Endovascular Treatment of Acute Aortic Syndrome

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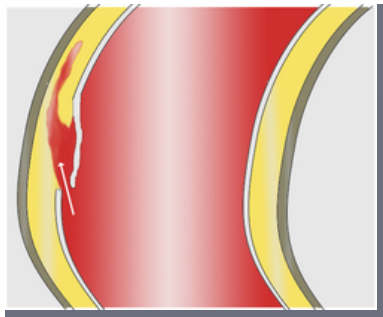
Outline

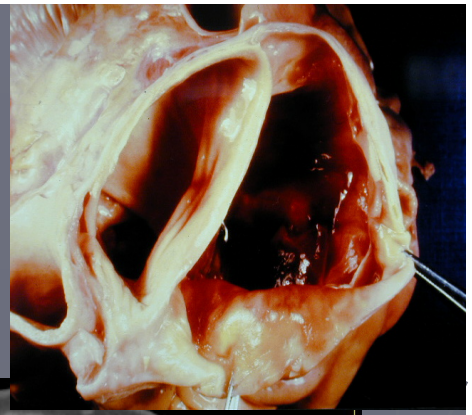
- Introduction: Acute aortic syndrome
- Imaging techniques in emergency : CTA
- Indications
- Endovascular techniques
- Results
- Conclusions

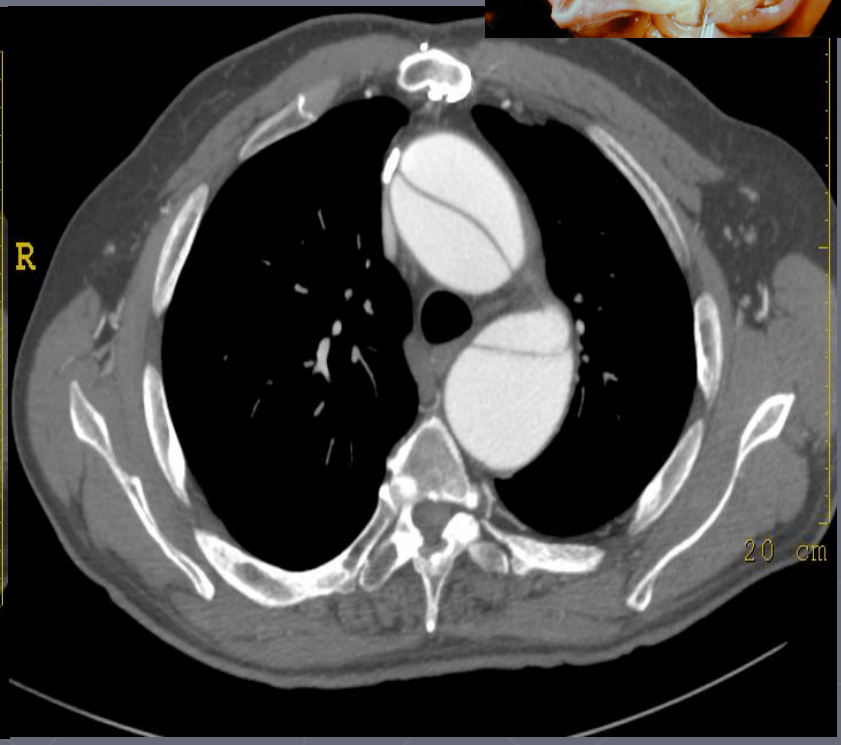
Acute Aortic Syndrome

- carry high mortality and morbidity
- early recognition by CTA of these conditions is vital to ensure prompt treatment:
  - Dissection Type A, IMH,
  - Traumatic partial or total rupture of the aorta
  - Non traumatic partial rupture of descending thoracic aorta aneurysm
  - Penetrating atherosclerotic ulcers (PAUs)
  - Dissection Type B
    - malperfusion
    - Acute false chenal dilatation



Aortic Dissection Type A





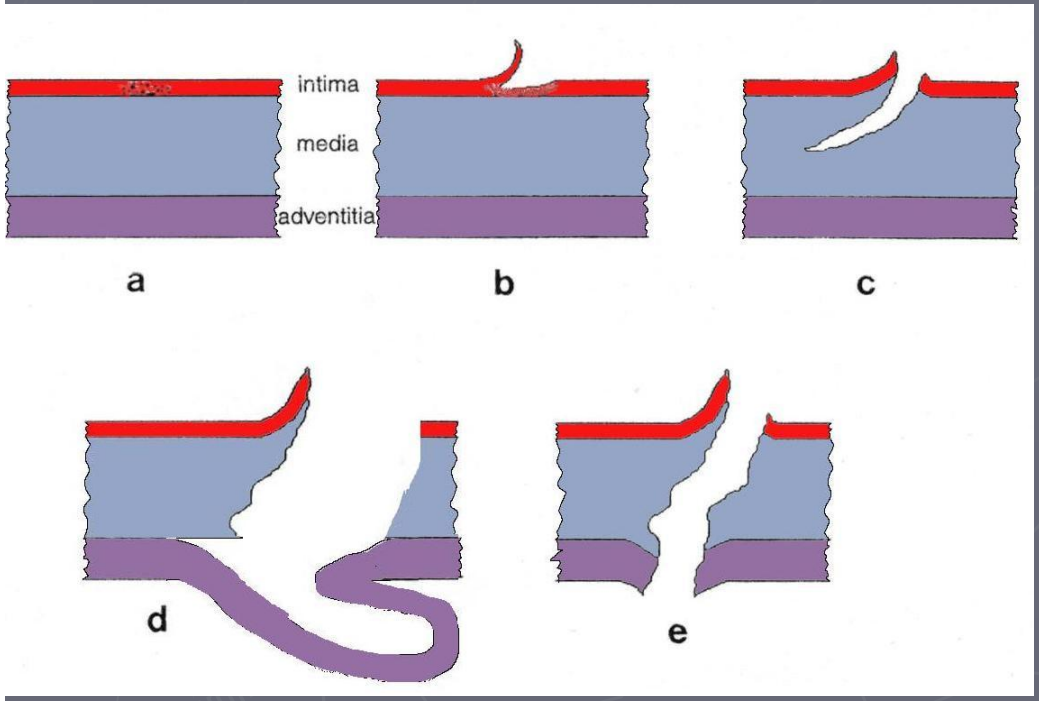
Emergency Surgery

Acute Aortic Syndrome

- Traumatic partial or total rupture of the aorta

Non Penetrating Traumatic Injury of the Aorta

Parmley[1] proposed a lesions classification based on pathology studies



a) Intimal Hémorragge
b) Intimal erosion
c) intimo-médial lesion

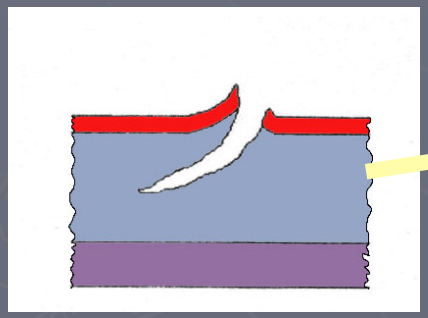
d) False aneurysm : sub adventia rupture

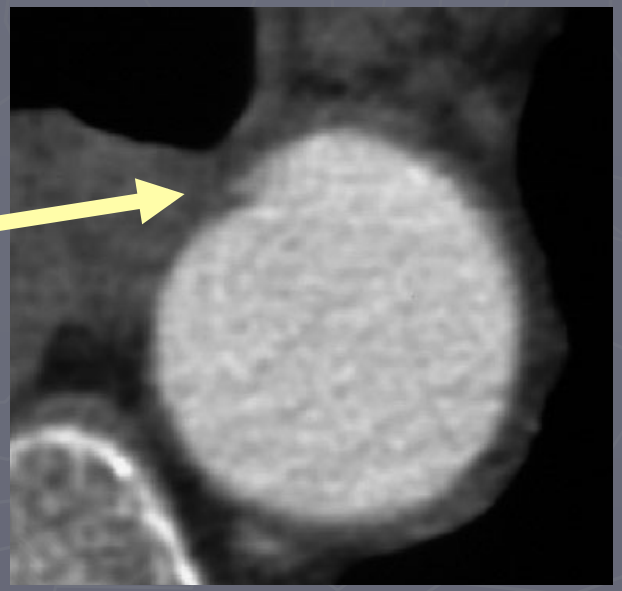
e) Rupture

(1) Parmley LF. Non penetrating traumatic injury of the aorta. Circulation 1958; 17 : 1086-101

Aortic Injury Direct Signs

- intimo-médial lesion:

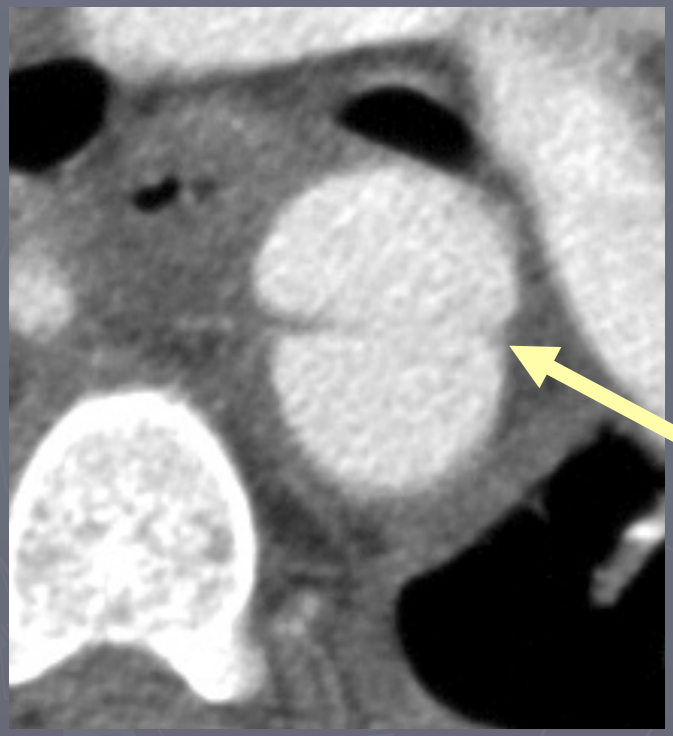


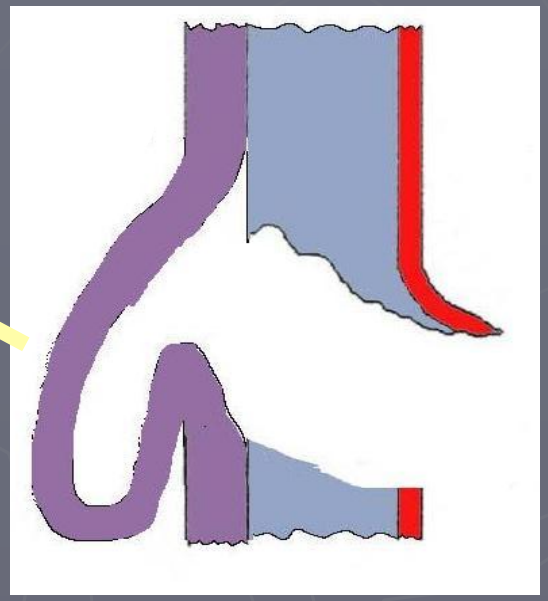


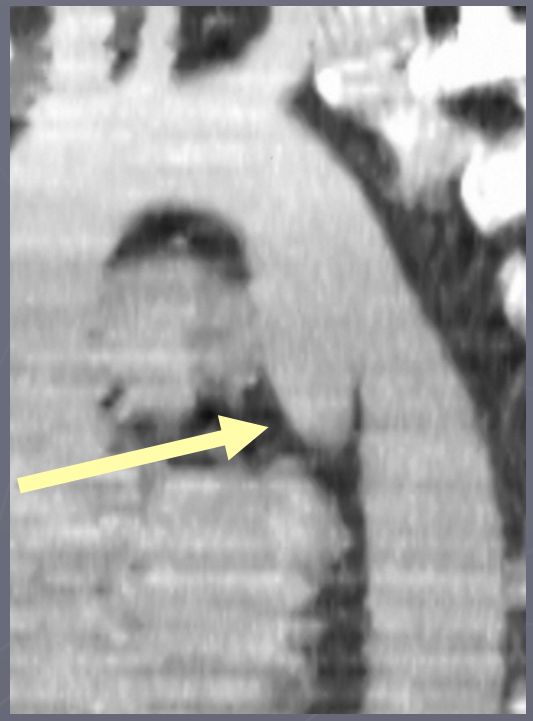
-Linear image in aortic lumen
-No aortic contour déformation because external media normal

Aortic Injury Direct Signs

- sub adventia rupture



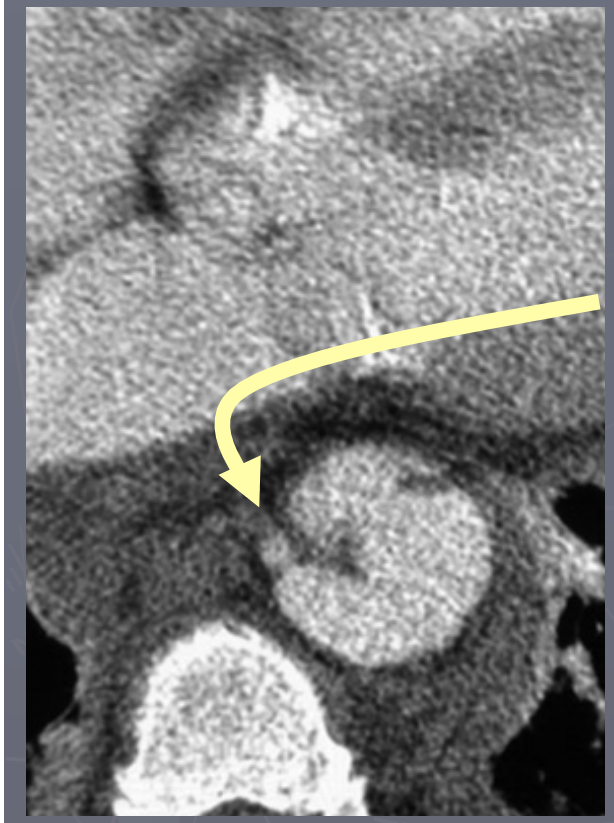


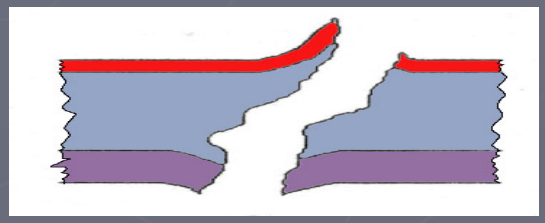


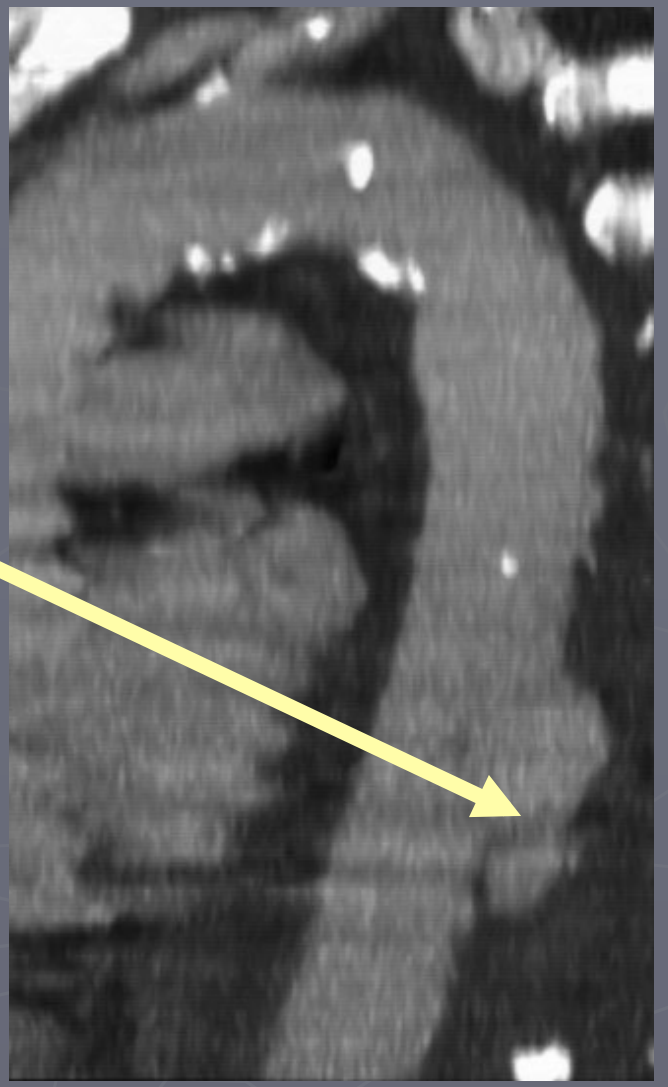
- Sacciform additional
- Regular contour

Aortic Injury Direct Signs

- rupture







-Pseudo saccular aneurysm
-Irréguliar contours

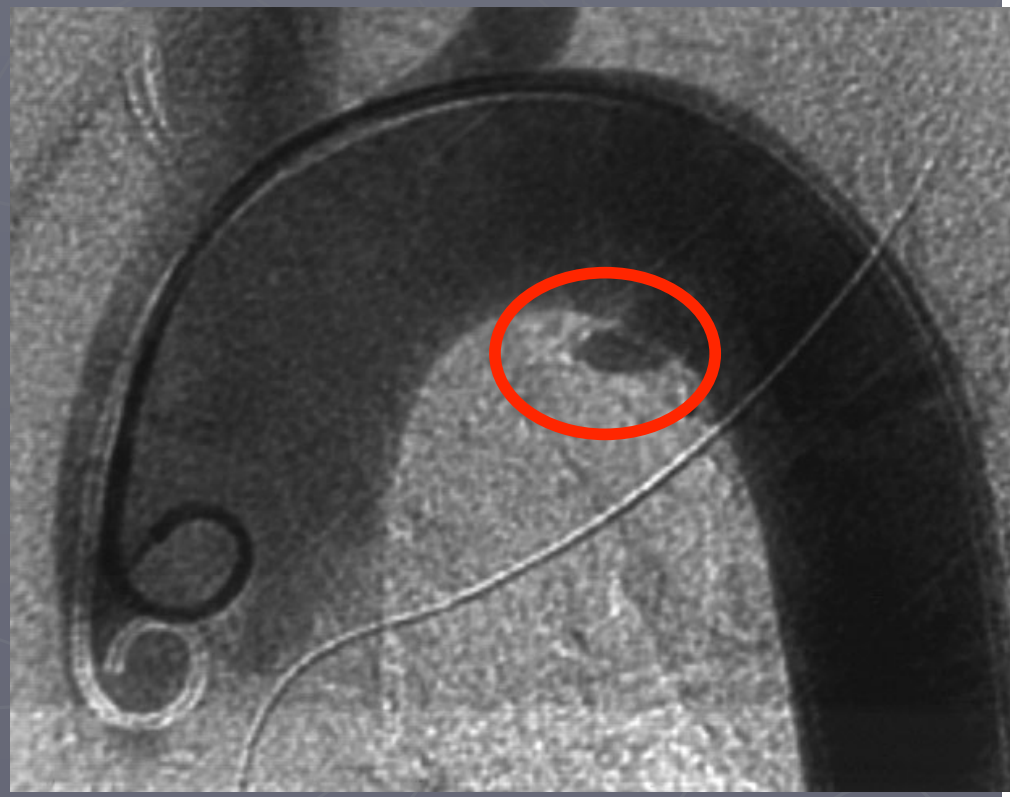
Indirect Signs

- such as mediastinal haematoma are:
  - neither sensitive (blood can stay contained)
  - nor specific (rupture of minor mediastinal vessels)

