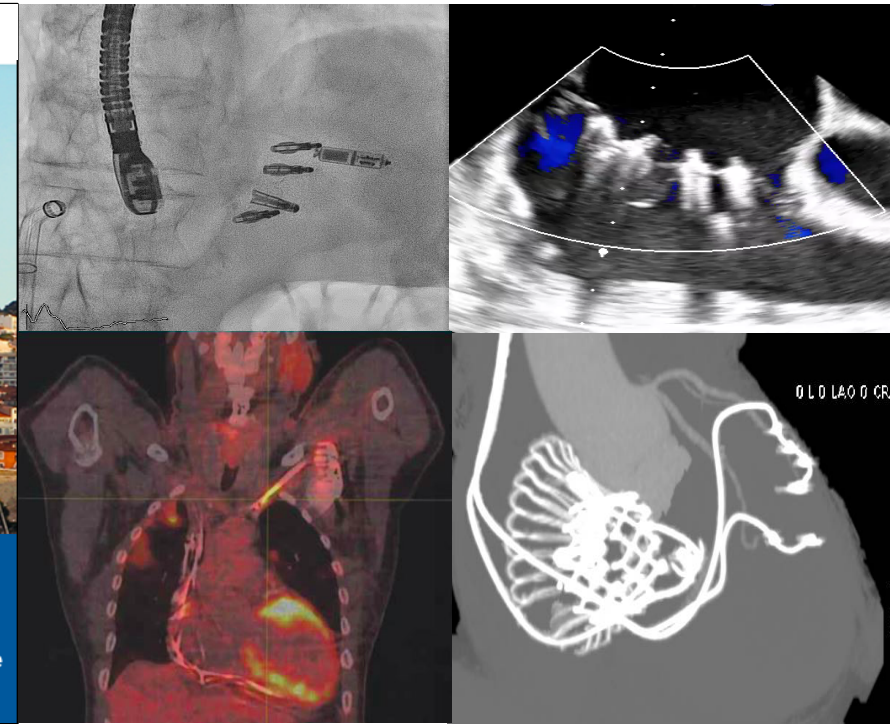
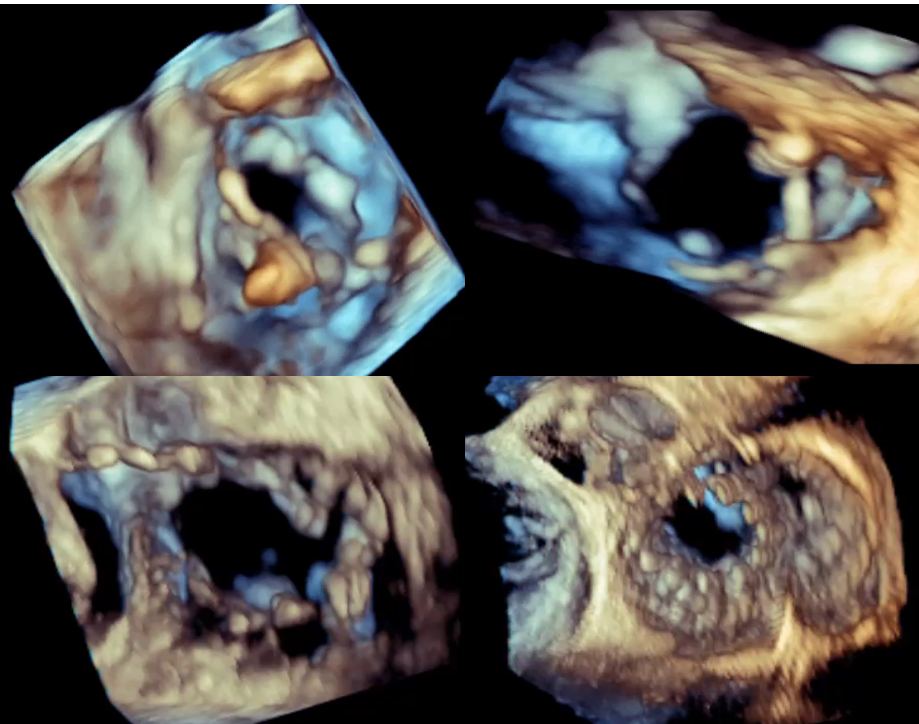
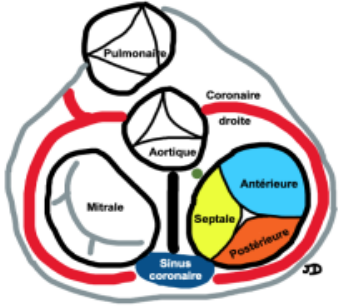


Gérer une fuite tricuspide sévère après extraction

Olivier Piot

Centre Cardiologique du Nord, Saint-Denis, France



Est-ce que l'IT est un problème dans l'extraction ?

2018 EHRA expert consensus statement on lead extraction: recommendations on definitions, endpoints, research trial design, and data collection requirements for clinical scientific studies and registries: endorsed by APHRS/HRS/LAHRs

Maria G. Bongiorni (Chair)^{1*}, Haran Burri (Co-chair)², Jean C. Deharo³, Christoph Starck⁴, Charles Kennergren⁵, Laszlo Saghy⁶, Archana Rao⁷, Carlo Tascini⁸, Nigel Lever⁹, Andrzej Kutarski¹⁰, Ignacio Fernandez Lozano¹¹, Neil Strathmore¹², Roberto Costa¹³, Laurence Epstein¹⁴, Charles Love¹⁵ and Carina Blomstrom-Lundqvist¹⁶



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Pas dans les indications !

1863 patients avec extraction

- 52,8 % infection
- 38,1 % dysfonction de sonde

Lead-related complications

Leads may be functional but cause complications for which extraction may be indicated (e.g. thromboembolic events, superior vena cava syndrome, arrhythmias, perforation, lead-lead interaction etc.). If stenting is planned for treating stenosis in a vein with a transvenous lead, extraction is usually performed to avoid entrapment of the lead.

Other indications

A number of other rare indications for lead extraction exist, such as prophylactic extraction of leads that due to their design or their failure pose a potential future threat to the patient if left in place e.g. Accufix leads (Telectronics).

Est-ce que l'IT est un problème dans l'extraction ?

Pas dans les complications !

2018 EHRA expert consensus statement on lead extraction: recommendations on definitions, endpoints, research trial design, and data collection requirements for clinical scientific studies and registries: endorsed by APHRS/HRS/LAHRs

Maria G. Bongiorno (Chair)^{1*}, Haran Burri (Co-chair)², Jean C. Deharo³, Christoph Starck⁴, Charles Kennergren⁵, Laszlo Saghy⁶, Archana Rao⁷, Carlo Tascini⁸, Nigel Lever⁹, Andrzej Kutarski¹⁰, Ignacio Fernandez Lozano¹¹, Neil Strathmore¹², Roberto Costa¹³, Laurence Epstein¹⁴, Charles Love¹⁵ and Carina Blomstrom-Lundqvist¹⁶

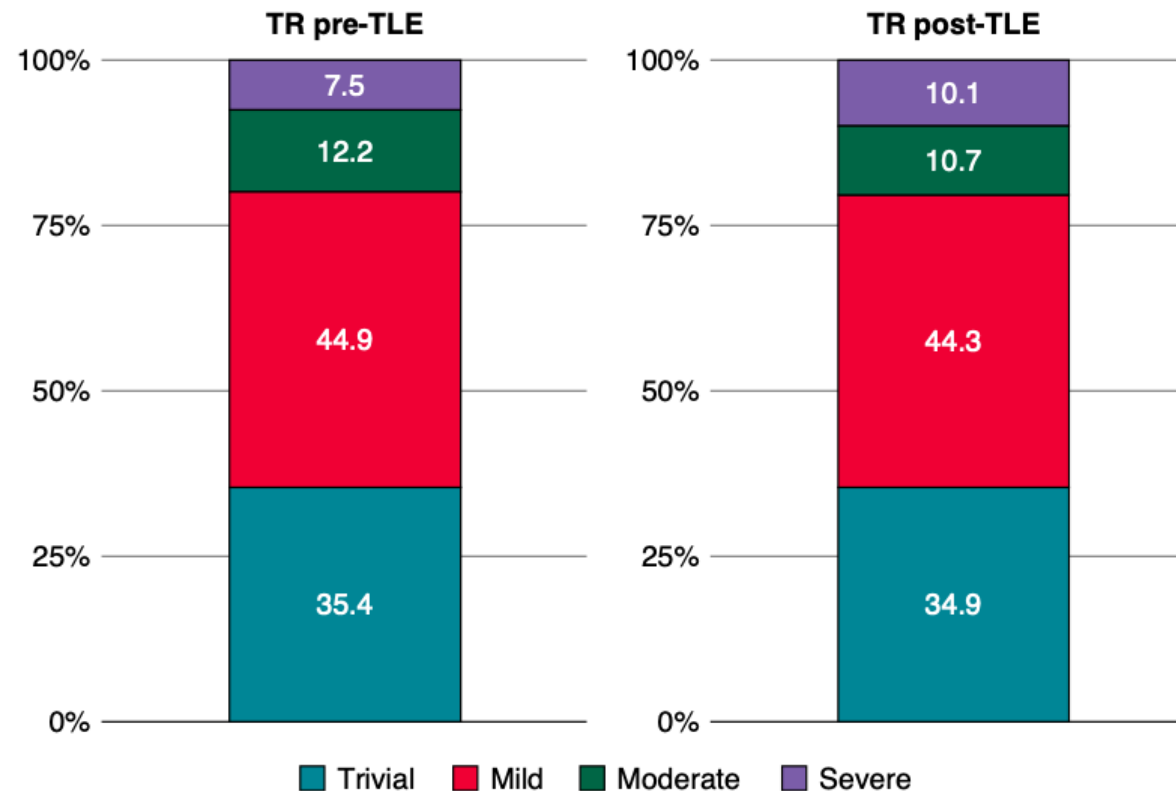


Table 5 Complications (table from reference⁶)

	Incidence%
Major	0.19–1.80
Death	0.19–1.20
Cardiac avulsion	0.19–0.96
Vascular laceration	0.16–0.41
Respiratory arrest	0.20
Cerebrovascular accident	0.07–0.08
Pericardial effusion requiring intervention	0.23–0.59
Haemothorax requiring intervention	0.07–0.20
Cardiac arrest	0.07
Thromboembolism requiring intervention	0.07
Flail tricuspid valve leaflet requiring intervention	0.03
Massive pulmonary embolism	0.08
Minor	0.06–6.20
Pericardial effusion without intervention	0.07–0.16
Haematoma requiring evacuation	0.90–1.60
Venous thrombosis requiring medical intervention	0.10–0.21
Vascular repair at venous entry site	0.07–0.13
Migrated lead fragment without sequelae	0.20
Bleeding requiring blood transfusion	0.08–1.00
AV fistula requiring intervention	0.16
Pneumothorax requiring chest tube	1.10
Worsening tricuspid valve function	0.02–0.59
Pulmonary embolism	0.24–0.59

Extraction de sondes >> IT sévère

- Altération sévère de la valve tricuspide dans 2,5 % des cas (registre > 2600 extractions)
- Plusieurs séries monocentriques: 9,1 % (Franceschi 2009), 5,7 % (Migliore 2024) >> 1,5 à 11,5 %
- Facteur favorisant toujours retrouvé: **durée d'implantation des sondes**



Tricuspid valve disease and cardiac implantable electronic devices

Martin Andreas^{1*}, Haran Burri², Fabien Praz³, Osama Soliman⁴, Luigi Badano^{5,6}, Manuel Barreiro⁷, João L. Cavalcante⁸, Tom de Potter⁹, Torsten Doenst¹⁰, Kai Friedrichs¹¹, Jörg Hausleiter^{12,13}, Nicole Karam¹⁴, Susheel Kodali¹⁵, Azeem Latib¹⁶, Eloi Marijon¹⁷, Suneet Mittal¹⁸, Georg Nickenig¹⁹, Aldo Rinaldi²⁰, Piotr Nikodem Rudzinski²¹, Marco Russo²², Christoph Starck²³, Ralph Stephan von Bardeleben²⁴, Nina Wunderlich²⁵, José Luis Zamorano²⁶, Rebecca T. Hahn¹⁵, Francesco Maisano²⁷, and Christophe Leclercq²⁸

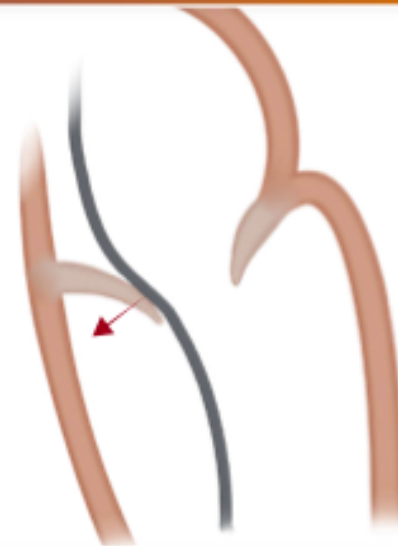
Lead-associated TR



No clear causative relationship between CIED and TR
Prevalence of at least moderate TR after CIED implantation: **7–30%**

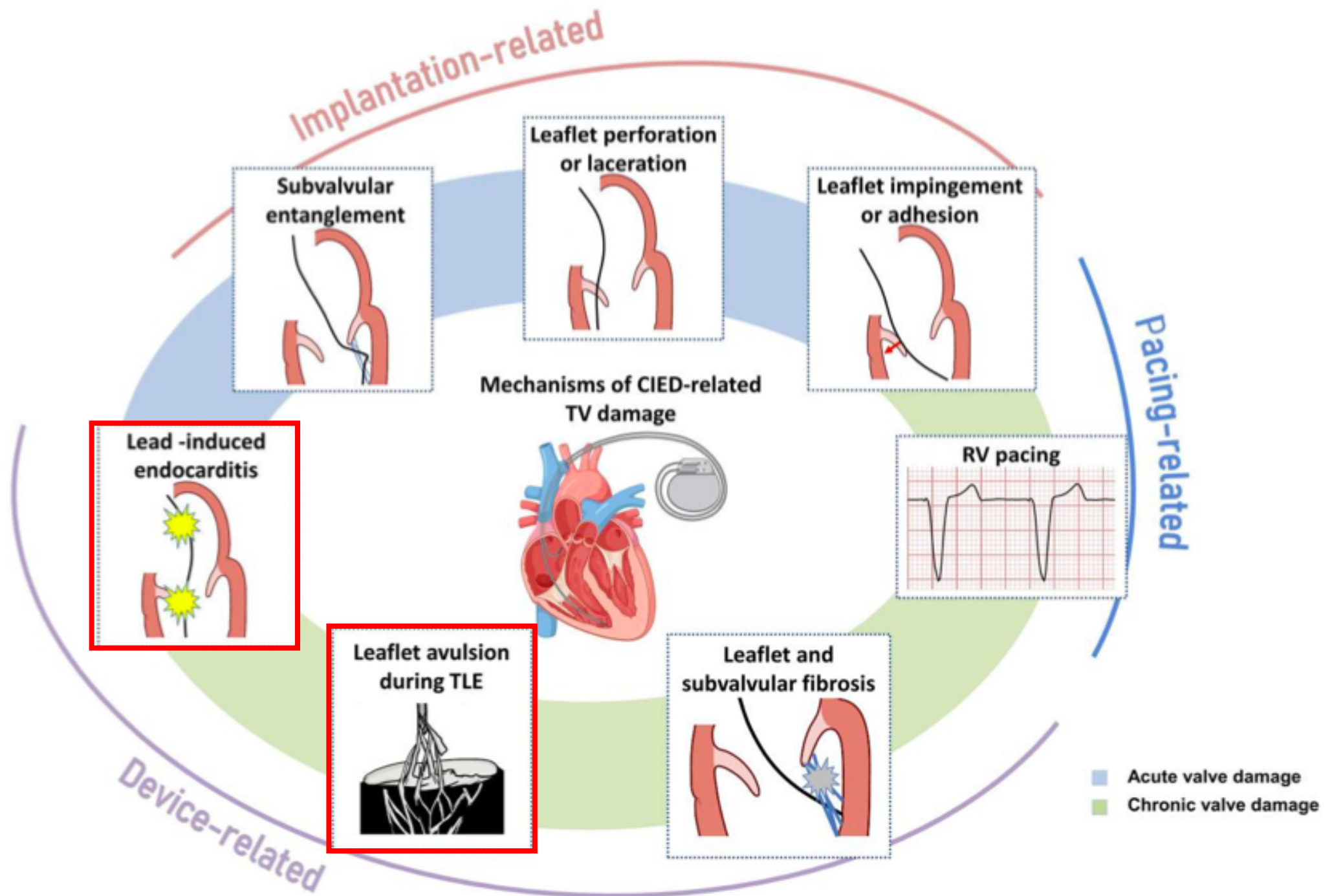
Evolution of TR dependent on the **usual risk factors**

