CONTROVERSIES & UPDATES IN VASCULAR SURGERY
JANUARY 22-24 2015
MARRIOTT RIVE GAUCHE & CONFERENCE CENTER PARIS, FRANCE

False lumen thrombosis by embolotherapy in chronic Dissections

H Rousseau, B St Lebes,

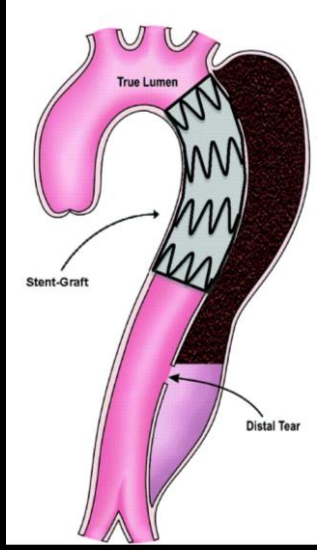
O Meyrignac,

CHU Rangueil

Toulouse

- Aortic remodeling : significant reduction in FL diameter and increase in TL diameter after intervention.

- There is evidence that aortic remodeling is associated with improved survival.



Hughes GC: J Thorac Cardiovasc Surg 2014. Nienaber 2009, Fattori, 2013

➔ Patients with a partially thrombosed FL exhibit significantly higher aortic growth rates compared to those with no residual FL flow.
(Sueyoshi E. Ann Thorac Surg. 2009)

A Systematic Review of Aortic Remodeling After Endovascular Repair of Type B Aortic Dissection: Methods and Outcomes

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Alan Karthikesalingam, PhD, MRCS, Peter J. Holt, PhD, FRCS,
Robert J. Hinchliffe, MD, FRCS, Ian M. Loftus, MD, FRCS, and
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Ann Thorac Surg 2014;97:588–95

- Acute dissection : more consistent degree of remodeling (thoracic FL thrombosis in 80% to 90%) than chronic dissection (38% to 91%)
- More common in less extensive dissections.
- FL thrombosis below the diaphragm in 22% to 76.5% for Acute d, vs 12.5% to 45% for Chronic d.

Extent of Coverage and False Lumen Thrombosis

Endovascular repair of complicated chronic distal aortic dissections: Intermediate outcomes and complications

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Introduction: Patients with chronic distal aortic dissection (CDAD) remain at high risk for late aorta-related events and reinterventions, and the ideal management strategy remains undefined. Open surgical procedures carry morbidity, but scant data for thoracic endovascular aortic repair (TEVAR) of CDAD exist. This study reports our intermediate-term results with TEVAR for complicated CDAD.

Methods: All cases of TEVAR for complicated (aortic growth, malperfusion, intractable pain) CDAD at our institution between 2000 and 2007 were retrospectively reviewed. Demographic information, indications for repair, complications, and aortic morphologic changes were collected from medical records and imaging studies. Aortic morphology (aneurysm size, false lumen thrombosis) was assessed at multiple levels with 3-dimensional image analysis techniques. Kaplan-Meier analysis was used to estimate survival, freedom from reintervention, and likelihood of false lumen thrombosis, with log-rank tests used to discriminate between Kaplan-Meier curves.

Results: In total, 144 stent–grafts were implanted in 76 consecutive patients (49 male) with complicated CDAD. Early (<30 postoperative days) mortality was 5%. There was no paraplegia, and 1 patient died of stroke. At mean follow-up of 34 months, 12 patients had died (1 aorta-related death). Seventeen patients (22%) underwent 19 secondary aortic reinterventions, mainly for enlargement of the untreated aorta remote to stent–graft repair. Three secondary procedures treated retrograde proximal dissections. Estimated survivals were 86%, 82%, and 80% at 12, 24, and 36 months, respectively, and freedoms from both death and reintervention were 72%, 64%, and 59% at similar time points. Of 67 patients (88%) with complete imaging follow-up, TEVAR resulted in significantly decreased aortic diameter through the stent–grafted segment but not untreated segments. Complete thrombosis of the entire false lumen was uncommon in patients with extensive dissections (13% vs 78% $P < .001$).

Conclusions: Management of complicated CDAD remains challenging for clinicians. TEVAR is a reasonable treatment modality for dissections limited to the thoracic aorta and for prevention of focal aortic growth in extensive dissections. Late complications and the need for secondary interventions emphasize the complexity of this patient population and the need for long-term follow-up. (J Thorac Cardiovasc Surg 2011;■:1-10)

Most patients that survive the acute phase of proximal or distal aortic dissection have a patent false lumen and thus have persistent disease of the aortic wall. Studies suggest that 75% to 97% of patients survive the acute phase of dissection when current management strategies are used, making chronic distal aortic dissection (CDAD) a more common and concerning issue.[1,2] These patients may remain at a high risk for secondary aorta-related events and subsequent reintervention.[3-9] Late complications in patients with CDAD include aneurysmal growth, persistent pain, recurrent dissection, end-organ ischemia, and rupture.

Controversy surrounds the ideal management of patients with CDAD. Optimal medical therapy with anti-impulse treatment during the uncomplicated phase,[8,10] and selected open surgical or endovascular repair[11,12] when aneurysmal degeneration, malperfusion, persistent pain, or rupture mandates it, is the most accepted standard of care.[8-22] Once intervention is indicated, however, the best treatment strategies (open vs endovascular) and the required extent of repair have not been well defined.

Irrespective of the treatment paradigm followed, the goal is to avoid late aorta-related death. Endovascular repair requires adequate decompression of false lumen perfusion to promote changes in aortic morphology by closure of the primary intimal entry tear.[11-22] The resulting passive decompression of the false lumen allows true lumen expansion. Although the results of the treatment of complicated acute aortic

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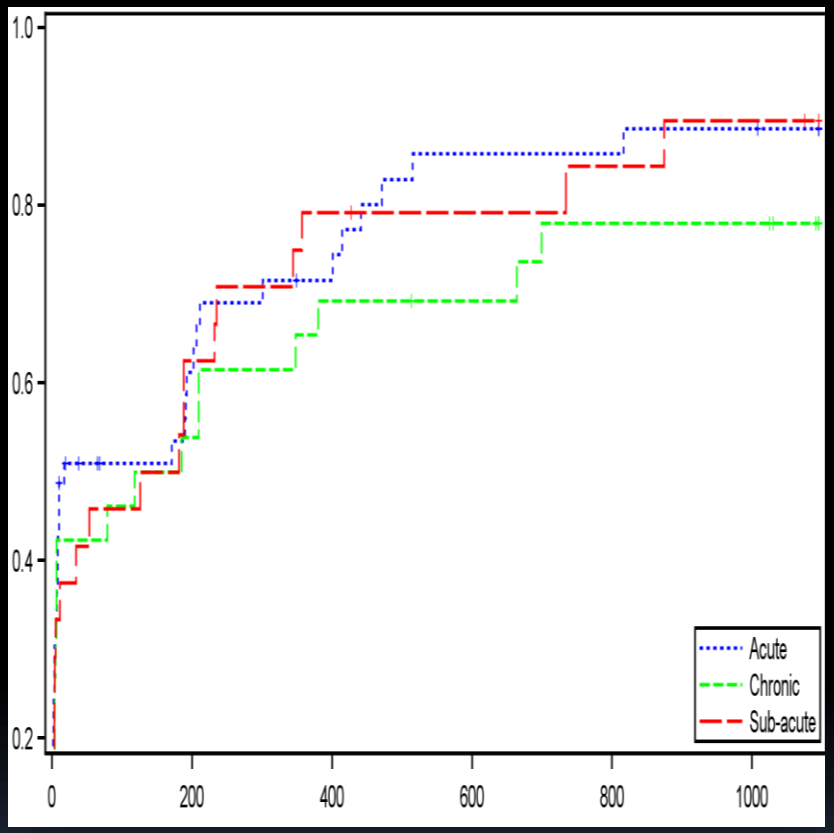
0022-5223/$36.00

doi:10.1016/j.jtcvs.2011.03.008

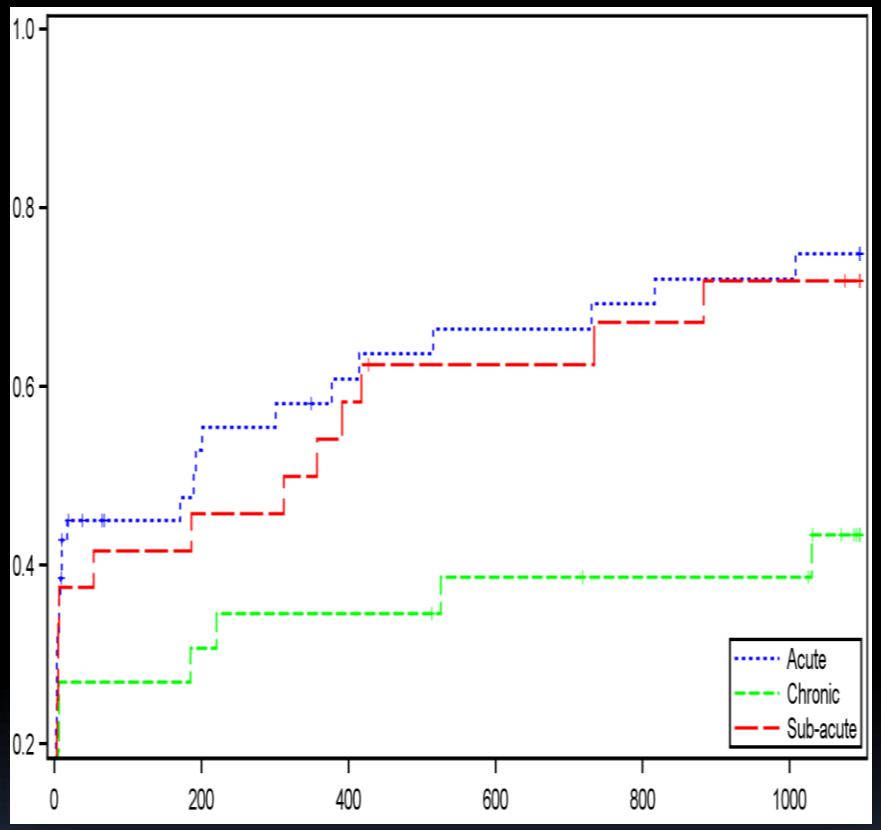
"..false lumen thrombosis and aortic diameter diminution occurred concurrently but were generally limited to the treated aortic segments, not the other levels"

Kang & al. J Thorac Cardiovasc Surg. 2011 Nov;142(5):1074-83

False Lumen Thrombosis

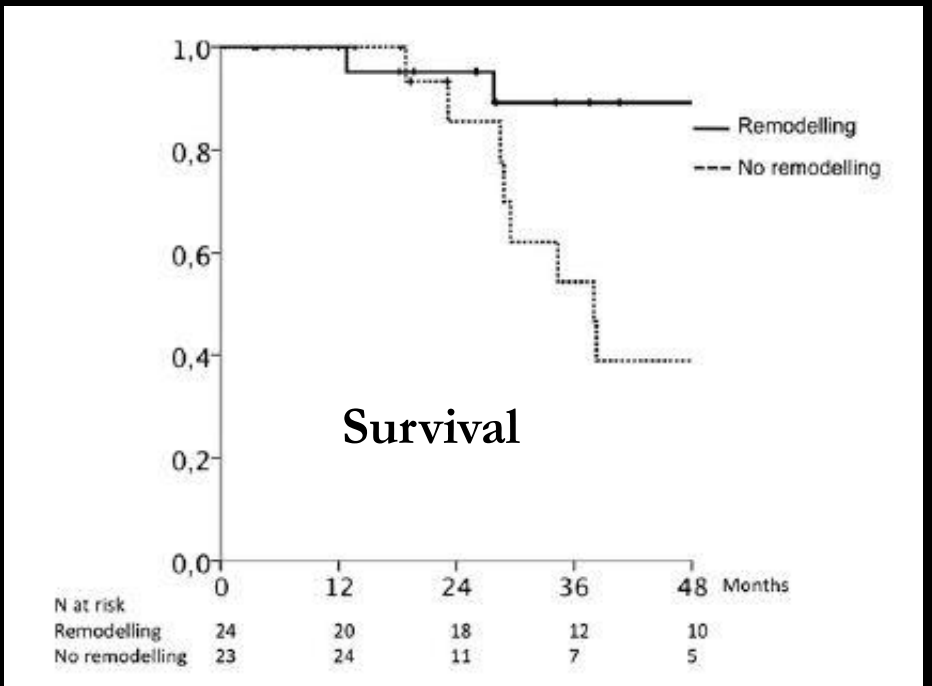


Distal ½ DTA

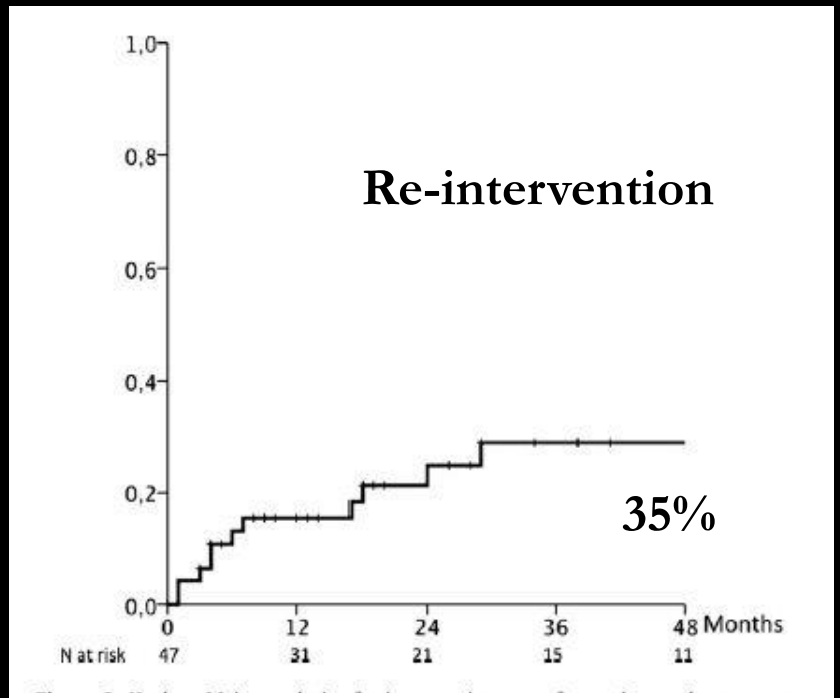


Diaphragm – Coeliac A

Sayer et al EJVES 2008;36: 522



Kaplan Meier analysis of survival based on remodelling of the aorta after endovascular intervention for chronic type B dissection.

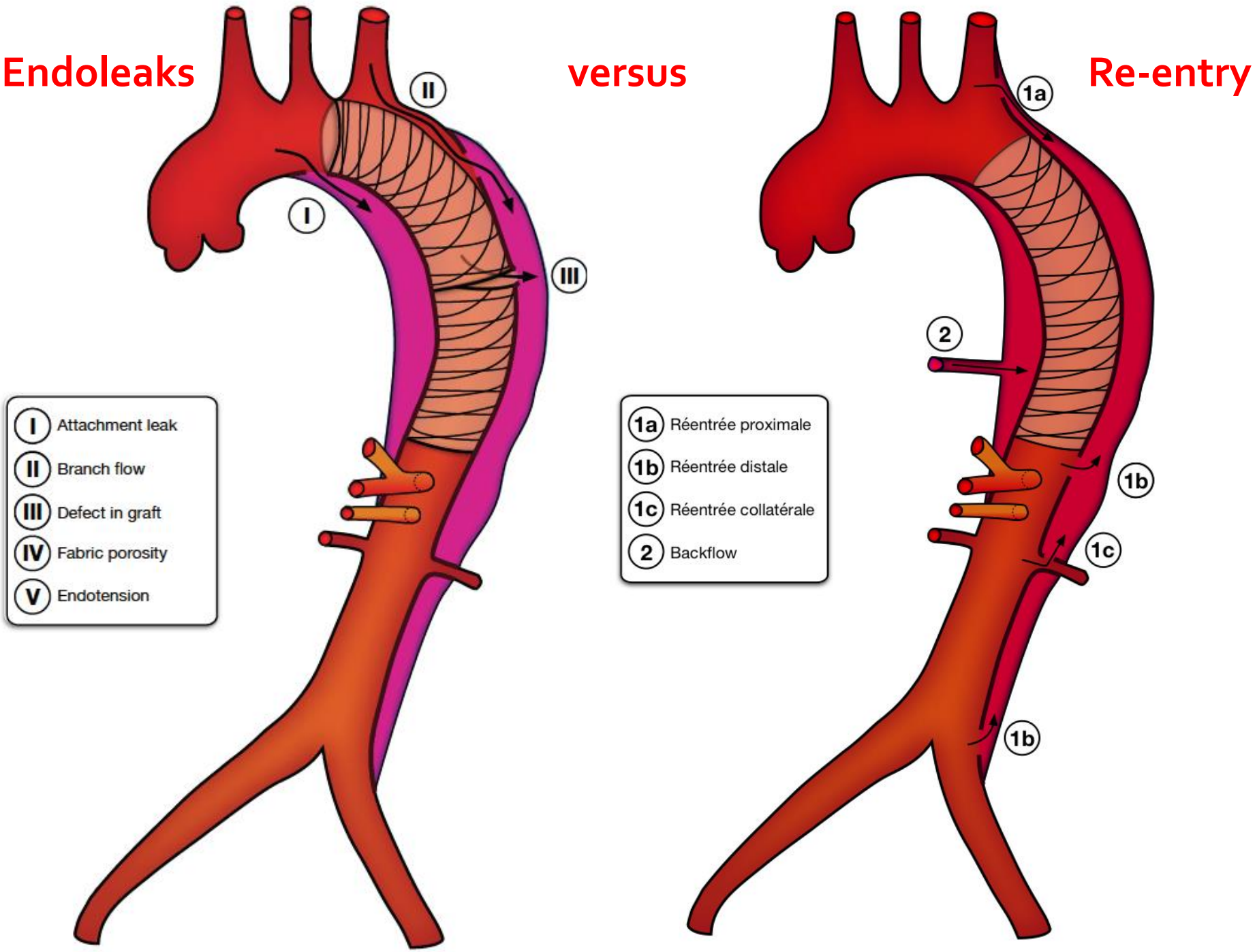


Kaplan Meier analysis of reintervention rate after endovascular treatment of chronic type B dissection.