And also…

- Note, here again, some similarities:

Conic Remnant Aortic Ductus type E



Aortic Ductus conic diverticulum

Modified from Goarin: Lesion and Proposed Therapy

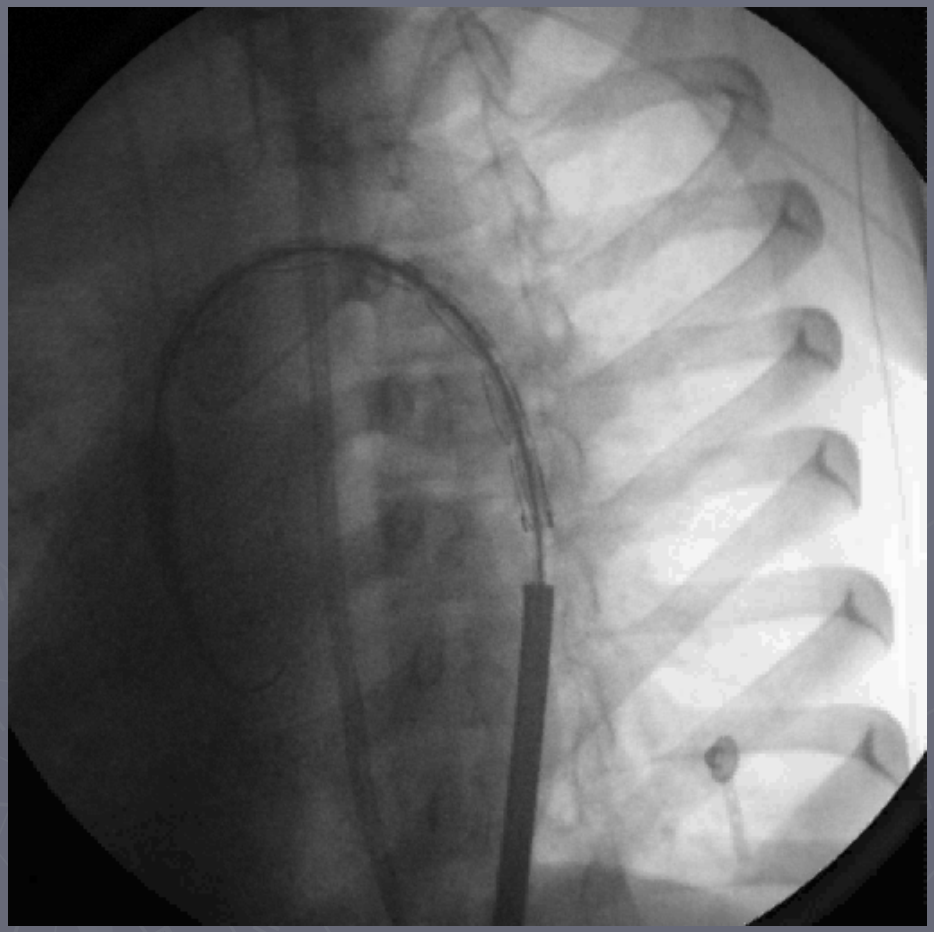
SEVERITY	CHARACTERISTICS	Therapy
Stade I	**intimo-médial Flap** and /or IHM	Surveillance
Stade II	**SUB Rupture**	ENDOVASCULAR
Stade III	**RUPTURE**	EMERGENCY ENDOVASCULAR

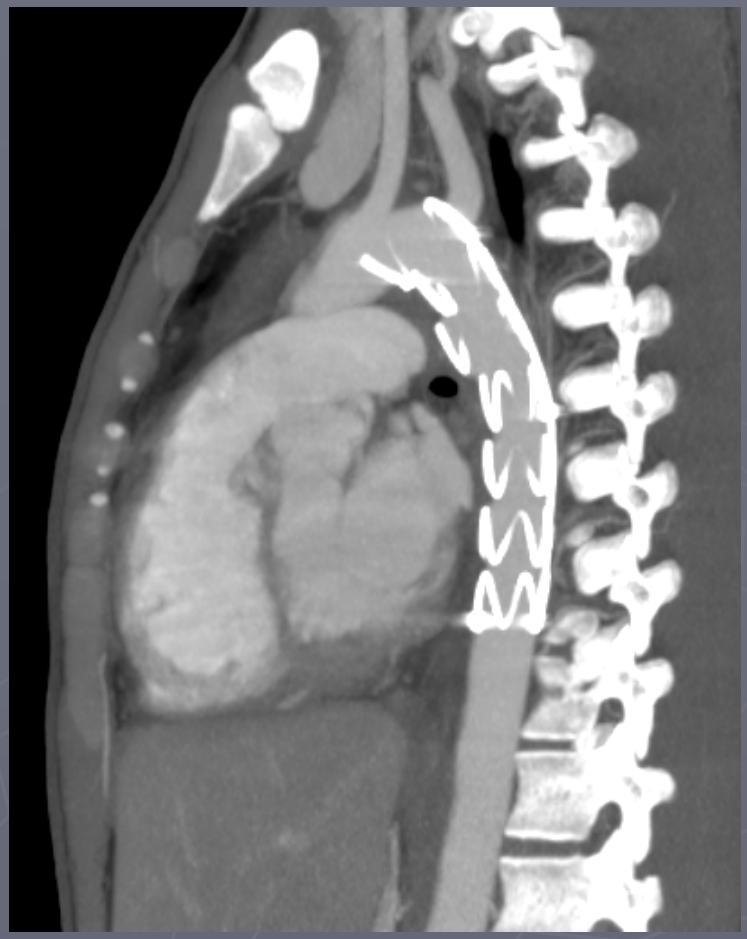
(1) Goarin JP. Evaluation of transesophagial echocardiography for diagnosis of traumatic aortic injury. Anesthesiology 2000; 93 : 1373-7.

Endovascular Techniques

- Aortic stent-graft ++++
- Embolisation of bleeding arteries
- Fenestration
  - Balloon
  - Sissors Technique
- Stenting visceral artery

Stade 3 :Rupture Endovascular treatment in emergency





Late outcome after endovascular repair of thoracic aorta*

- Traumatic aortic injuries:19
- TAA, AD: 19
- 1 penetrating ulcer

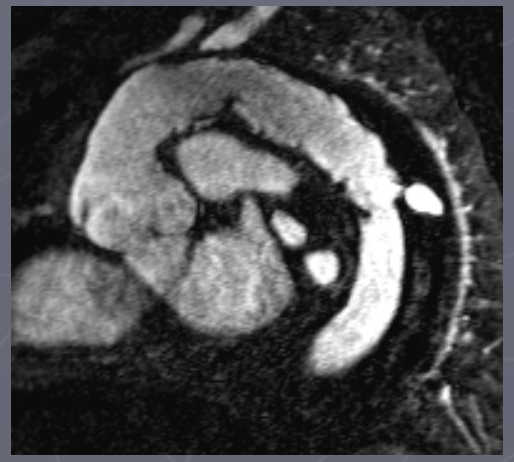
Eur J Cardiothorac Surg. 2015 Dec;48(6):923-30.DufourC, Gamondes, D, Robin J, Revel D,, Douek P

Early Results

- Primary technical success: 96%
- No procedure related death
- 6% of death because of brain or pelvic injury
- 1 paraplegia (AD rupture of false chanel)

Late outcome after endovascular repair of thoracic aorta * (8 years)

- Aortic-related mortality occurred in (14%) patients with aneurysms, but not in other groups (P = 0.02).
- No relationships among late complications were found for traumatic aortic injuries. No reintervention except 1 patient
-The most common complication was an endoleak (28.4%), which occurred more frequently with aneurysms than other: Reintervention was required in 12% of patients ; in 23% with atherosclerotic aneurysms. A false lumen was thrombosed in 54% of dissections (), and shrank in 39%)



Eur J Cardiothorac Surg. 2015 Dec;48(6):923-30.DufourC, Gamondes, D, Robin J, Revel D,, Douek P

