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Tétralogie de Fallot

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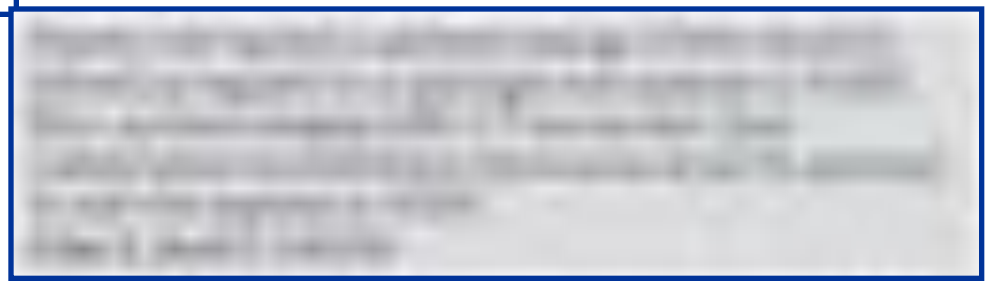
Suivi clinique

Follow-up recommendations

All patients with ToF should have periodic cardiac follow-up in a specialized GUCH centre, which in most patients should be done annually, but can be less frequent in those patients at the best end of the spectrum with minimal/stable haemodynamic disturbance. Follow-up evaluation needs to look for the complications listed above (see late clinical presentation). Echocardiography is performed as part of each visit. All patients should have CMR. The intervals for repeat studies depend on the pathology found.



Frequency of Routine Follow-Up and Testing	Physiological Stage A* (mo)	Physiological Stage B* (mo)	Physiological Stage C* (mo)	Physiological Stage D* (mo)
Outpatient ACHD cardiologist	12–24	12	6–12	3–6
ECG	24	12	12	12
TTE†	24	12–24	12	6–12
Pulse oximetry	As needed	As needed	Each visit	Each visit
Holter monitor	As needed	As needed	12–24	12–24
CMR‡/CCT§	36	24–36	12–24	12–24
Exercise test ‖	36–60	24–60	12–24	12–24

Baumgartner et al. *Eur Heart J 2010*
Warnes et al. *Circulation 2008*
Silversides et al. *Can J Card 2010*

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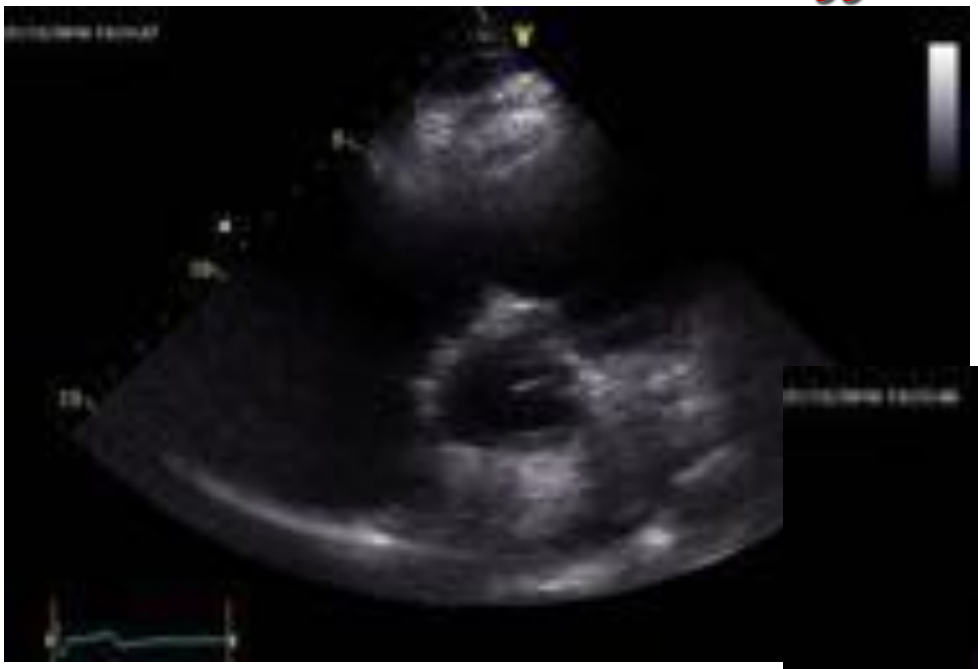
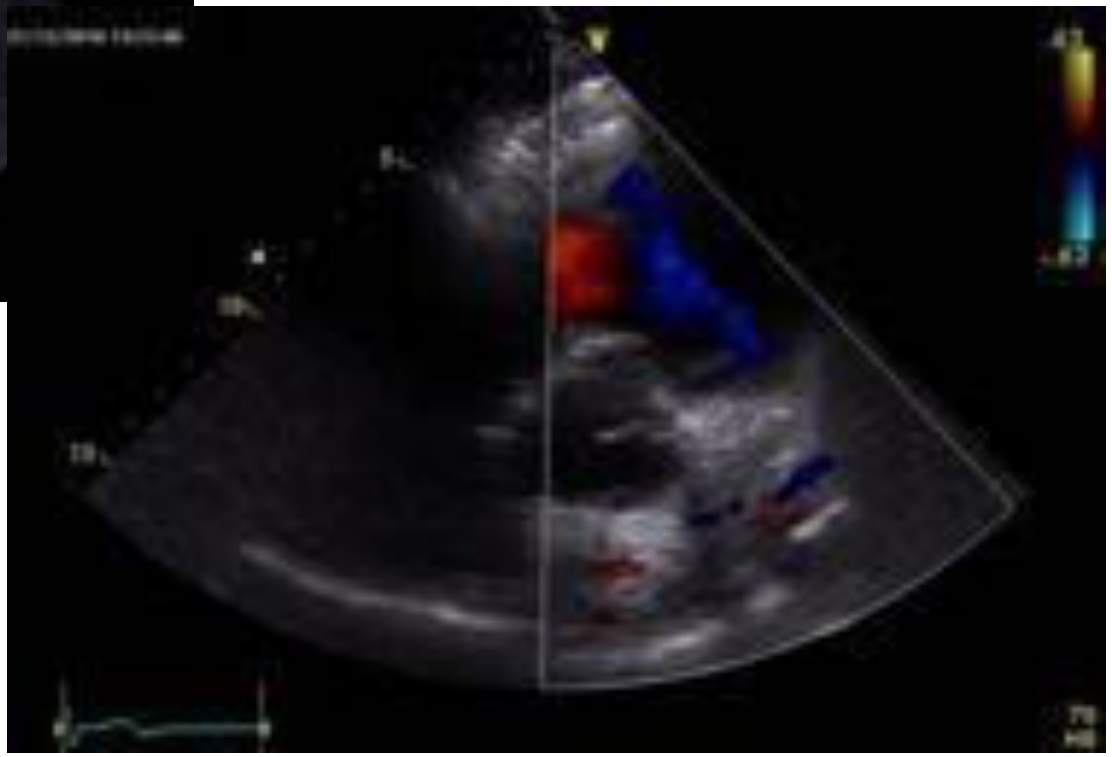
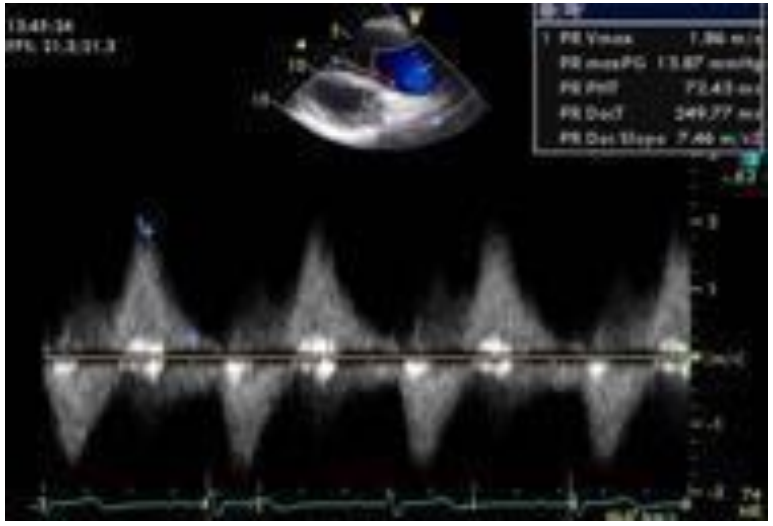
Suivi hémodynamique