Predictors of Outcome after Endovascular Repair for Chronic Type B Dissection
K. Mani , & al. European Journal of Vascular and Endovascular Surgery 43 (2012)

Conclusions : Survival is associated with aortic remodeling, which is related to persistence of flow in the false lumen.

Endoleaks versus Re-entry



Type B dissection: Treatment modalities

- Medical Treatment: Blood pressure control
  - ß-blockers
  - Nitroprusiate
- Surgical treatment
  - Aortic repair
  - Surgical fenestrations
  - Extra-anatomical bypasses
- Endovascular Treatment
  - Endovascular fenestrations
  - Stenting
  - Endografting

False lumen embolisation

Eur J Vasc Endovasc Surg (2014) 48, 641–648

Outcomes of Fenestrated/Branched Endografting in Post-dissection Thoracoabdominal Aortic Aneurysms

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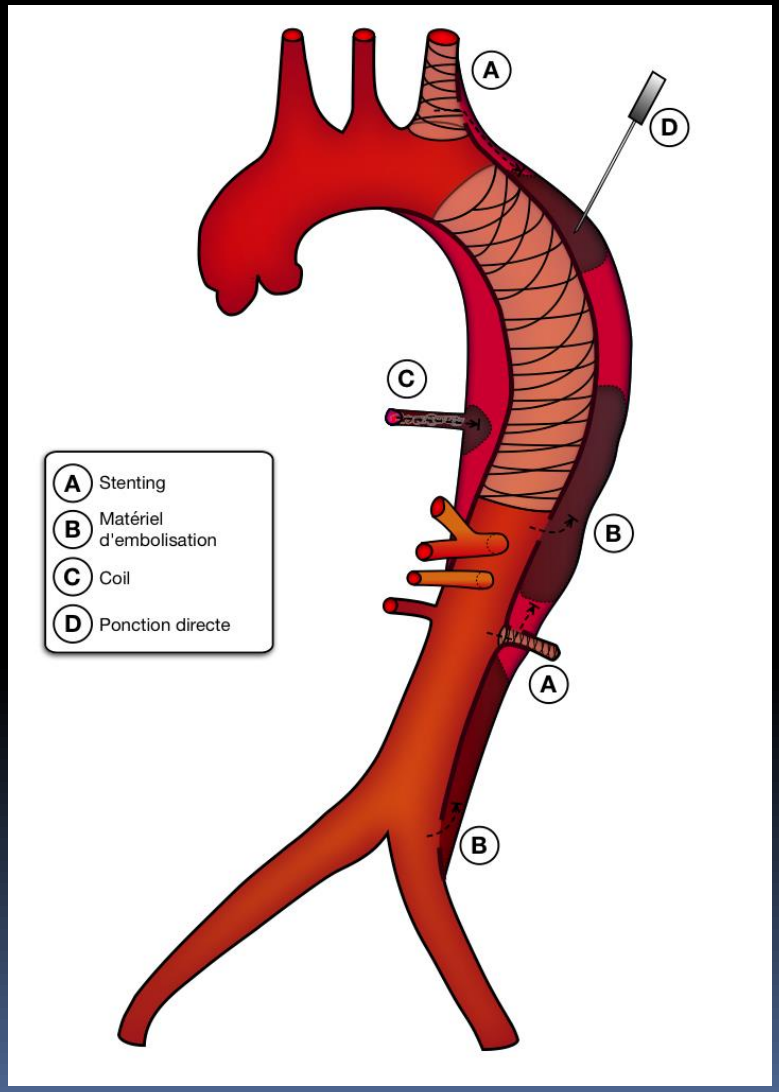
- With a mean Follow Up of 17 months,
- Endoleaks or reentries were diagnosed in 38% of cases and reintervention were needed in more than 22%.
- FL thrombosis rate of 66.7% and 88.2% were observed at 6 and 12 months respectively.

1. Occlusion of the entry tear by coil or glue placement at the tear entry site;

2. Elimination of retrograde branch vessel FL perfusion from inter- costal, coeliac, gastric or lumbar arteries;

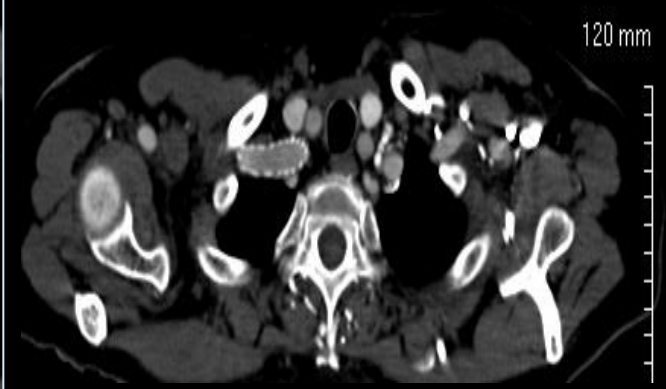
3. Induction of complete local occlusion of the FL above the most cephalad abdominal re-entry site (usually at the thoracoabdominal junction).

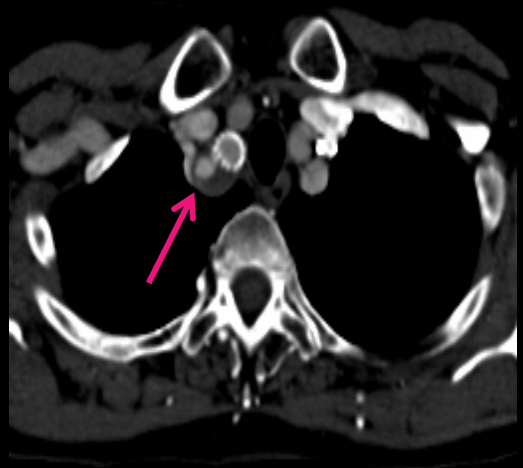
4. Direct puncture

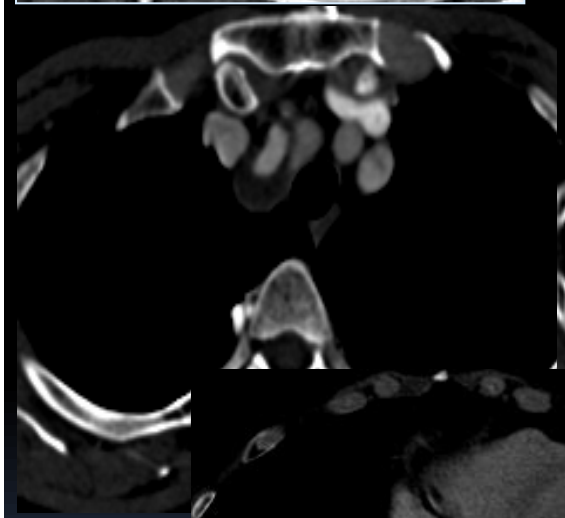


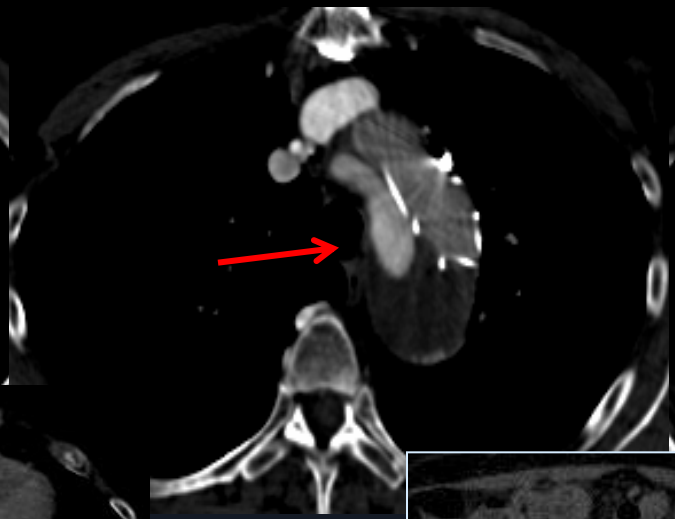
Methods:

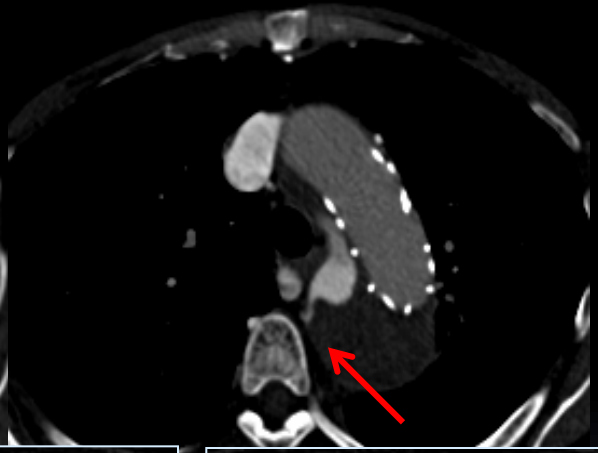
- Between 1997 - 2014, 301 patients (49F/ 252M), 68y. (29-88), underwent aortic reconstruction for Type A & B dissection.
- Of these, 52 patients (41 men; mean age 64 years) who had undergone repair of 24 type A, 28 type B dissections demonstrated re-entry tear(s) and FL patency associated with aortic expansion> 5 mm or flow into a persistently dilated aortic segment.
- Catheter-directed embolization using coils, glue, or plugs was performed via a transfemoral approach to the true or the false lumen.

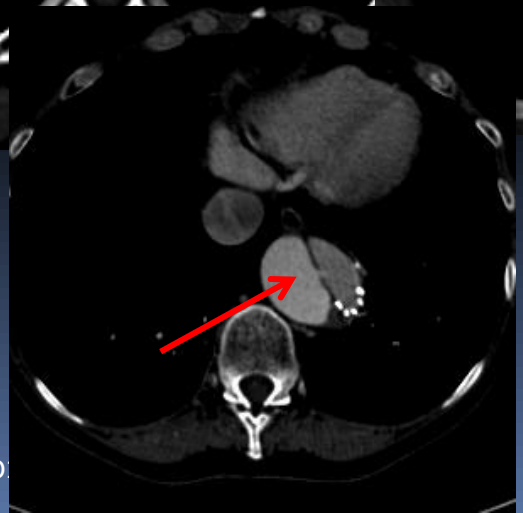












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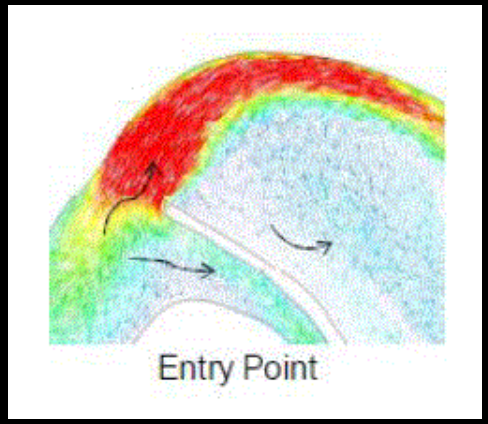