American Association for the Surgery of Traum:traumatic aortic injuries

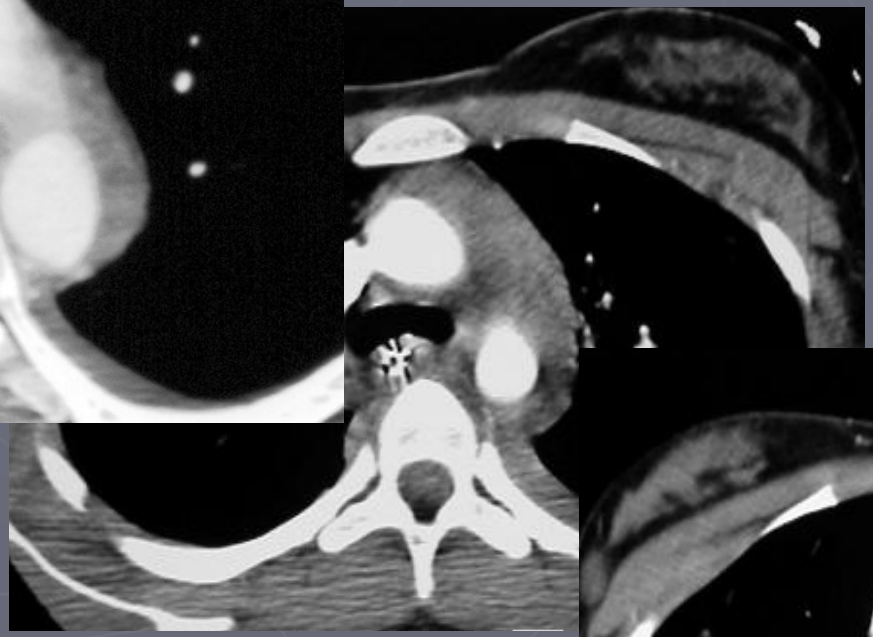
- A prospective multicenter study demonstrated lower mortality in the endovascular repair group than in the open repair group (7.2% *vs.* 23.5%) and fewer blood transfusions in the endovascular repair group
- Other advantages of endovascular repair include :
  - lower risk of paraplegia and no need to open the chest cavity.
- However, endovascular repair requires:
  - regular imaging follow up to assess for complications such as graft migration, graft fracture, endoleak, graft infection or access site complications,

Endovascular repair of the descending thoracic aorta: evidence for the change in clinical practice*

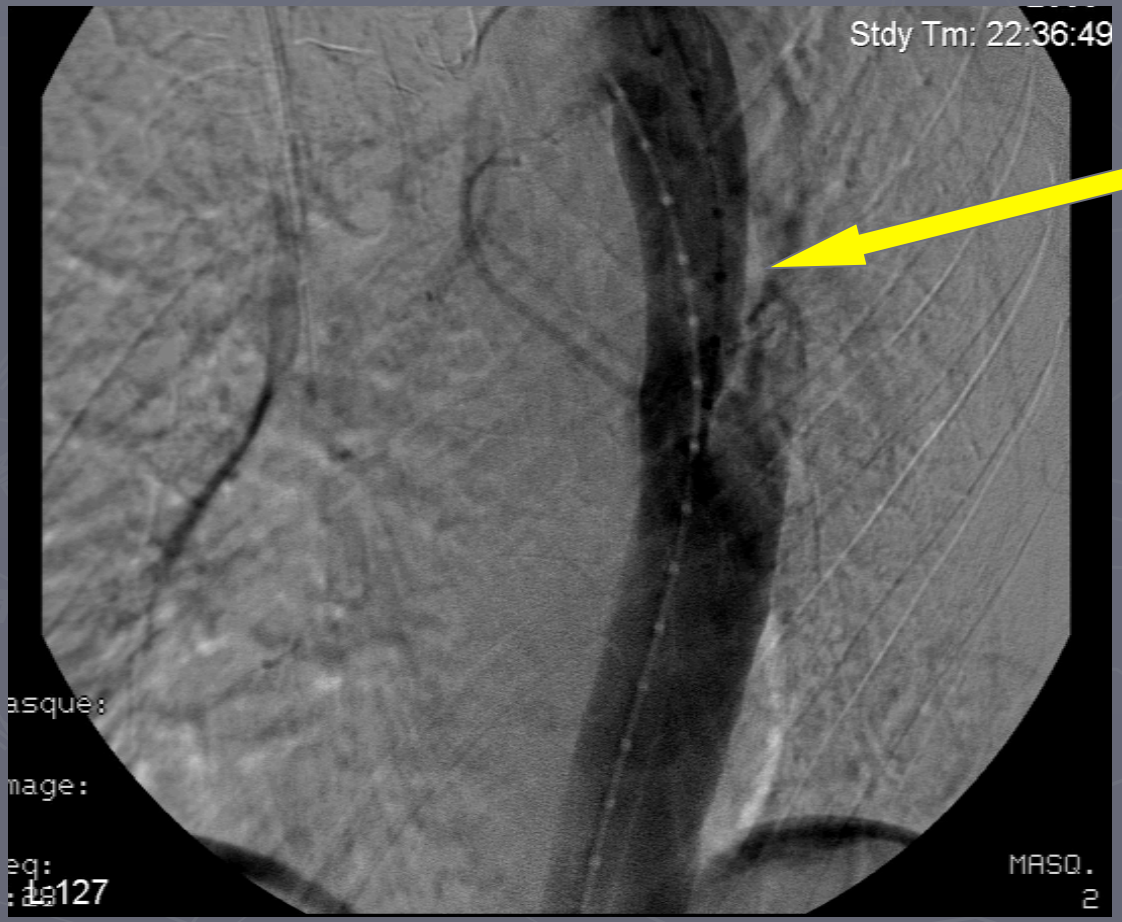
- The purpose was to review outcome data following endovascular repair of the descending thoracic aorta from reports published between 1994 and 2004.
- To accomplish this task, 1,518 patients underwent endovascular repair for thoracic aortic disease;
  - 810 thoracic aortic aneurysms,
  - 500 type B thoracic aortic dissections,
  - 106 traumatic ruptures.
- The 30-day mortality rate was 5.5% and 6% for late postoperative deaths.
- The primary technical success rate was 97%, with only 15 patients requiring open conversion.
  - Neurologic deficits occurred in 29 patients.
  - In total, 118 endoleaks were reported; 29 were restented, and the remainder required surgical intervention.
  - Graft infection occurred in 6 cases, and migrations were detected in 10..

Sayed *Thompson MM et al. J Cardiothorac Surg*

Day 1 MVA



Month 1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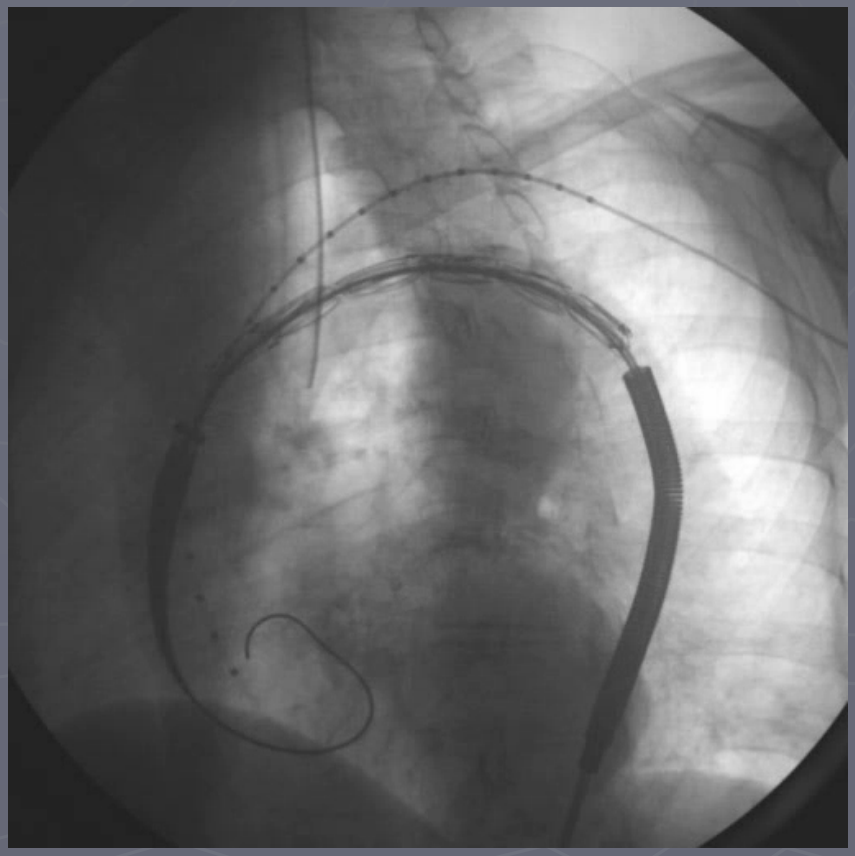
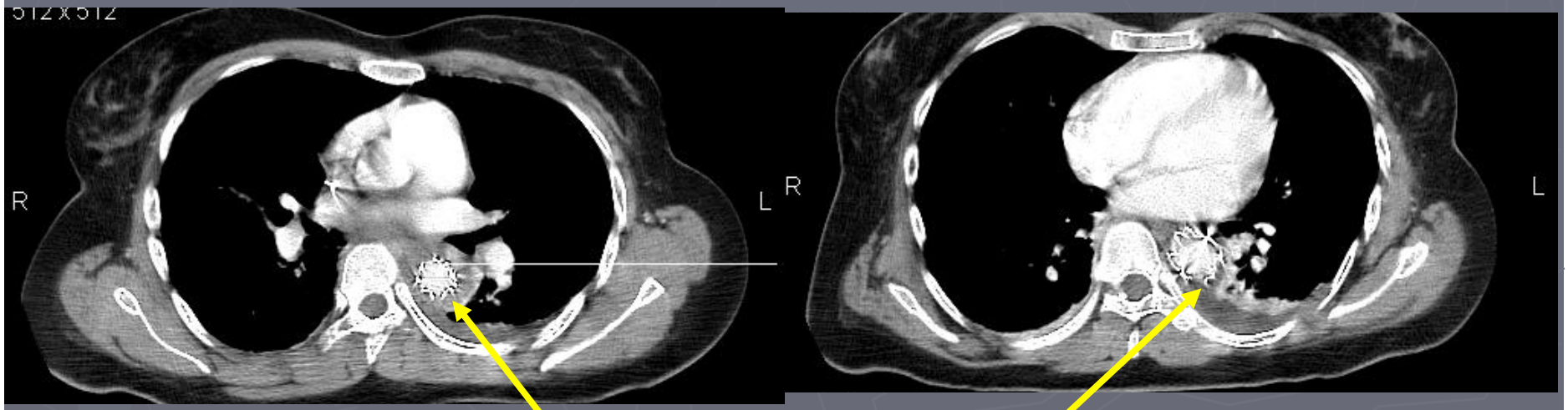
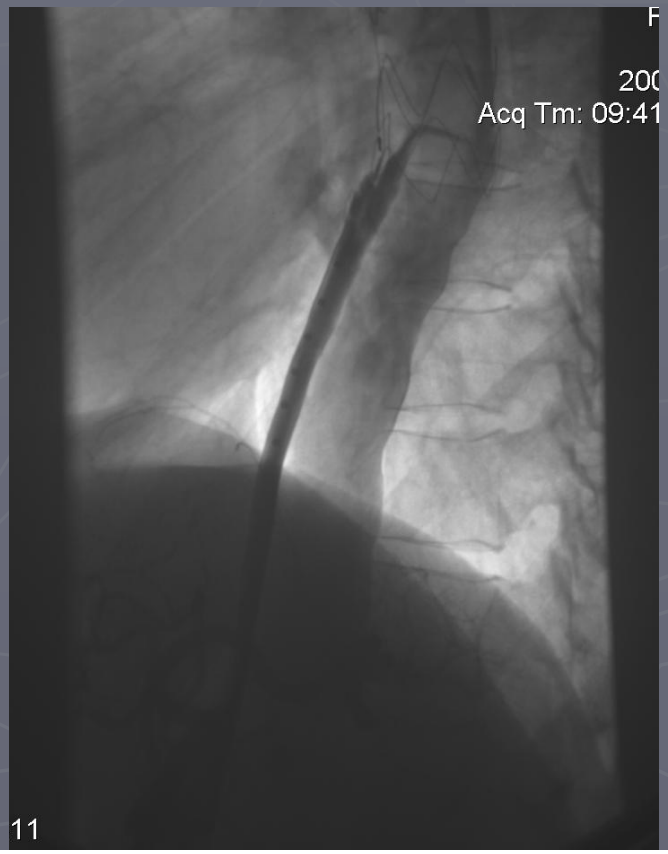