Insuffisance pulmonaire







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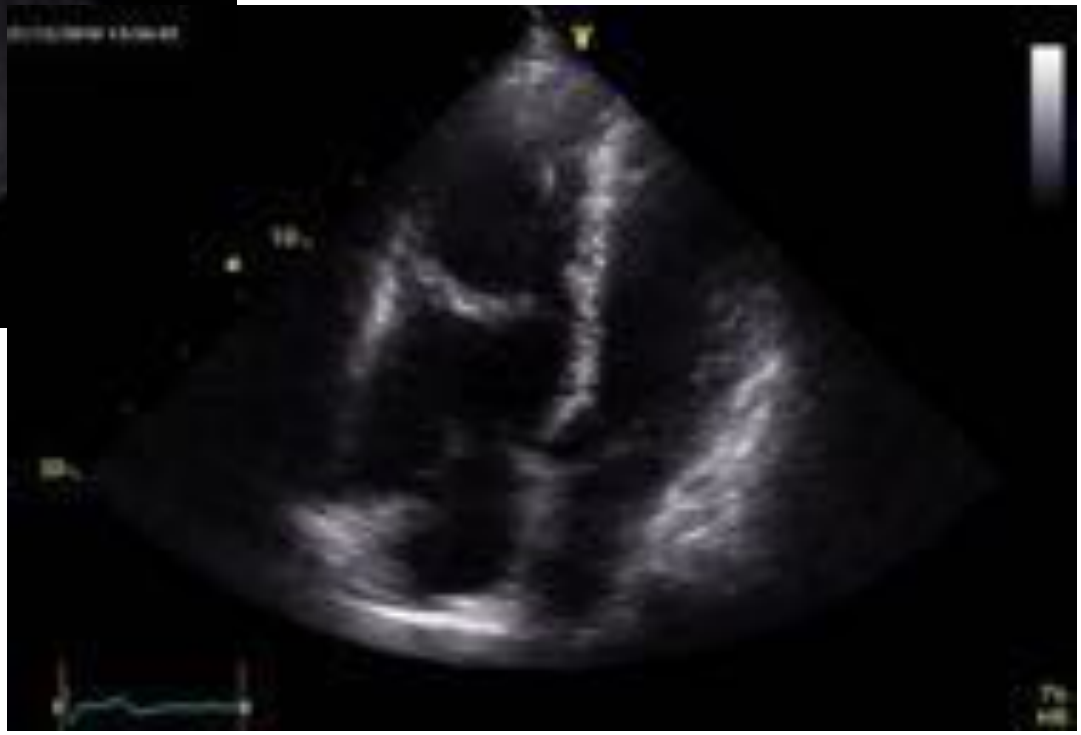
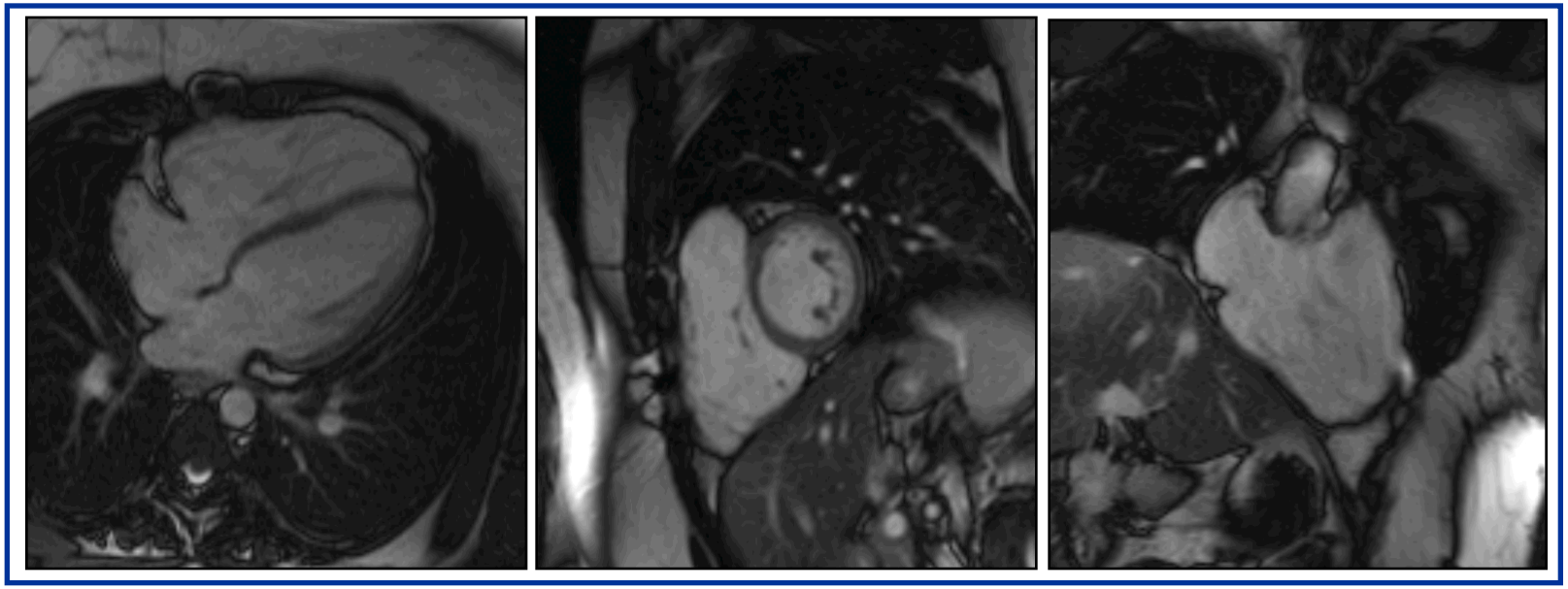
Suivi hémodynamique