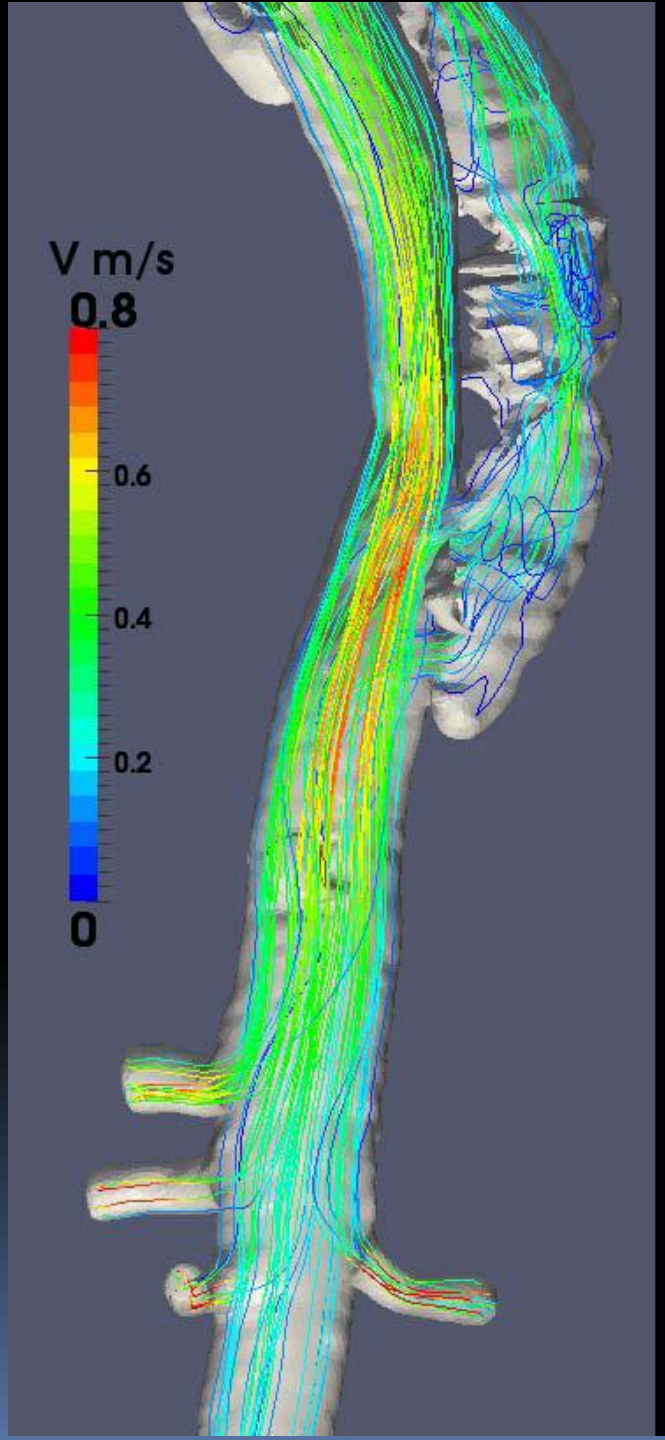

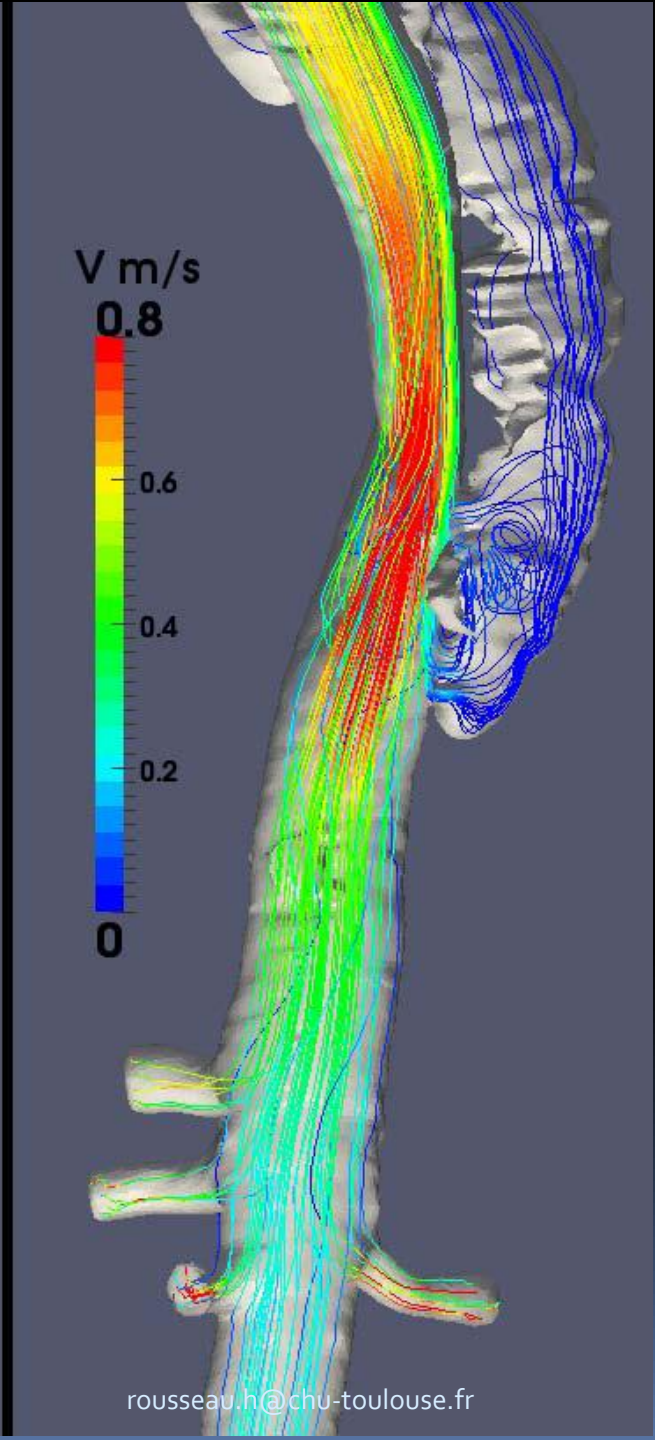

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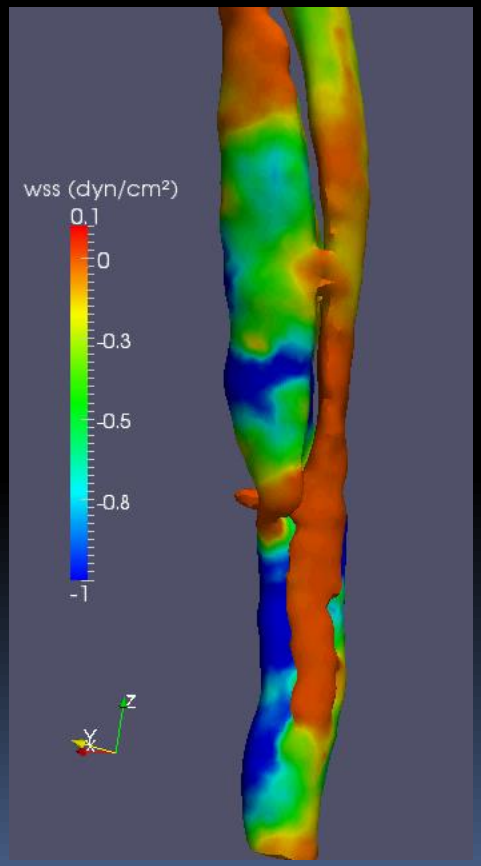
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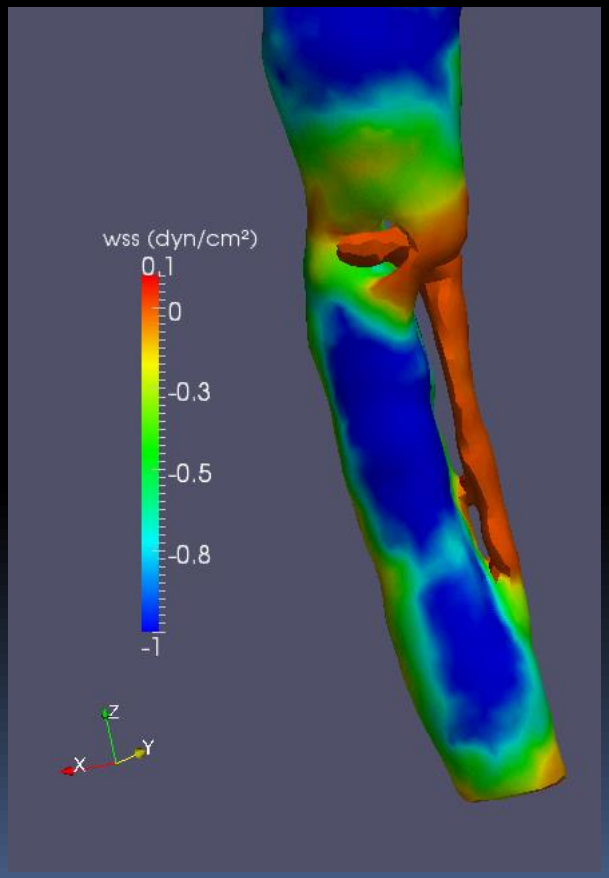
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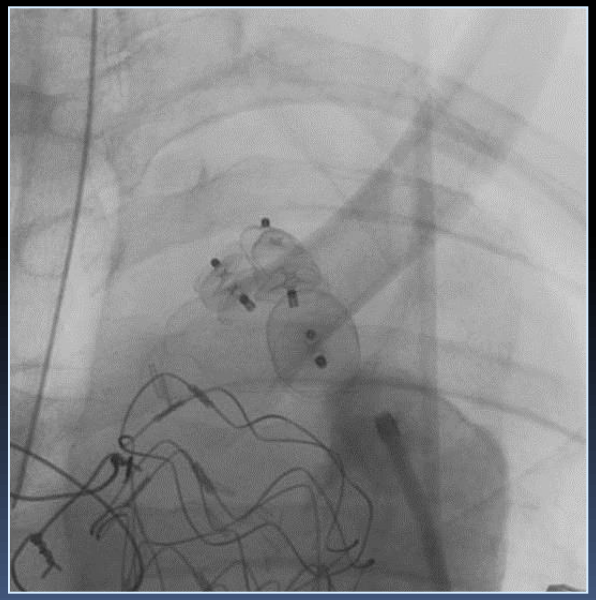
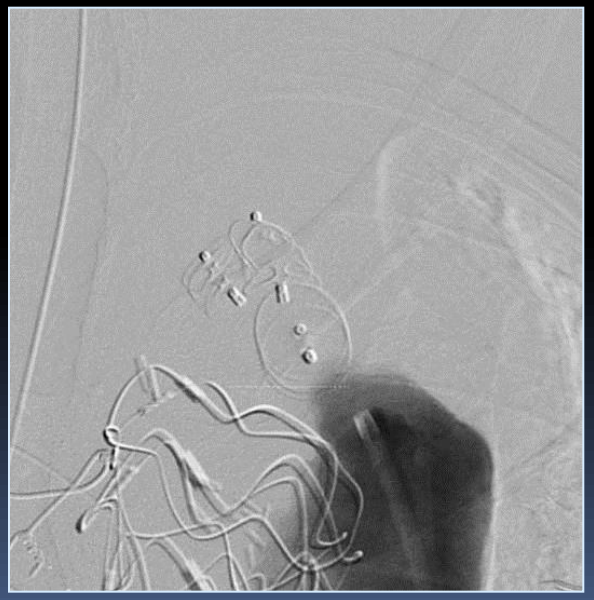
007
15-Oct-2012
Doe
Jane
LAO 0 deg
CRA 0 deg
L 0 deg
FOV 32 cm
C 87 deg
LAO 33 deg
CRA 1 deg

Methods:

- Strategy 1:

induction of FL thrombosis via occlusion of the entry tear by coil , plug or glue placement at the tear entry site (and locally within the adjacent FL space);



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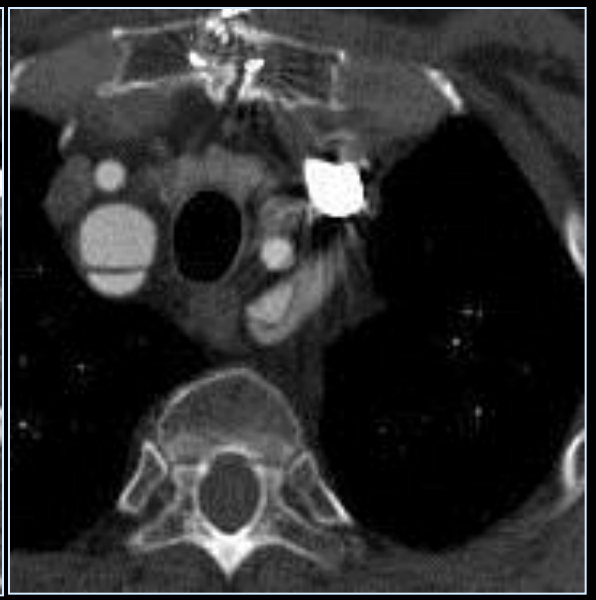
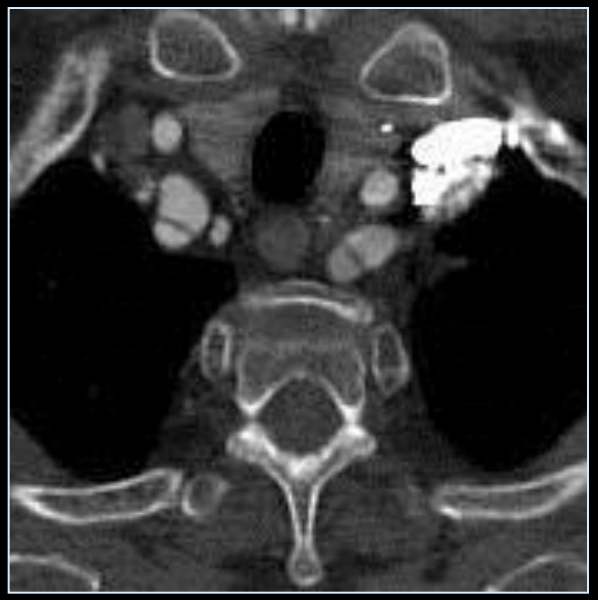

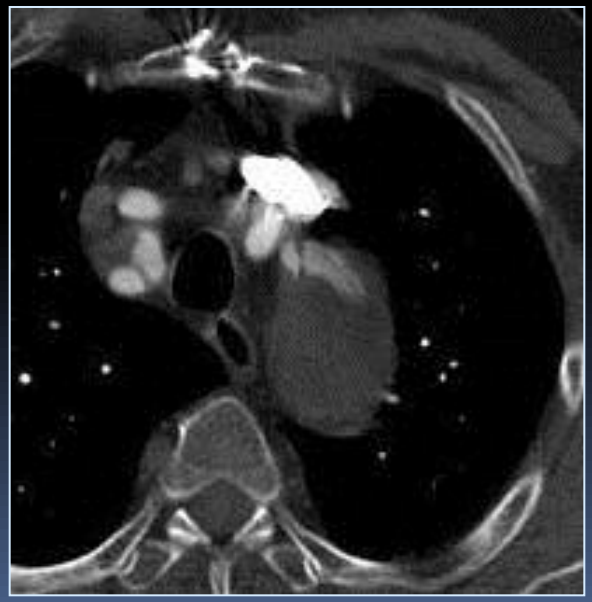


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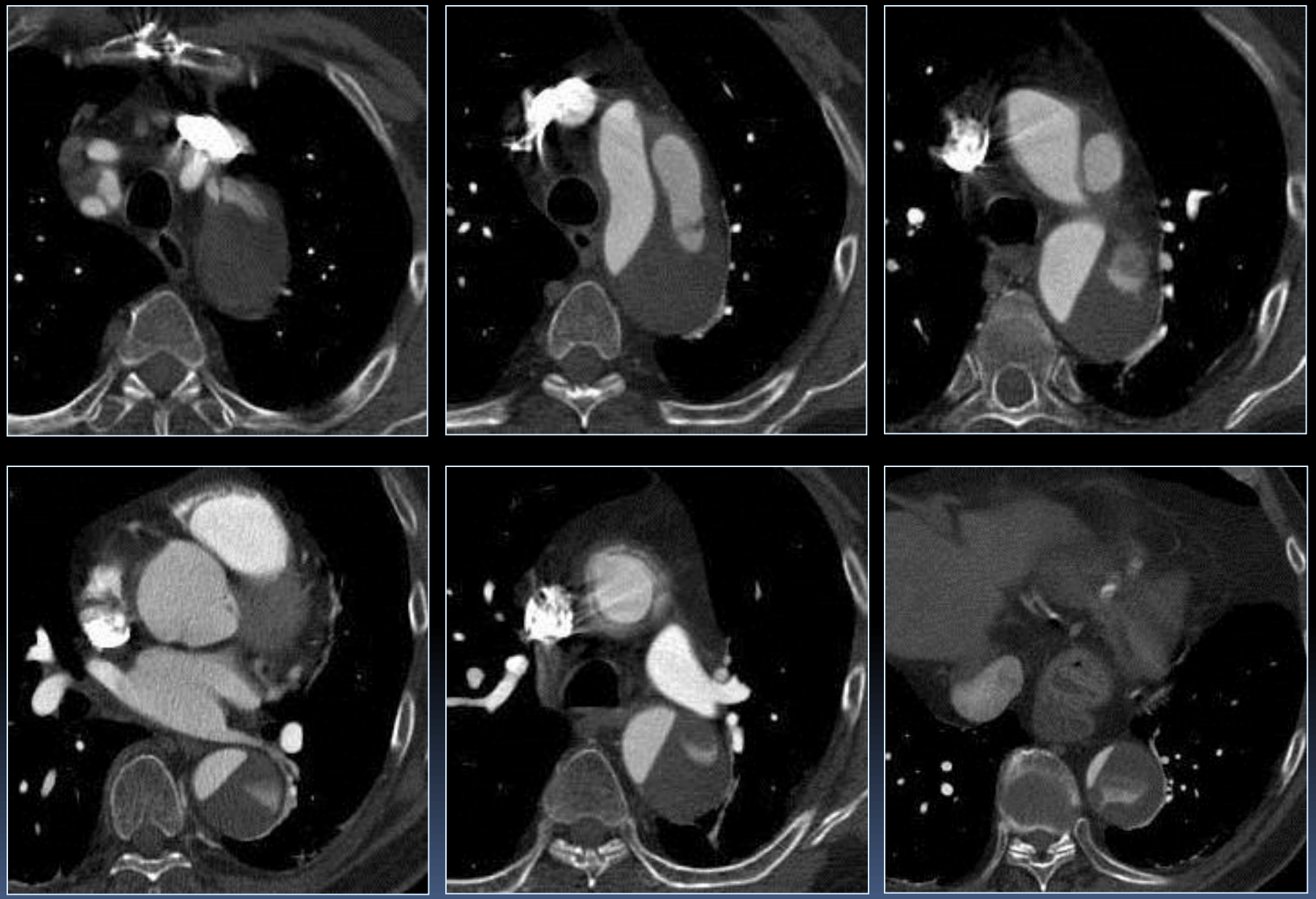

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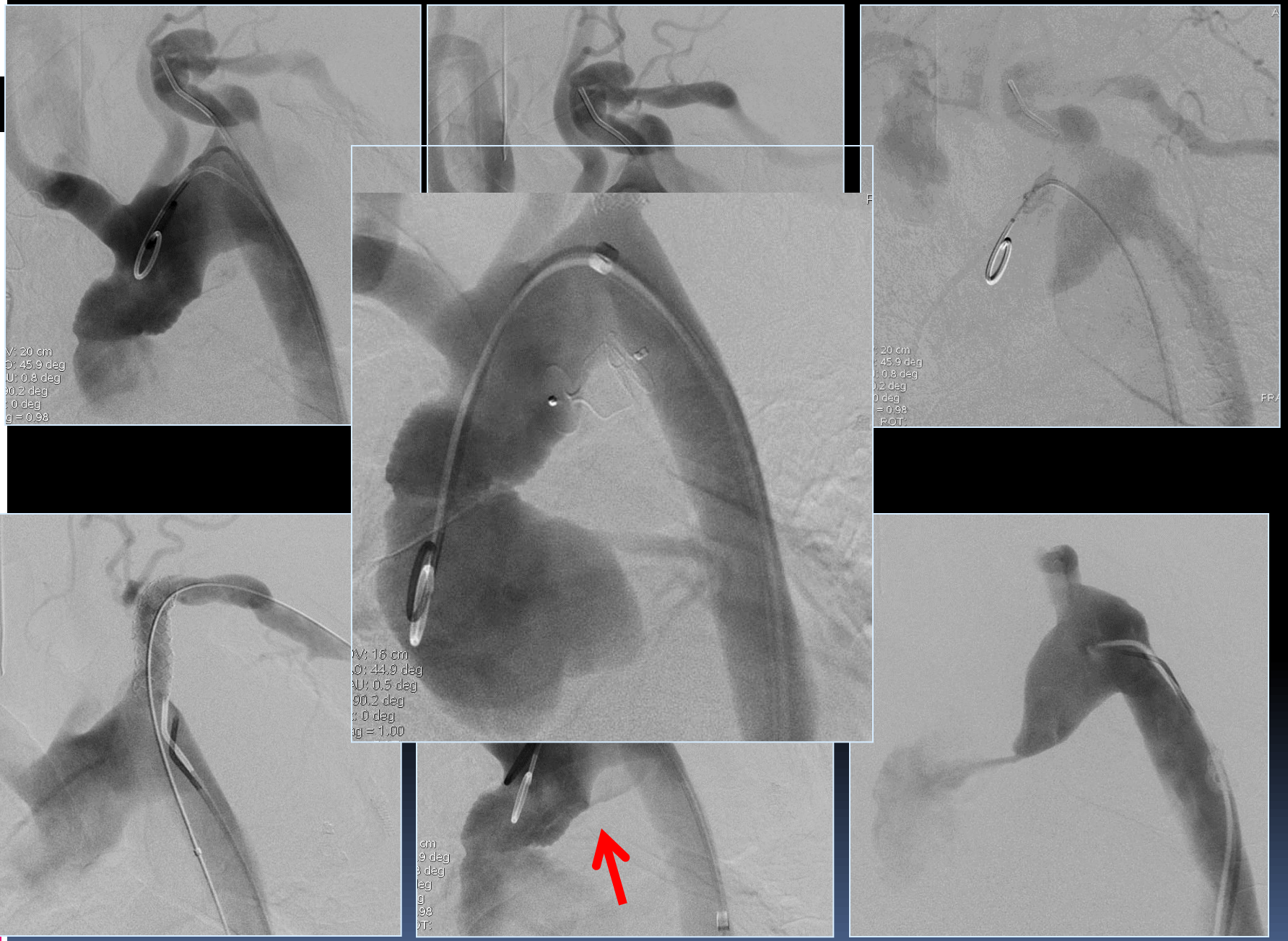

