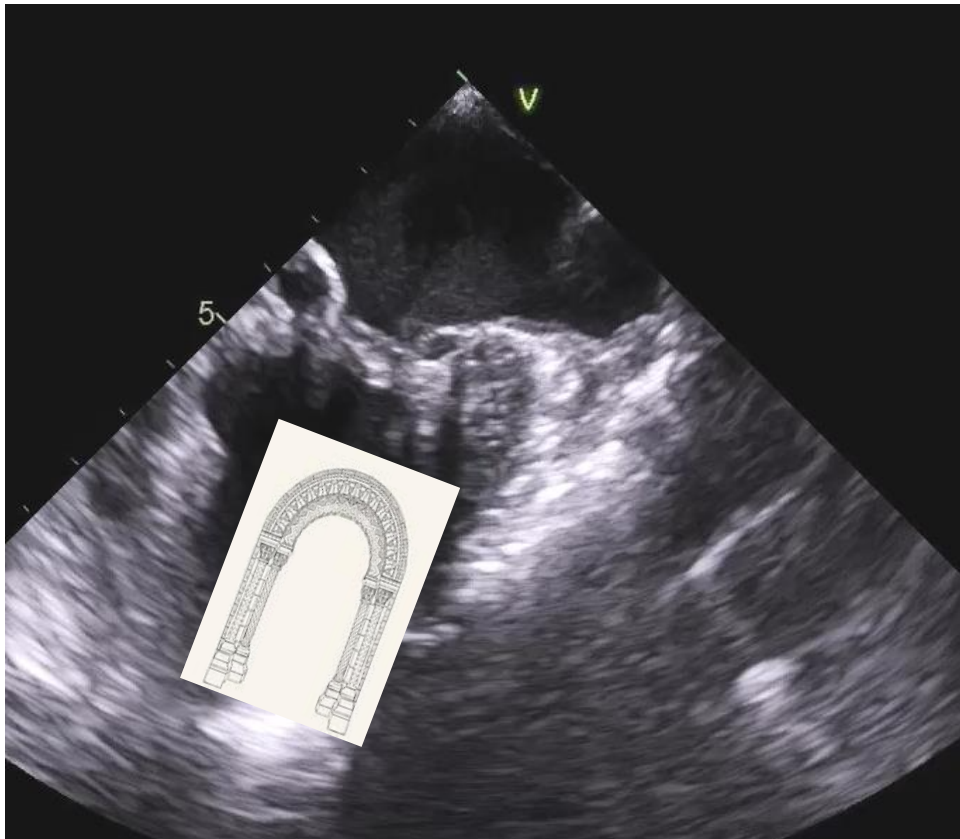
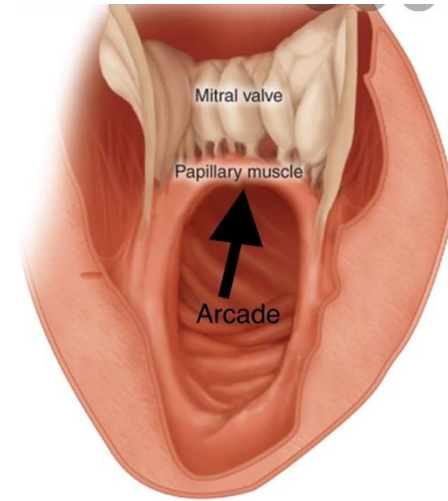


Arcade mitrale

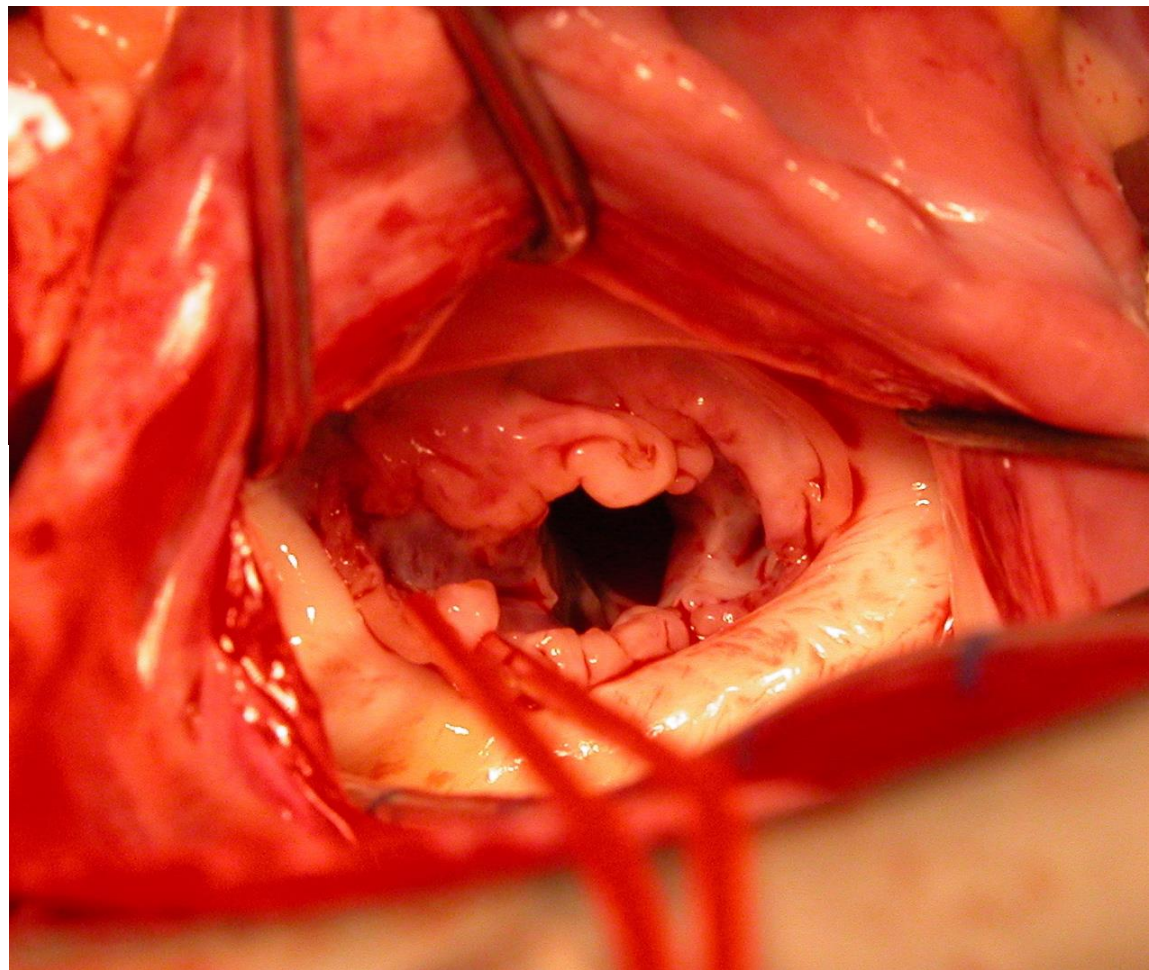
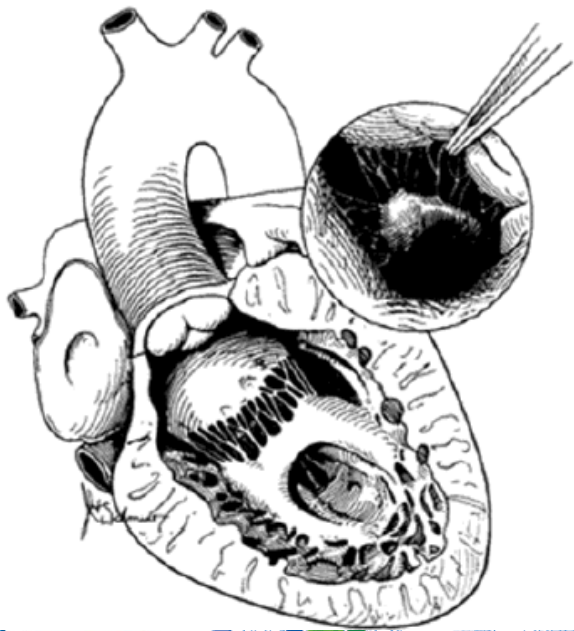