Dilatation du VD (1)



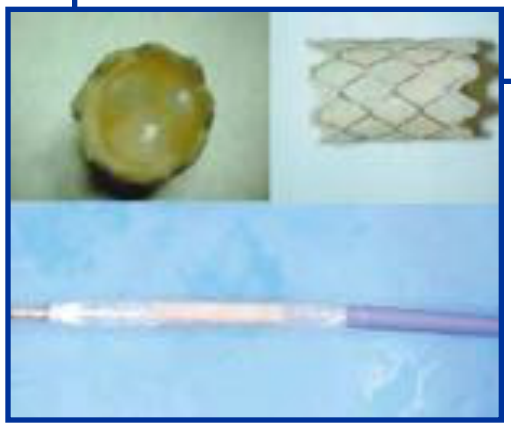
Suivi hémodynamique

Dilatation du VD (2)



Normalisation post-opératoire du VD si

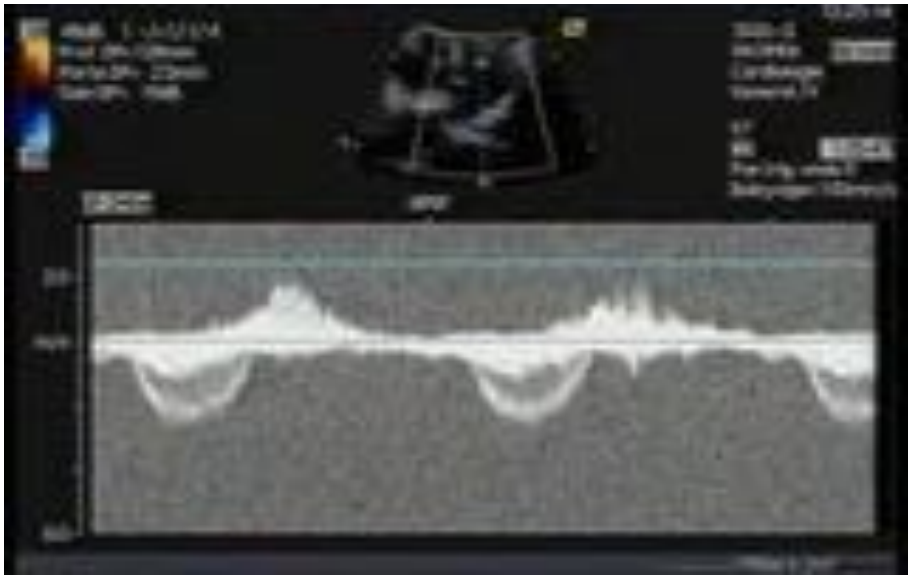
VTDVD<160 ml/m² et VTSVD<80 ml/m²

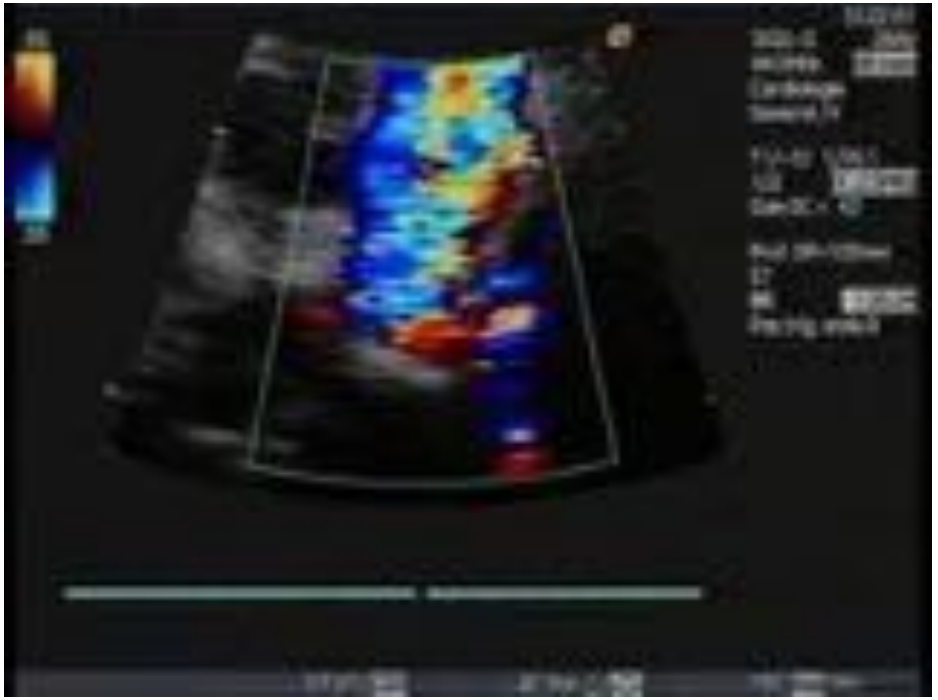


Buechel et al. *Eur Heart J 2005*
Oosterhof et al. *Circulation 2007*

Suivi hémodynamique

Sténose des branches pulmonaires

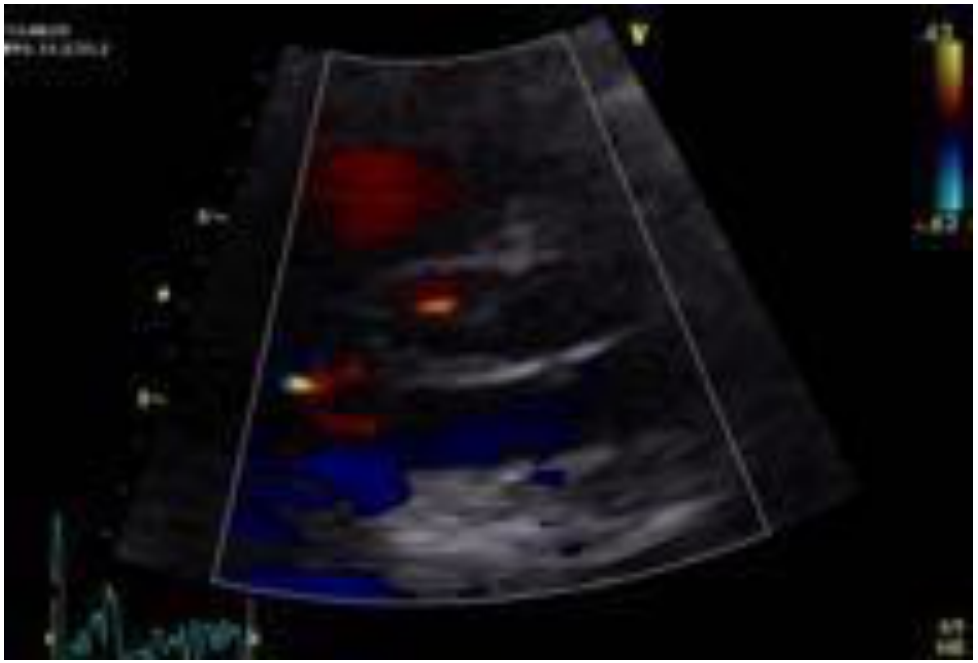