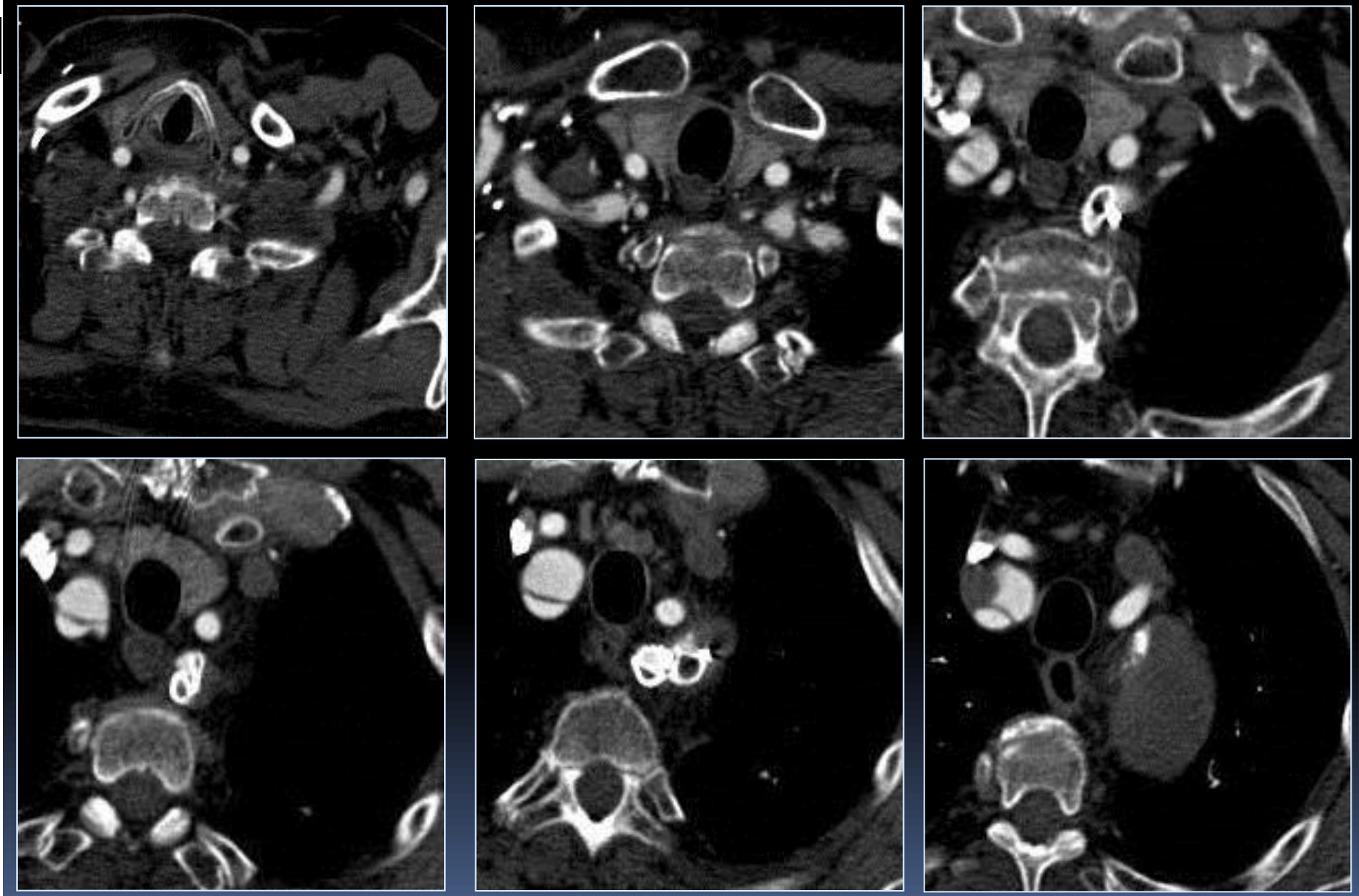

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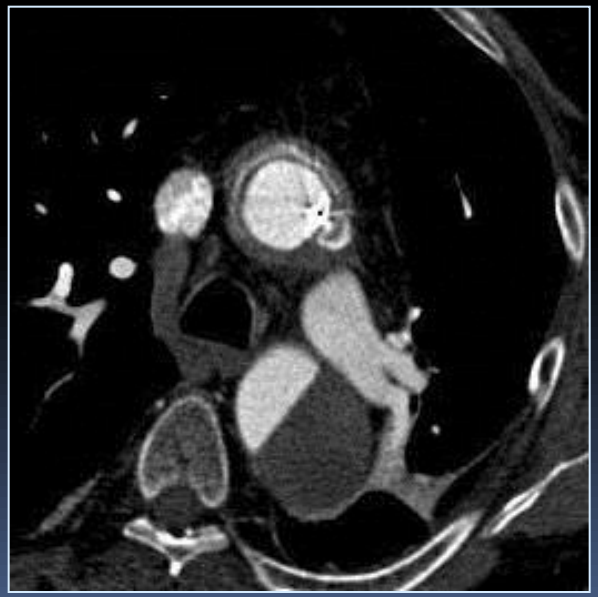


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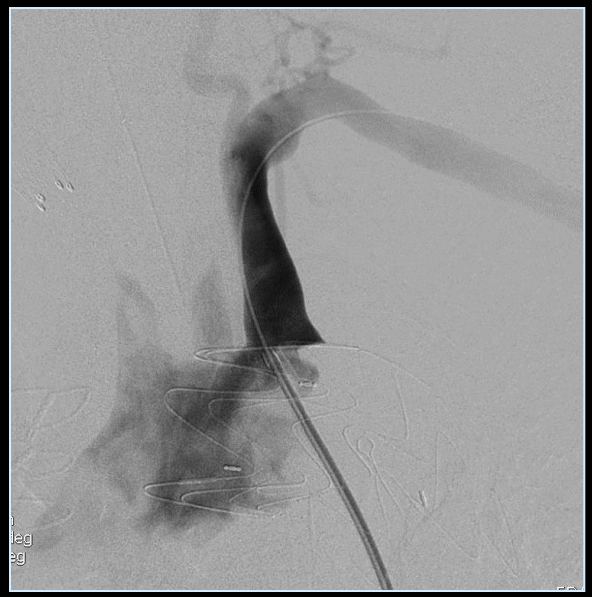

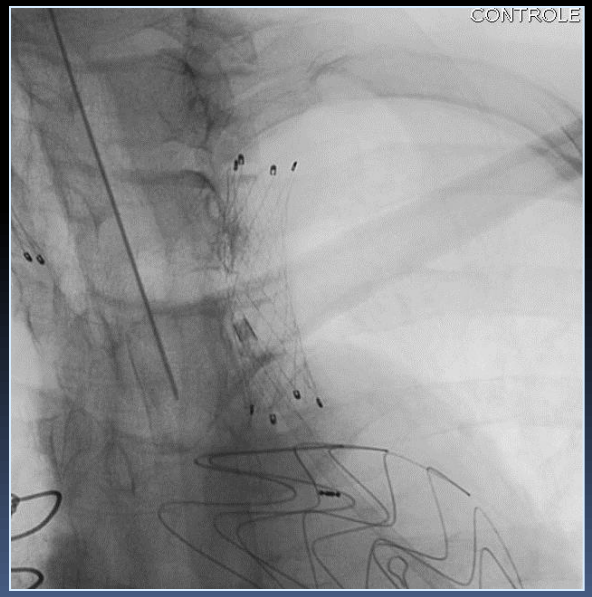

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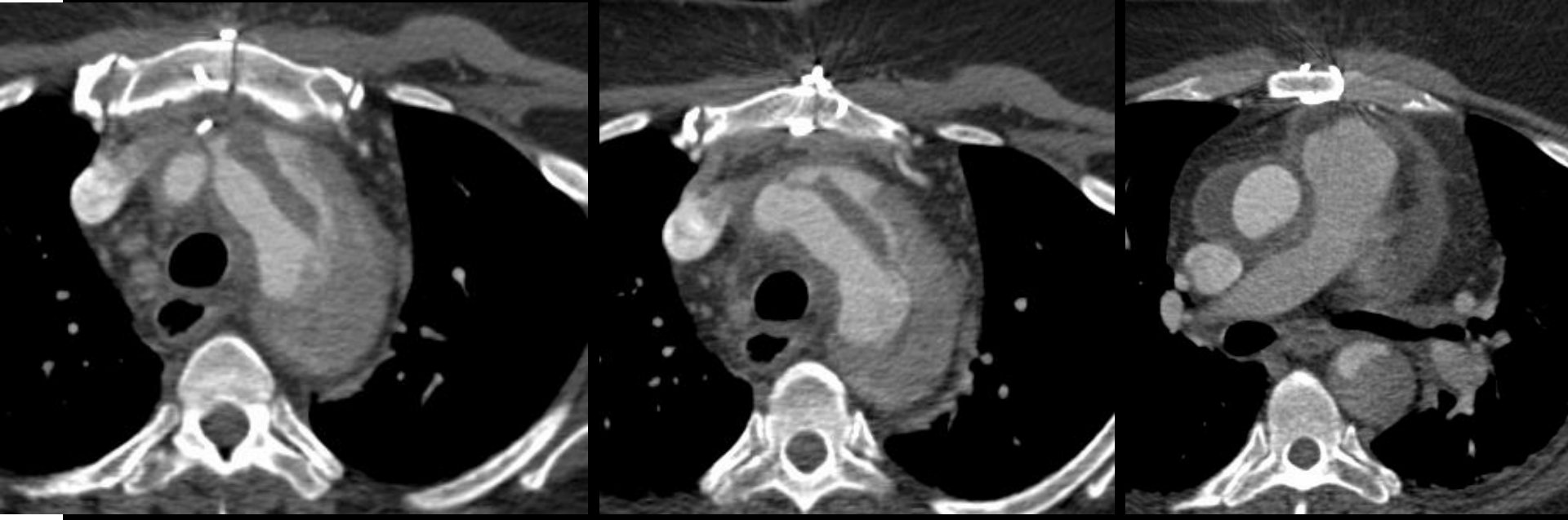

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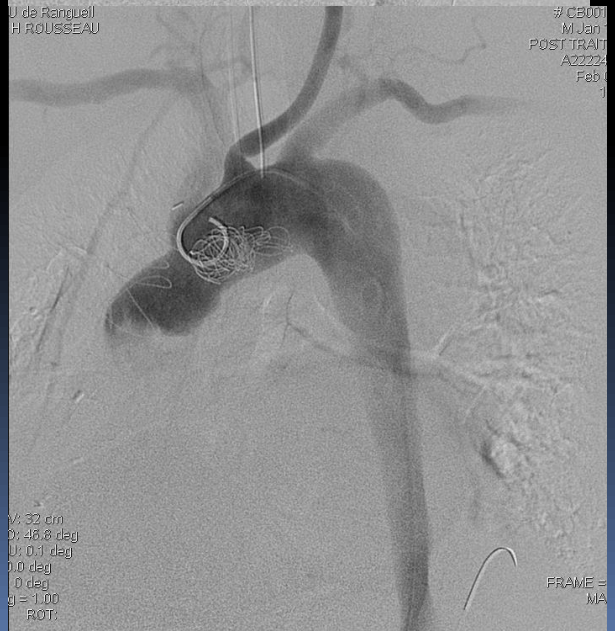

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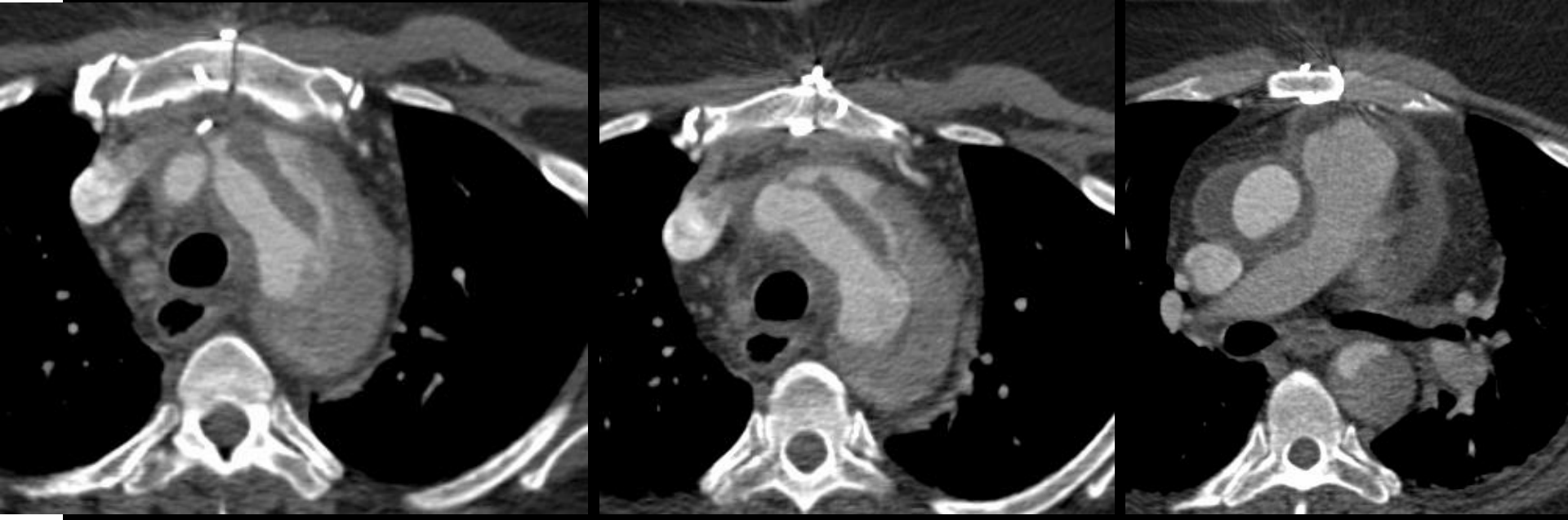

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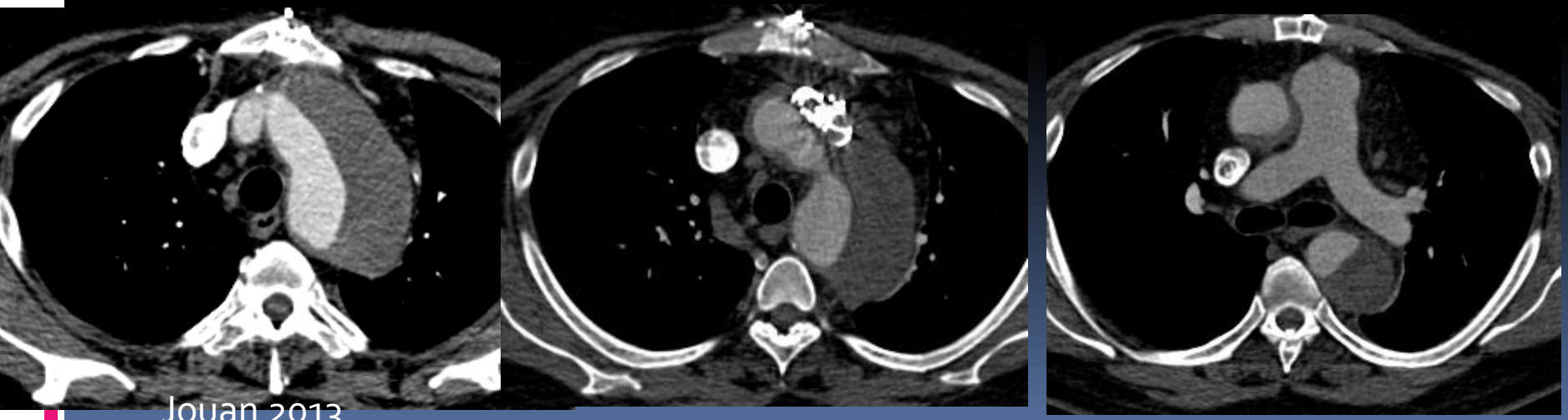
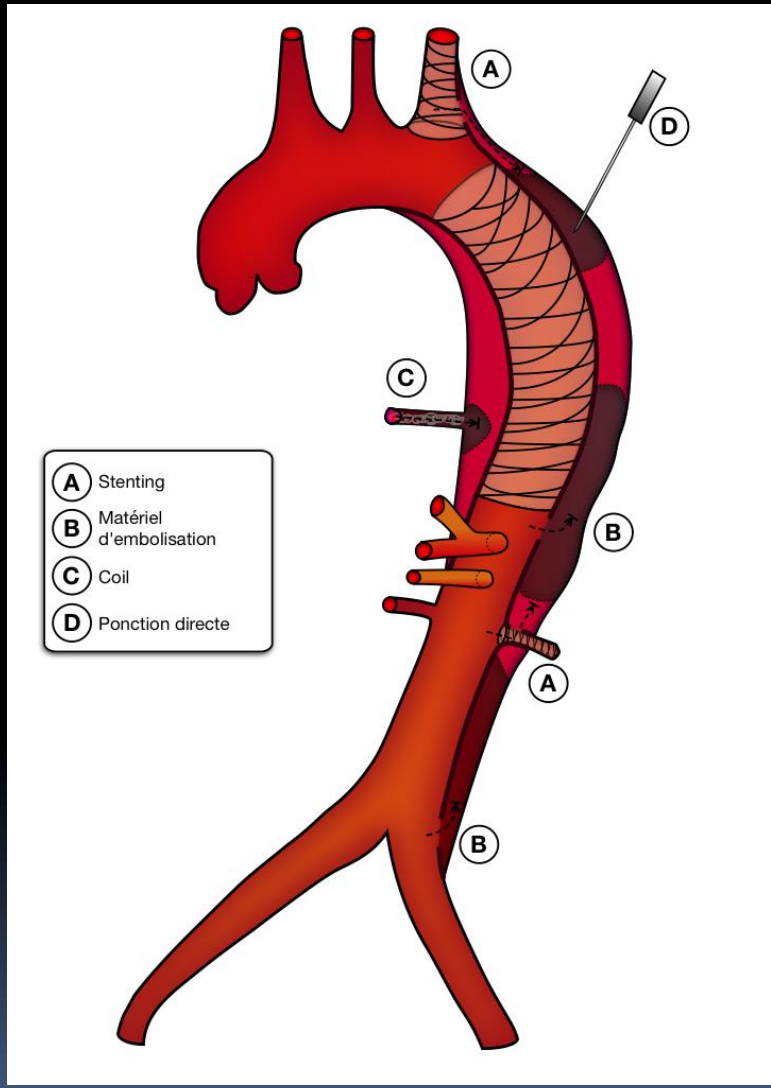


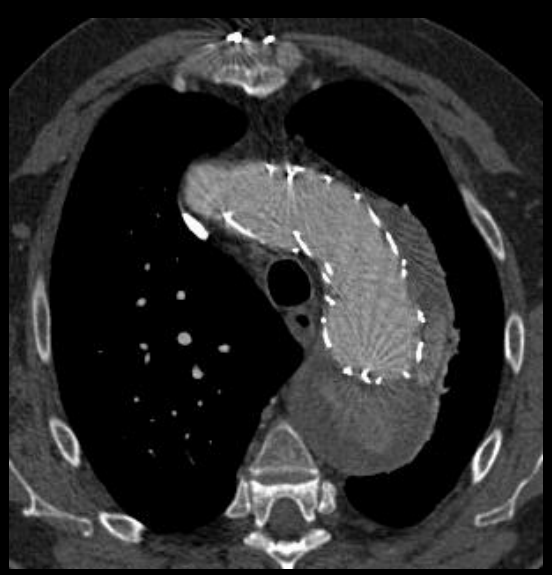
Jouan 2013

Methods:

- Strategy 2:

elimination of retrograde branch vessel FL perfusion from intercostal, coeliac, gastric, inferior phrenic or lumbar arteries;

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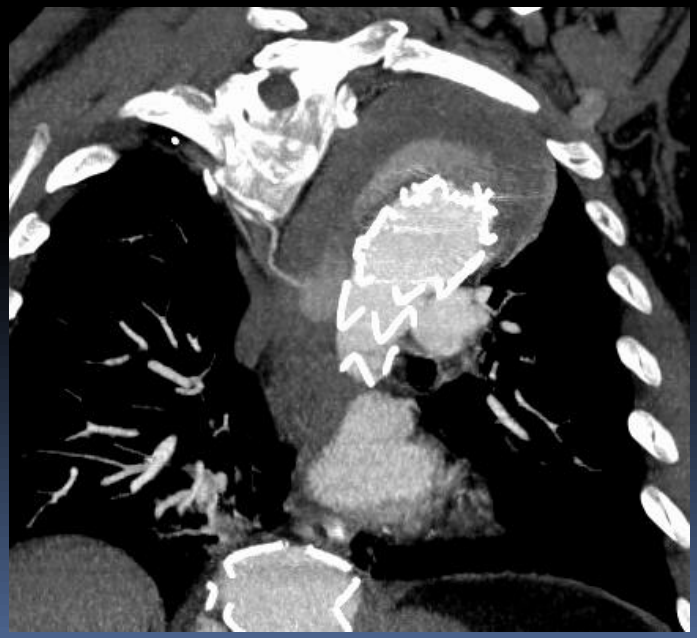

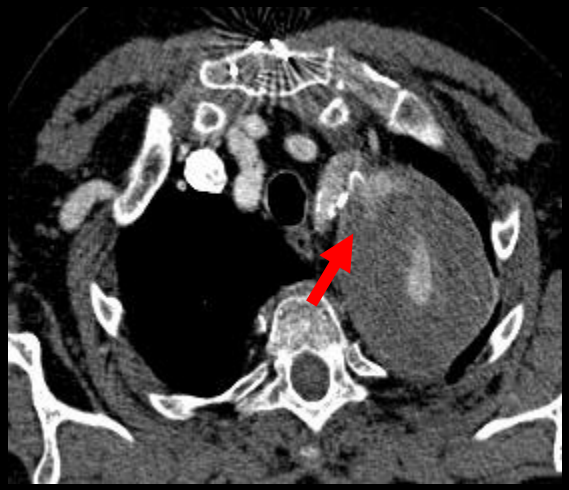

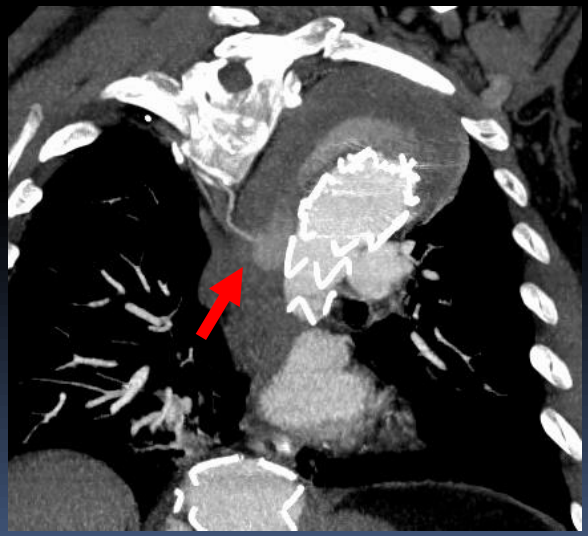

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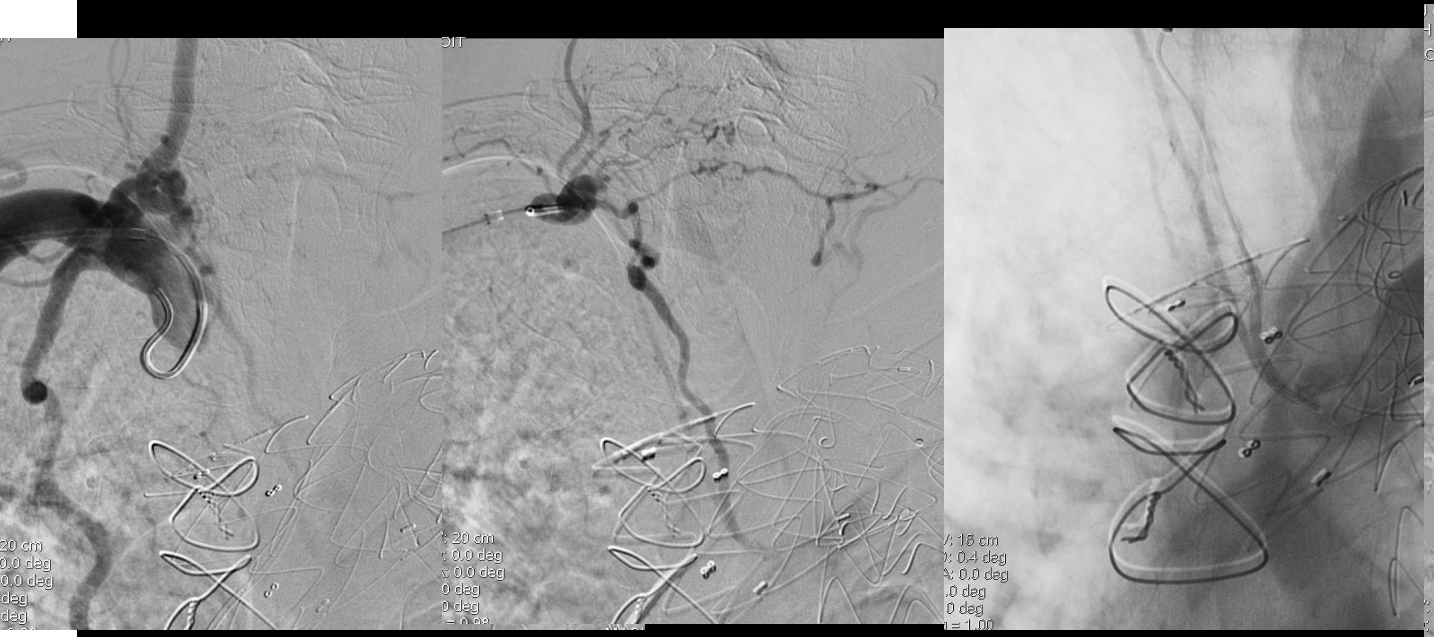

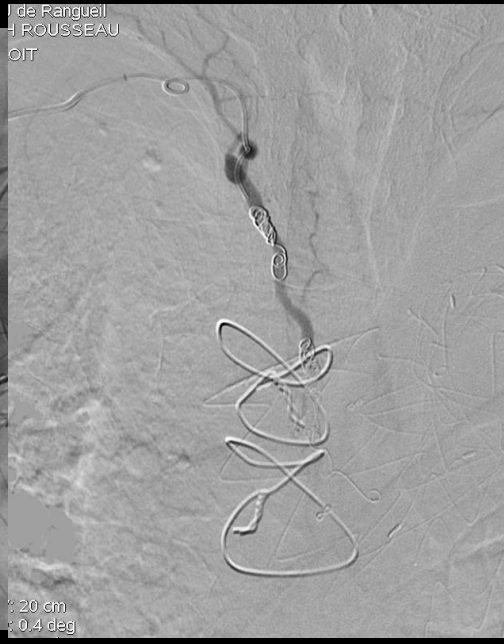

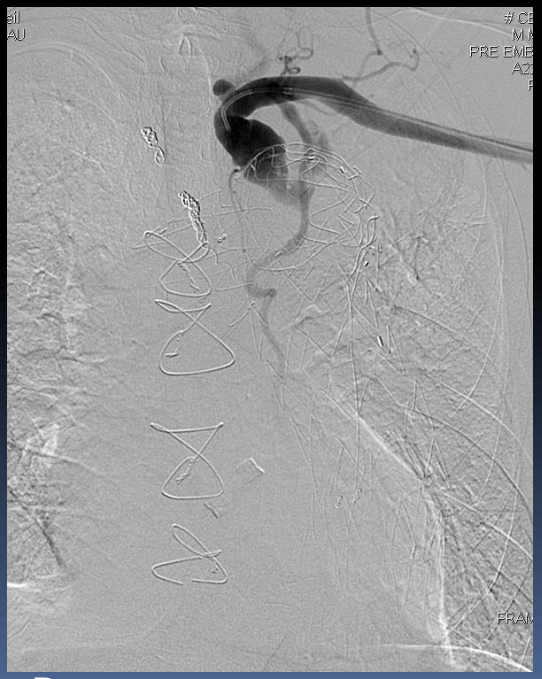

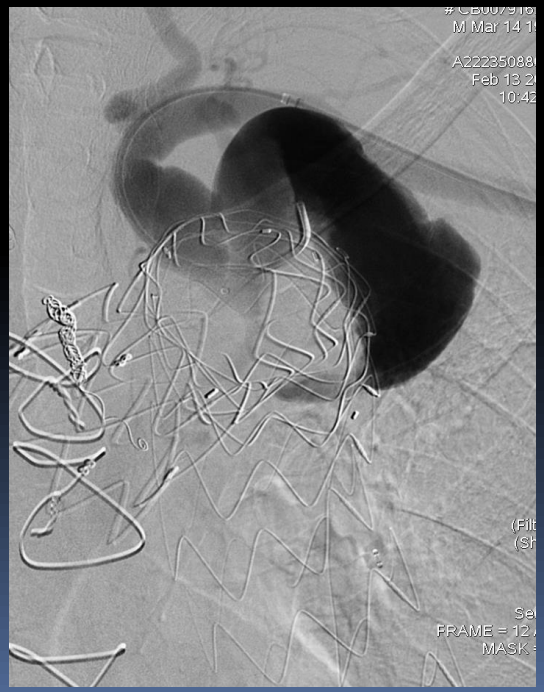

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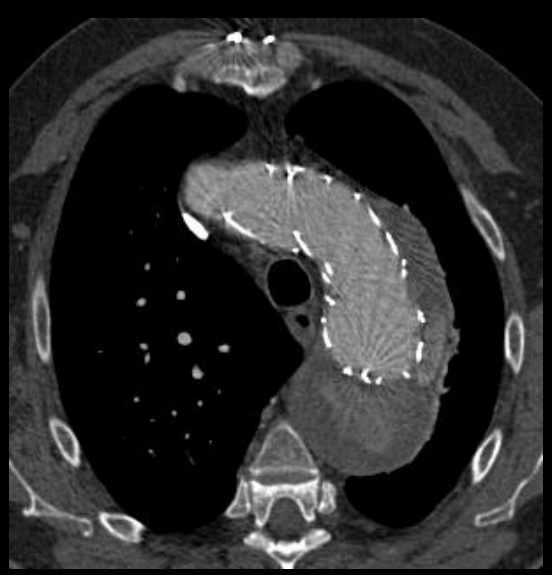


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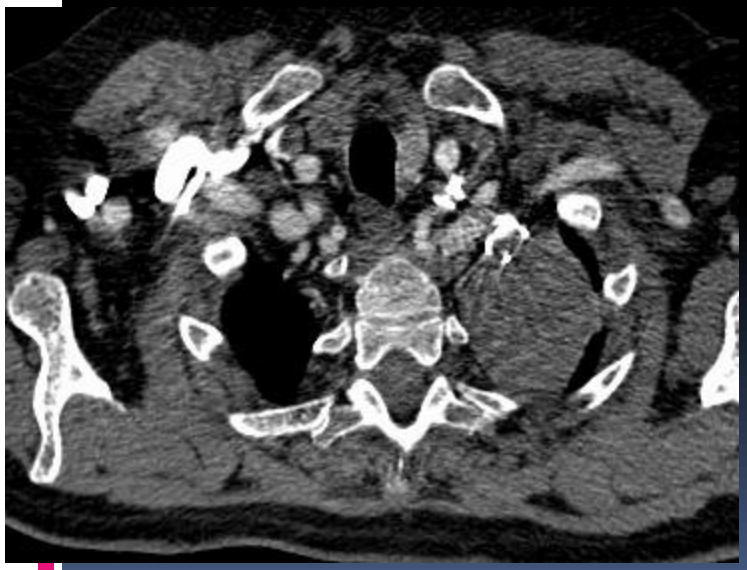
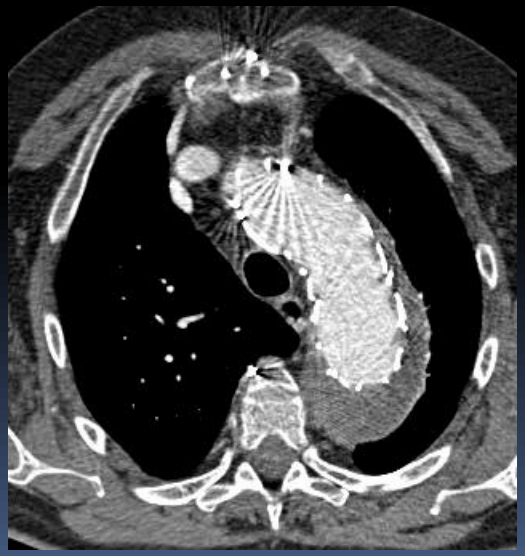
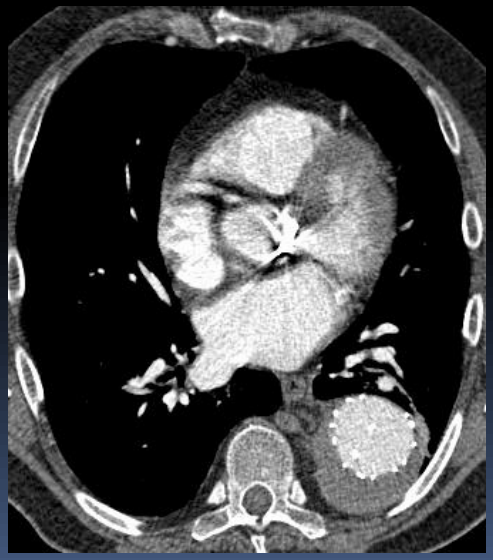