ANOMALIES DES CORDAGES

VALVE EN ARCADE



Valve mitrale en arcade



Hôpitaux de
Bordeaux

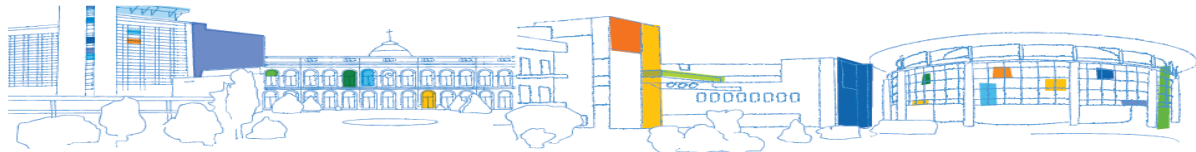
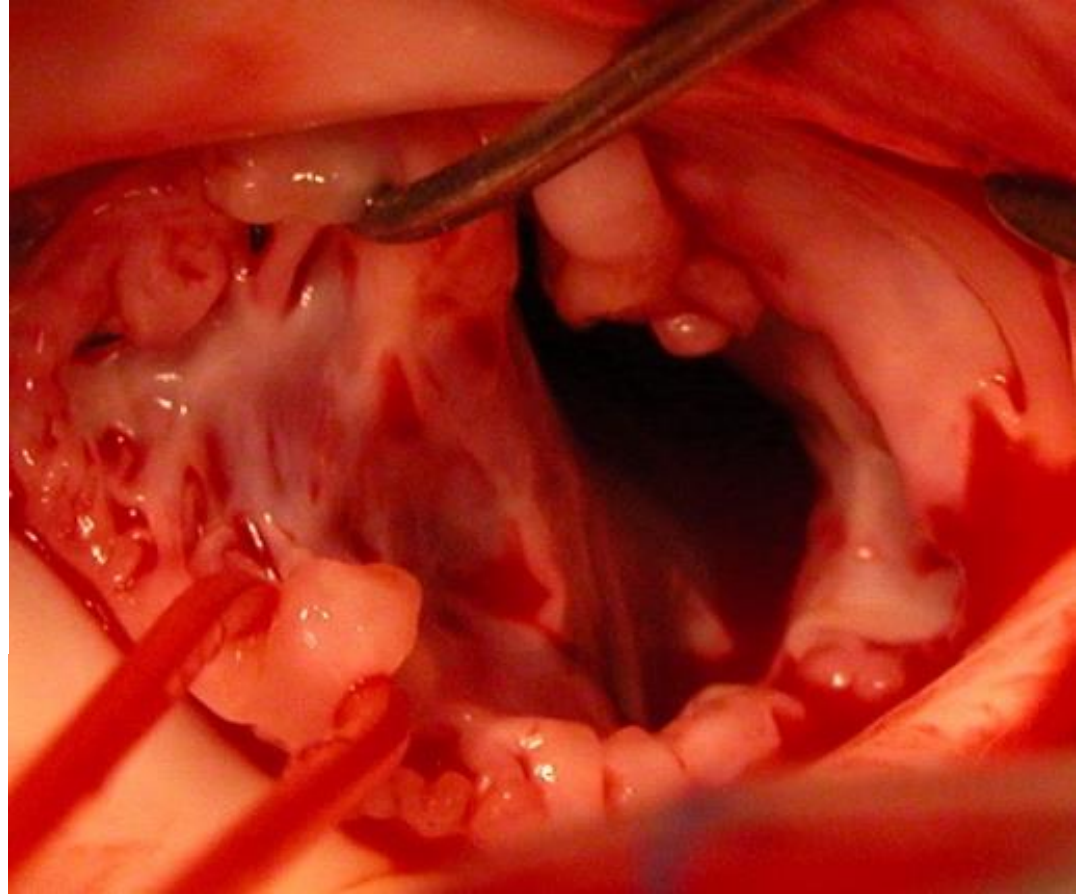
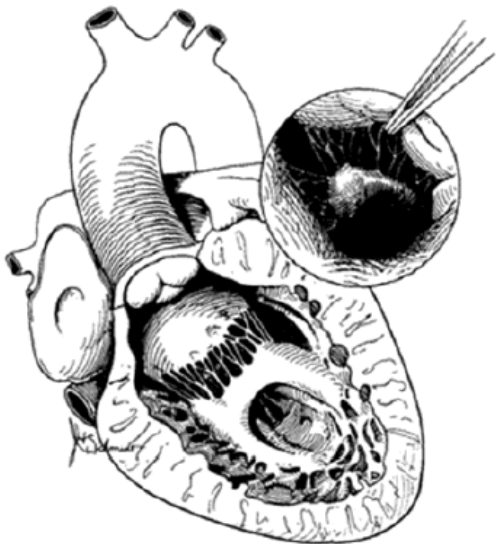


Valve mitrale en arcade

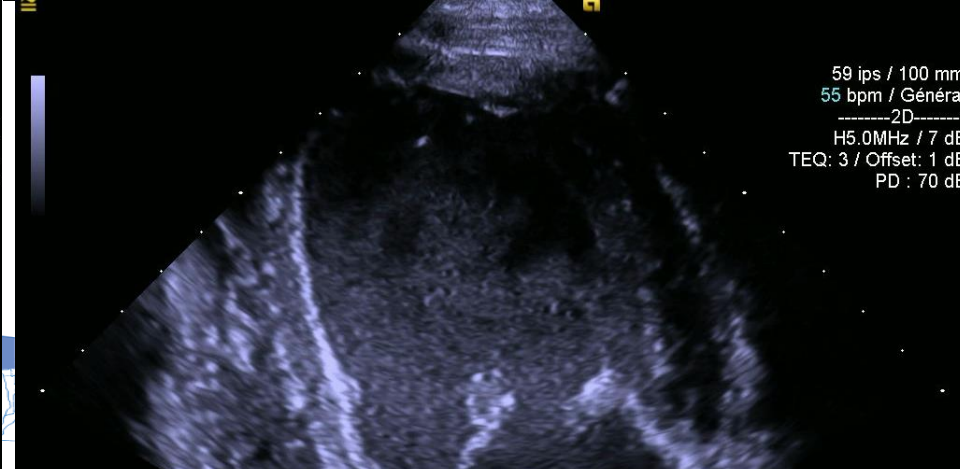
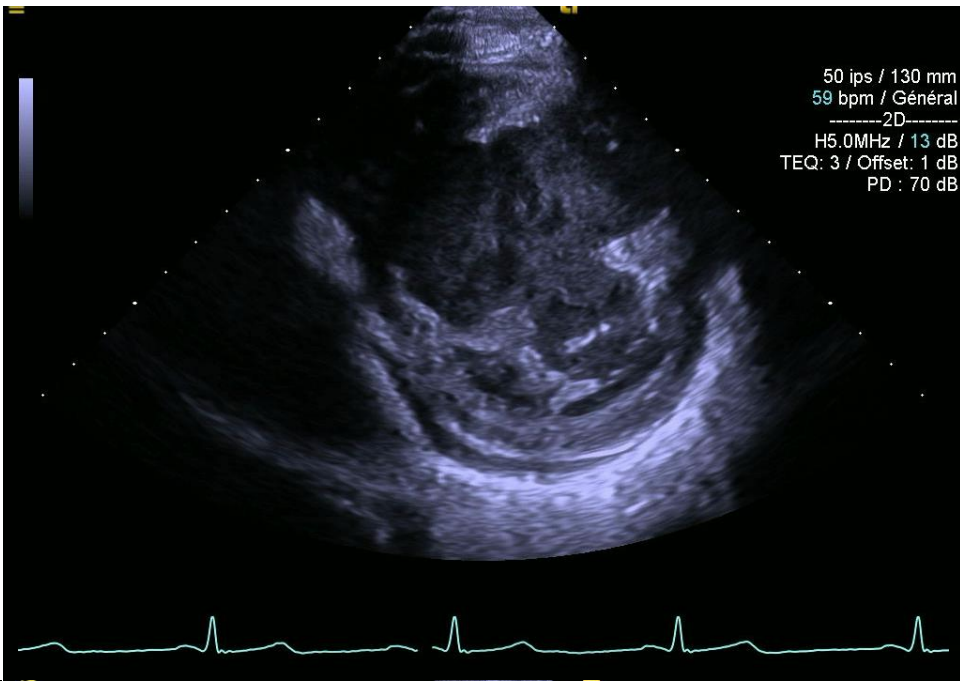
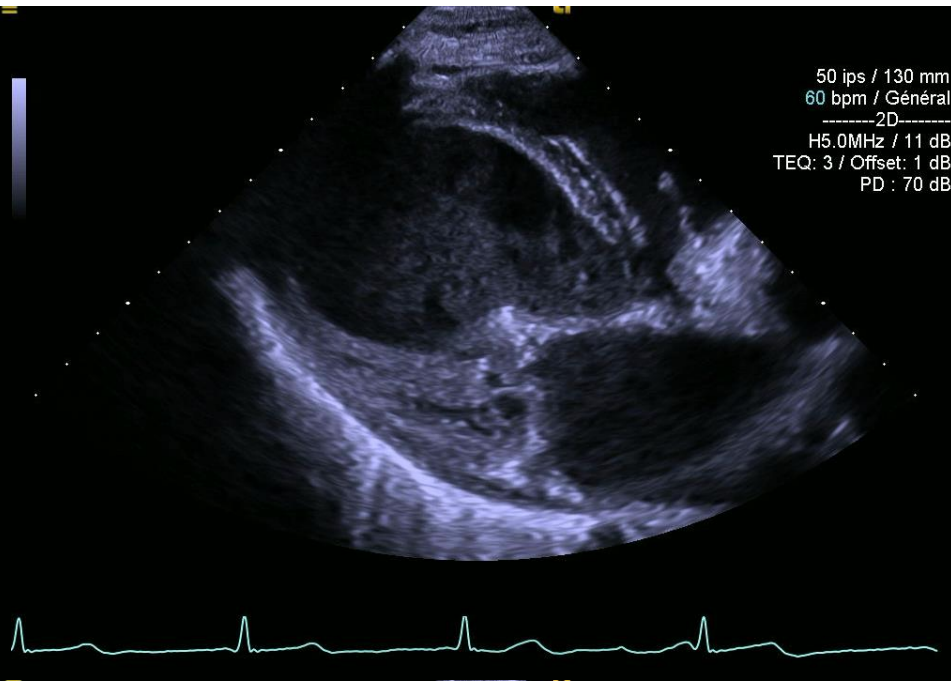