PVRep should be performed in symptomatic patients with severe PR and/or stenosis (RV systolic pressure >60 mmHg, TR velocity >3.5 m/s)	I	C

Baumgartner et al. *Eur Heart J 2010*

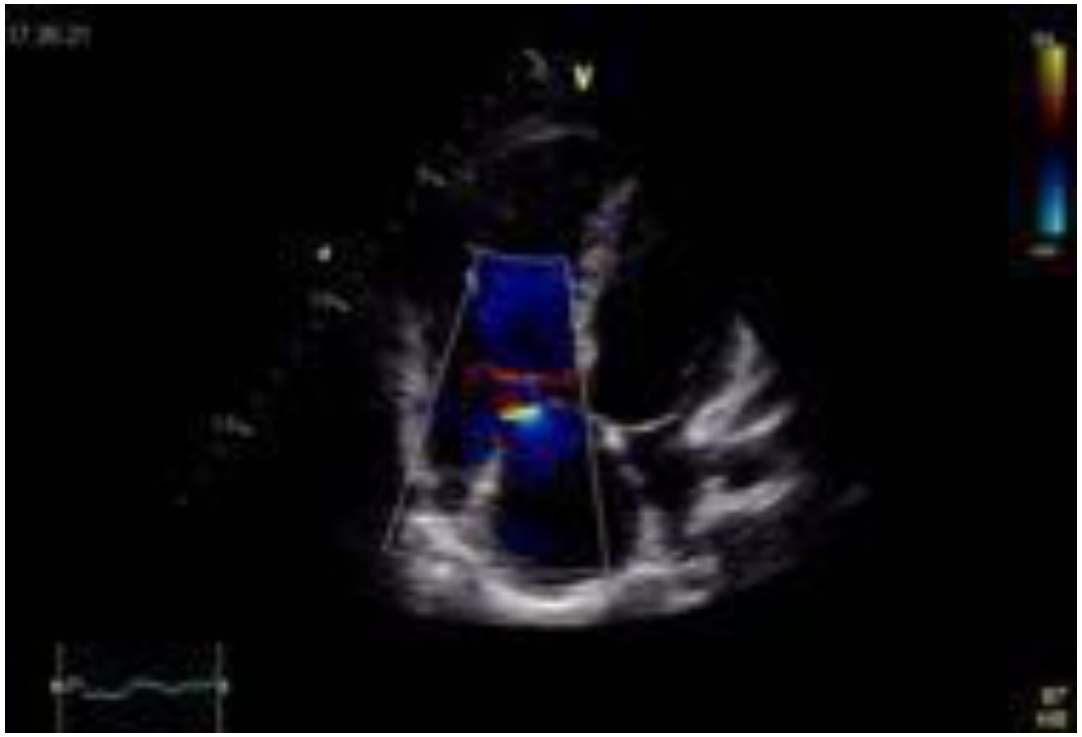
Suivi hémodynamique
CIV résiduelle



VSD closure should be considered in patients with residual VSD and significant LV volume overload or if the patient is undergoing pulmonary valve surgery	IIa	C