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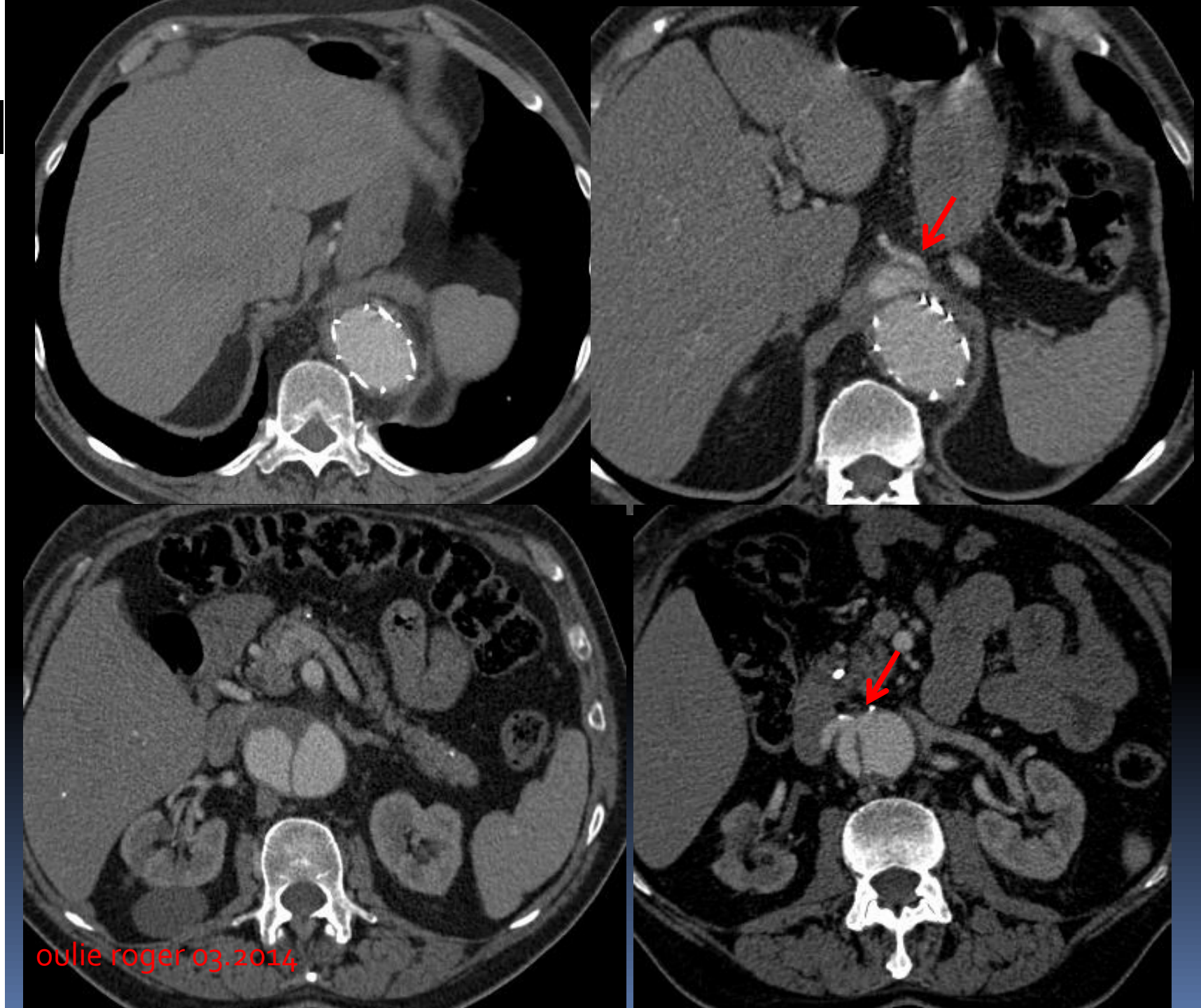
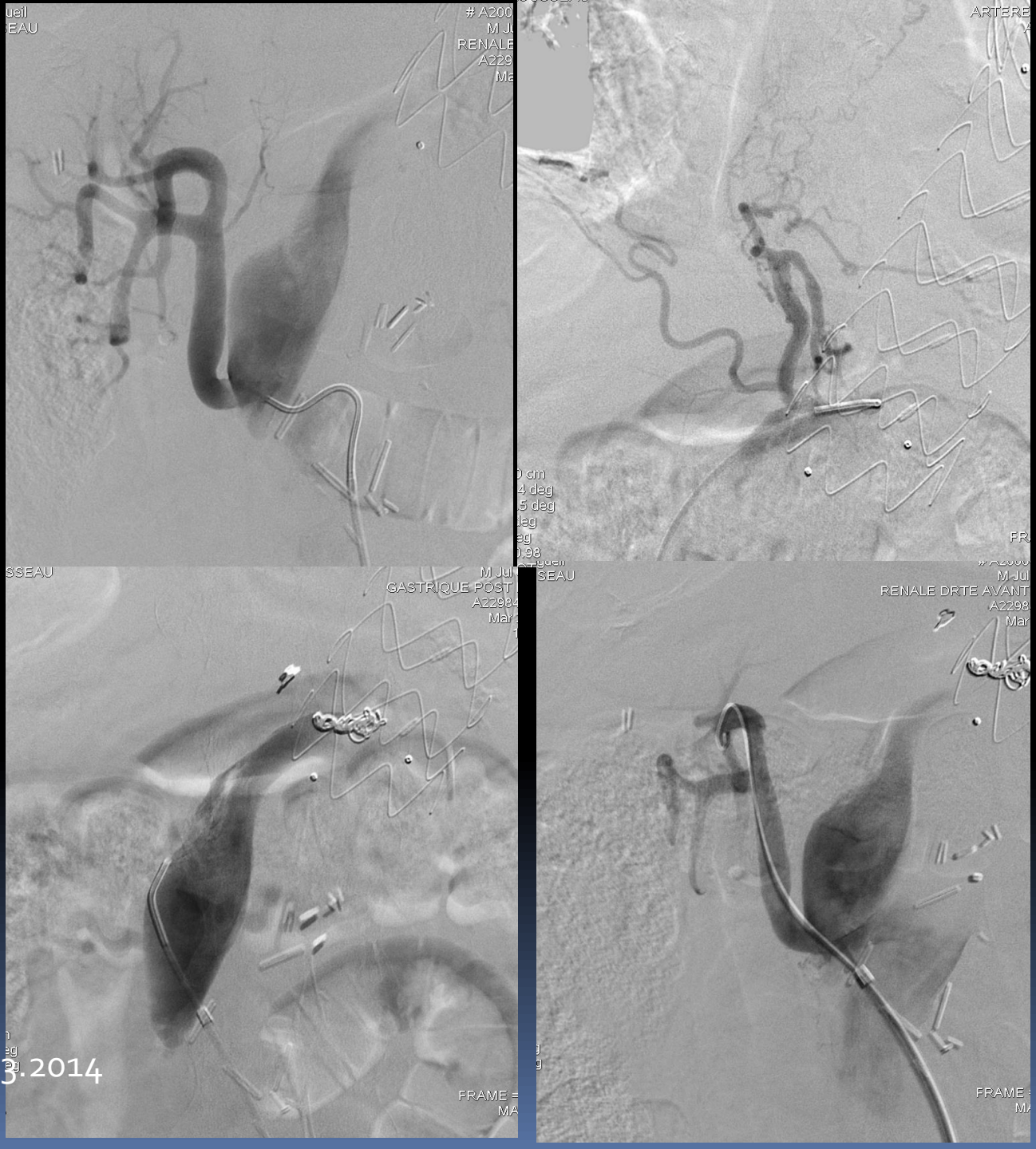

oulie roger 03.2014



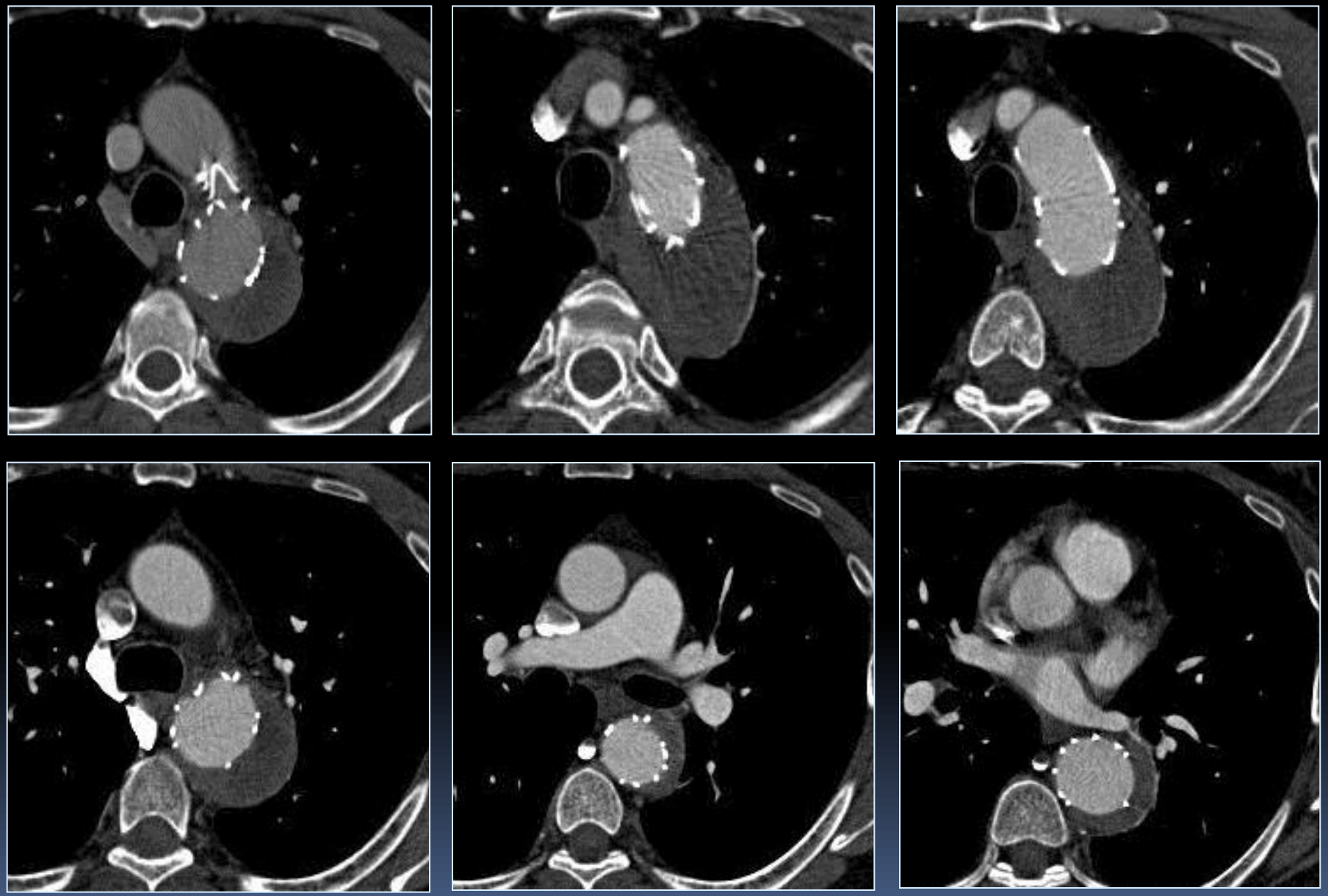
oulie roger 03.2014

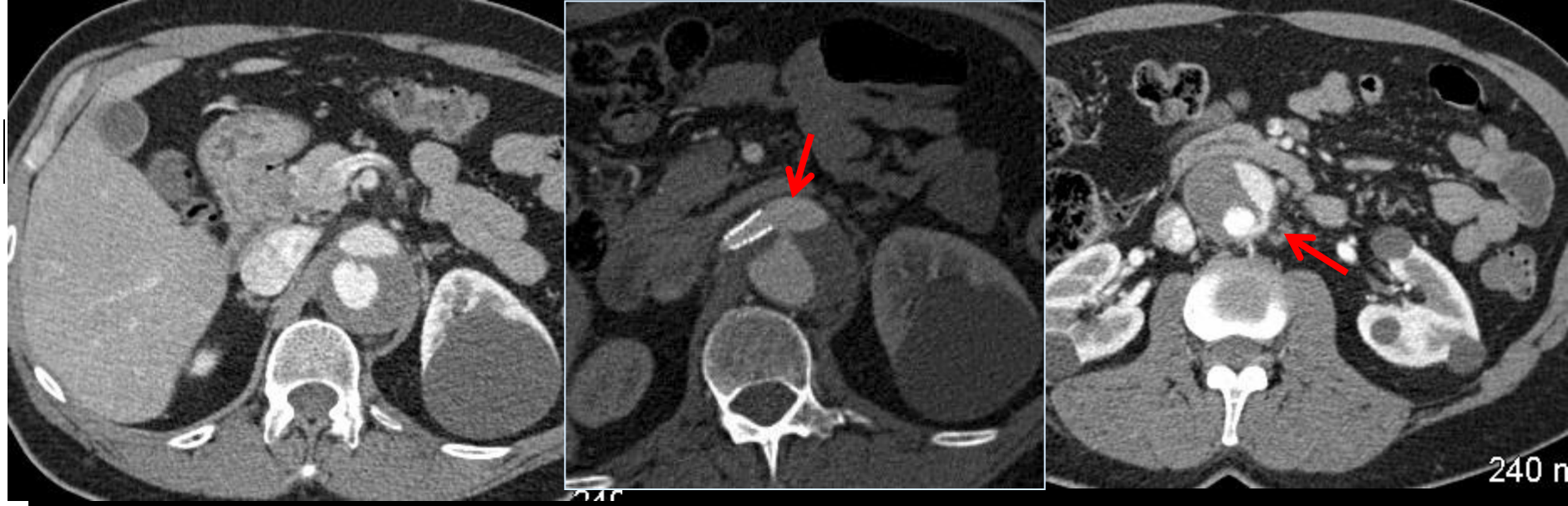
oulie roger 03.2014

Methods:

- Strategy 3: Induction of complete local occlusion of the FL above the most cephalad abdominal re-entry site (usually at the thoracoabdominal junction).

- This strategy was performed in patients where obliteration of all entry tears was not achievable, with the goal being occlusion of retrograde flow into the thoracic aorta and subsequent promotion of segmental thoracic FL thrombosis.

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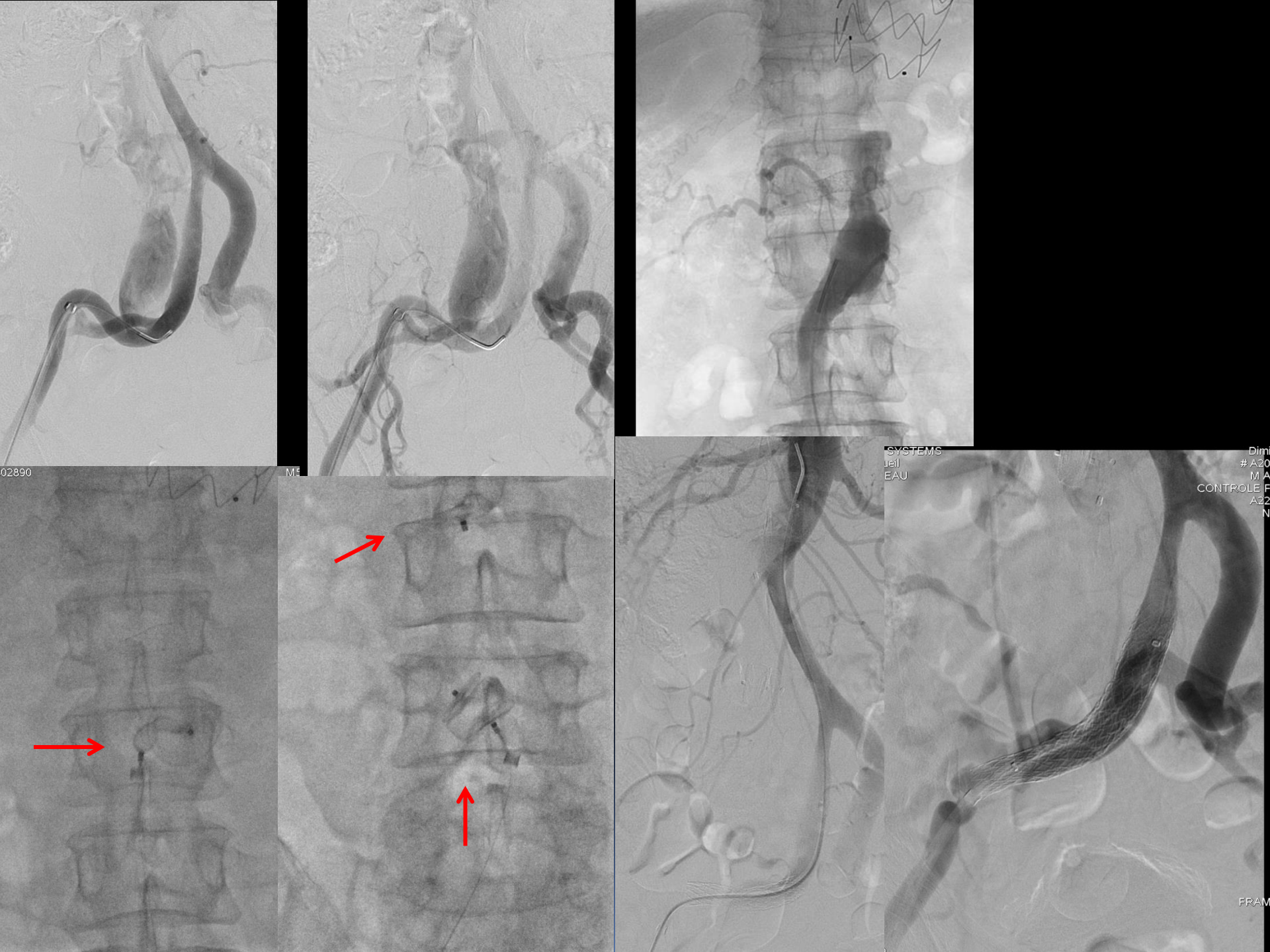
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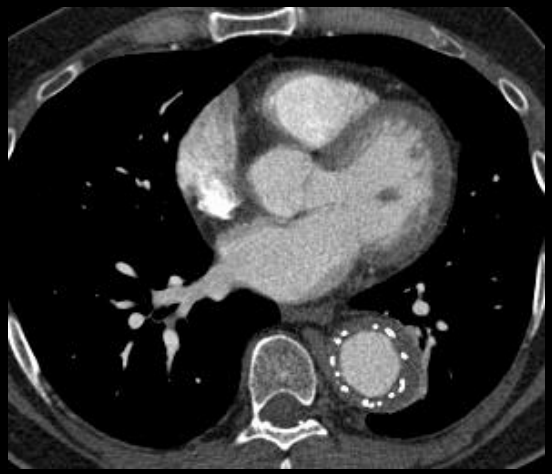
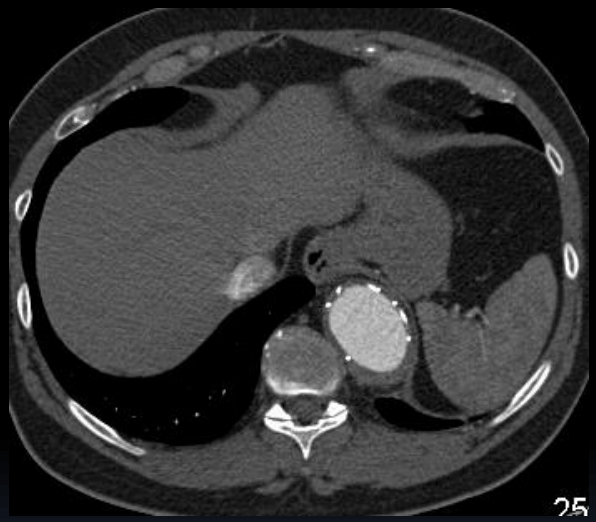


