

# Tips and triks for open surgery after failed TEVAR

**L Canaud MD, PhD;**

**P Branchereau, MD; F Joyeux, MD; K Hireche, MD;**

**C Marty-Ané, MD, PhD; P Alric, MD, PhD.**

Department of Thoracic and Vascular Surgery

Montpellier, France

# Introduction

- **Thoracic endovascular aortic repair (TEVAR):**
  - Improved early and late outcomes compared with open repair
  - Lower perioperative morbidity and mortality
- **TEVAR replacing open repair as the procedure of choice**
- **Concerns over long-term endograft durability remain**
- **Reintervention after TEVAR up to 3.8% of patients**

# Materials and methods

- **2002-2012**

- **Surgical conversion:** **14** patients

- 9 men and 5 women

- Mean age 67.3 years, range 27-75 years

- **Initial disease:**

- Thoracic aortic aneurysm: 11

- Arch: 7

- DTA: 4

- Aortobronchial fistulae: 3

- Traumatic rupture of the thoracic aorta: 1

# Materials and methods

**n: 14**

## *The indications of surgical conversion included:*

1. Aortobronchial fistula **n: 6**
2. Retrograde type A dissection **n: 4**
3. Aneurysm enlargement without endoleak **n: 2**
4. Device collapse **n: 1**
5. Aortoesophageal fistula **n: 1**

# **Aortobronchial fistula**

*Primary or after open repair*

**N: 3**

# Hybrid repair of Aortobronchial fistulas

## ■ TEVAR

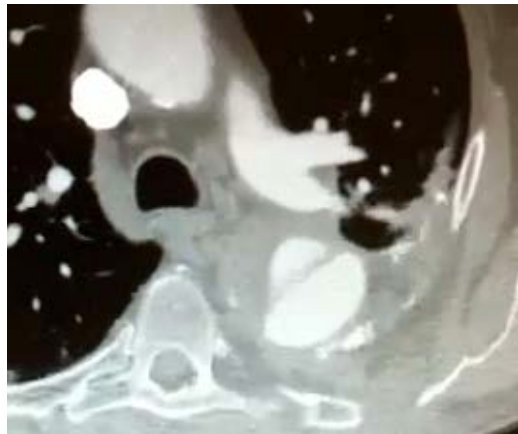
n=1

- **Mediastinitis with thoracic stent-graft infection**
- **Staged procedure**
  - . Ascending to supraceliac abdominal aorta bypass
  - . Stent-graft explantation
- **7 days post-surgically died** due to multi-organ failure