Stent graft

6 months: recurence of abdominal pain


Stdy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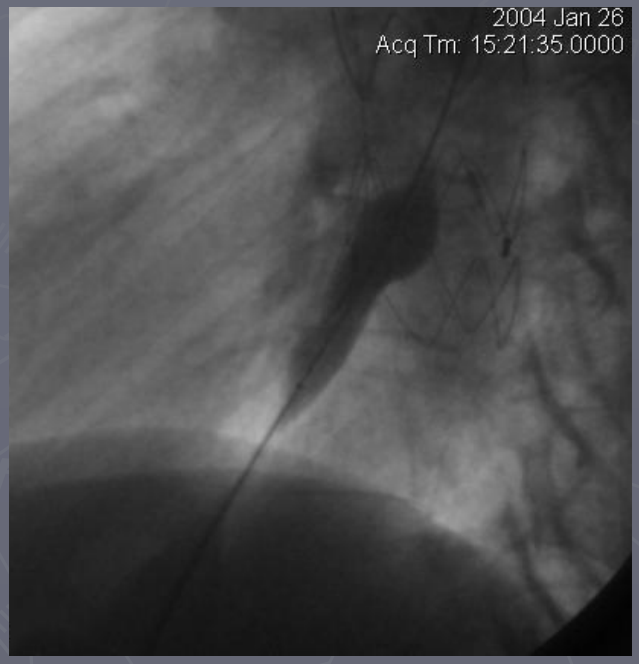
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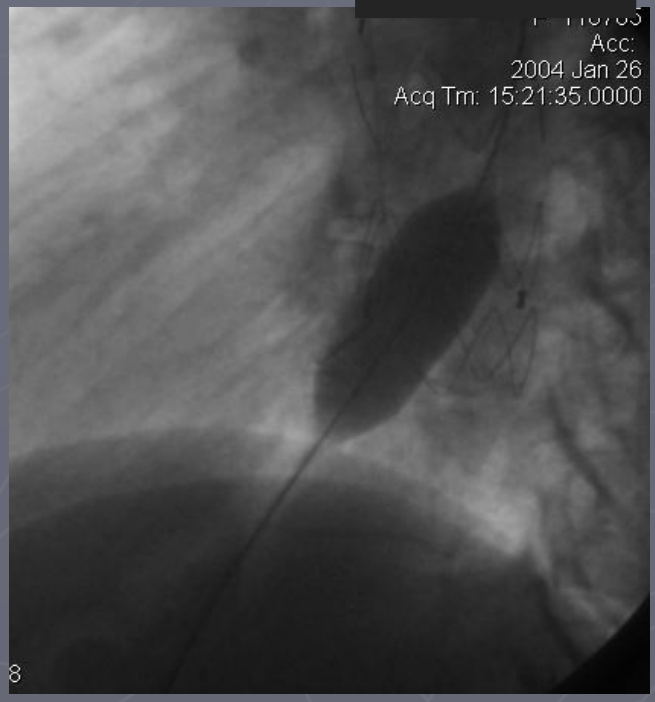
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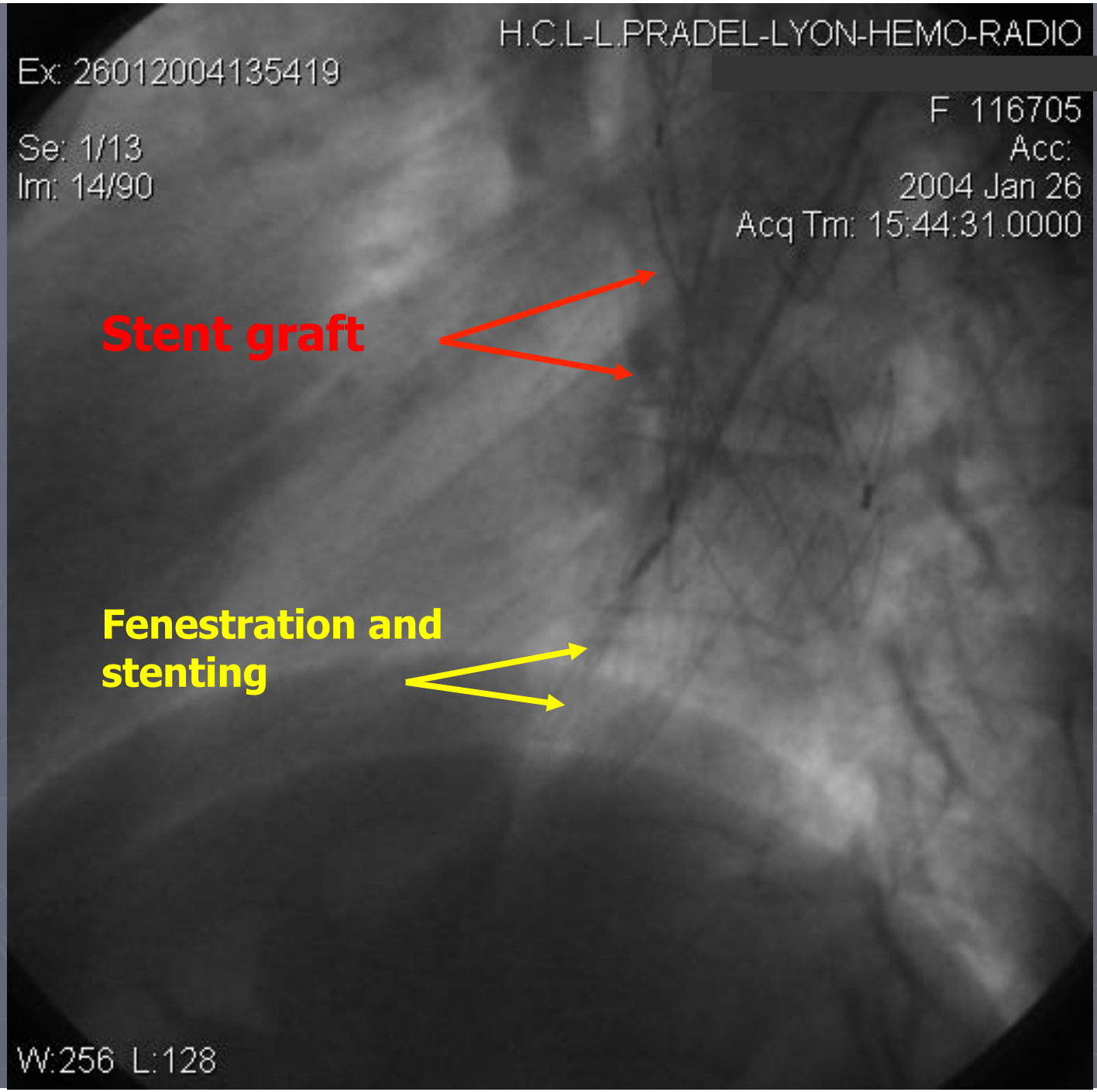
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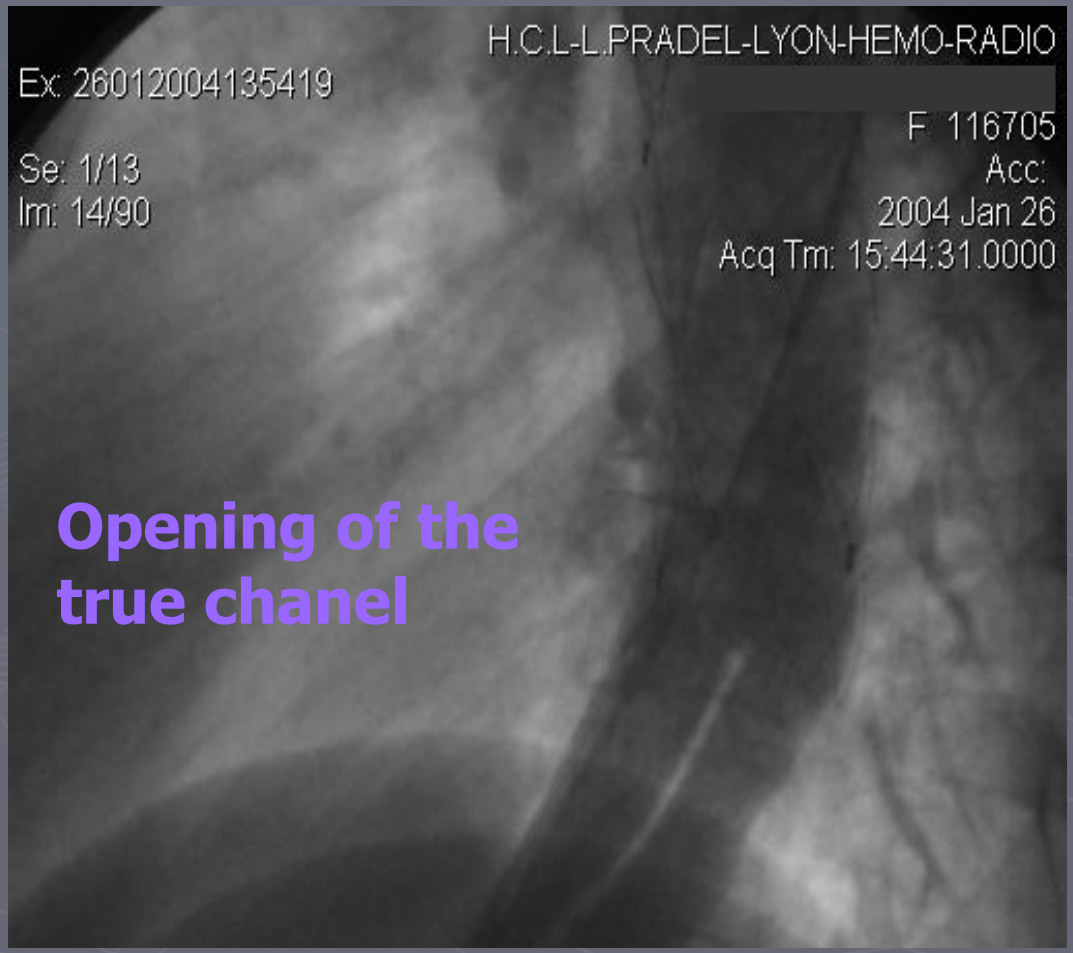