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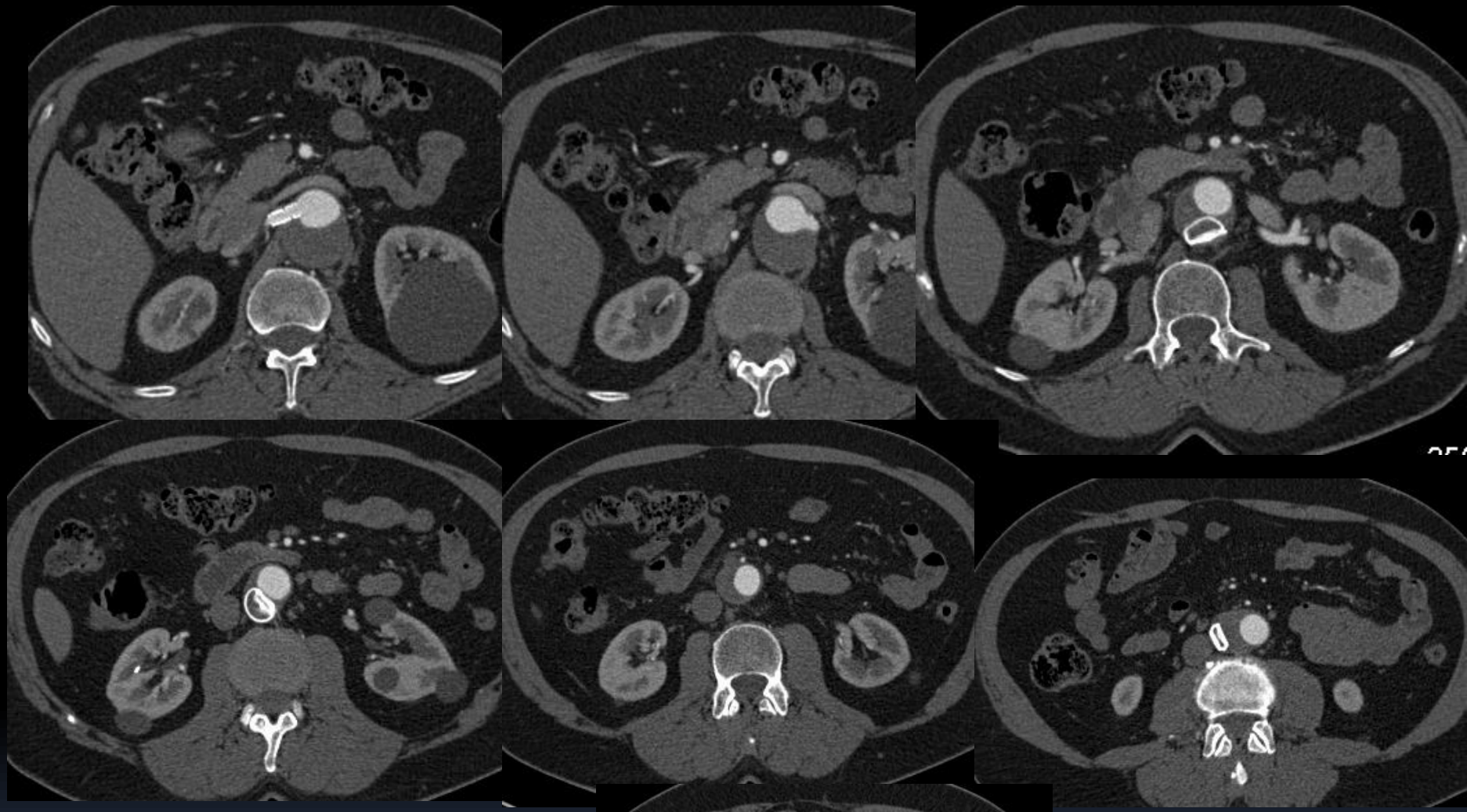

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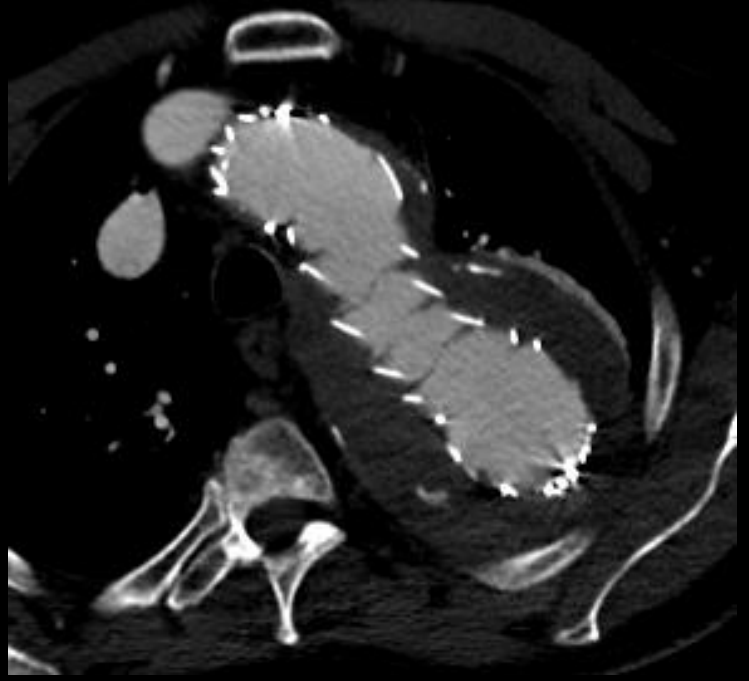
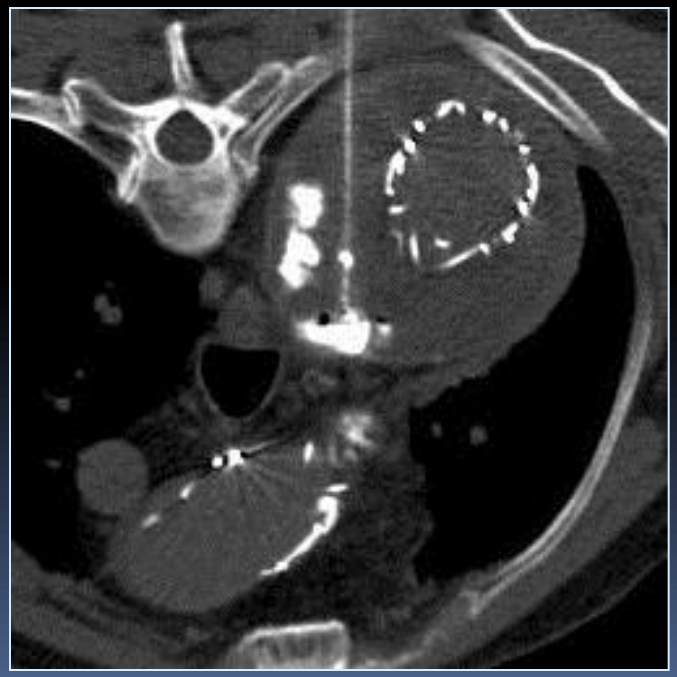
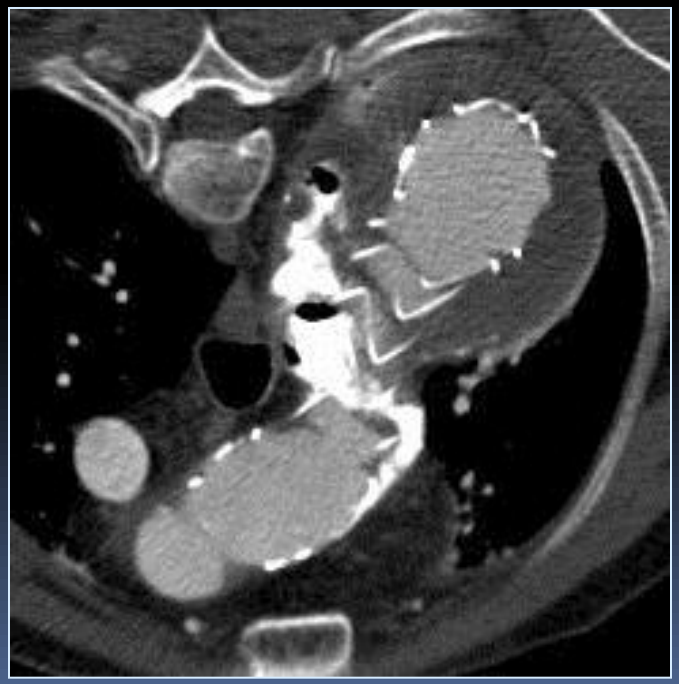
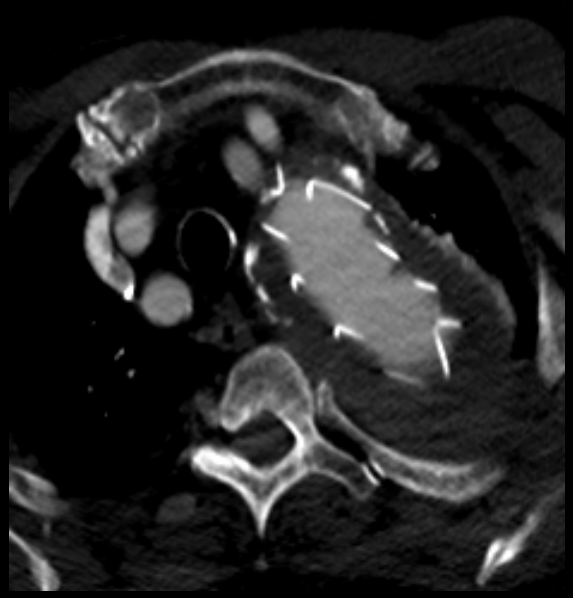
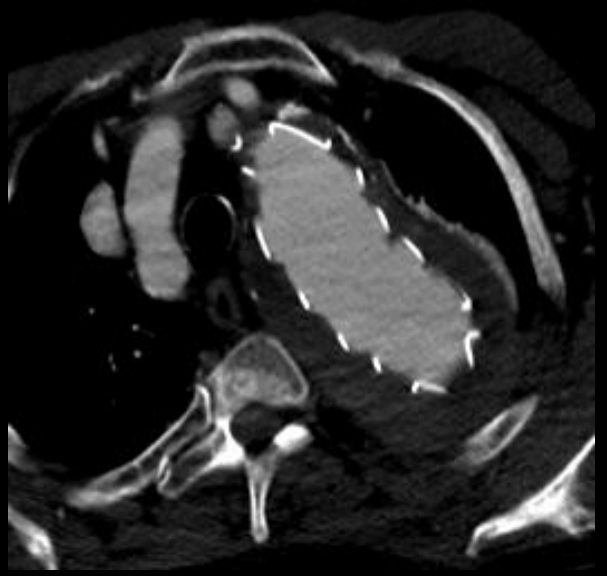
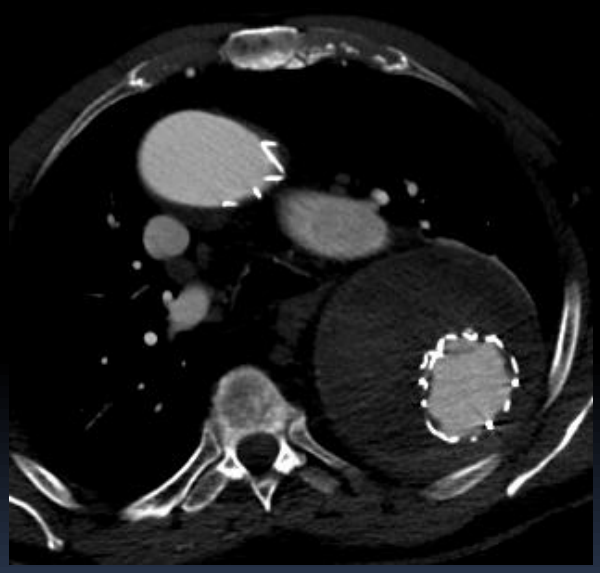
Methods:

- Strategy 4: direct puncture of the aorta

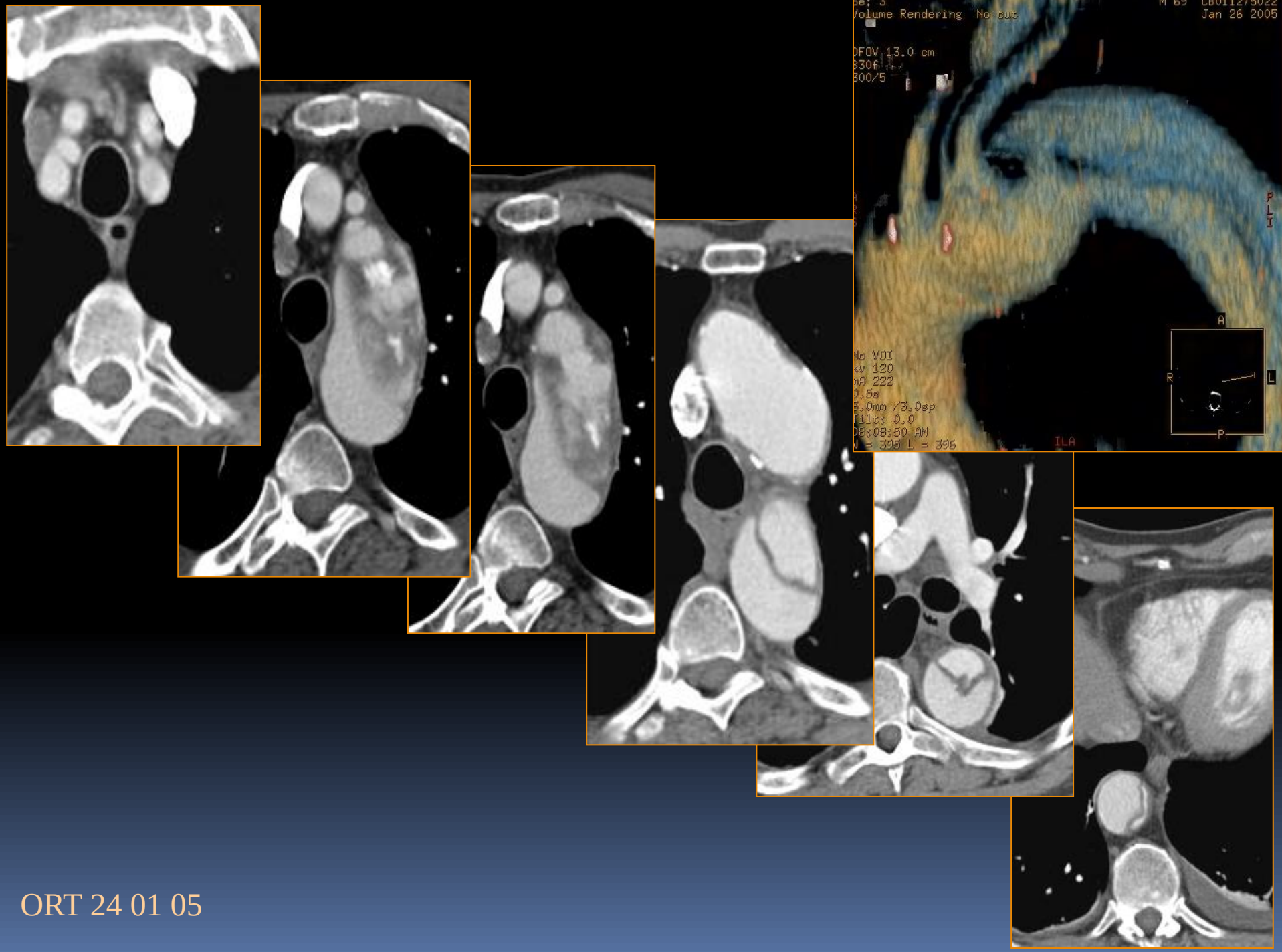



Results:

- Analysis
- Aortic remodeling was assessed from serial CTAs acquired before embolization and at 1-year intervals up to the most recent follow-up.
- Analysis included assessment of FL thrombosis and maximal aortic diameters in the thoracic (level of carina) and abdominal aorta (level of renal arteries) at latest follow-up CTA

Results:

- Technical success was achieved in all patients, with no intraoperative complications. Thirty-day morbidity and mortality was nil.
- Mean follow-up was 63 months (range 1–186).
- Complete thrombosis of the thoracic and abdominal FL occurred in 86% patients.
- Four demonstrated partial FL thrombosis in the thoracic and abdominal aorta.
- One patient with chronic aneurysmal type B dissection died 26 months post-embolization from aortic rupture with oesophagus fistulas .



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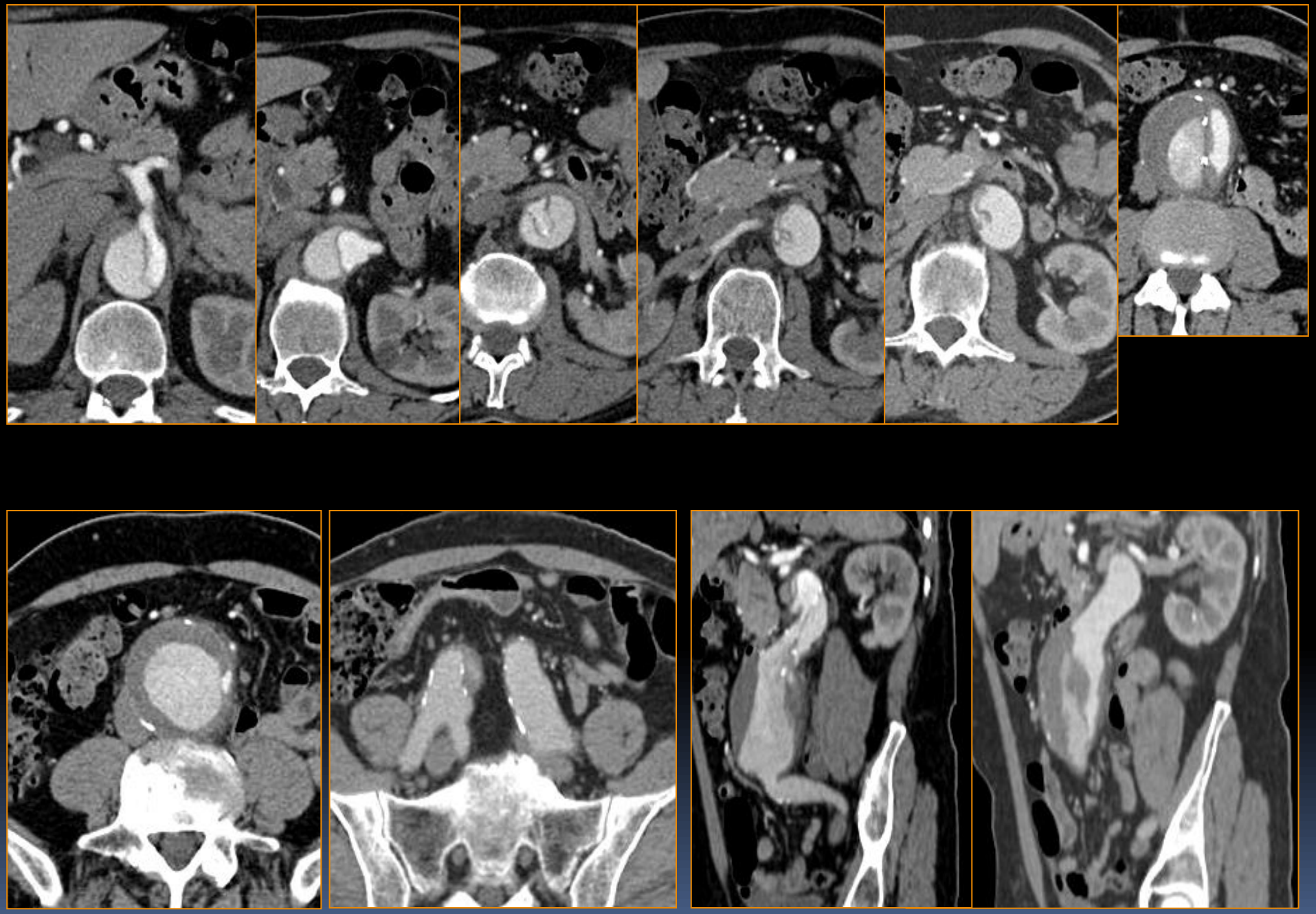