Baumgartner et al. *Eur Heart J 2010*

Suivi hémodynamique
Insuffisance tricuspide

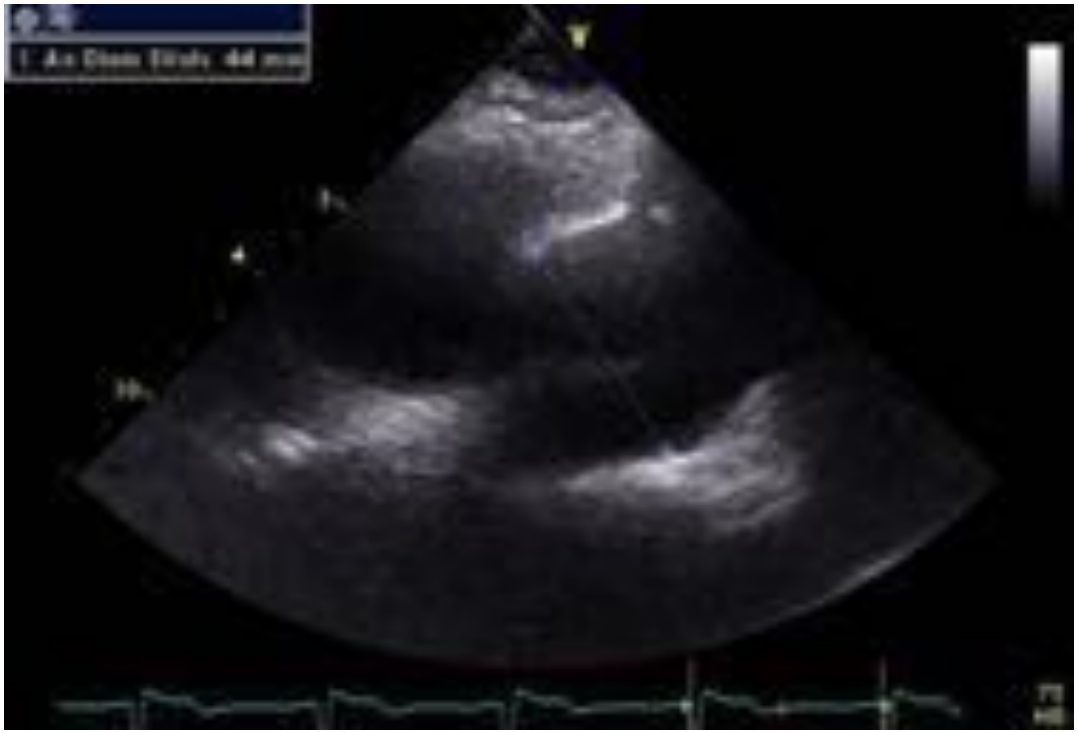


PVRep should be considered in asymptomatic patients with severe PR and/or PS when at least one of the following criteria is present: • Decrease in objective exercise capacity • Progressive RV dilation • Progressive RV systolic dysfunction • Progressive TR (at least moderate) • RVOTO with RV systolic pressure >80 mmHg (TR velocity >4.3 m/s) • Sustained atrial/ventricular arrhythmias	IIa	C

Baumgartner et al. *Eur Heart J 2010*

Suivi hémodynamique

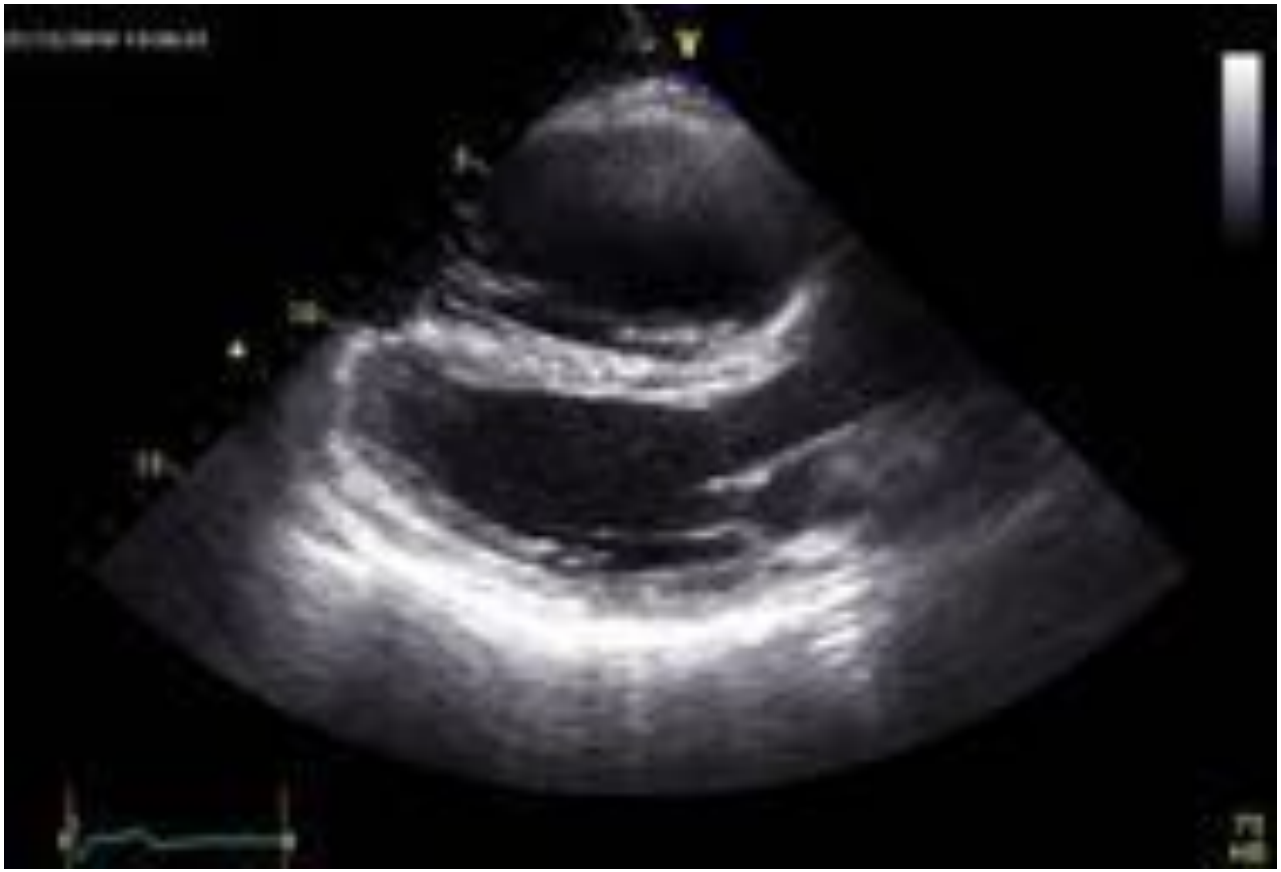
Aortopathie



Silversides et al. *Can J Card 2010*

Le Gloan et al. *Expert Rev Cardiovasc Ther 2013*

Suivi hémodynamique
FeVG



+ strain longitudinal?

Diller et al. *Circulation 2012*

Suivi rythmologique
Troubles conductifs

- **Classiquement décrits:**
  - ✓ BBD *80-90%* Friedli. *Arch Mal Cœur Vaiss 1996*
  - ✓ BBD+HBAG *15-20%* Friedli. *Arch Mal Cœur Vaiss 1996*
  - ✓ BAVc transitoire ou permanent≤*1%* Friedli. *Pediatr Cardiol 1999*
  - ✓ Dysfonction sinusale rare Friedli. *Pediatr Cardiol 1999*

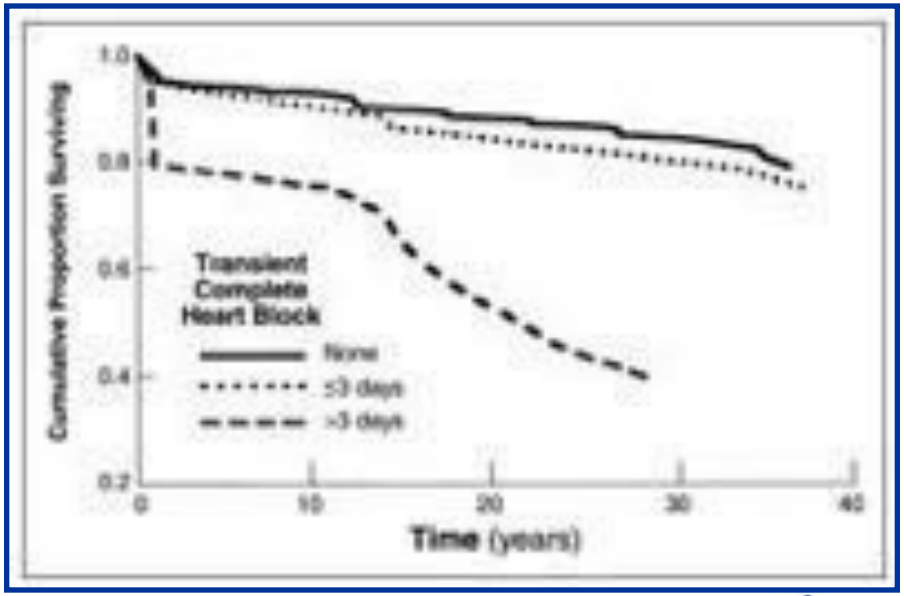
- **Quelle signification?**

Facteurs prédictifs de *BAVc tardif*:

✓ BAVc post-opératoire transitoire

✓ BBD+HBAG+BAV1

✓ PW pour des fréquences stimulées<180/min

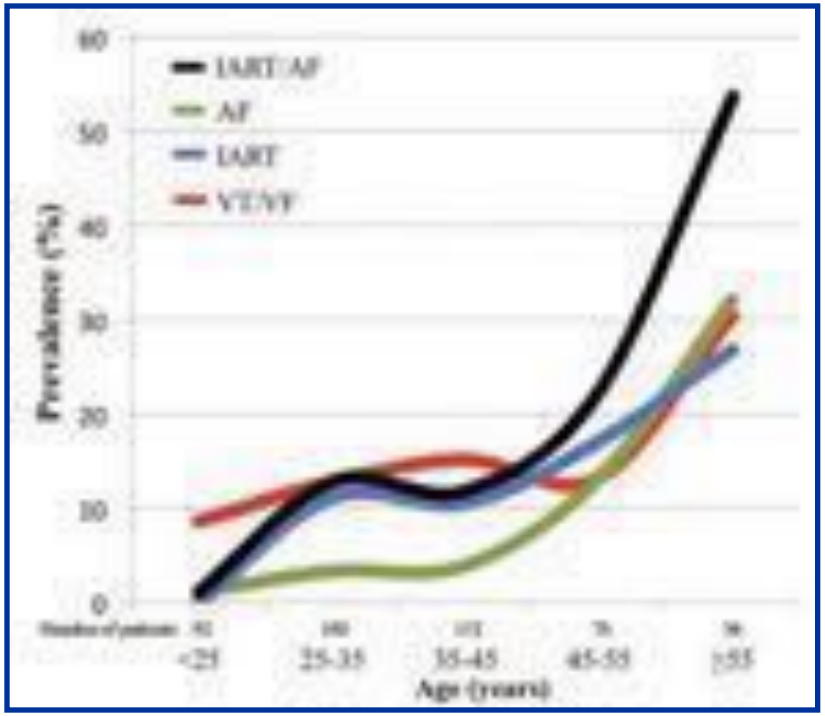


Friedli et al. *JACC 1988*

Hokanson et al. *Am J Cardiol 2001*

Suivi rythmologique
Arythmies supraventriculaires

Characteristic	Prevalence, %	95% CI
Sustained tachyarrhythmia	29.9	26.2–33.7
Atrial tachyarrhythmia	20.1	17.0–23.6
IART	11.5	9.0–14.3
AF	7.4	5.4–9.7
Other	6.7	4.8–8.9
Ventricular tachyarrhythmia	14.6	11.8–17.7



Variable	OR	95% CI	P
IART			
Prior cardiac surgeries, n	1.4	1.2–1.6	<0.001
Hypertension, %	2.3	1.1–4.6	0.022
Right atrial enlargement, %	6.2	2.8–13.6	<0.001
AF			
LV ejection fraction, %	0.93	0.89–0.96	<0.001
Age, y	1.09	1.05–1.12	<0.001
Prior cardiac surgeries, n	1.5	1.2–1.9	<0.001
Left atrial enlargement, %	3.2	1.5–6.8	0.003

Khairy et al. *Circulation 2010*

Suivi rythmologique

Arythmies ventriculaires/Mort subite

Characteristic	Prevalence, %	95% CI
Ventricular tachyarrhythmia	14.6	11.8–17.7
VT	14.2	11.5–17.3
VF	0.5	0.1–1.4

Khairy et al. *Circulation 2010*

Incidence annuelle de mort subite <0.2%

Intérêt de *stratifier* le risque rythmique

Prévention 2ndaire → DAI

Prévention 1aire → ?

FDR non invasifs

- Histoire de la cardiopathie
  - ✓ Age tardif à la cure complète, long suivi (Gatzoulis et al. *Lancet 2000*)
  - ✓ Shunt palliatif antérieur
  - ✓ Ventriculotomie/Patch transannulaire (Dietl et al. *Circulation 1994*)
- Données électrophysiologiques
  - ✓ QRS≥180 msec (VPN 100%, Se 94.7%) (Gatzoulis et al. *Circulation 1995*)
  - ✓ TVNS prédictive de TV clinique (Khairy et al. *Circulation 2008*) et de TV inductible (Khairy et al. *Circulation 2004*)
  - ✓ Fragmentation des QRS? (Egbe et al. *J Am Heart Assoc 2018*)
  - ✓ TSV (Valente et al. *Heart 2014*)
- Données hémodynamiques
  - ✓ Dysfonction systolique (Ghai et al. *JACC 2002*) et diastolique (Khairy et al. *Circulation 2008*) du VG, altération fonction longitudinale VG (Diller et al. *Circulation 2012*)
  - ✓ IP sévère (Gatzoulis et al. *Lancet 2000*), dilatation VD (Daliento et al. *Heart 1999*), dysfonction VD (Knauth et al. *Heart 2008*), hypertension VD (Katz et al. *Circulation 1982*), anévrysme CCVD (Harrison et al. *JACC 1997*), réhaussement tardif (Babu-Narayan et al. *Circulation 2006*) → IRM