ESC

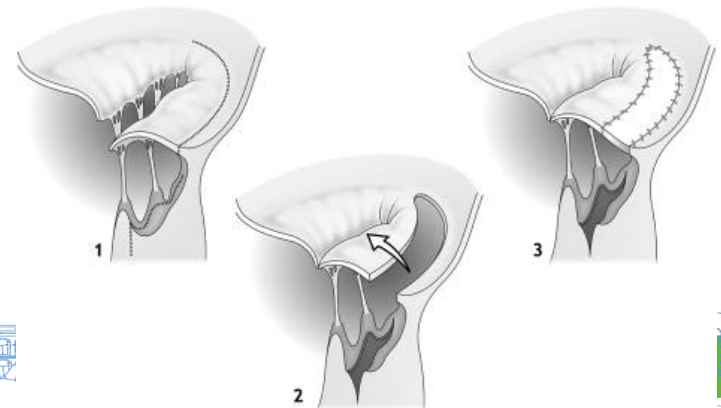
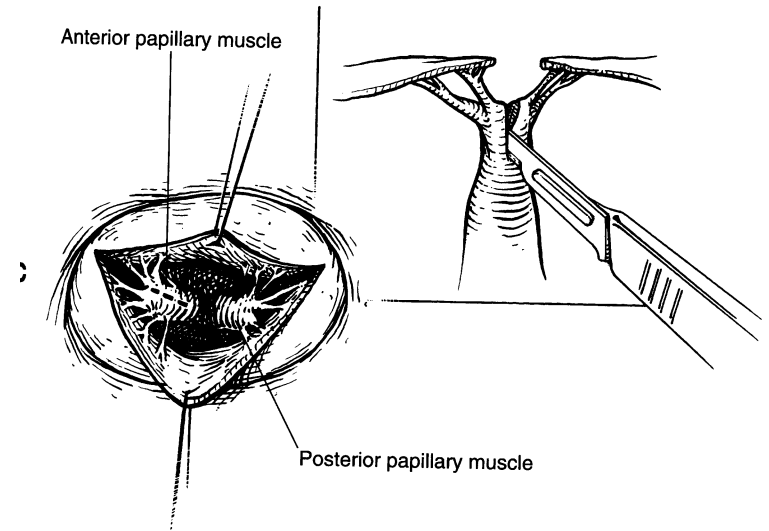
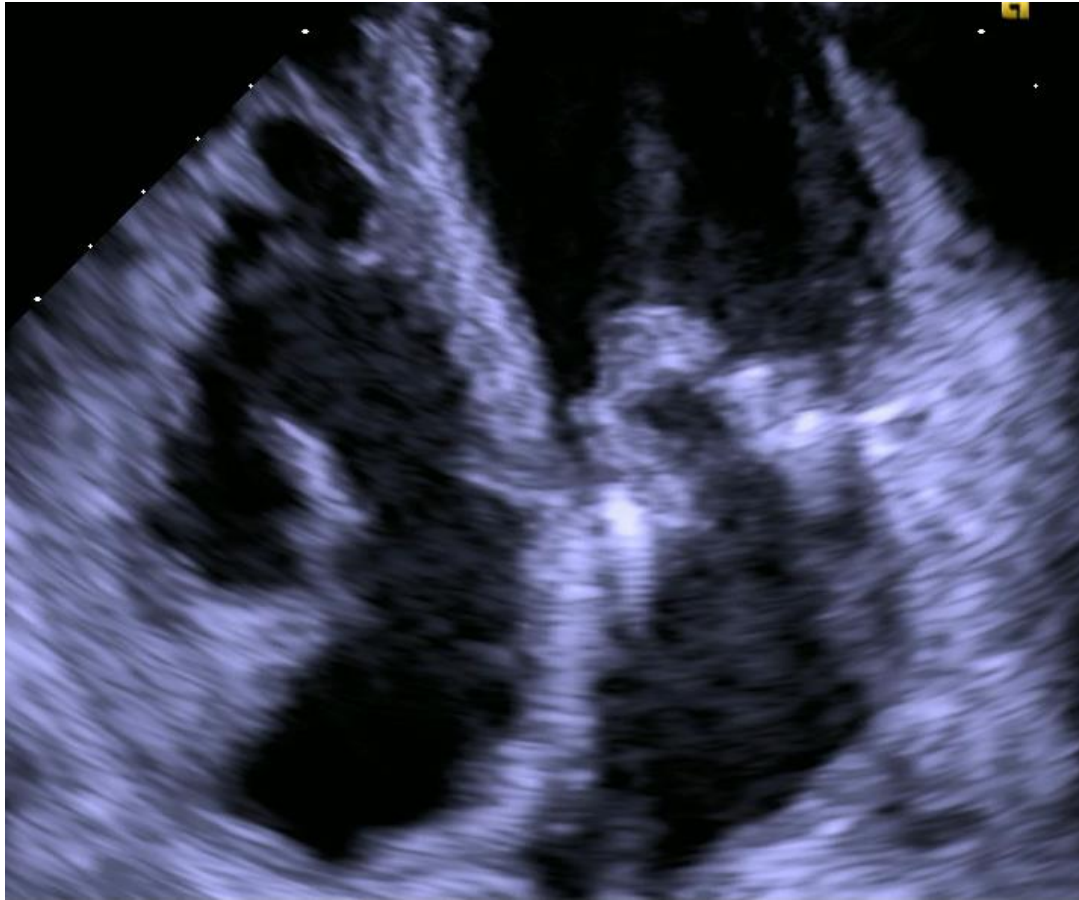
A