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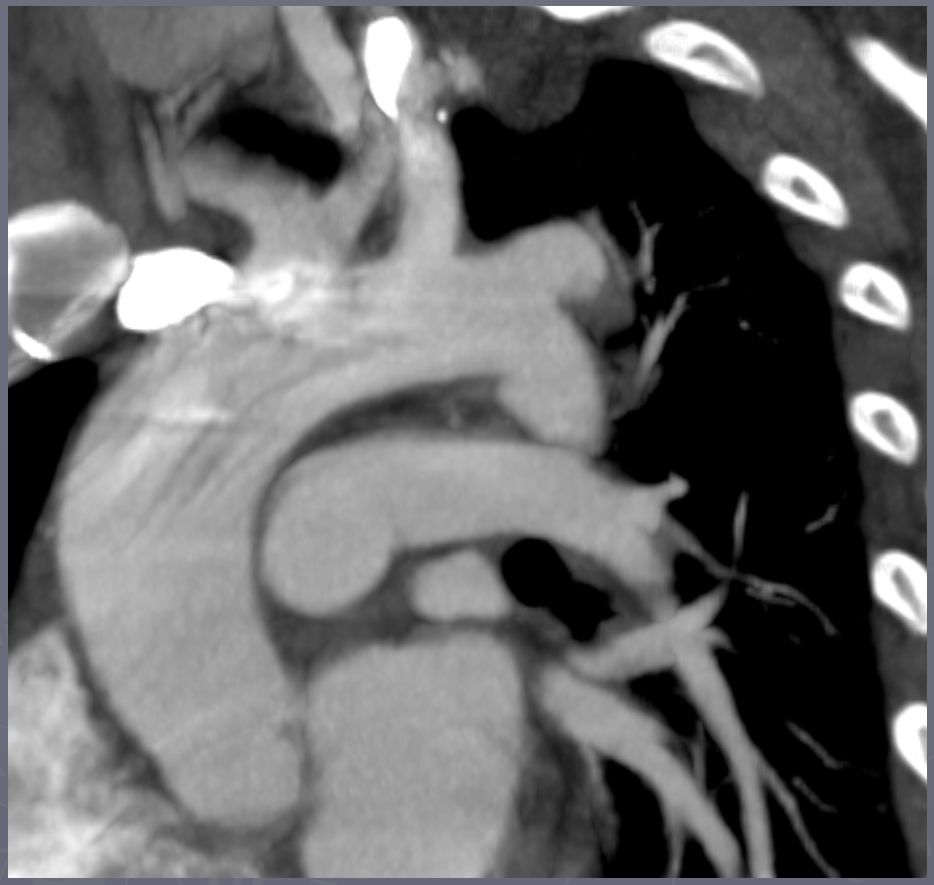
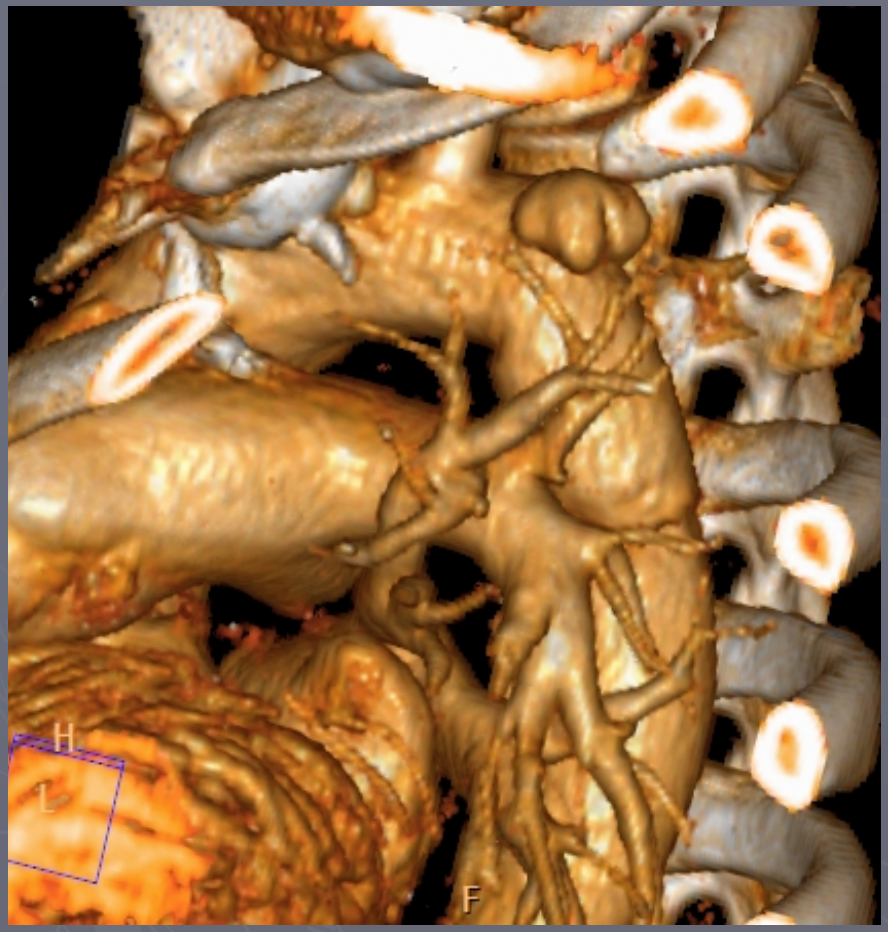
Opening of the
true chanel

Penetrating Atherosclerotic Ulcers

- Plaque rupture
- focal protrusions of contrast through atheroma into the aortic wall
- Invariably in a patient with significant generalised atherosclerotic disease.
- They most commonly occur in the descending aorta