Lead-related TR



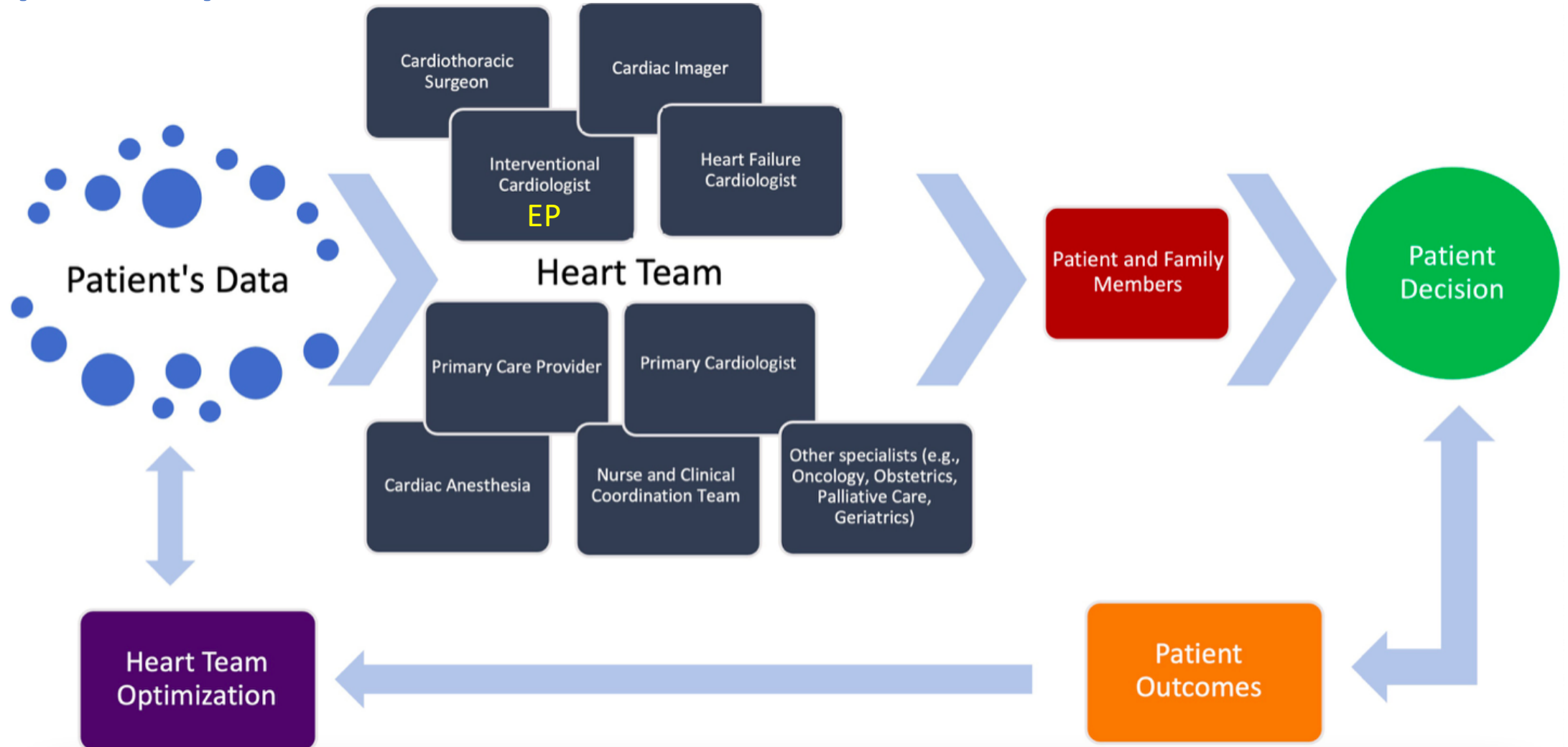
Established causative relationship between CIED and TR
TR worsens by at least 1 grade in about **20%** of the patients after CIED implantation
Leaflet impingement occurs in **14%**
Severe lead-related TR in **4–7%**

Accelerated TR evolution

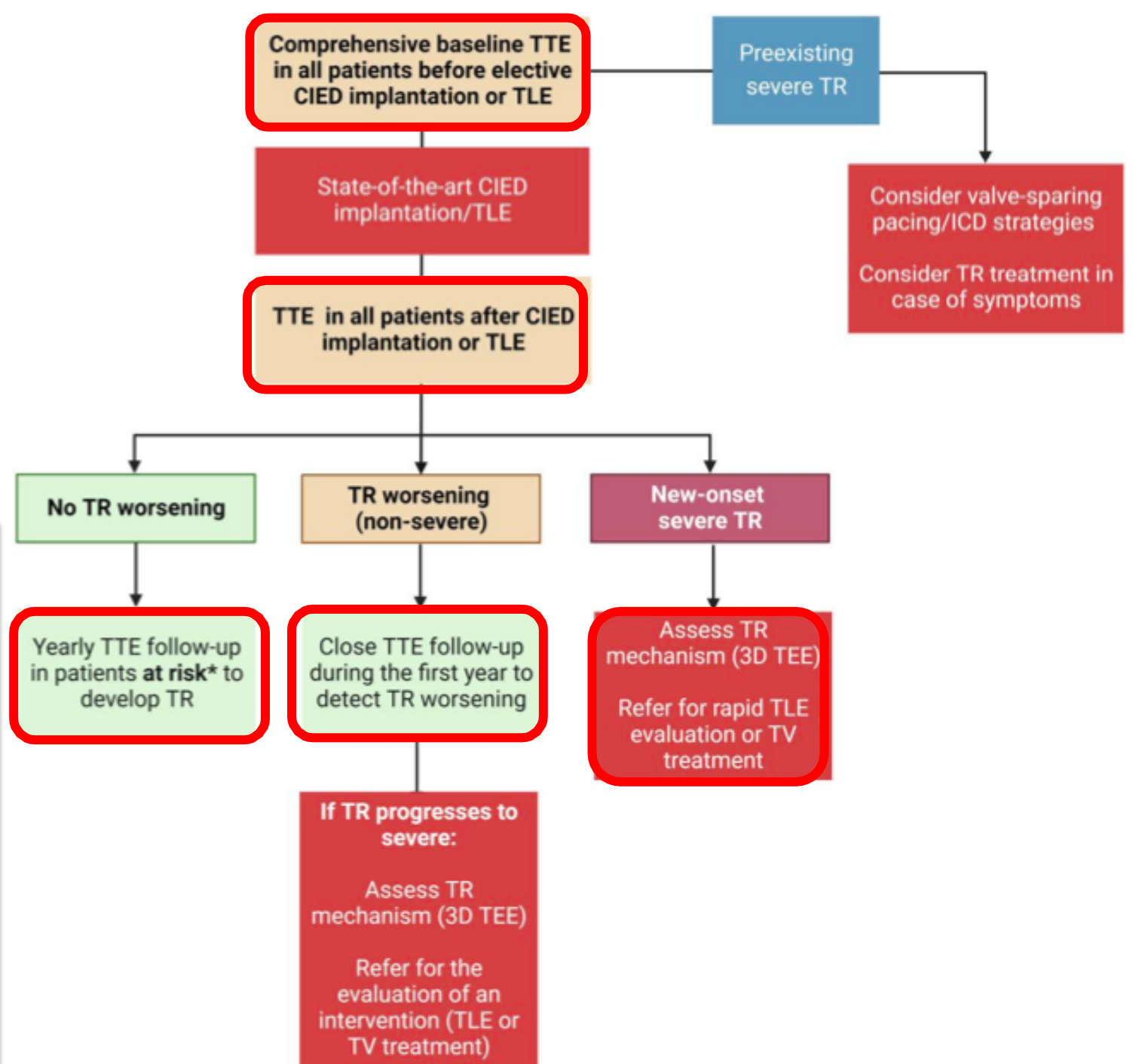
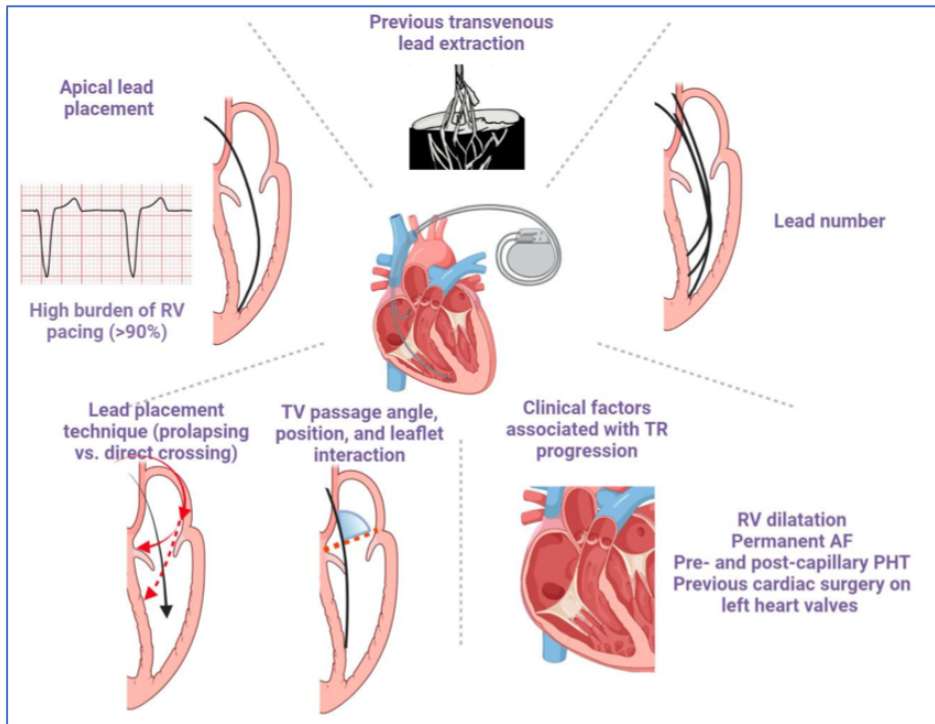


Gestion IT sévère après extraction


En pratique ?



Gestion IT sévère En pratique ?



En pratique, avec la Heart team ?

2021 ESC/EACTS Guidelines for the management of valvular heart disease: Developed by the Task Force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS) 

Alec Vahanian , Friedhelm Beyersdorf , Fabien Praz, Milan Milojevic, Stephan Baldus, Johann Bauersachs, Davide Capodanno, Lenard Conradi, Michele De Bonis, Ruggero De Paulis, Victoria Delgado, Nick Freemantle, Martine Gilard, Kristina H Haugaa, Anders Jeppsson, Peter Jüni, Luc Pierard, Bernard D Prendergast, J Rafael Sádaba, Christophe Tribouilloy, Wojtek Wojakowski, ESC/EACTS Scientific Document Group, ESC National Cardiac Societies

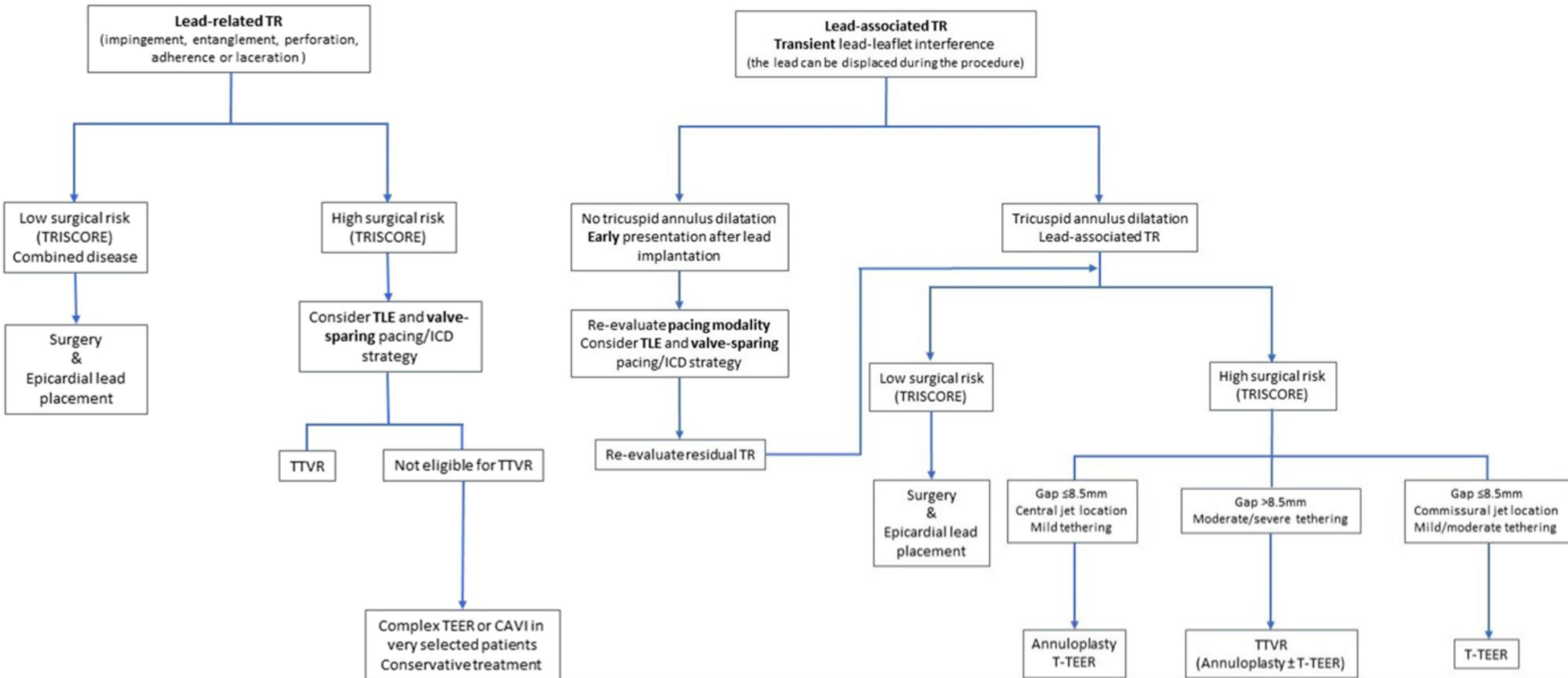
European Heart Journal, Volume 43, Issue 7, 14 February 2022, Pages 561–632, <https://doi.org/10.1093/eurheartj/ehab395>

Published: 28 August 2021

New or Revised	Recommendations in 2017 version	Class	Recommendations in 2021 version	Class
Section 8: Indications for intervention in secondary tricuspid regurgitation				
Revised	After previous left-sided surgery and in absence of recurrent left-sided valve dysfunction, surgery should be considered in patients with severe tricuspid regurgitation who are symptomatic or have progressive RV dilatation/dysfunction, in the absence of severe RV or LV dysfunction and severe pulmonary vascular disease/hypertension.	IIa	Surgery should be considered in patients with severe secondary tricuspid regurgitation (with or without previous left-sided surgery) who are symptomatic or have RV dilatation, in the absence of severe RV or LV dysfunction and severe pulmonary vascular disease/hypertension.	IIa
New			Transcatheter treatment of symptomatic secondary severe tricuspid regurgitation may be considered in inoperable patients at a Heart Valve Centre with expertise in the treatment of tricuspid valve disease.	IIb

>>> Le traitement médicamenteux ne doit pas retarder le recours à un traitement chirurgical ou percutané +++

En pratique, avec la Heart team ?