Valve mitrale en arcade

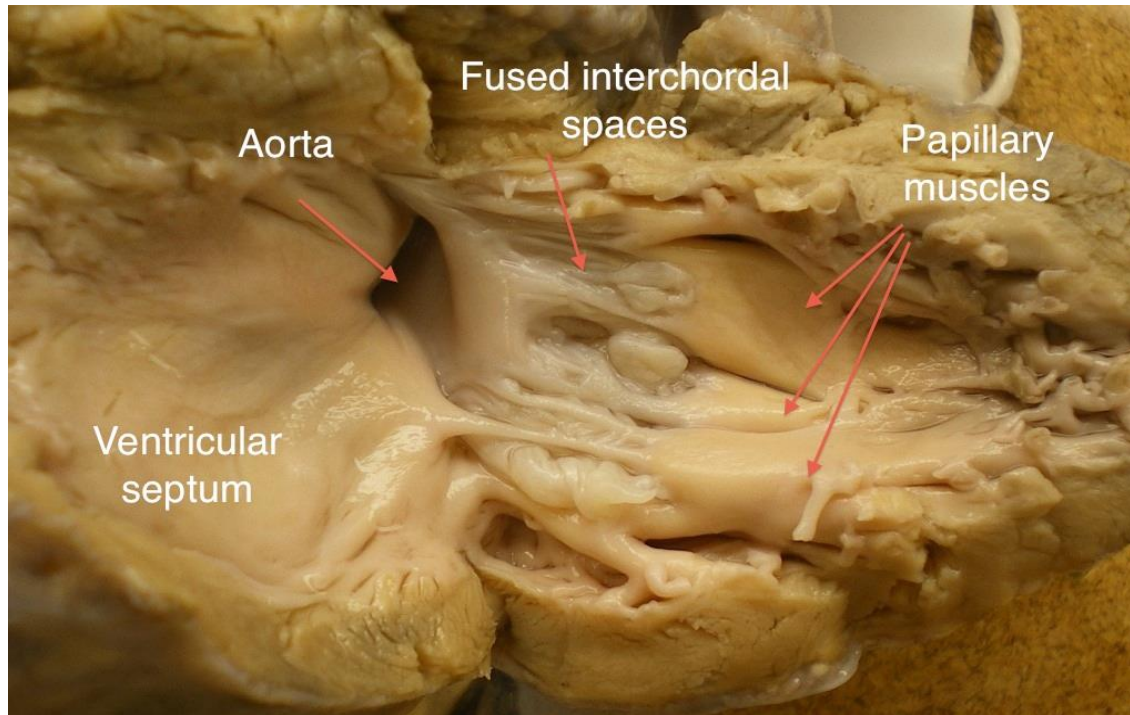


Valve mitrale en arcade

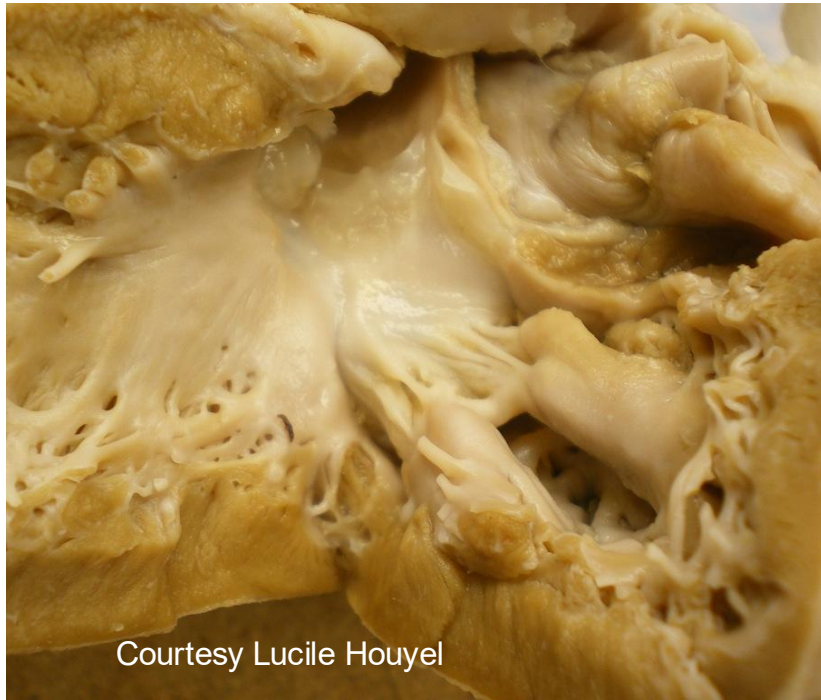


Anomalies de l'appareil sous-valvulaire

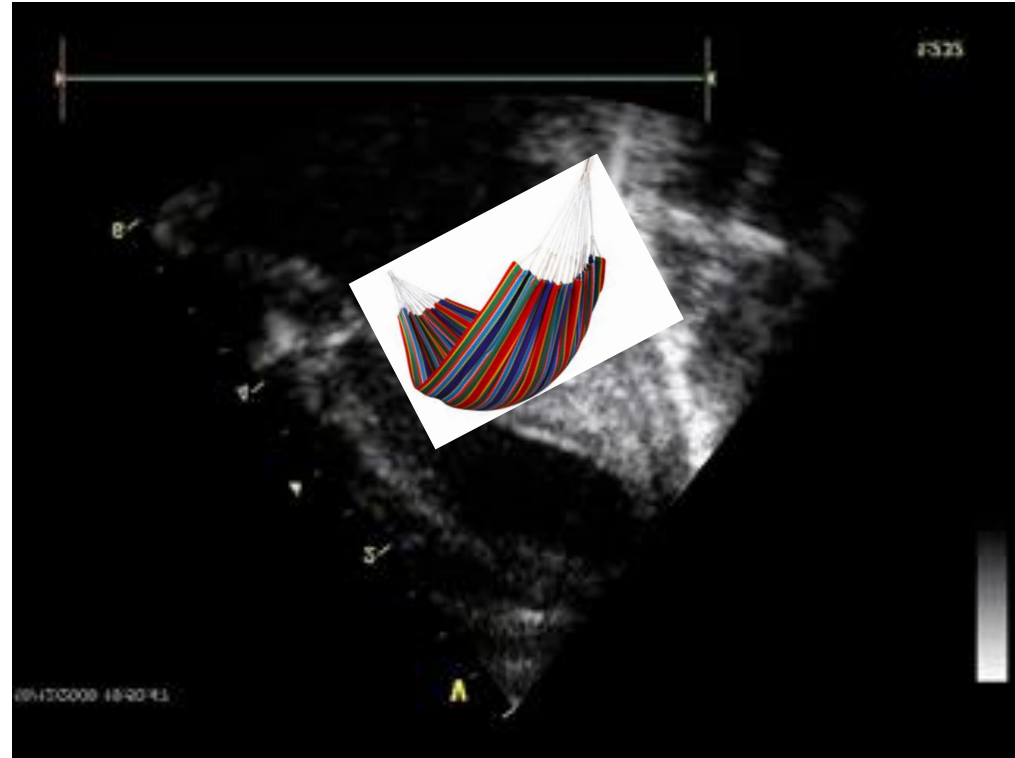
Mitrale en hamac



mitral valve en Hamac

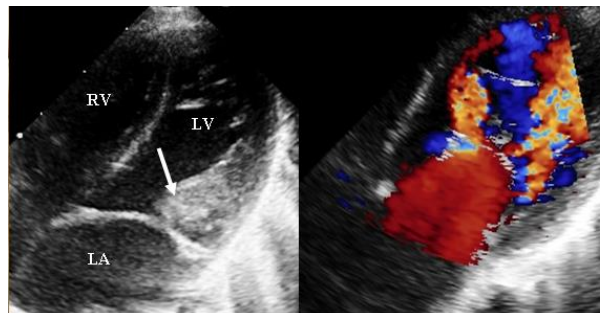
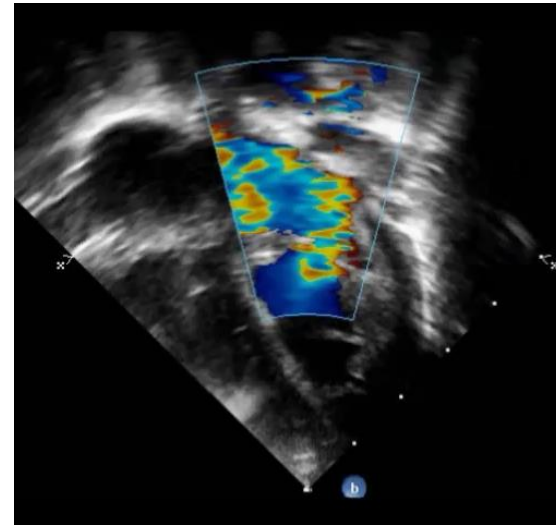
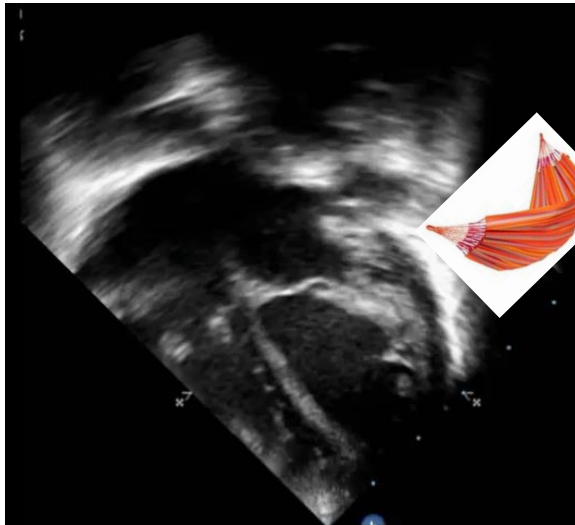