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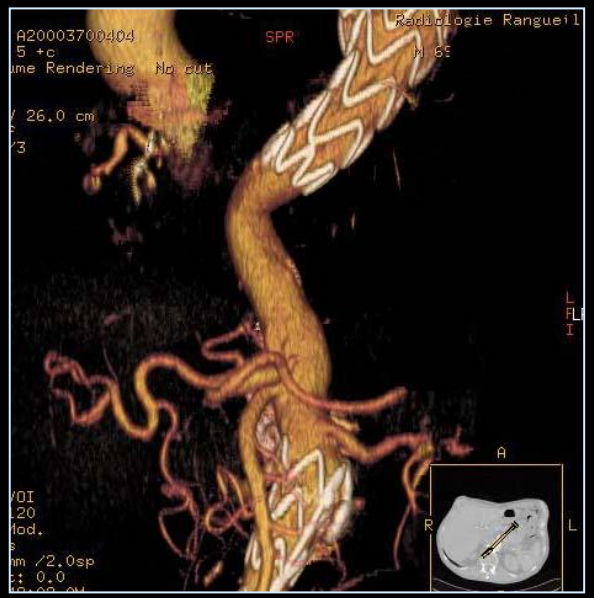

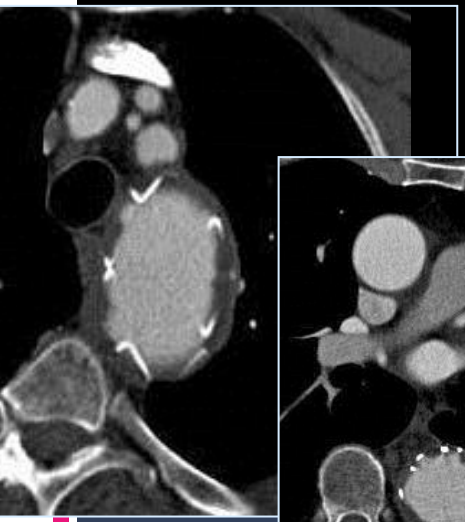

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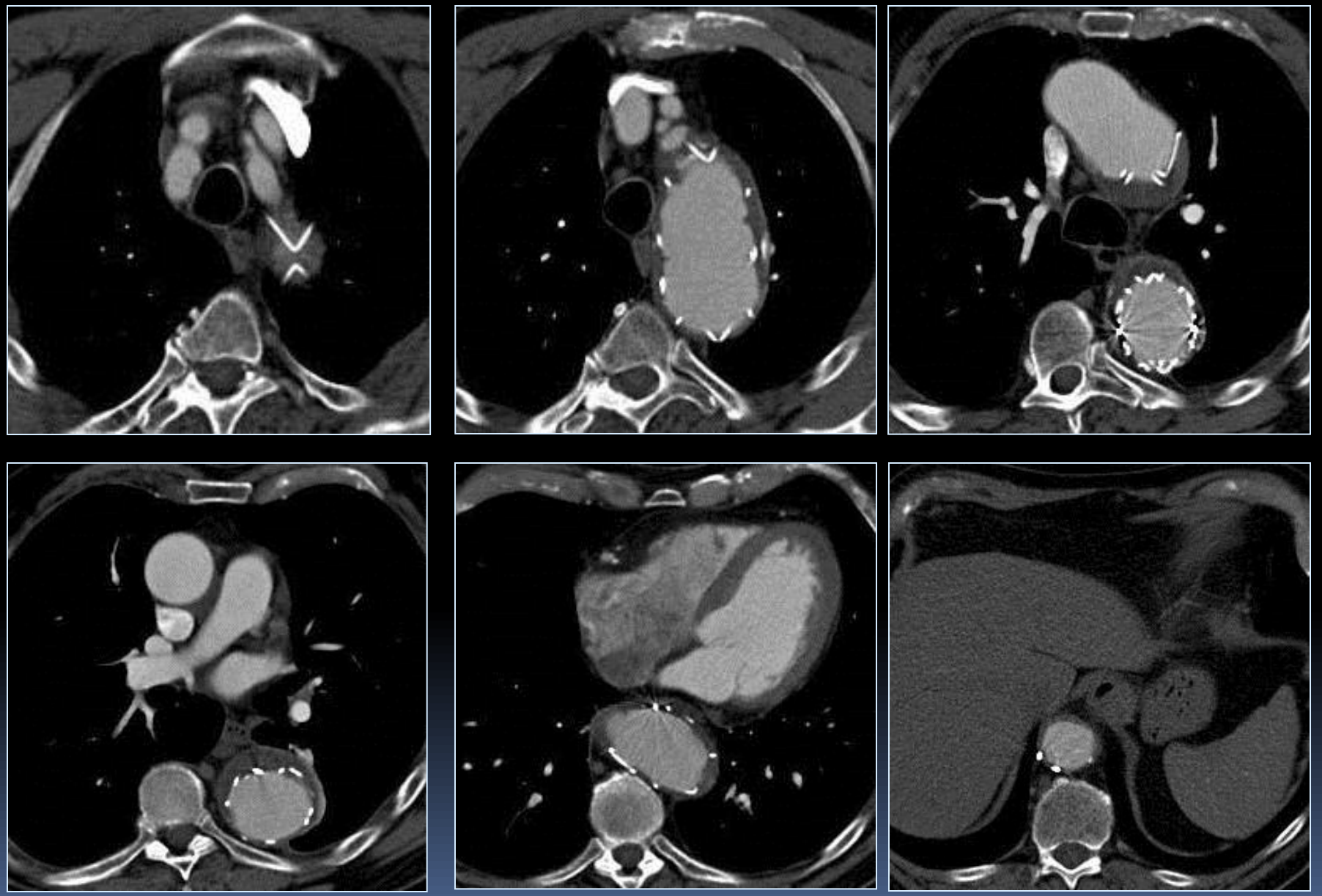


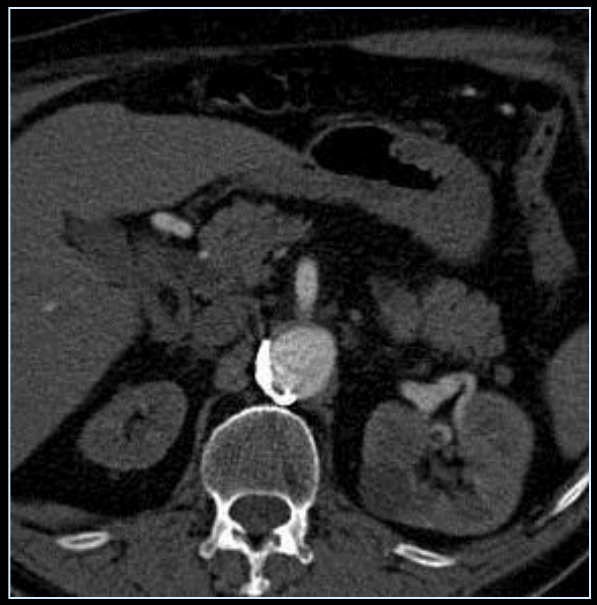



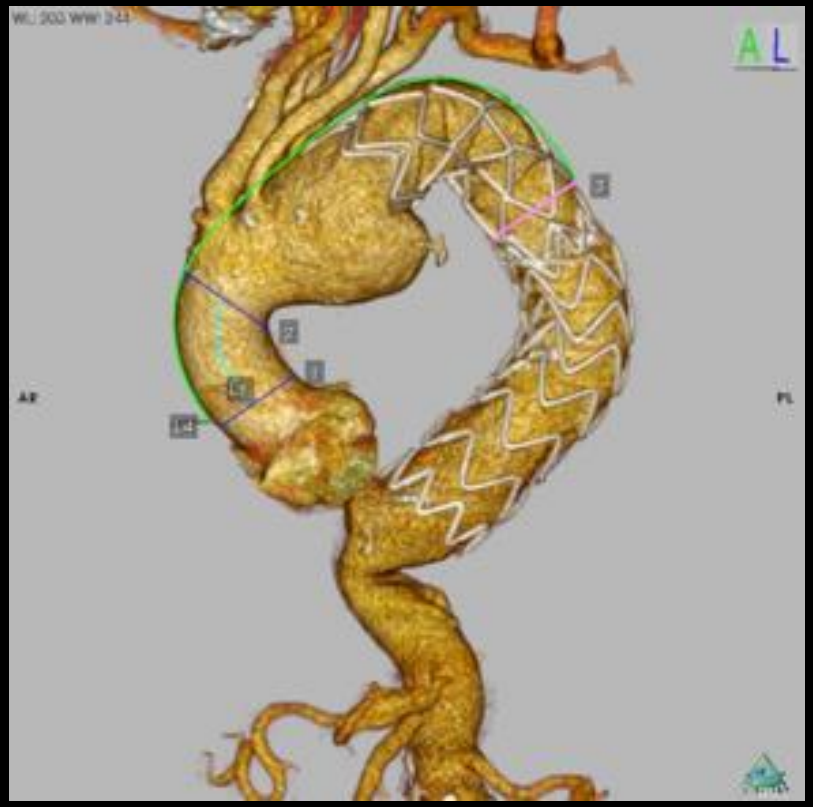
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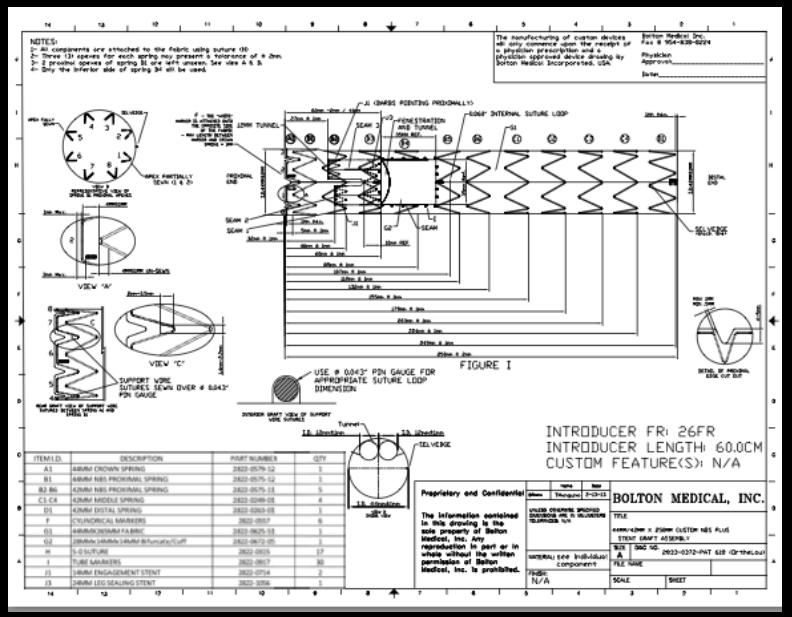
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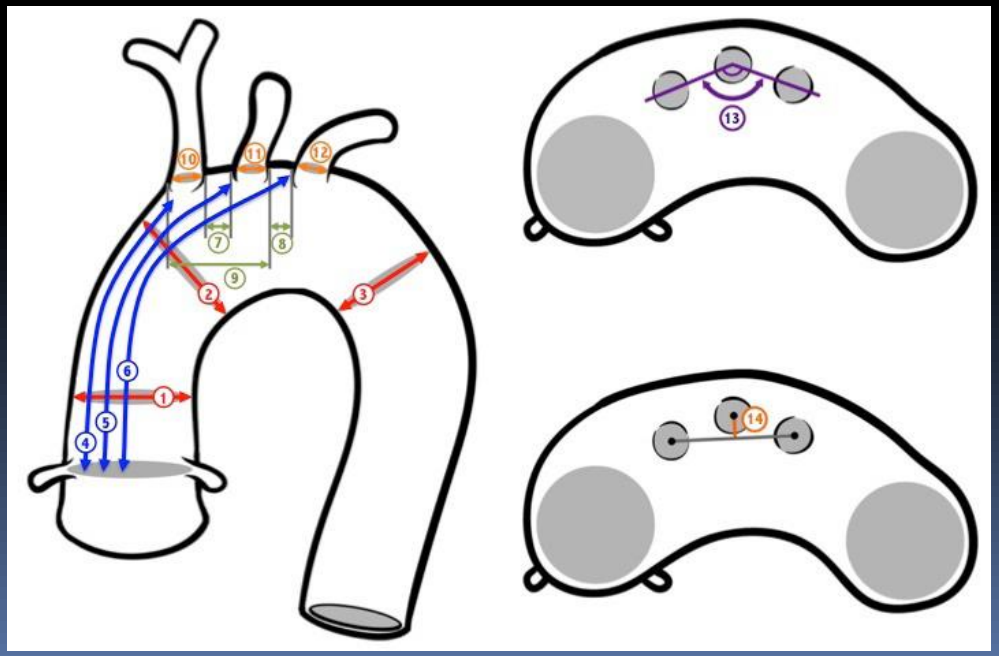
BOLTON MEDICAL, INC.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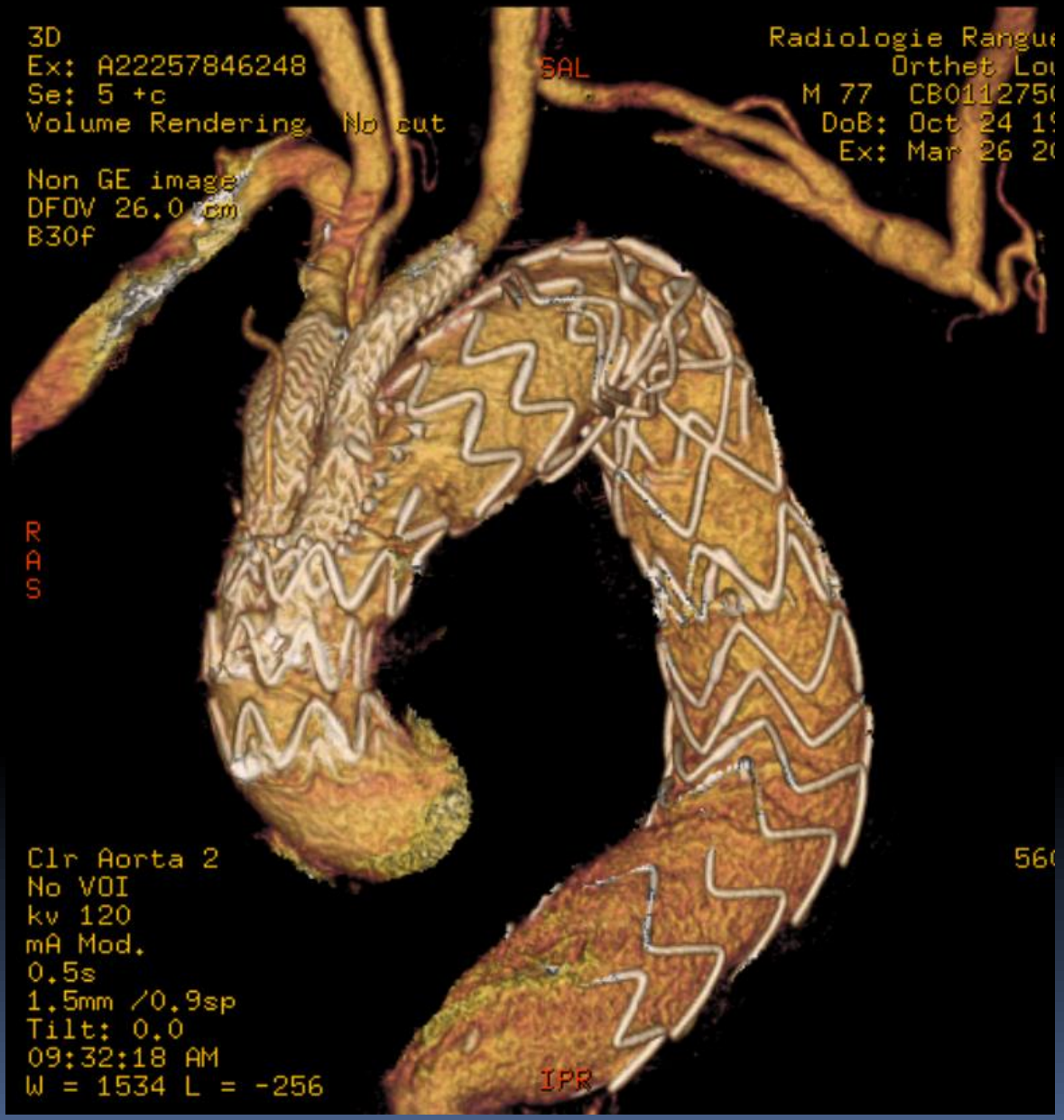
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CONCLUSION

- Coverage of the primary entry tear may not be sufficient to induce effective aortic remodelling and technical success
- A completely thrombosed FL has been associated with less aortic enlargement and even aortic wall remodeling.
- The endovascular strategy appears to be a safe and promising to treat residual FL patency with aortic enlargement
- More complex and individualised endovascular treatment strategy using current available technical advancements is often required to allow sustainable success