TRIGISTRY

2413 patients (33 centers – 10 countries)

with severe isolated functional tricuspid regurgitation on native valve

and TRI-SCORE available

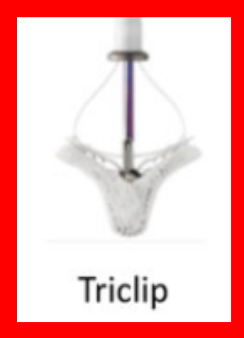


Characteristics	Overall (n = 2413)	Conservative management (n = 1217)	Isolated tricuspid valve surgery (n = 551)	Transcatheter tricuspid valve repair (n = 645)	P-value
Atrial fibrillation—no./total no. (%)	1532/2317 (66)	685/1204 (57)	367 (67)	480/562 (85)	<.001
Permanent pacemaker—no./total no. (%)	651/2406 (27)	319 (26)	145/544 (27)	187 (29)	.43

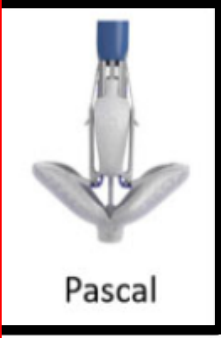
Transcatheter treatment for TR

Repair

Coaptation devices




Triclip




Pascal

Annuloplasty devices



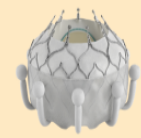
Cardioband



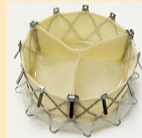
TriCinch

Replacement


Orthotopic position



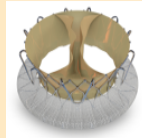
Evoque




NaviGate




LUX-valve




Trisol



Topaz




Intrepid

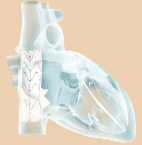


CardioValve

Heterotopic position



TricValve



Tricento

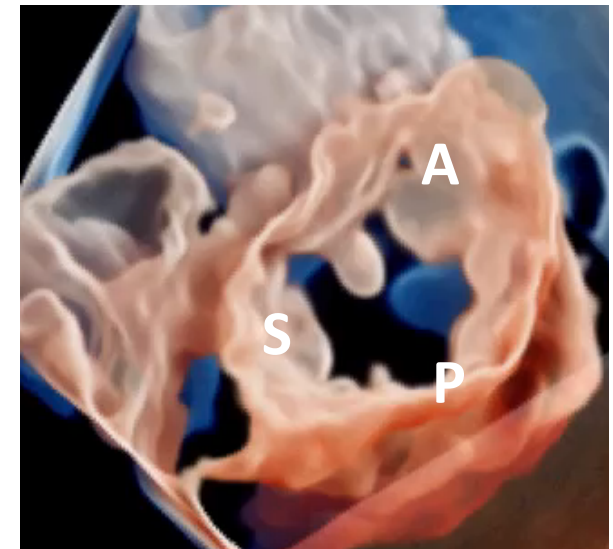
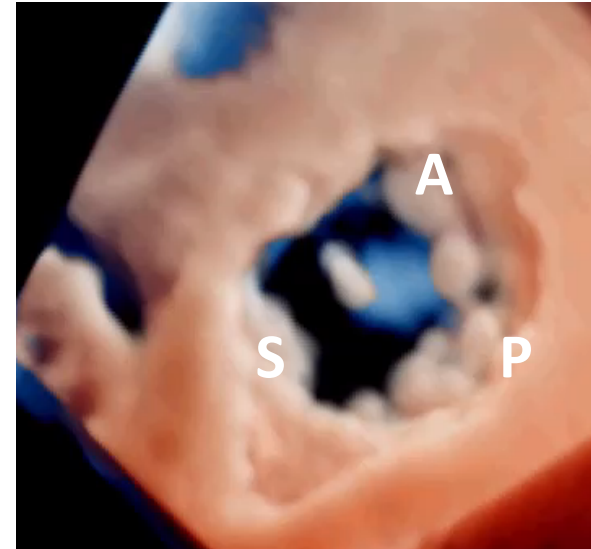
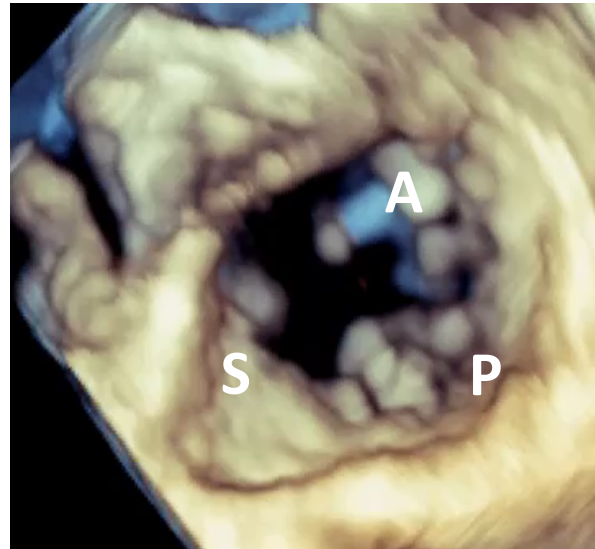
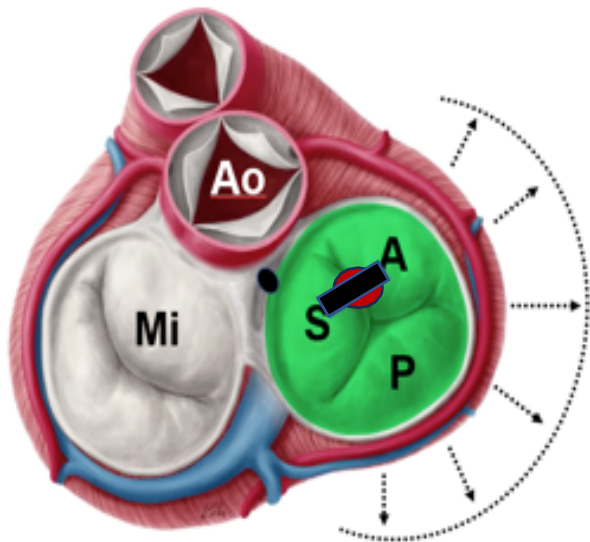
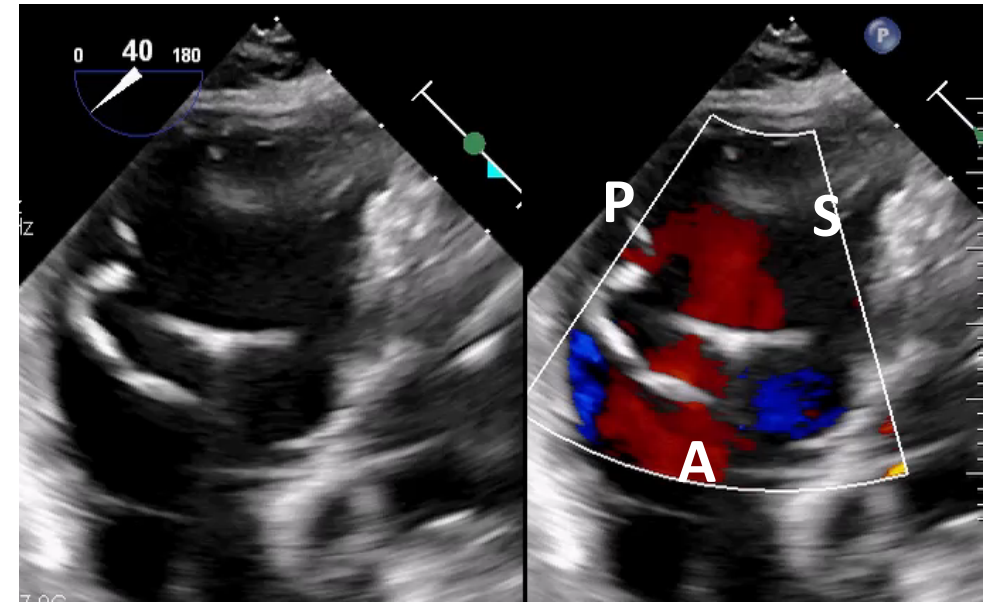
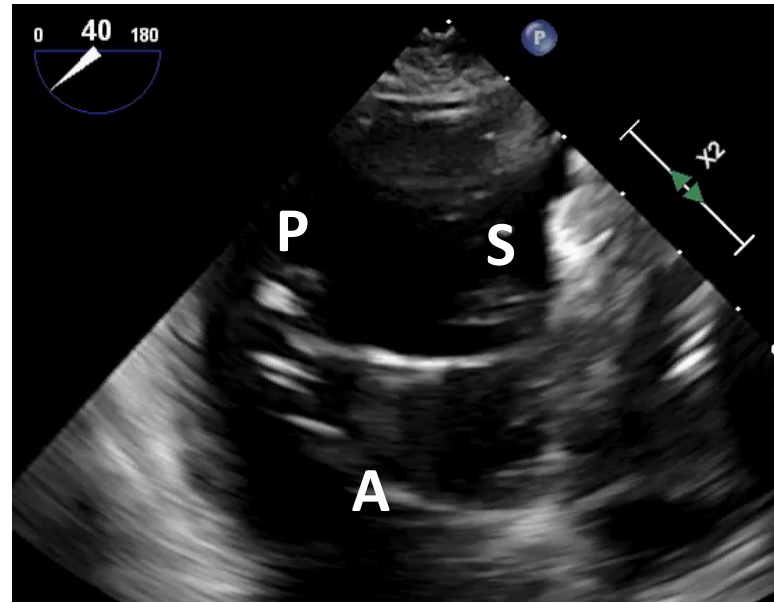
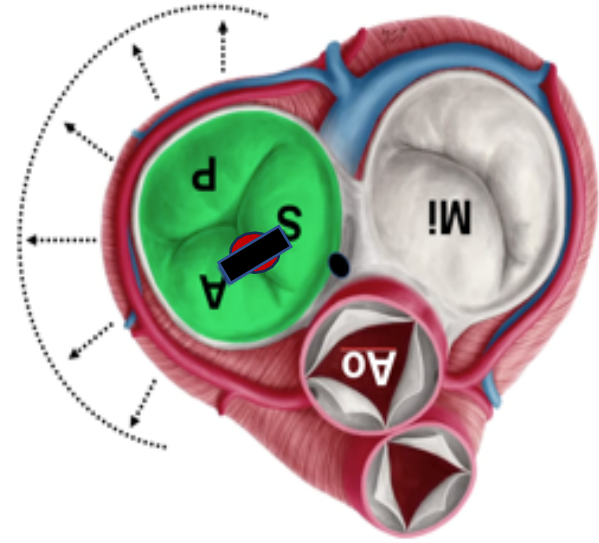
Adapted from Hell MM et al. EHJ CVI 2020

Adapted from Dreyfus J et al. Prog CardioVasc Med. 2022

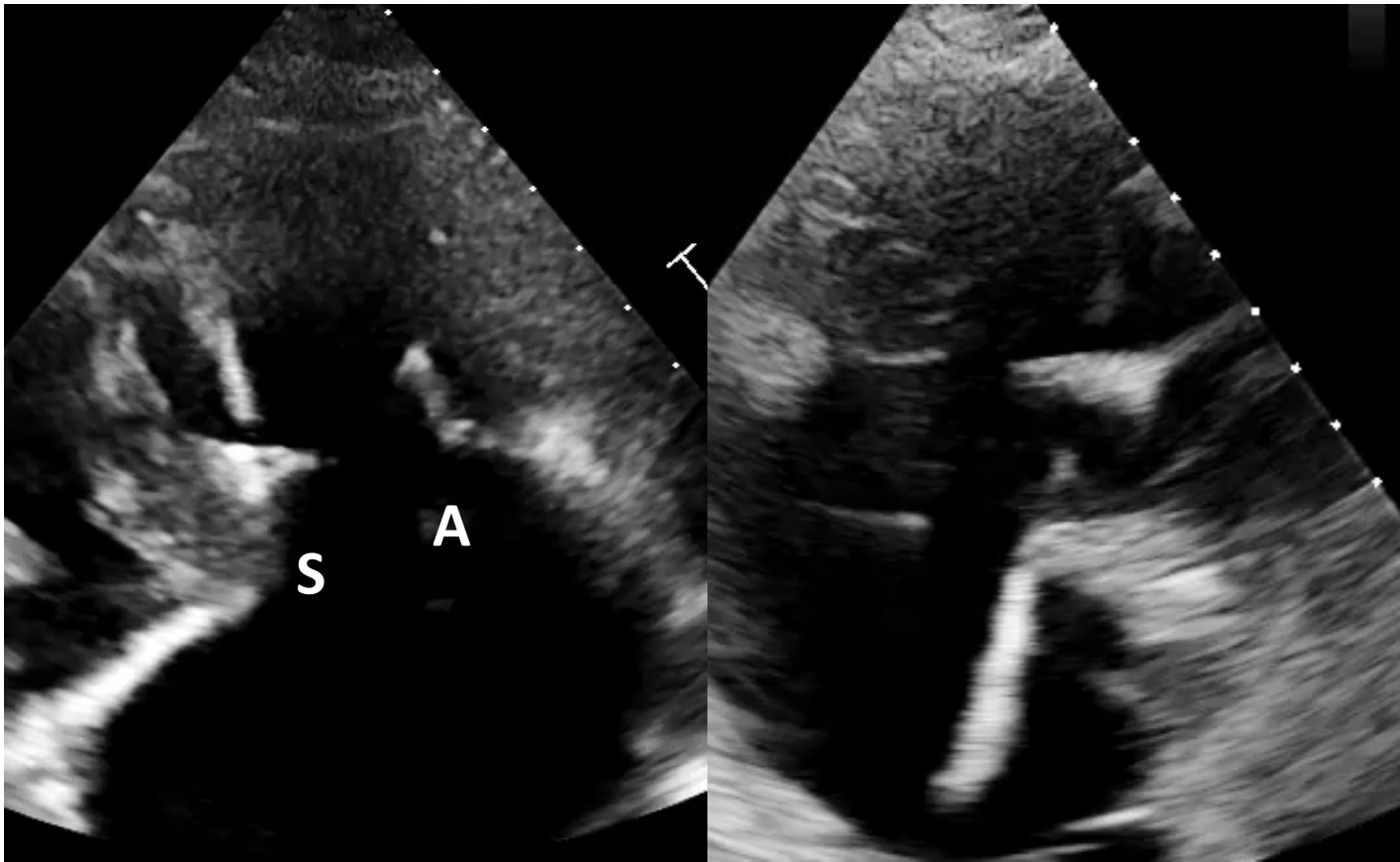
Transcatheter tricuspid valve interventions registries and randomized studies