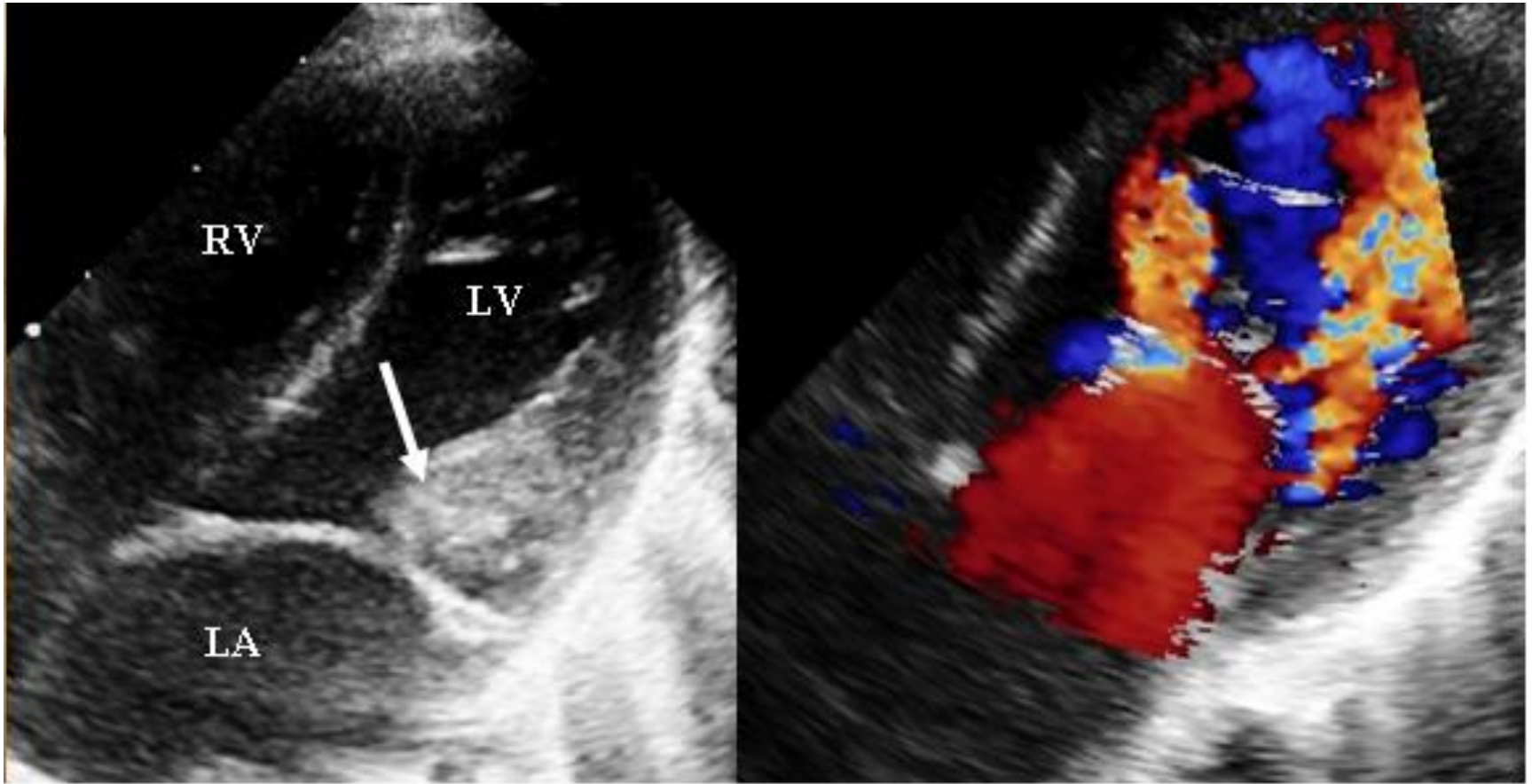
Courtesy Lucile Houyel



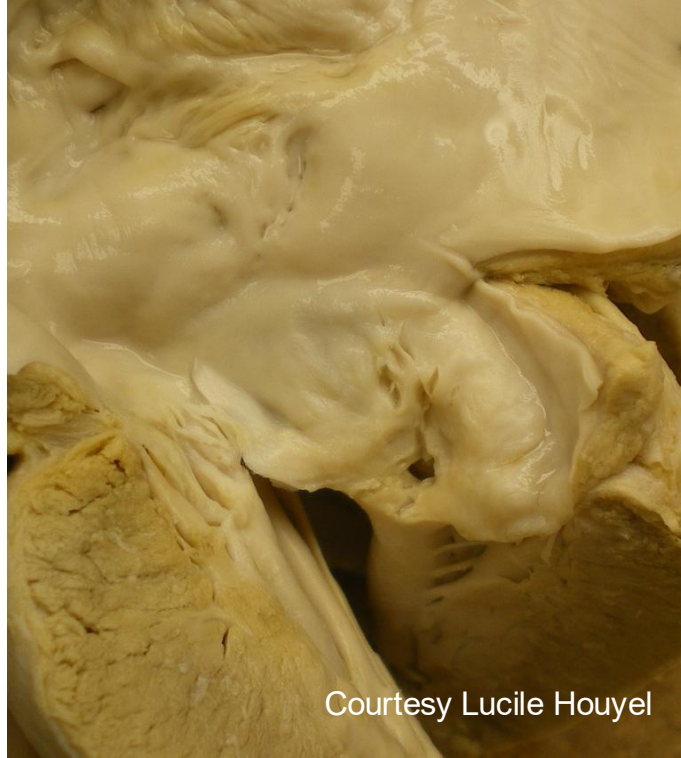
ANOMALIES DES CORDAGES

VALVE EN HAMAC

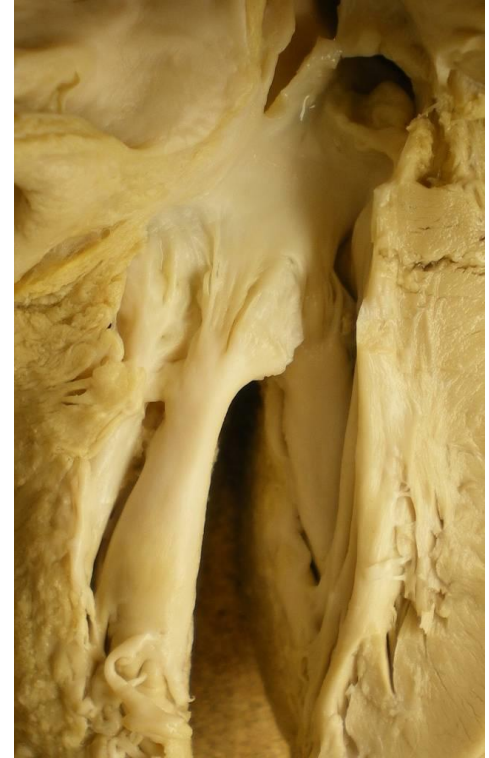




Valve mitrale en entonnoir



Courtesy Lucile Houyel





Pédiatrique
S8-3
26Hz
10cm

2D
51%
C 50
P Arrêt
P en

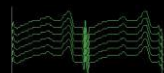
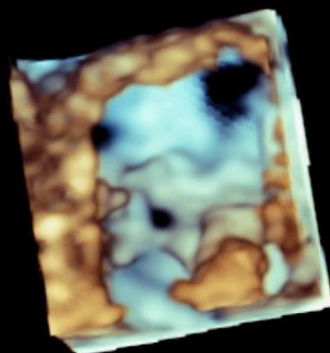
Coul
40%
6600Hz
FP 659Hz
3.3MHz