## ■ TEVAR combined with delayed:

- Segmentectomy



*Uneventful pos*



# Aortobronchial fistula

*After TEVAR*

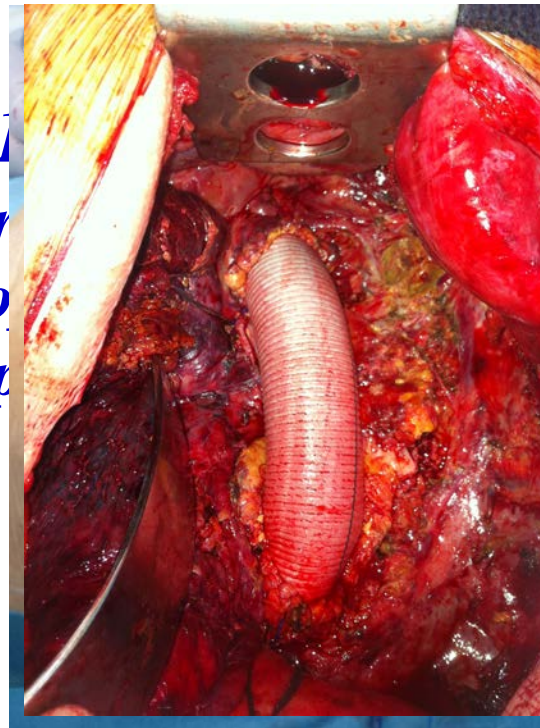
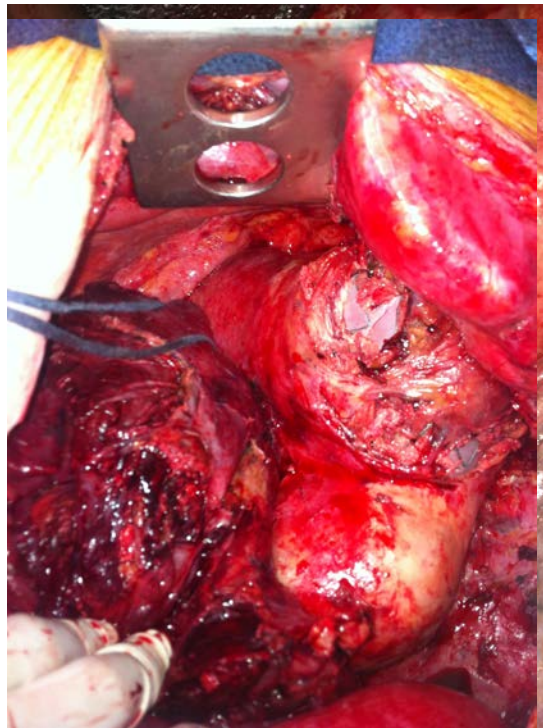
**N: 3**

# TEVAR Aortobronchial fistulas after TEVAR

## ■ Zone 3:

n:2

- Pulmonary segmentectomy
- Pleural or muscle flap



*TA: Silver coated*



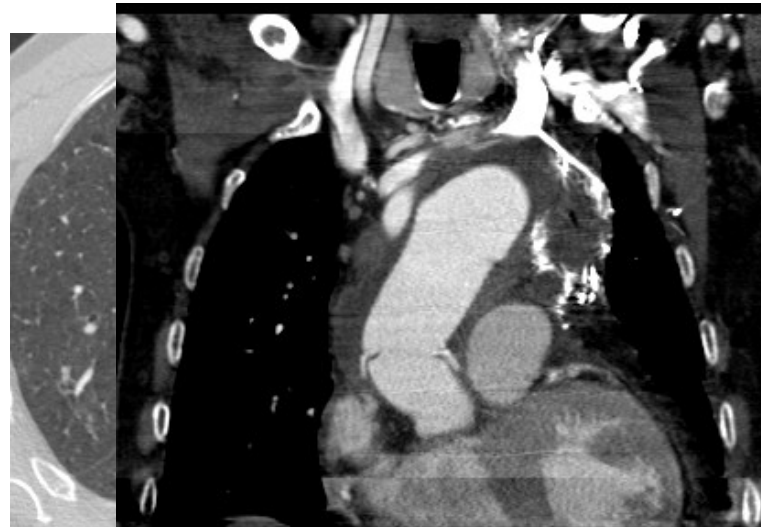
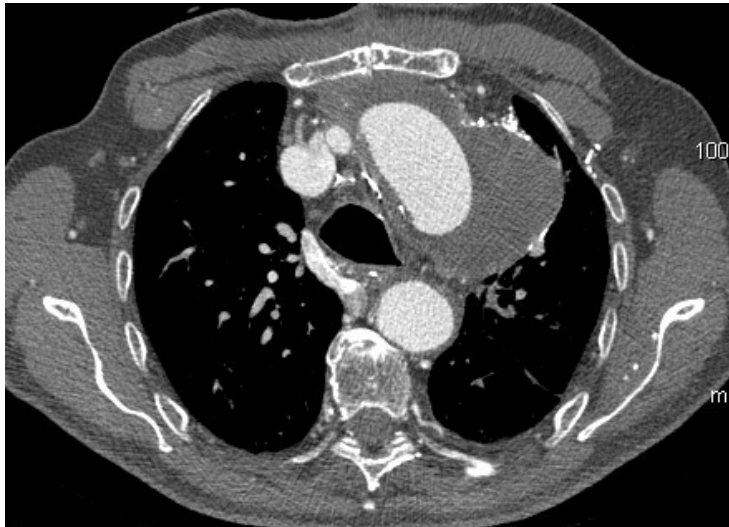
# TEVAR Aortobronchial fistulas after TEVAR