Baseline characteristics	TRIVALVE REGISTRY (N=472)	bRIGHT Study (TriClip) (N=511)	TRIGISTRY Transcatheter tricuspid valve repair group (N=645)	TRILUMINATE RCT arm (TriClip) (N=175)	TRISCEND I (EVOQUE) (N=176)	TRISCEND II RCT arm (EVOQUE) (N=96)
Atrial fibrillation	83%	86%	85%	87%	92%	98%
Cardiac implantable electronic device	26%	23%	29%	16%	32%	37%

Centro-antero-septal CIED lead

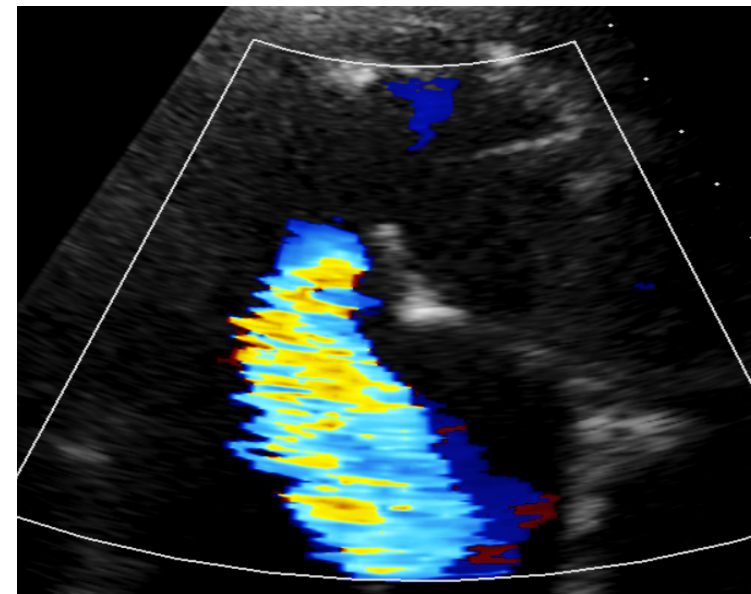
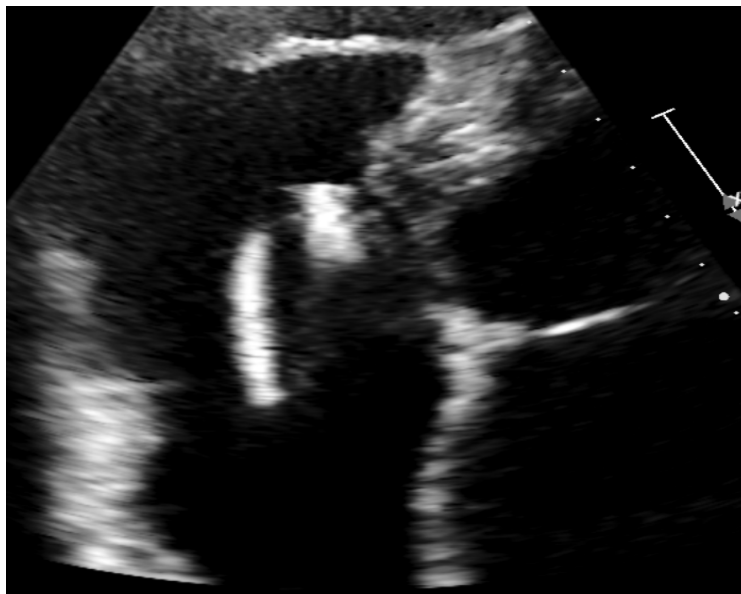
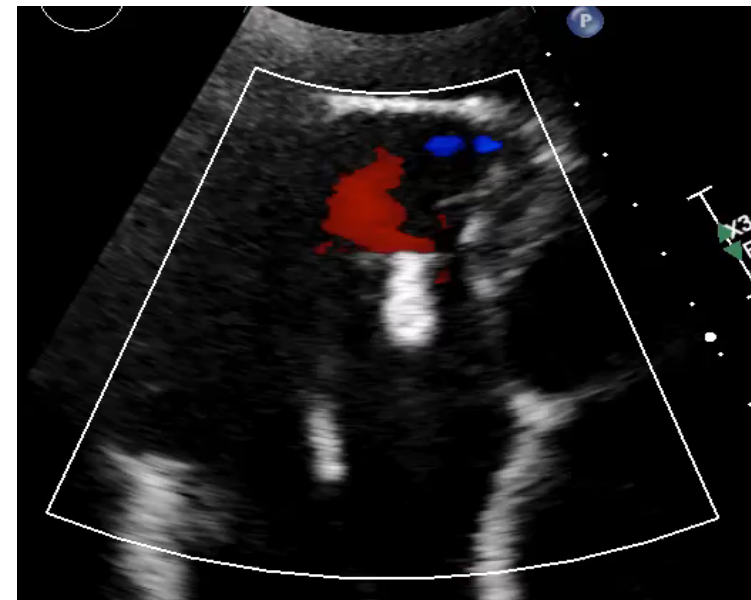
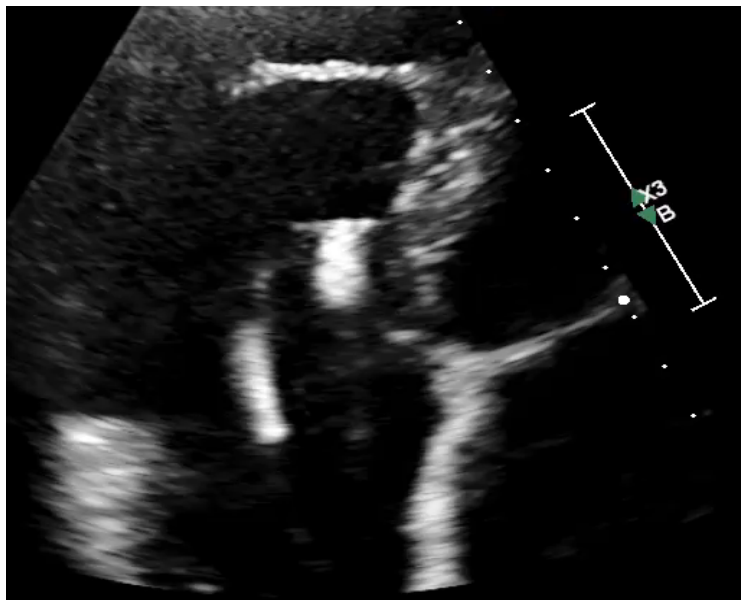
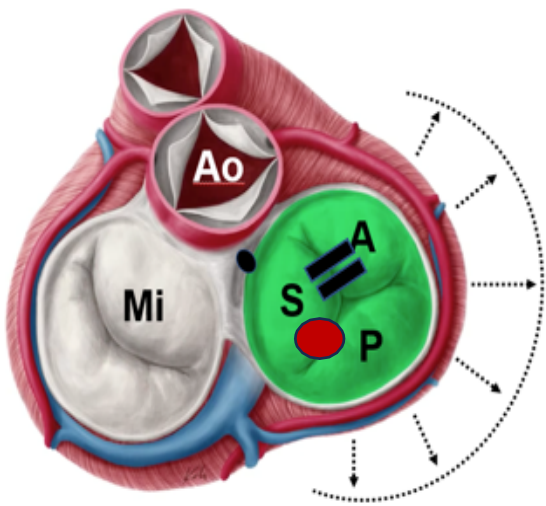


Centro-antero-septal CIED lead



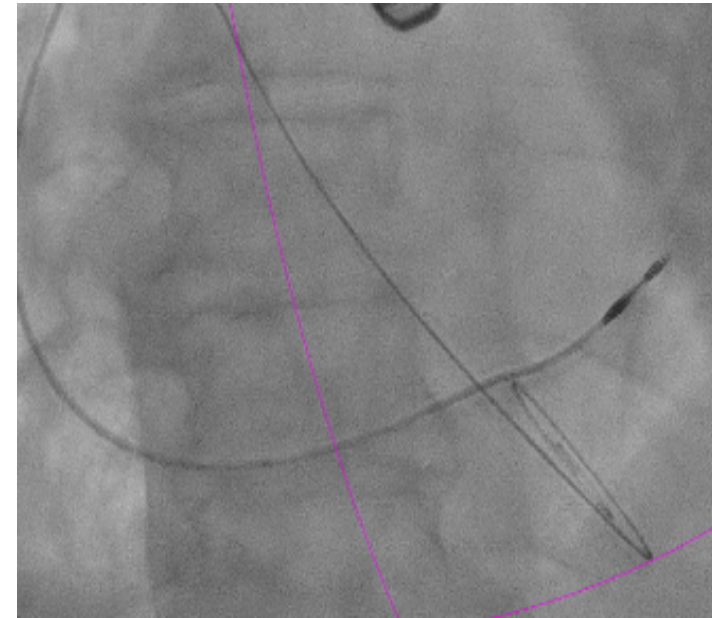
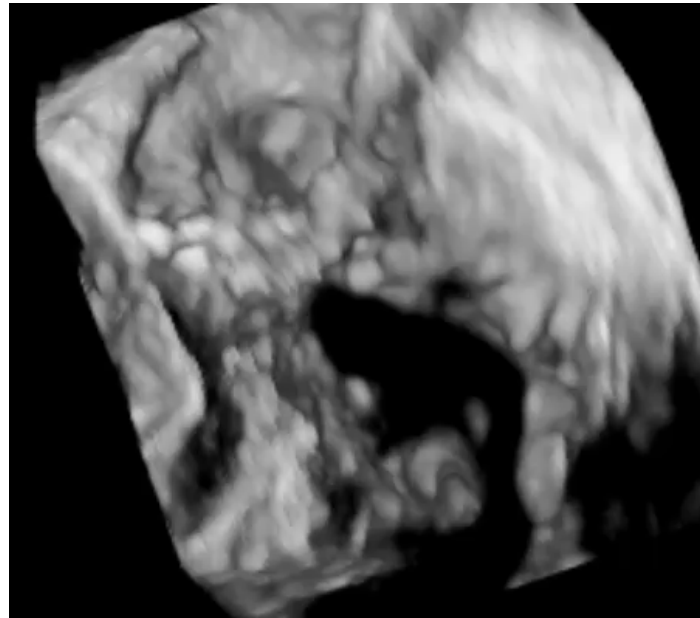
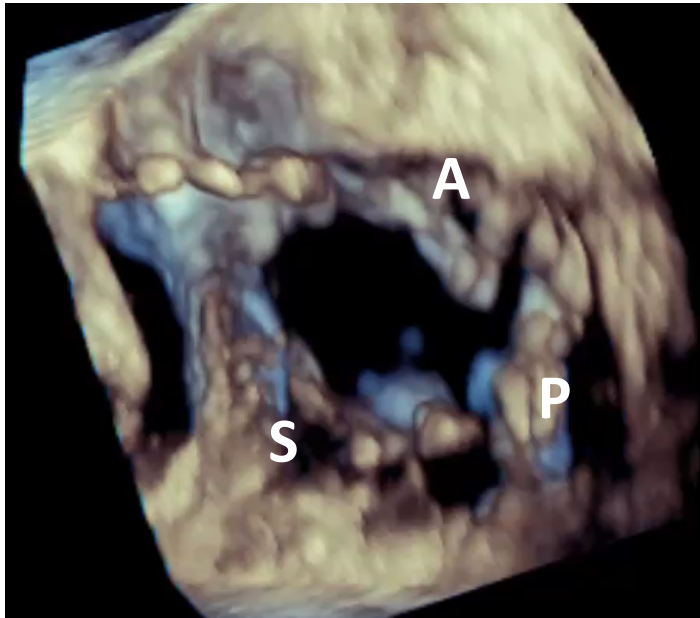
*Courtesy Nicolas Bonnet
Centre Cardiologique du Nord*

Antero-septal Triclip and posterior CIED lead

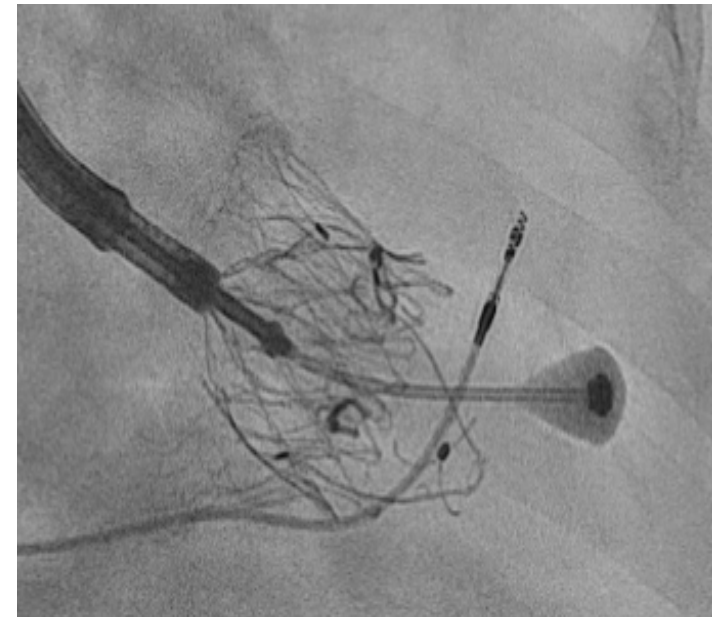
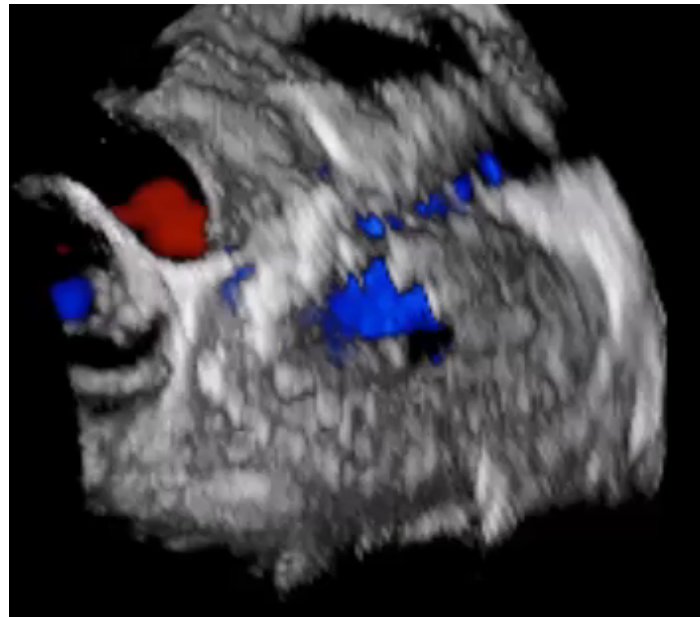