JPEG CR 12: TIS1.6 MI 0.9

M4 M
+77
-77
cm/

*** bpm



CHU
Hôpitaux de
Bordeaux



Cordages de la Valve mitrale

Syndrome Piliers-Commissures

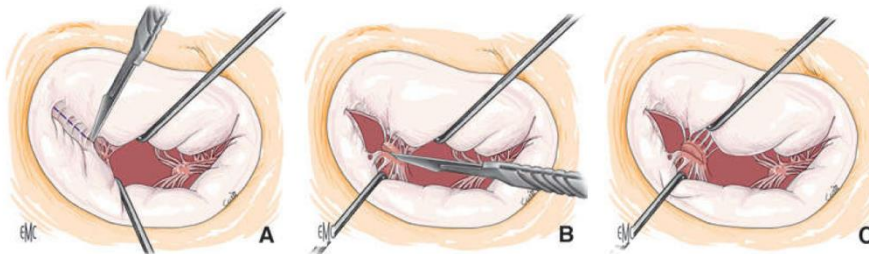


Figure 12. Fusion pilier-commissure.
A. Commissurotomie au bistouri.
B. Extension de l'incision dans les piliers.
C. Fenestration des espaces intercordaux.

EMC
2020

Piliers de la Valve mitrale

Parachut

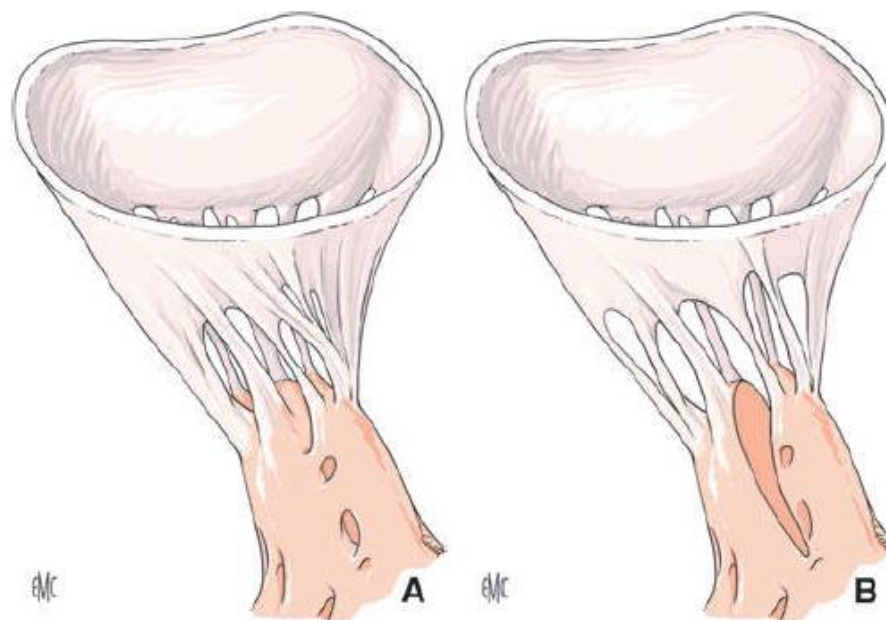
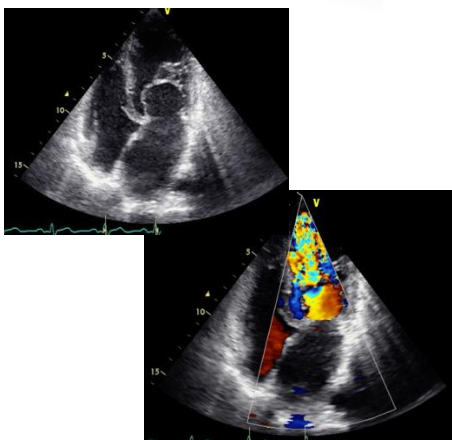


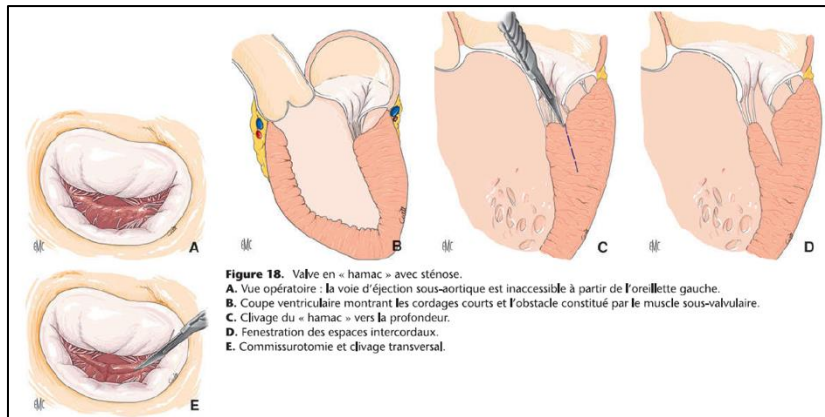
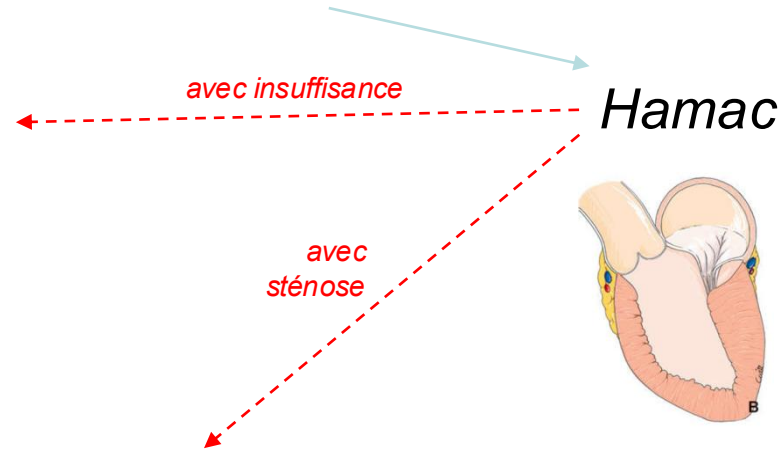
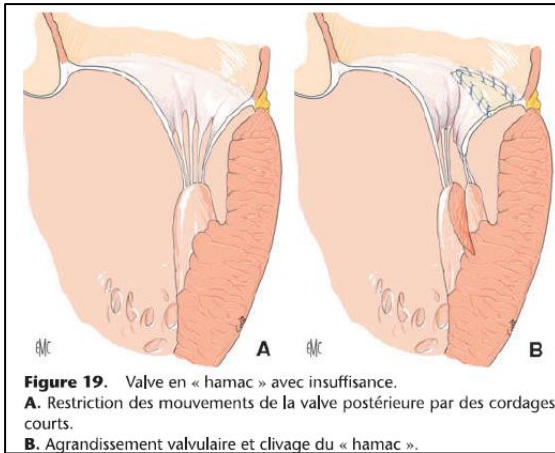
Figure 17. Valve en « parachute ».