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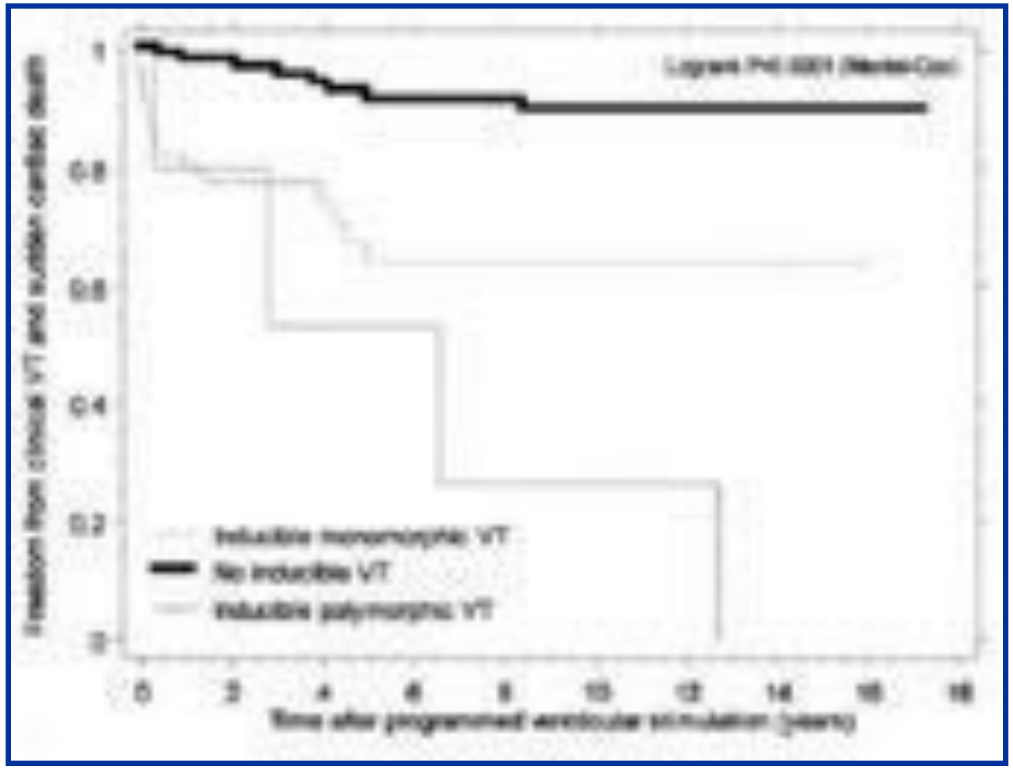
Facteurs prédictifs de TV inductible: **âge≥18 ans, palpitations, shunt palliatif antérieur, TVNS et ICT ≥ 0.6**



	Sustained Monomorphic VT	Sustained Monomorphic or Polymorphic VT
Sensitivity, %	66.1±6.0	77.4±5.3
Specificity, %	81.6±2.8	79.5±2.9
Diagnostic accuracy, %	77.8±2.6	79.0±2.6
Positive predictive value, %	53.9±5.7	55.2±5.3
Negative predictive value, %	88.1±2.4	91.5±2.2

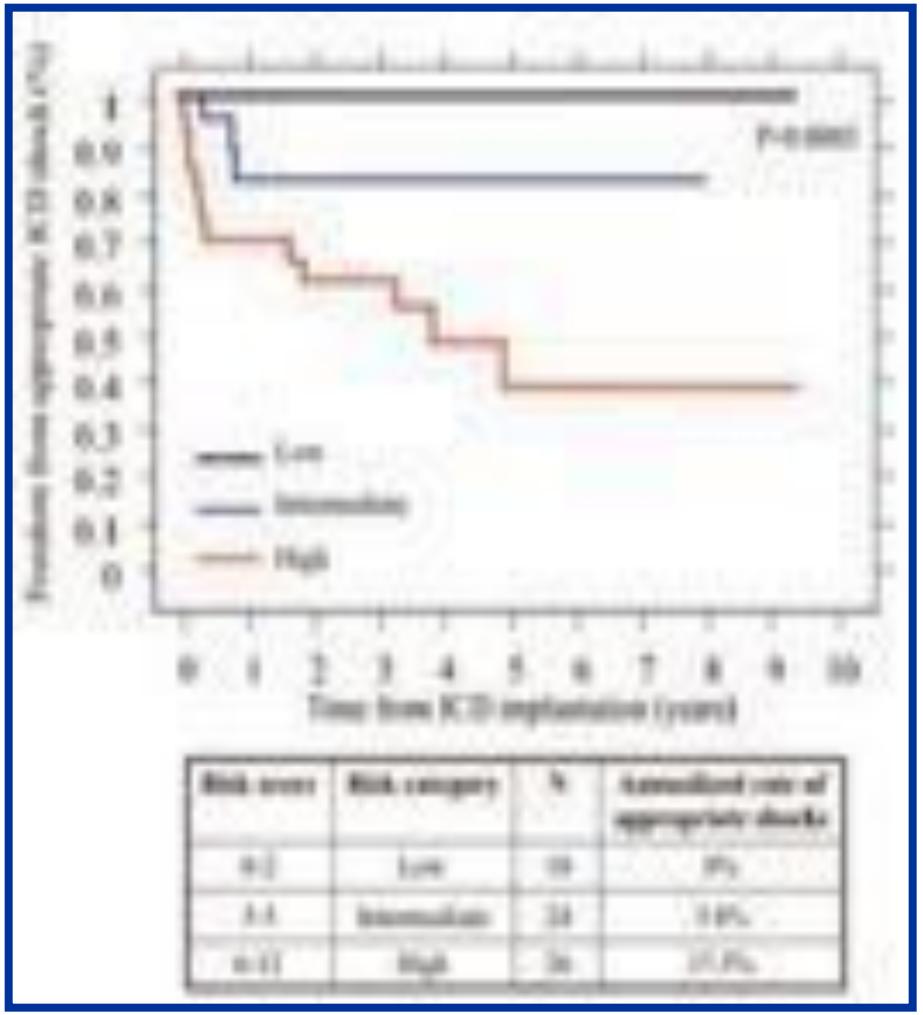
Khairy et al. *Circulation 2004*

Suivi rythmologique

Mort subite/ Stratification du risque (1)

Table 3. Risk Score for Appropriate ICD Shocks in Primary Prevention

Variable	Exp(β)	Points Attributed
Prior palliative shunt	3.2	2
Inducible sustained ventricular tachycardia	2.6	2
QRS duration ≥180 ms	1.4	1
Ventriculotomy incision	3.4	2
Nonsustained ventricular tachycardia	3.7	2
LVEDP ≥12 mm Hg	4.9	3
Total points	...	0–12



29.8% de complications

24.8% de chocs inappropriés

Khairy et al. *Circulation 2008*
Egbe et al. *Heart 2018*

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Khairy et al. *Expert Rev Cardiovasc Ther 2009*