Posterior CIED lead and Transcatheter tricuspid valve replacement

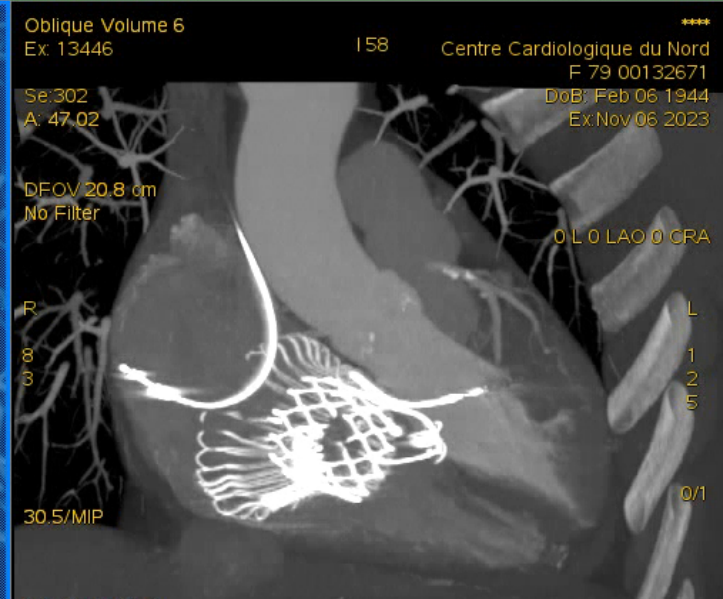
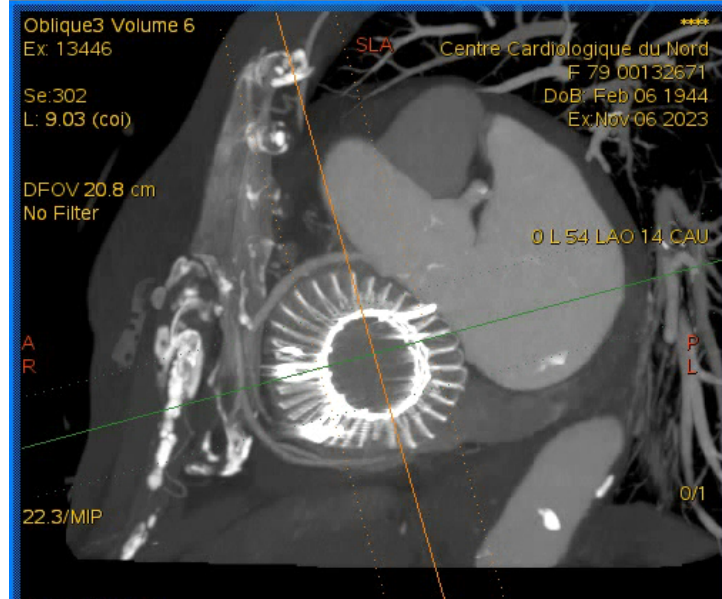
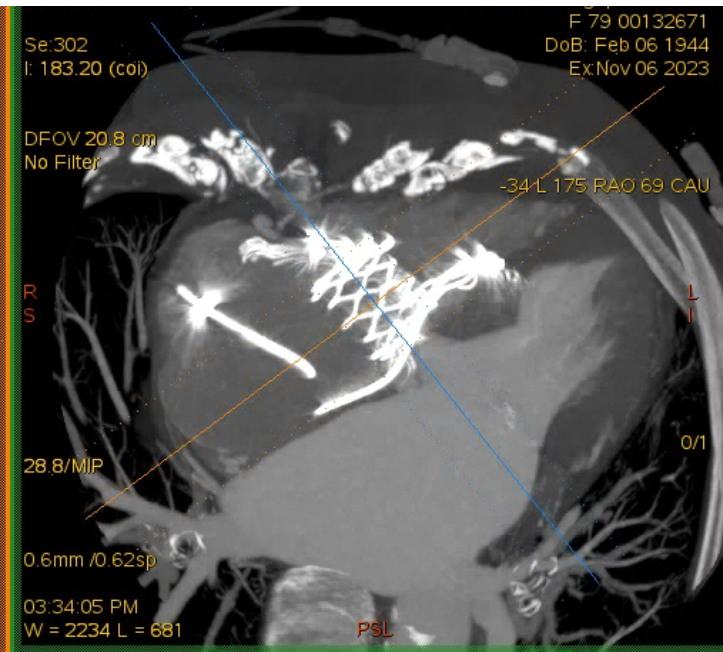
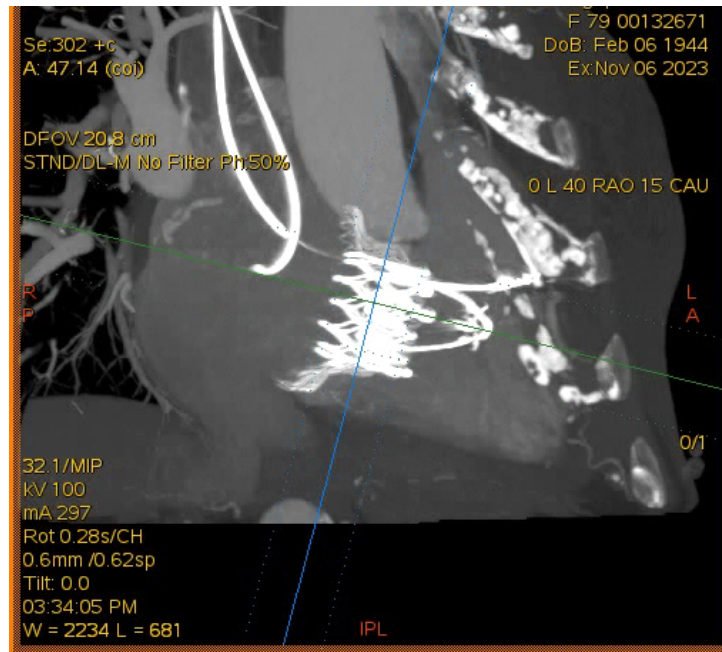
Before



After



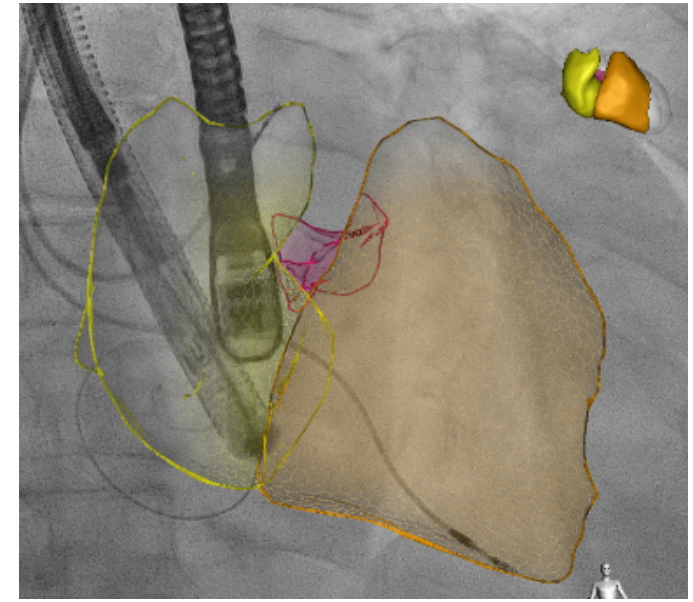
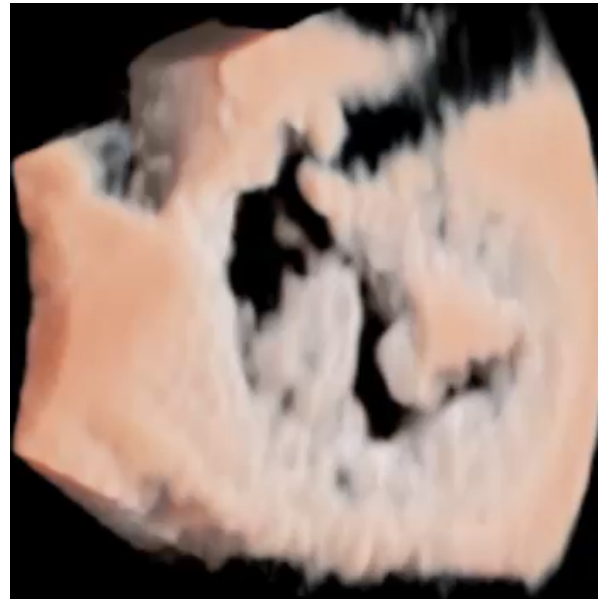
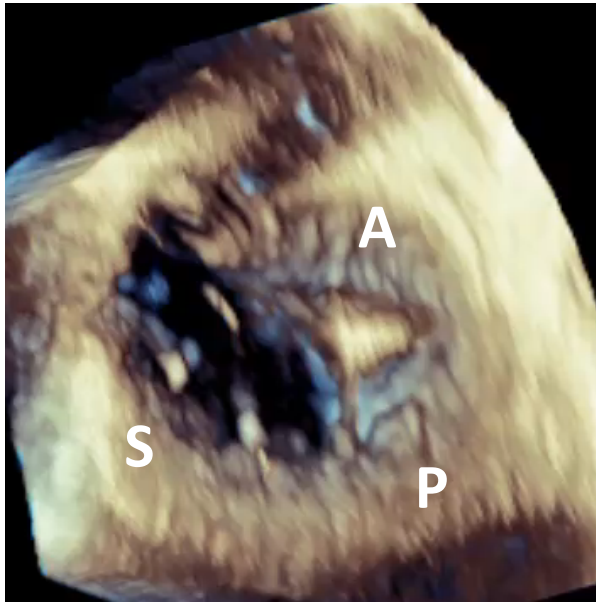
CIED lead and Transcatheter tricuspid valve replacement



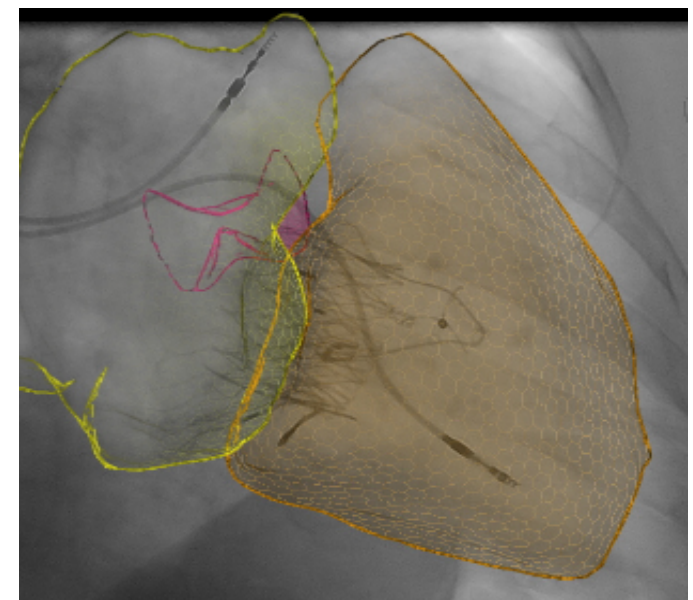
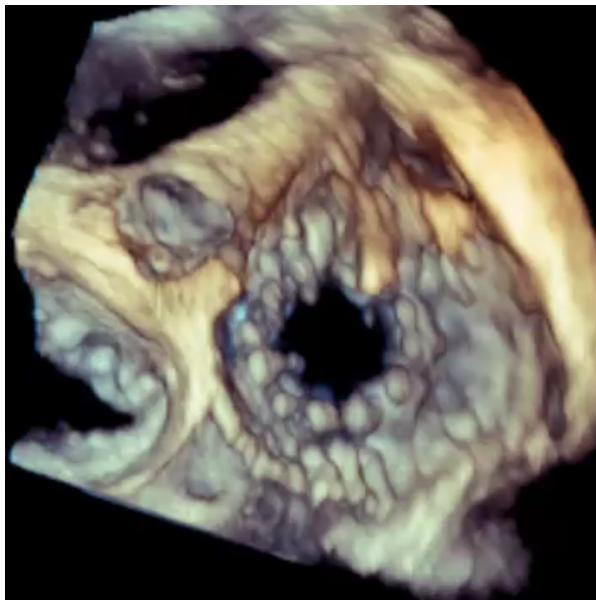
*Courtesy Jacques Feignoux
Centre Cardiologique du Nord*