Cas 3

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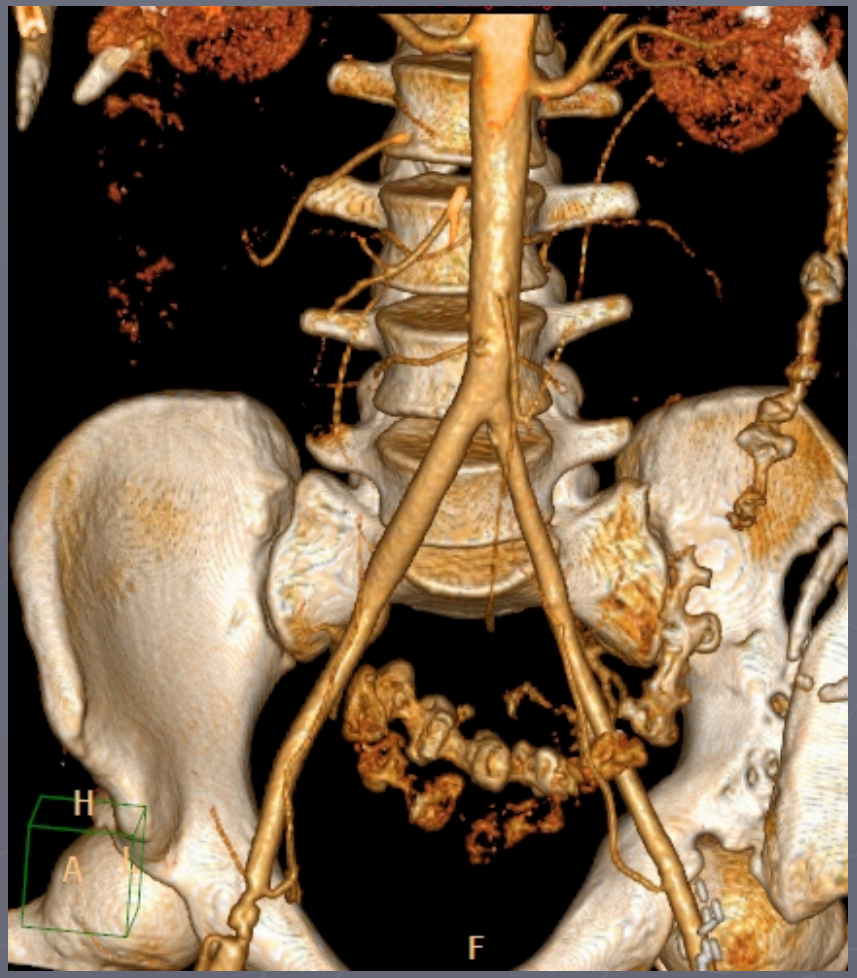
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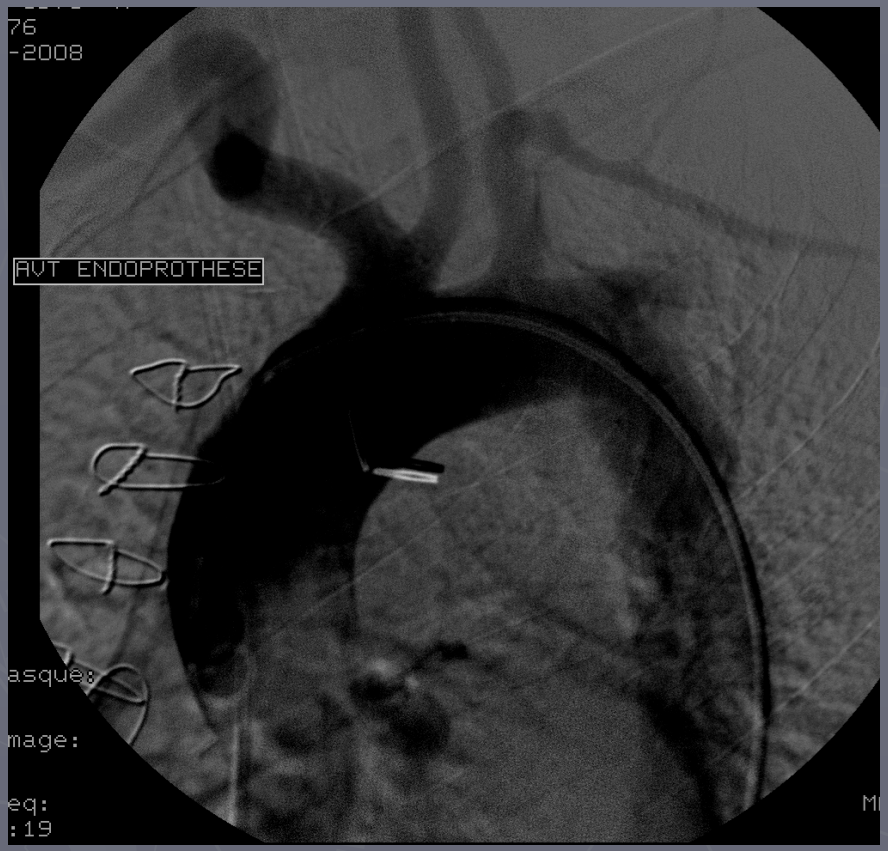
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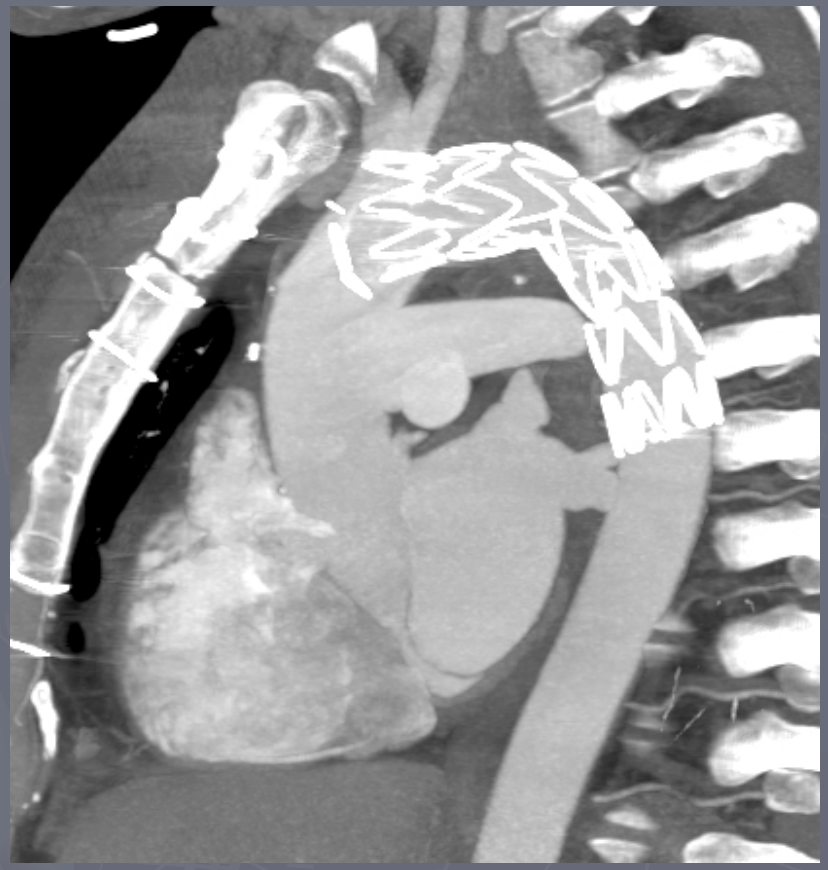


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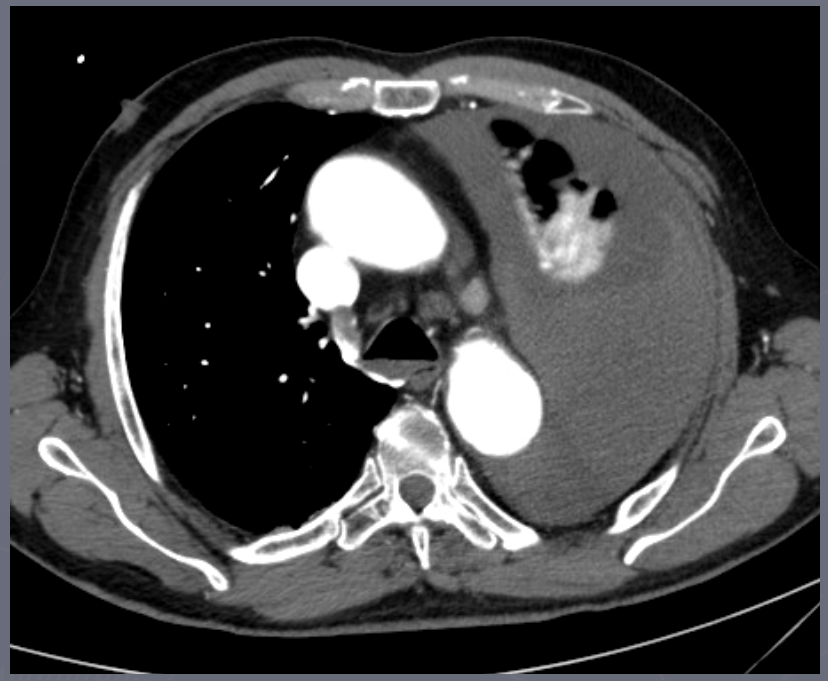