A. L'ensemble des cordages se rend à un pilier unique.

B. Levée de l'obstacle par clivage du pilier et résection du tissu intercordanal.



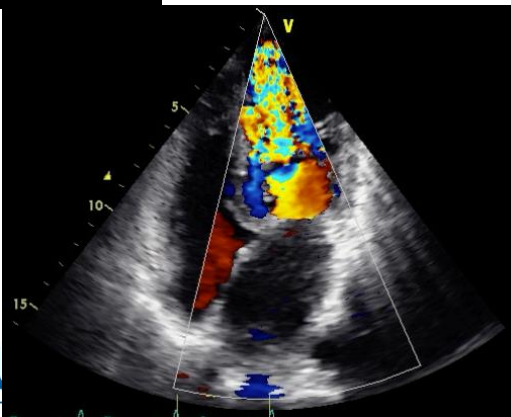
Piliers de la Valve mitrale



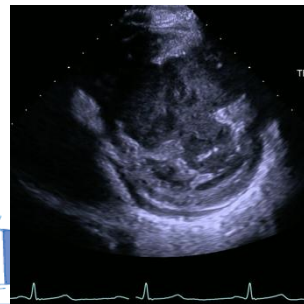
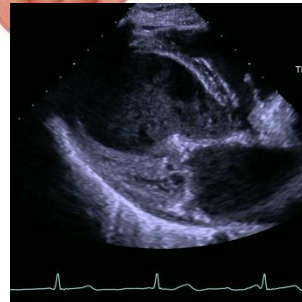
Courtesy of Lucile Houyel

Piliers de la Valve mitrale

Parachute



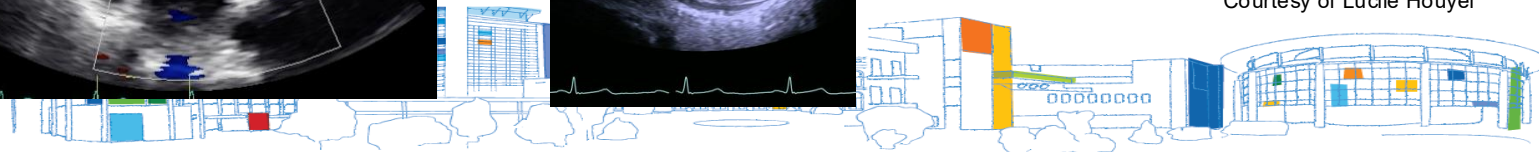
Arcade



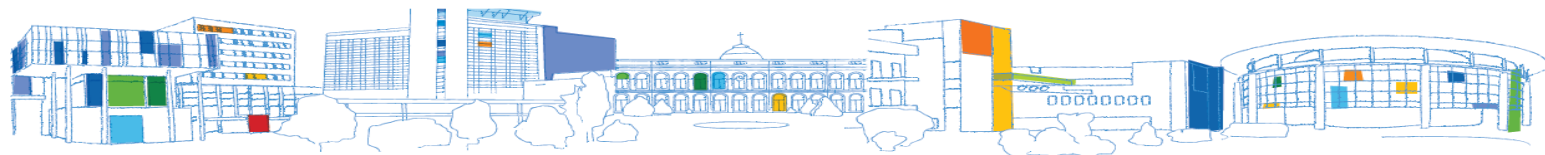
Hamac



Courtesy of Lucile Houyel

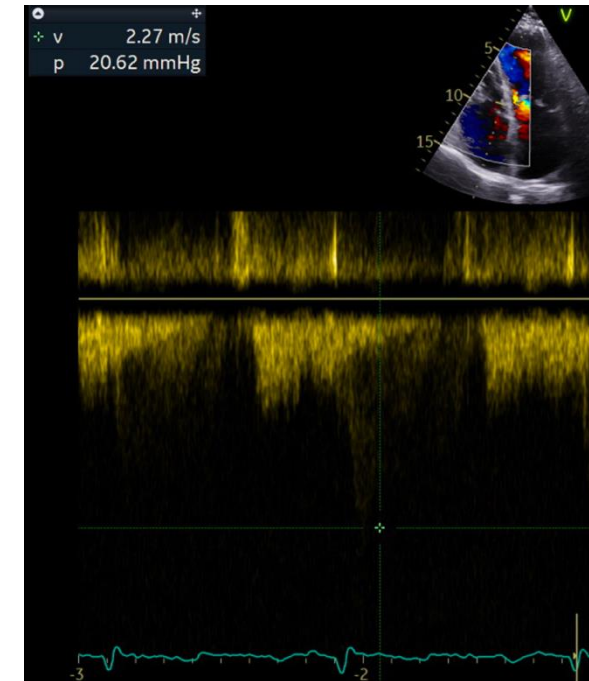
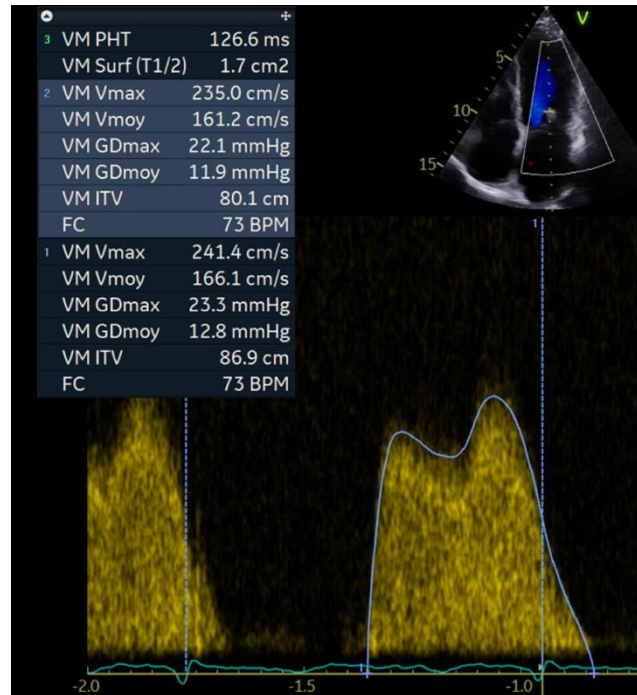
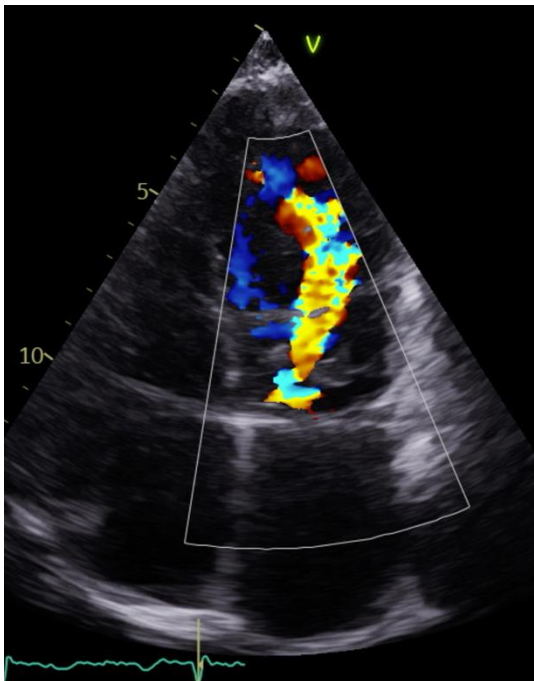