CIED-induced TR and Transcatheter tricuspid valve replacement

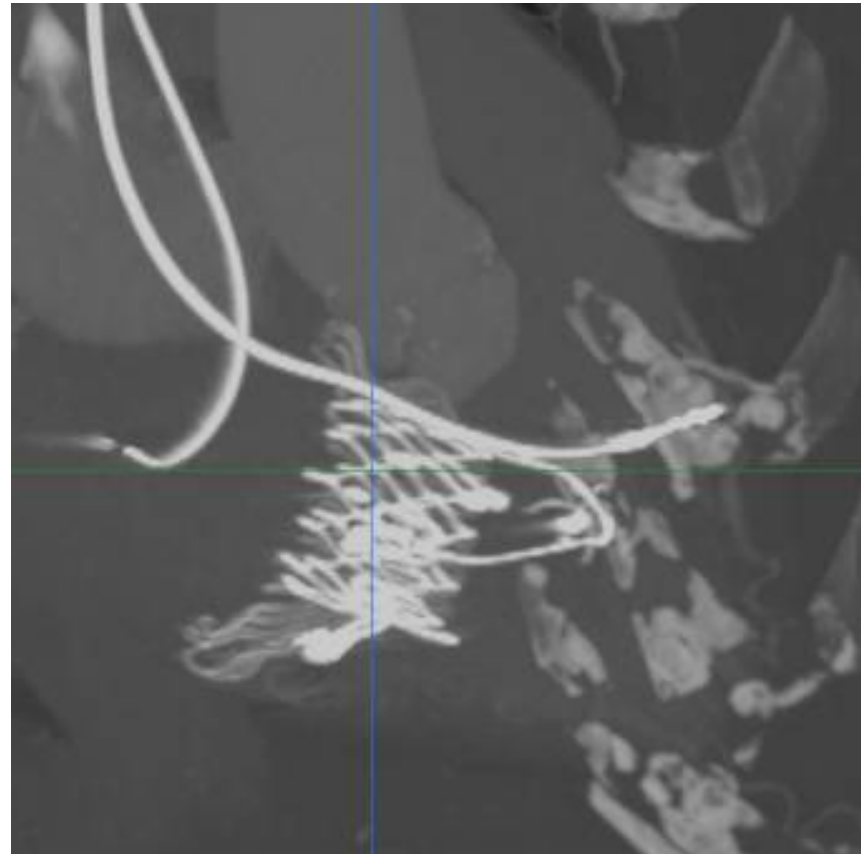
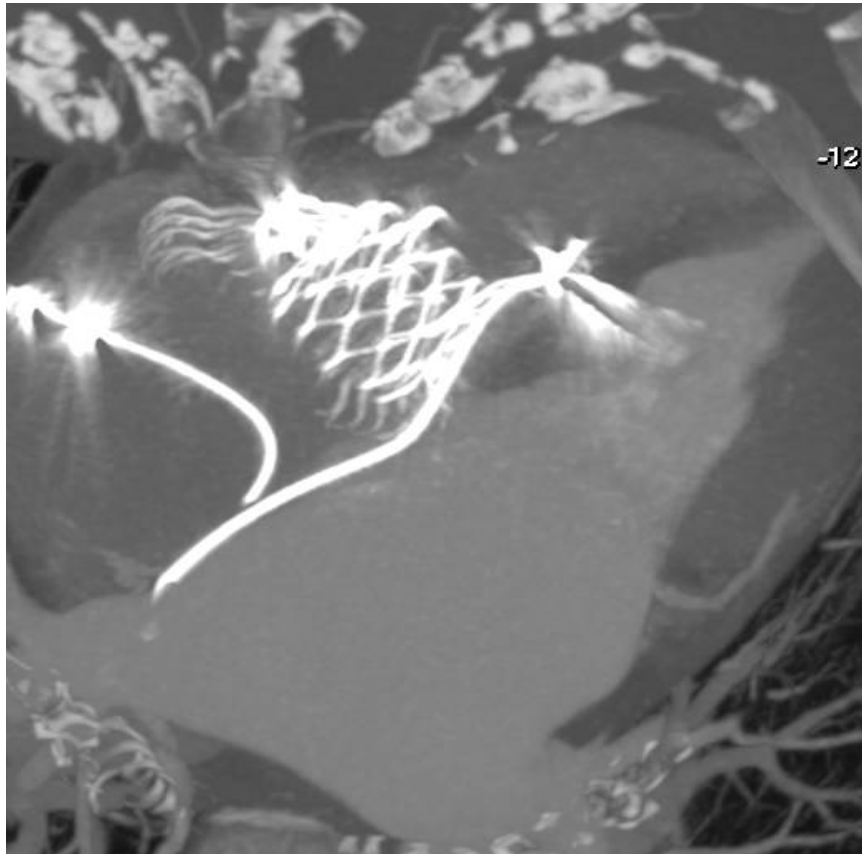
Before



After

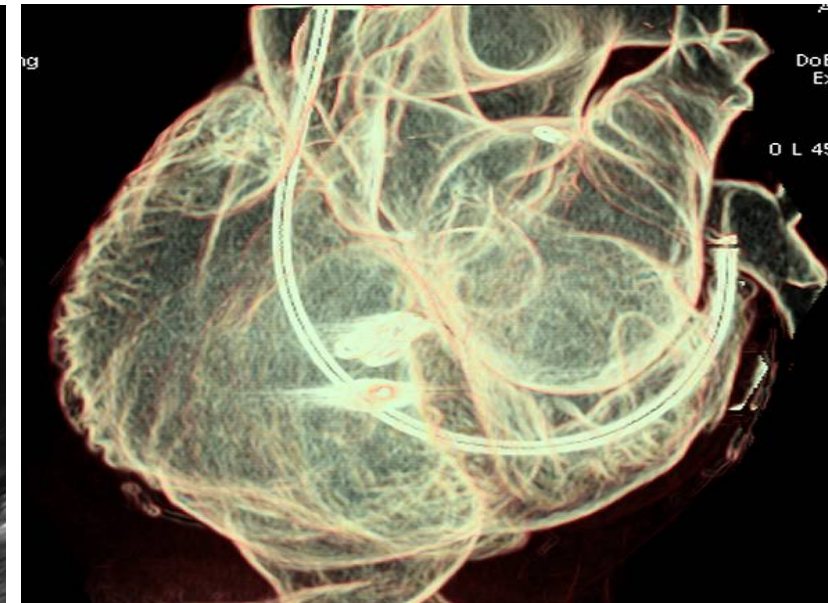
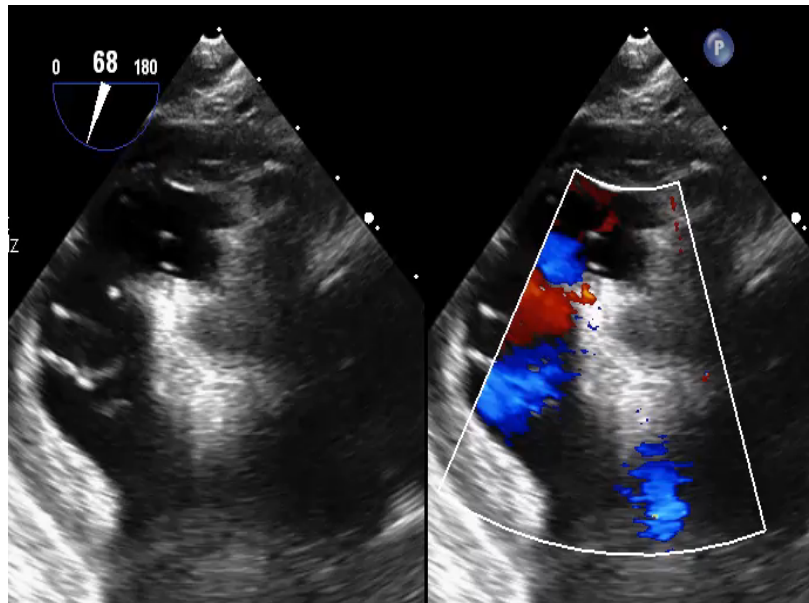
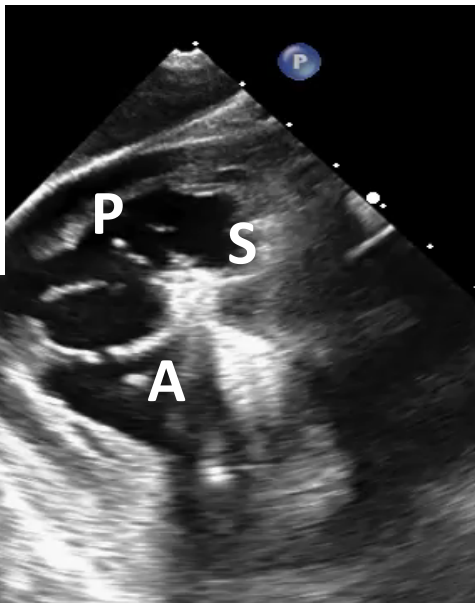
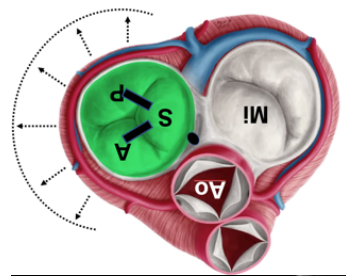
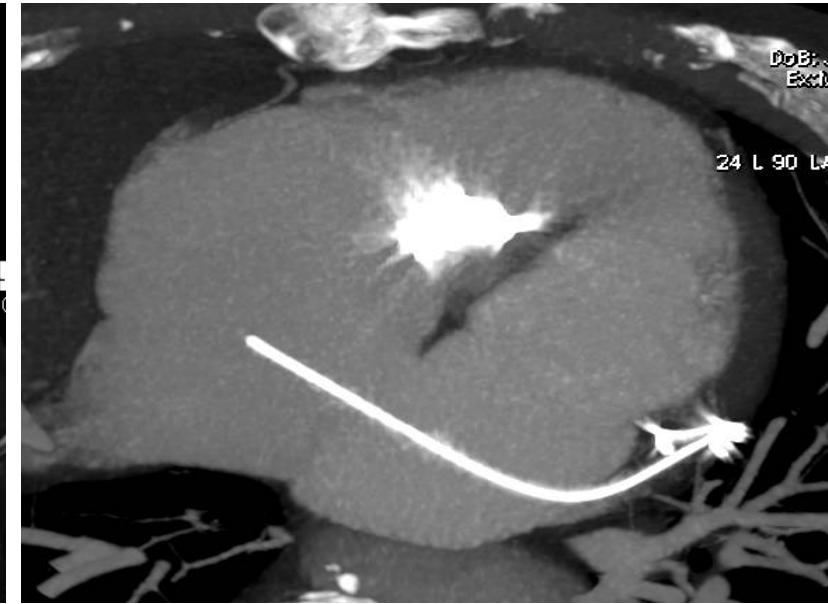
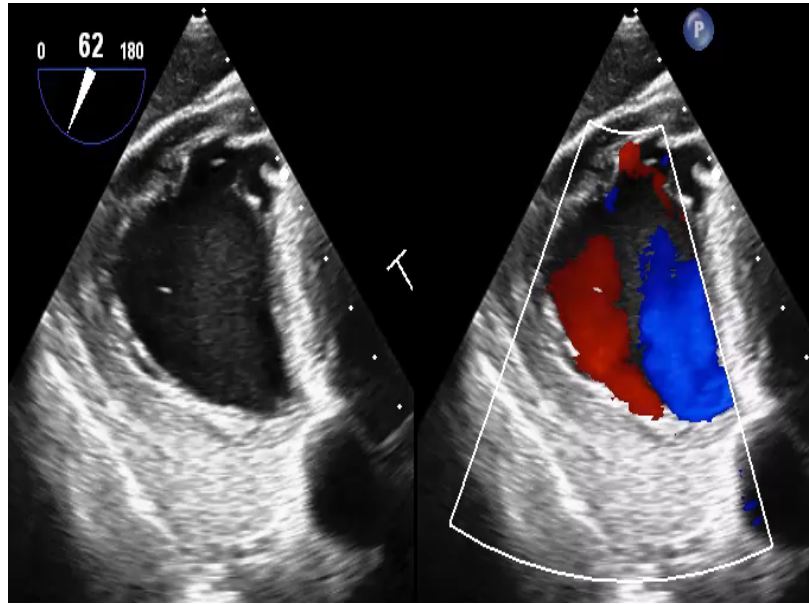
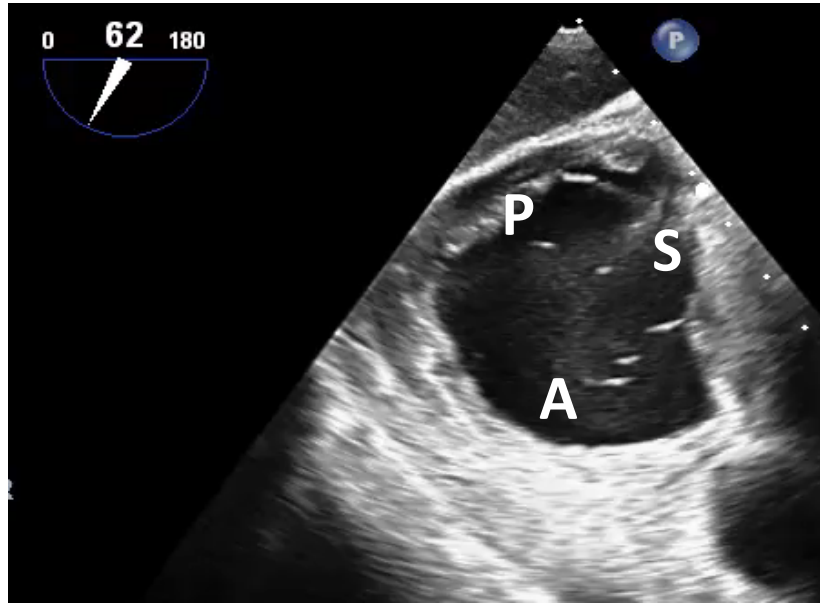


CIED-induced TR and Transcatheter tricuspid valve replacement

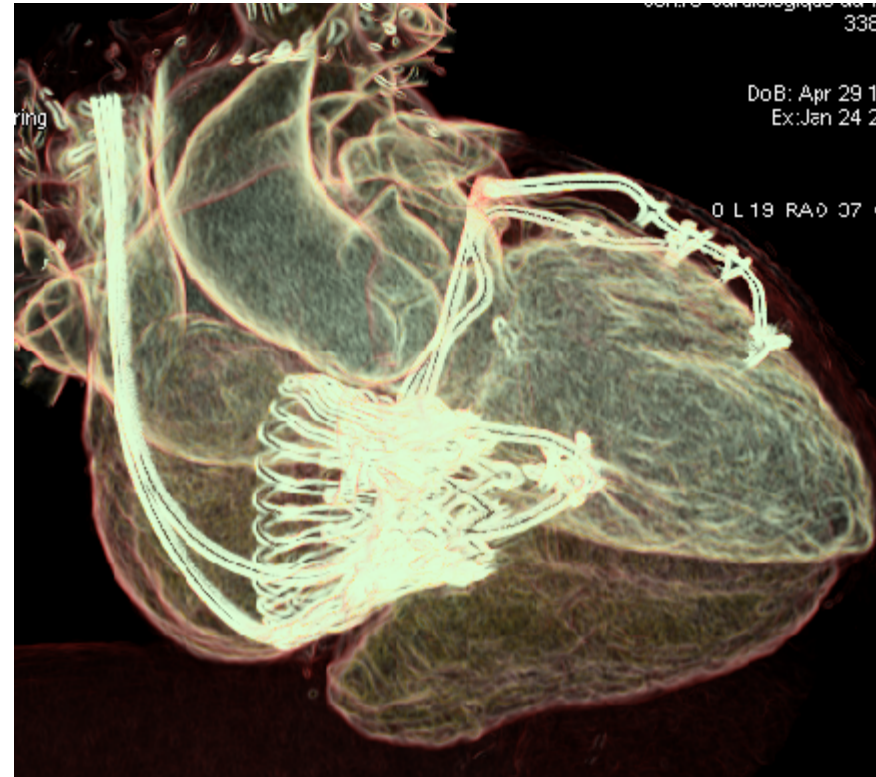
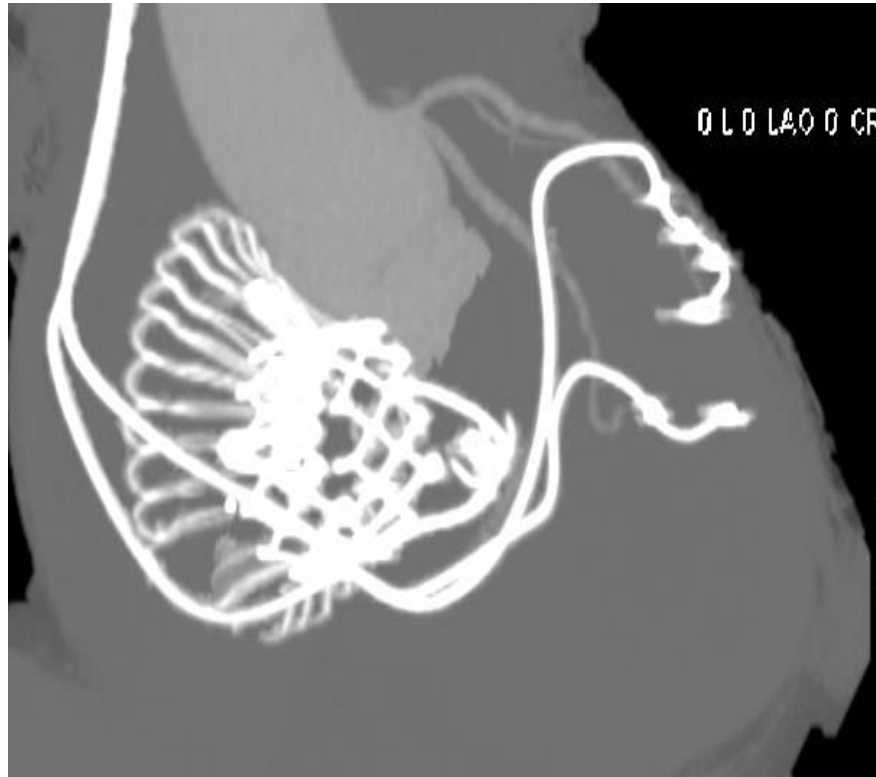


*Courtesy Jacques Feignoux
Centre Cardiologique du Nord*

Coronary sinus lead implantation AFTER Triclip



Coronary sinus lead implantation AFTER Transcatheter tricuspid valve replacement



*Courtesy Jacques Feignoux
Centre Cardiologique du Nord*

TR worsening after lead extraction

Mr N., 75 yrs

BradytachyAF > PM + AVN ablation

Pocket infection > extraction 9M > TR worsening

>TR with triclip indication

> Reimplantation : CS lead or leadless ?