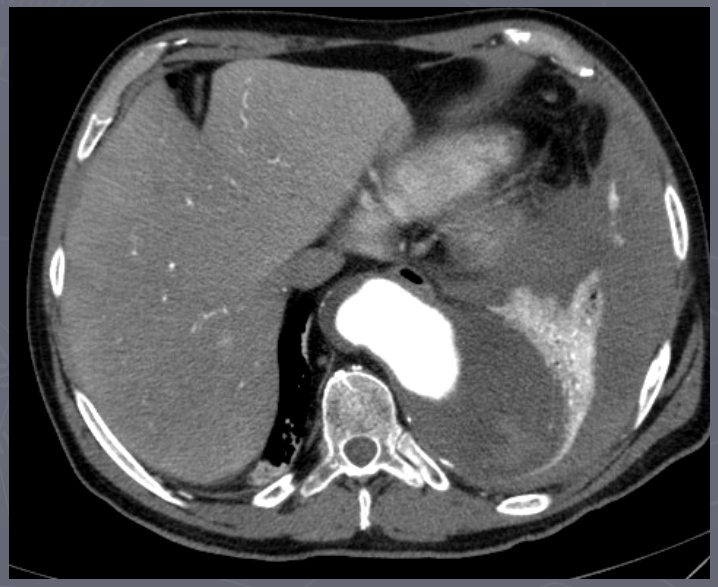

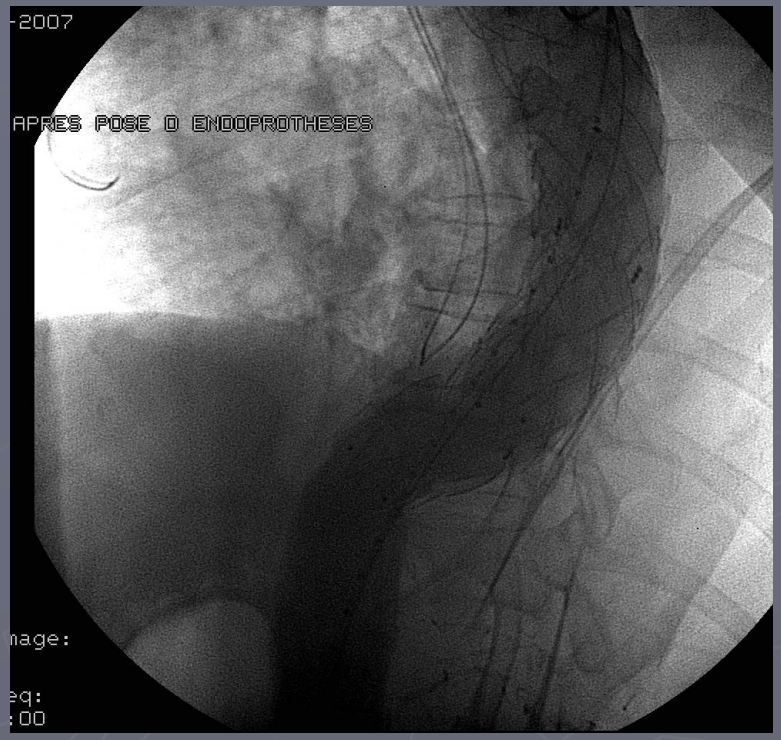
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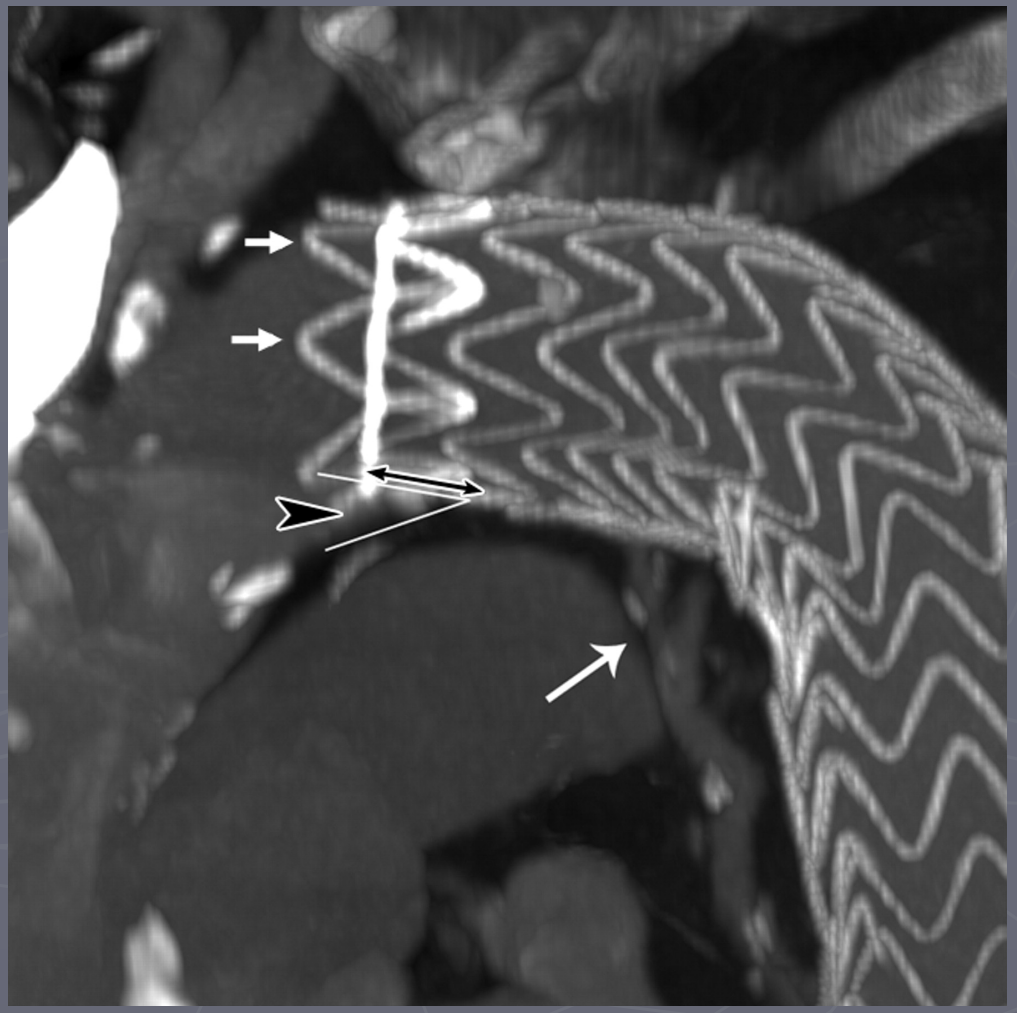
84-year-old woman who underwent TEVAR for an atherosclerotic aortic aneurysm show bird-beak configuration resulting in type Ia endoleak.



Ueda T et al. Radiology 2010;255:645-652

Radiology

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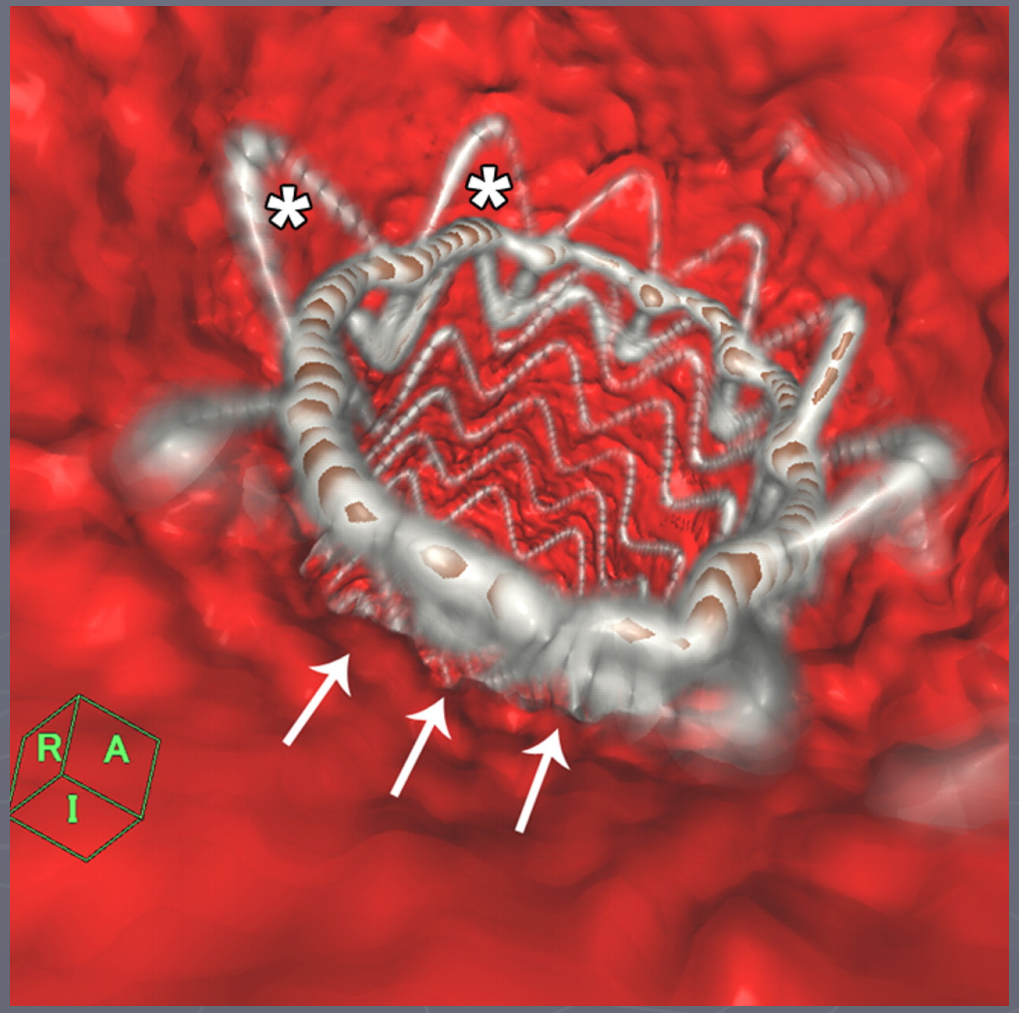

Ueda T et al. Radiology 2010;255:645-652

Endovascular Therapy in Acute Aortic Syndrome

- Good Alternative therapy/surgery:
  - less morbi-mortality
- Patients selection : +++ (CTA)
- Use of combination techniques for best results