Grey zone



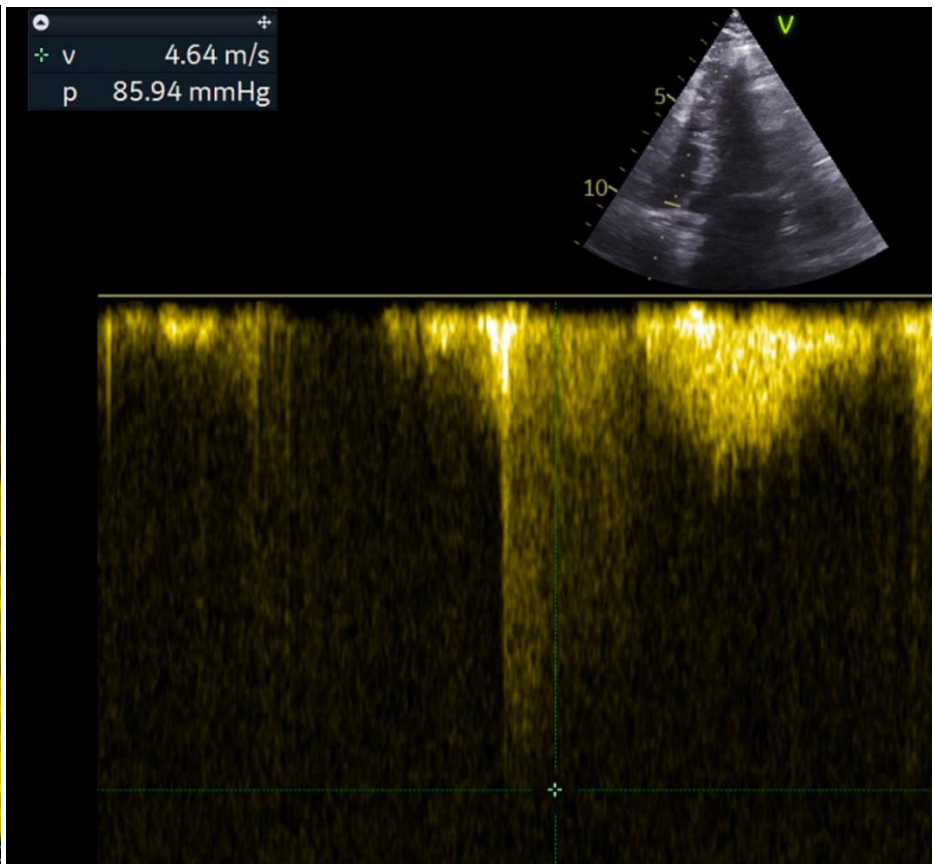
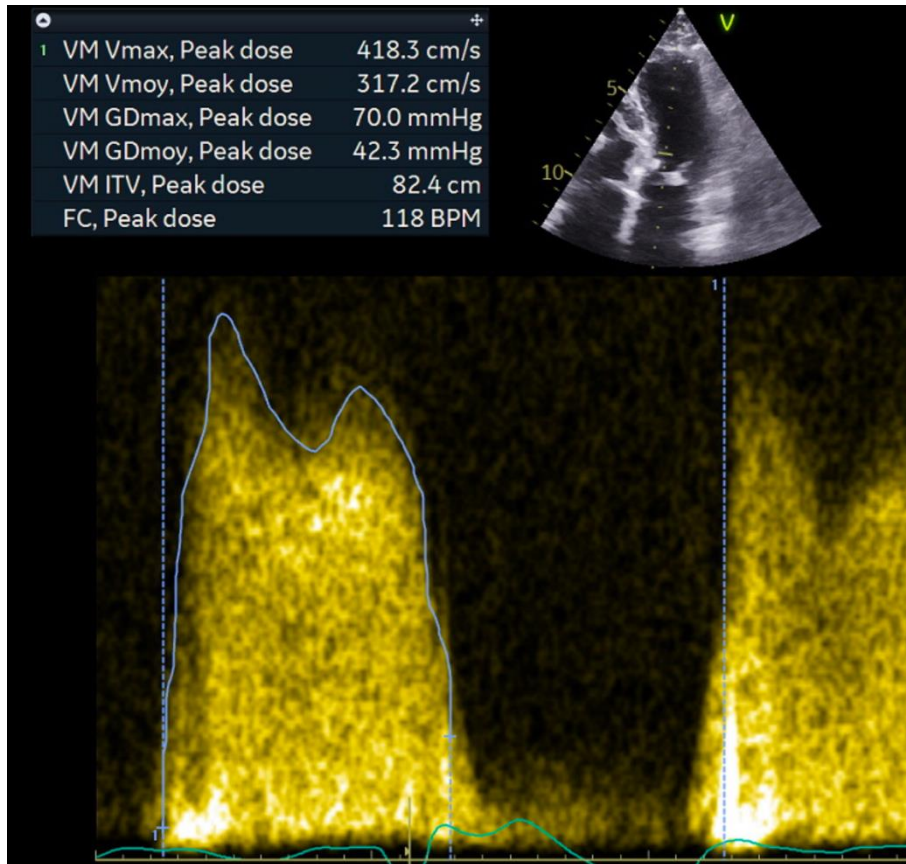
Écho d'effort

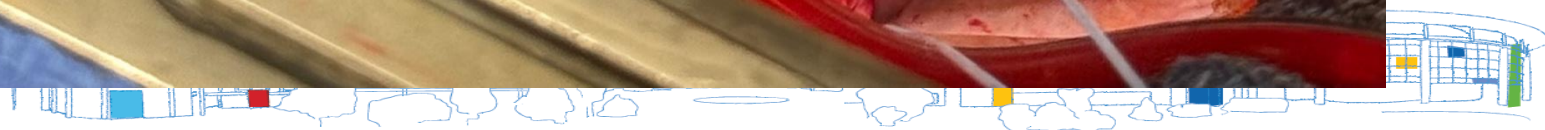
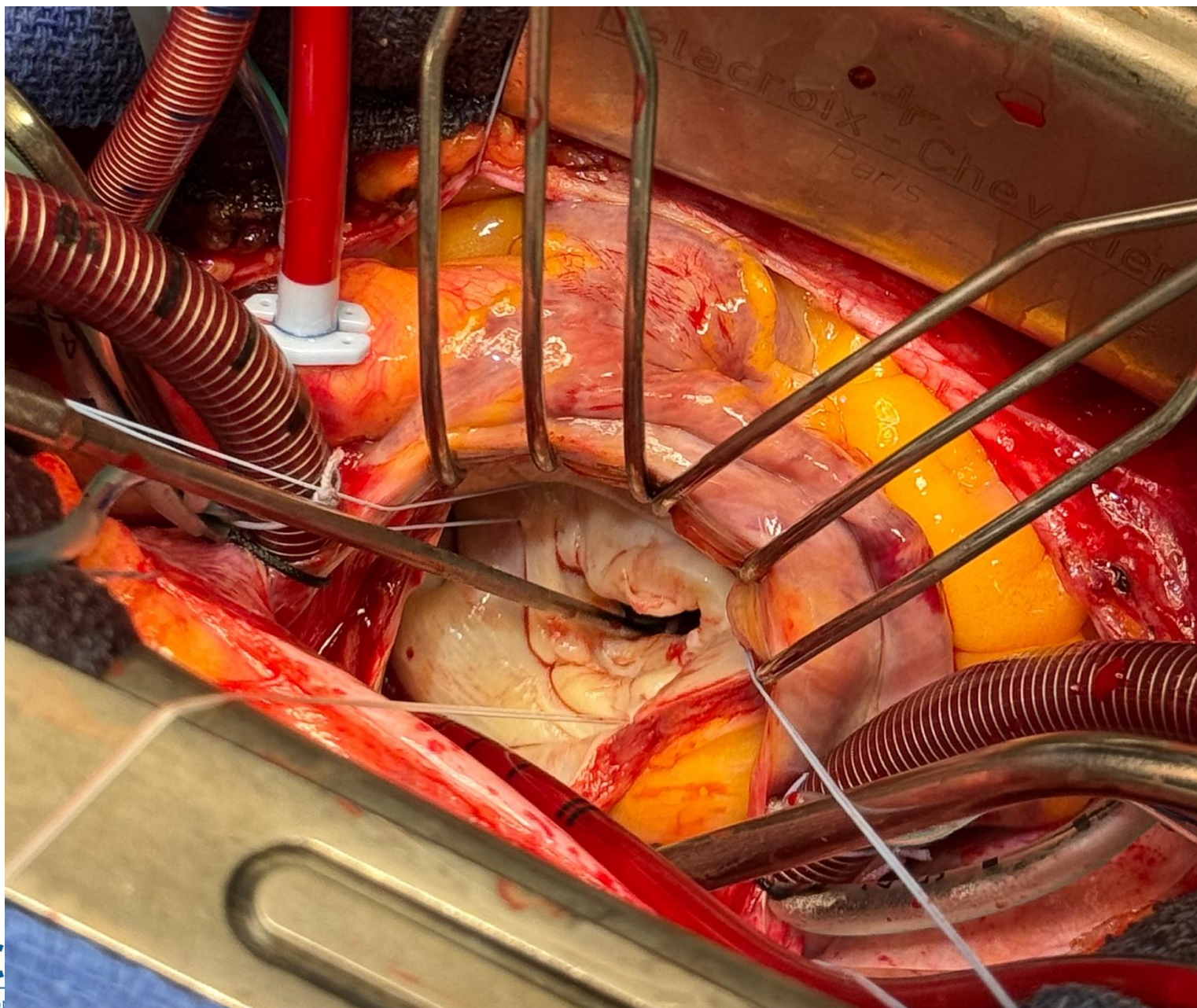
- 46 ans immigration récente du Maroc
- Dilatation mitrale percutanée en 2019 en plein grossesse
- Resténose mitrale
- Très peu symptomatique , Dyspnée d'effort stade I –II
- Discordance à l' écho : SM à 2,8 cm² , Gmoy à 14 mmhg , PAPS à 45 mmhg
- Que faire ?



Baseline : FC à 73/ min

60W, FC 139/min, dyspnée d'effort





Lésion mixte congénitale (cordages courts, piliers anormaux) et quelques calcifications