TR worsening after lead extraction

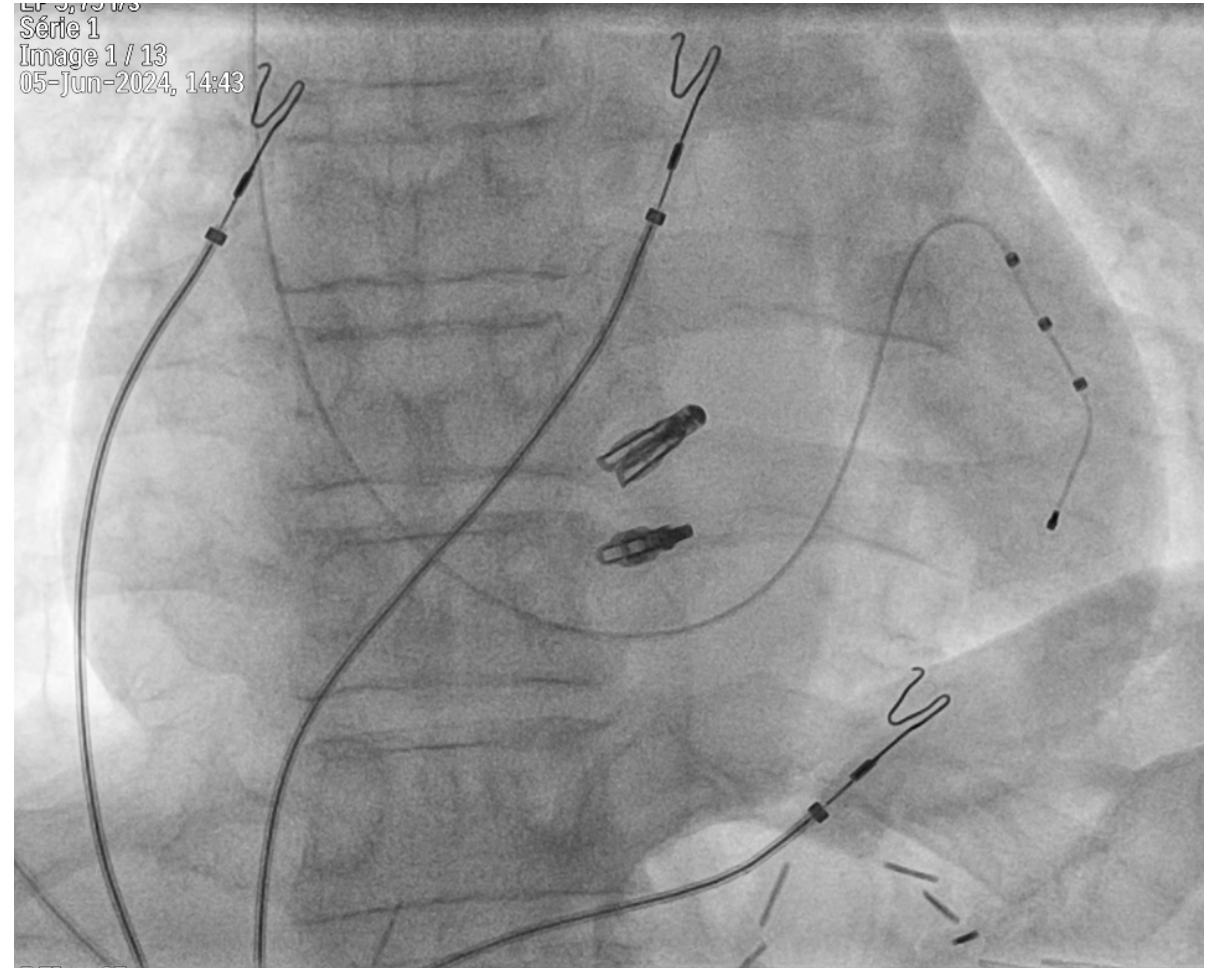
Mr N., 75 yrs

BradytachyAF > PM + AVN ablation
Pocket infection > extraction 6M > TR worsening

>TR with triclip indication
> Reimplantation : CS lead or leadless ?

>> CS lead
>> Triclip

AF rate control difficult >> AVN ablation



Difficult AV junction ablation AFTER Triclip

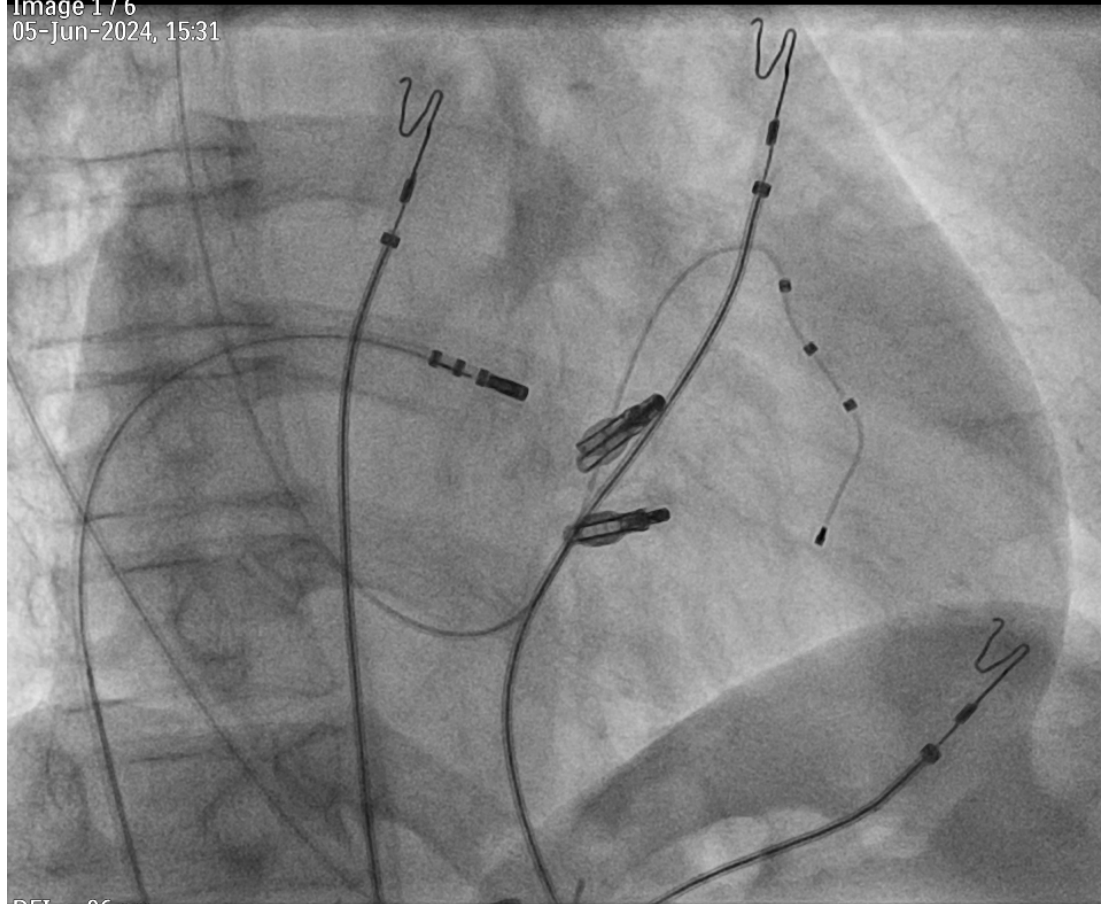
triclip abla jav1

EP 3,75 i/s

Série 8

Image 1 / 6

05-Jun-2024, 15:31



DFI 96 cm
FD 30 cm
OAD 24°
CAUD 3°

triclip jav2

EP 3,75 i/s

Série 9

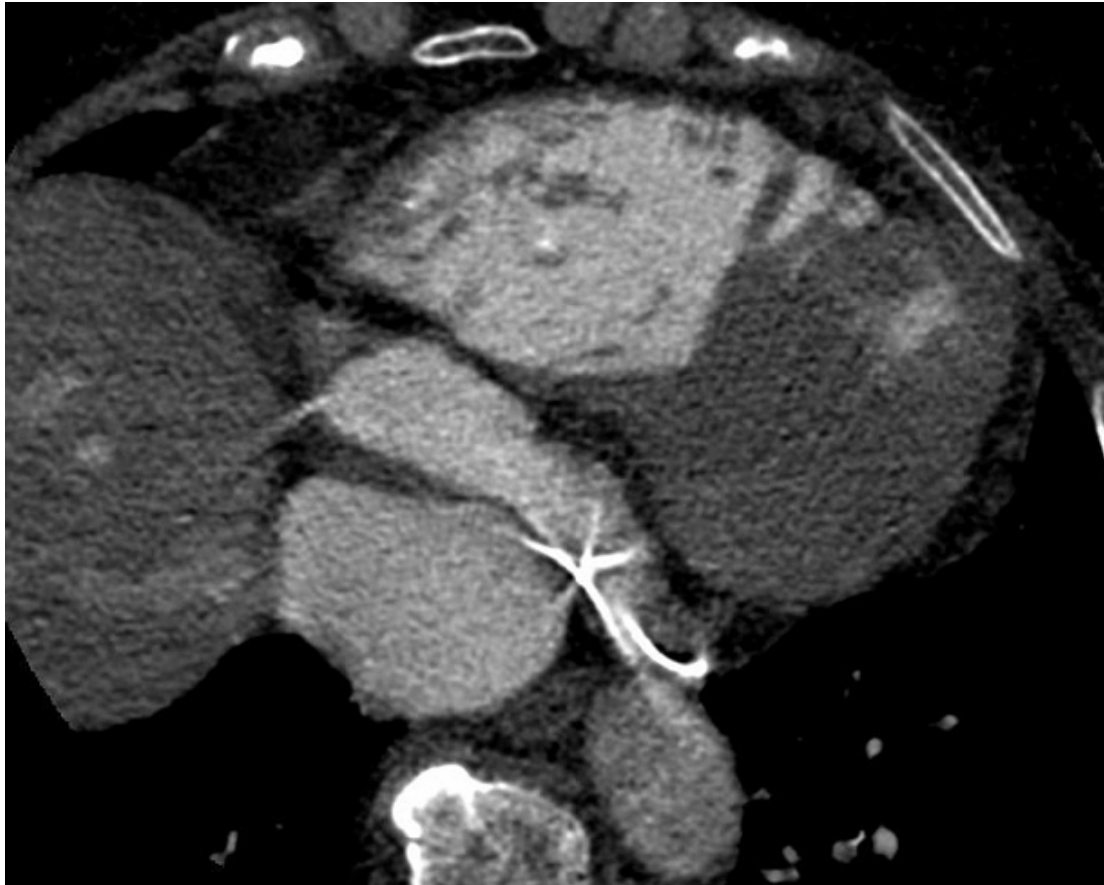
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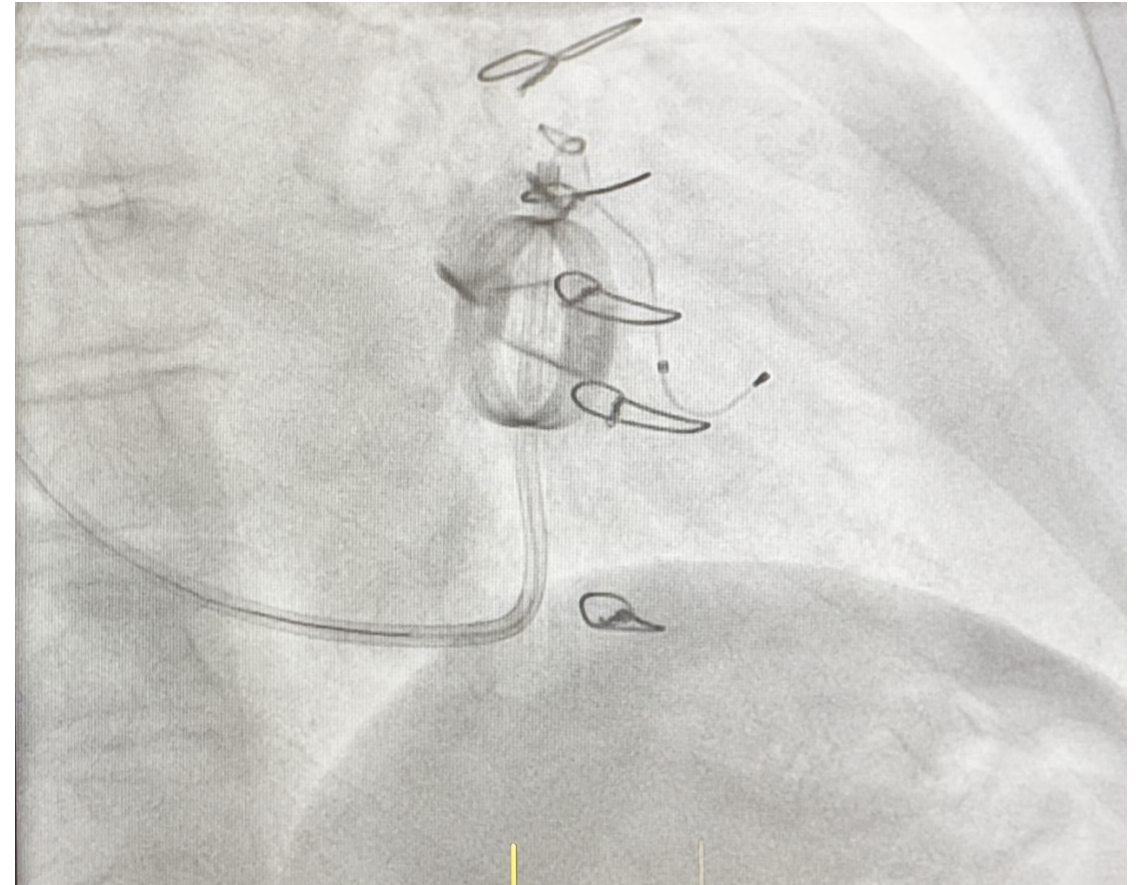