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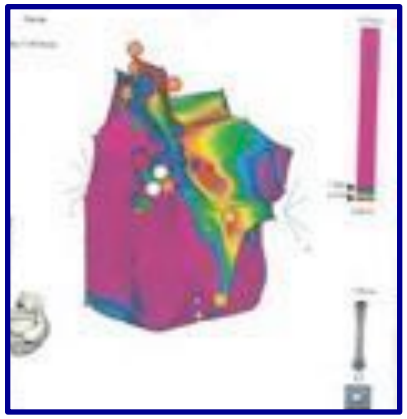
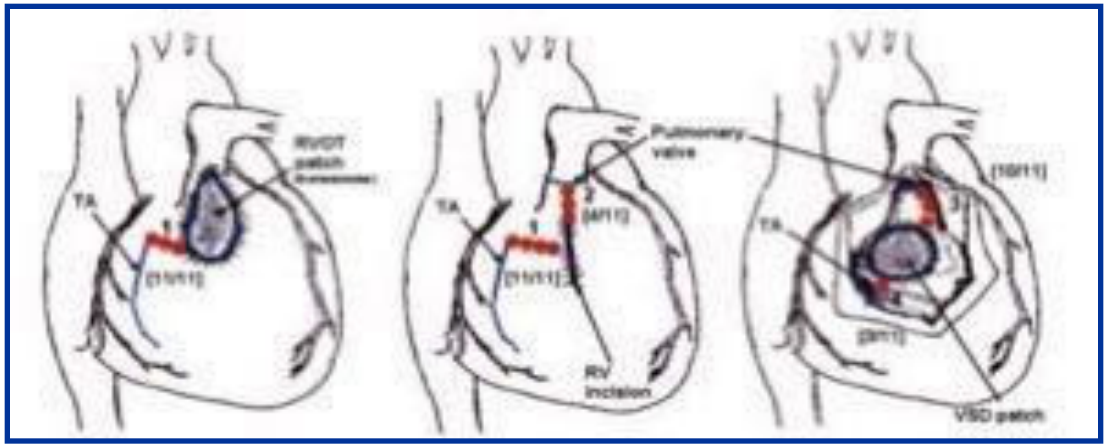
Ablation endocavitaire?

Class I	Catheter ablation is indicated as adjunctive therapy to an ICD in adults with CHD and recurrent monomorphic ventricular tachycardia, a ventricular tachycardia storm, or multiple appropriate shocks that are not manageable by device reprogramming or drug therapy *(Level of evidence: C)*.[94,320]
Class IIa	Catheter ablation can be considered for symptomatic sustained monomorphic ventricular tachycardia in adults with CHD and ICDs as an alternative to drug therapy *(Level of evidence: B)*.[215,306]

Khairy et al. *Heart Rhythm 2014*





Zeppenfeld et al. *Circulation 2007*

- Selon modalités chirurgicales
- TV monomorphe le plus souvent
- Ablation efficace

Zeppenfeld et al. *Card Clin Electrophysiol 2017*

Mr Claude R, ddn 08/12/1952

- Coarctation aortique
- Cure chirurgicale à l'âge de 11 ans
- Bicuspidie aortique saine
- HTA sous trithérapie et dyspnée d'effort progressive

- PA 152/95 mmHg, BDC réguliers, SS 2/6 RSG.

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Que faites-vous?

- Reconduction de l'ordonnance de traitements anti-HTA
- Un ECG
- Je palpe ses pouls fémoraux
- Je vérifie que la PA est prise au MSG
- Explorations complémentaires (dont imagerie aortique)
- Une ETT

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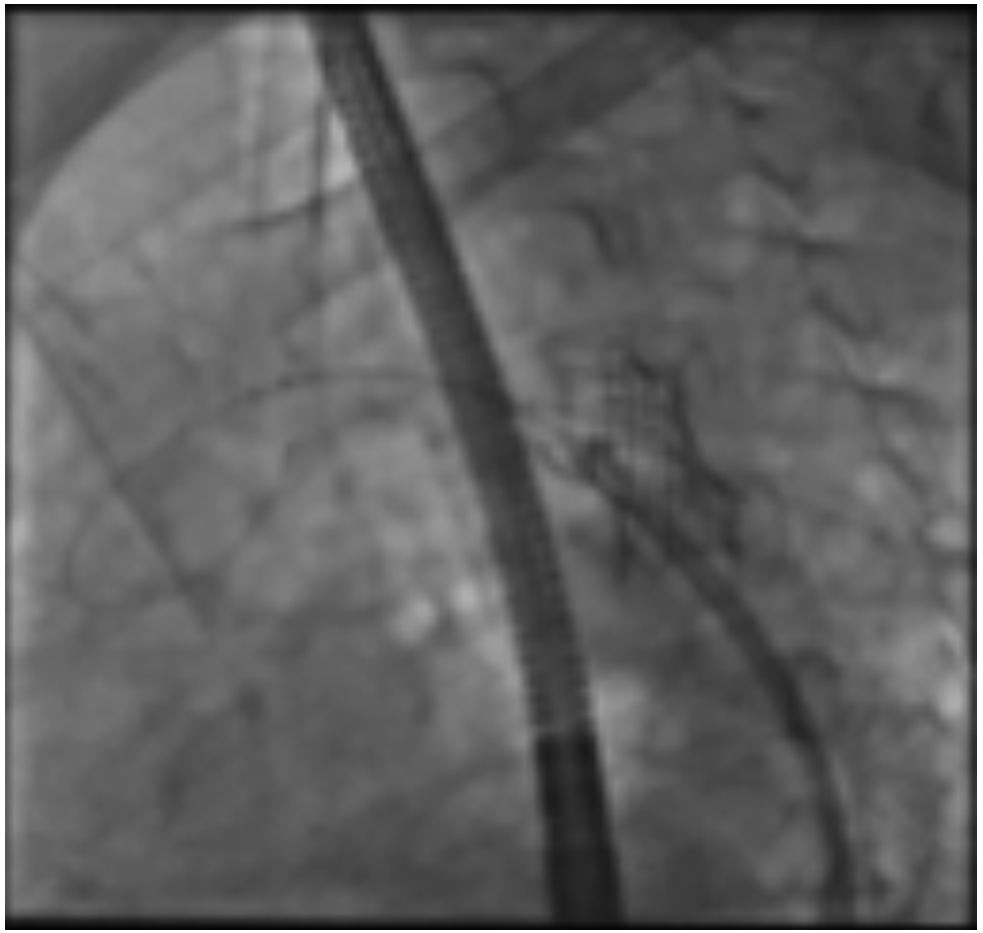
Angioplastie de recoarctation *(stent couvert)*:

Gradient pic à pic: 22→ 3 mm Hg



Diminution des traitements anti-HTA…

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