DFI 96 cm
FD 30 cm
OAG 39°
CAUD 3°

Coronary sinus lead implantation BEFORE transcatheter intervention

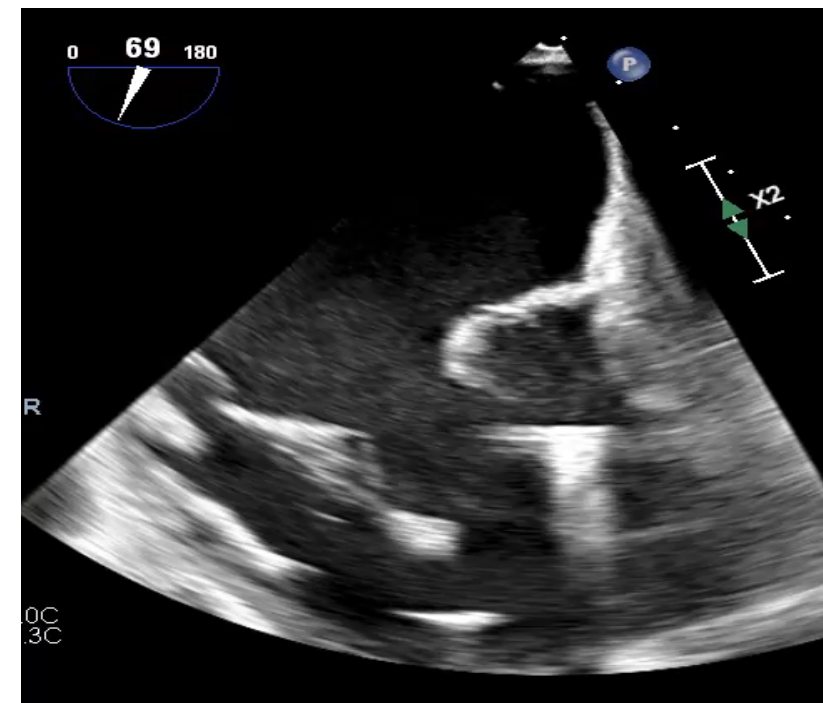
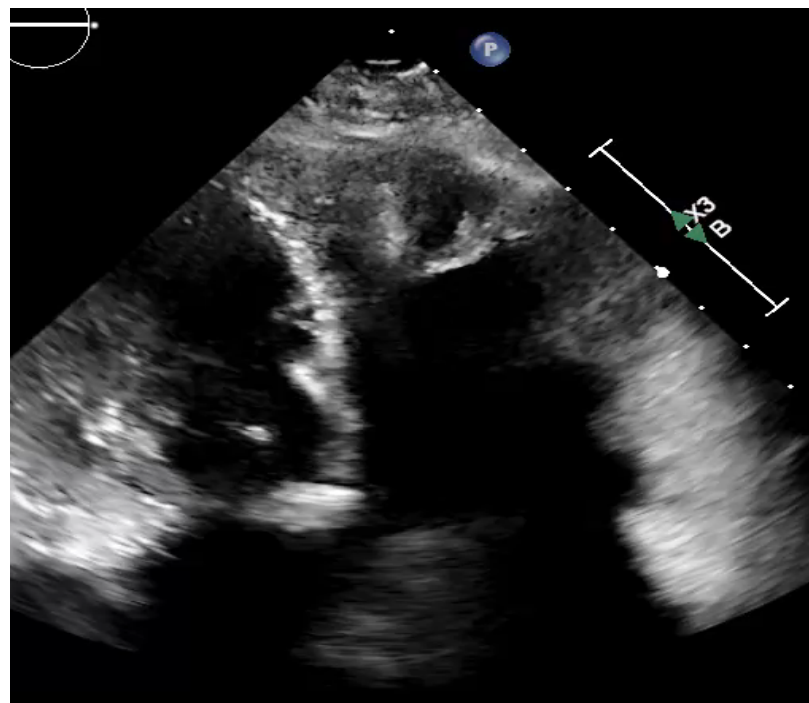
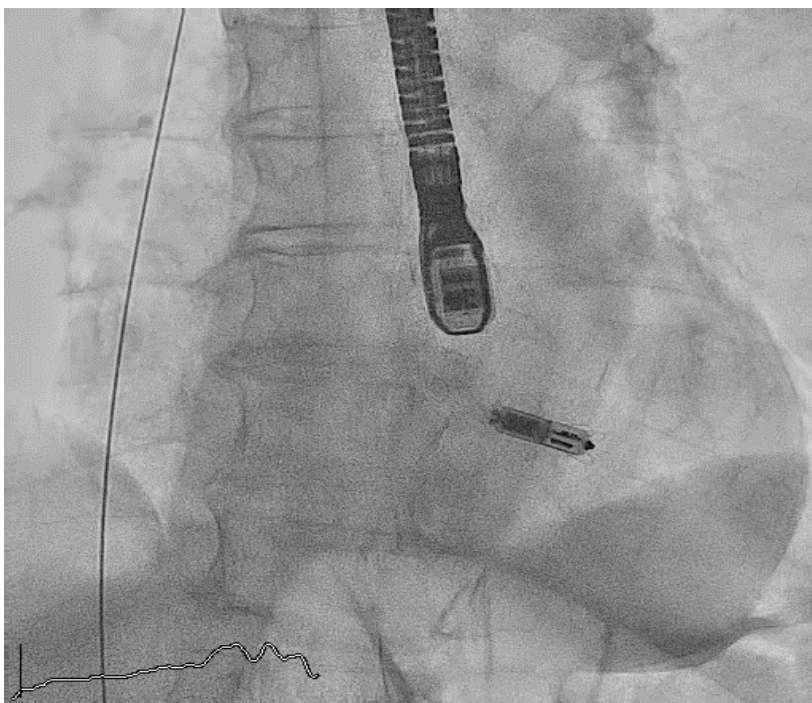


*Courtesy Jacques Feignoux
Centre Cardiologique du Nord*

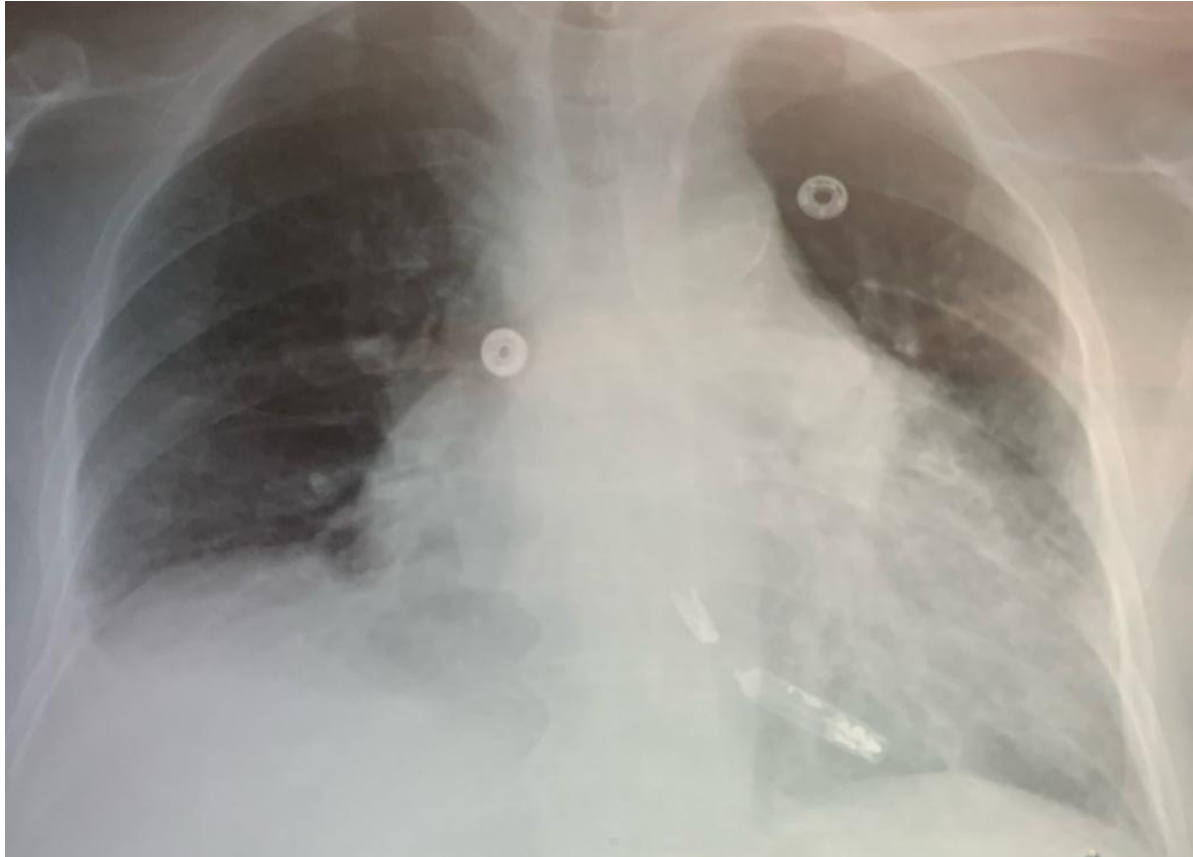


*Courtesy William Escande
Centre Cardiologique du Nord*

Leadless pacemaker implantation BEFORE transcatheter intervention





Triclip AFTER leadless pacemaker implantation



Triclip AFTER leadless pacemaker implantation

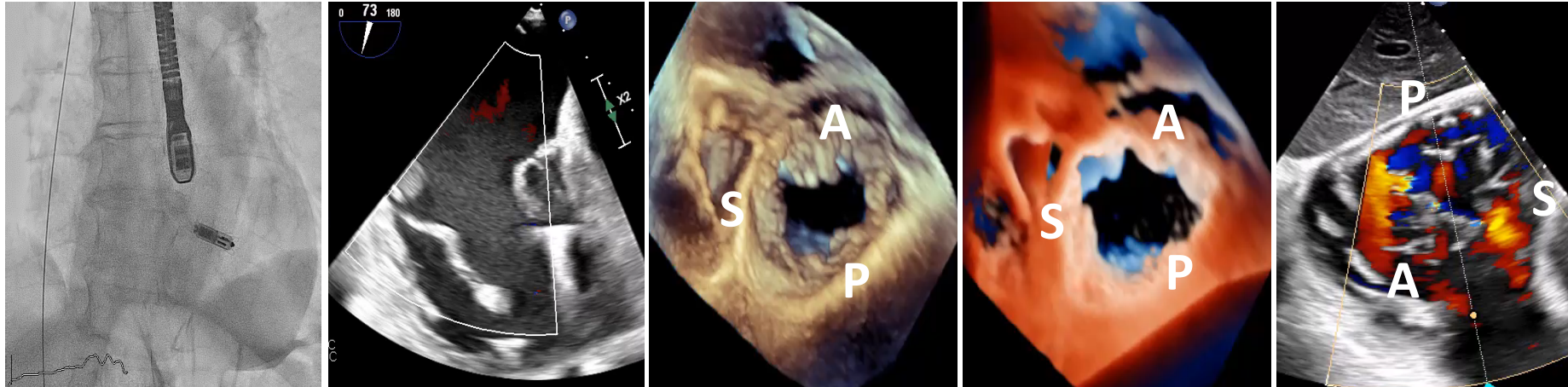
Tailored pre-procedural management and four-clip trans-catheter edge-to-edge repair procedure to efficiently treat torrential tricuspid regurgitation: a case report

Julien Dreyfus ^{*}, Ariel Nakache, and Mohammed Nejari 

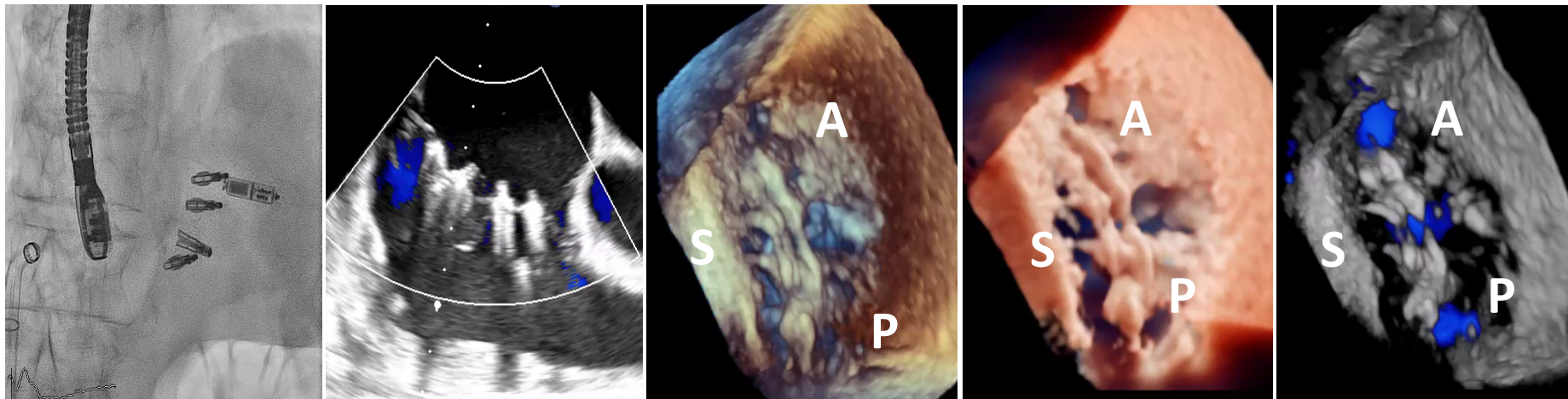
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Before
TEER



After
TEER



Gestion de l'IT sévère après extraction

- Situation pas si rare (3-5%)
- Analyse multidisciplinaire : mécanisme IT, besoin de stimulation/défibrillation
- Deux objectifs simultanés
 - Gestion de l'IT elle-même: traitement médicamenteux, ne pas retarder la proposition de réparation ou changement de la valve +++
 - Adaptation du système de stimulation avec respect de l'orifice tricuspide (stimulation SC, sans sonde, épicardique, DAI avec sonde extracardiaque)
- Peut être contrôlée par un traitement percutané