## ■ Zone 0: n:1

- Stent graft explant
- Prosthetic replacement of the arch: Silver coated
- Deep hypothermic circulatory arrest
- Pleural flap interposition



*Uneventful postoperative course*





# **Retrograde Type A dissection**

**N: 4**

# Retrograde Type A dissection

n:4



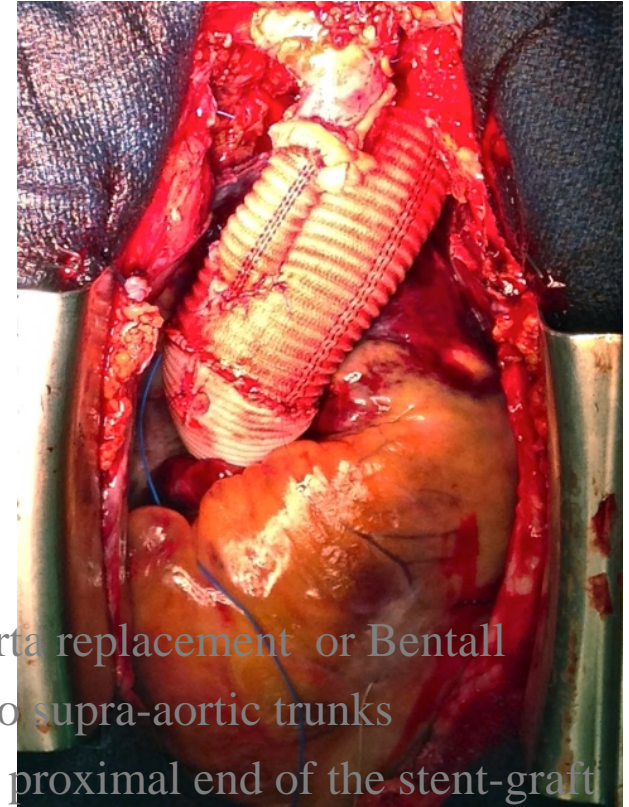
## ■ Indication:

- Degenerative aneurysm
- Zone:
  - 0: 3
  - I: 1

## ■ Asymptomatic

## ■ Conversion:

- Supracoronary ascending aorta replacement or Bentall
- Reimplantation of the graft to supra-aortic trunks
- Distal part of the graft to the proximal end of the stent-graft



*Uneventful postoperative course*



# **Aneurysm enlargement without endoleak**

**N:2**

# Aneurysm enlargement without endoleak n:2

- DTA aneurysm

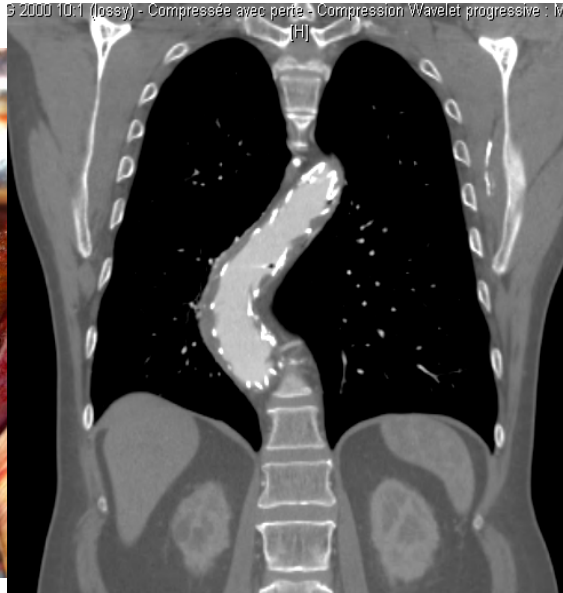
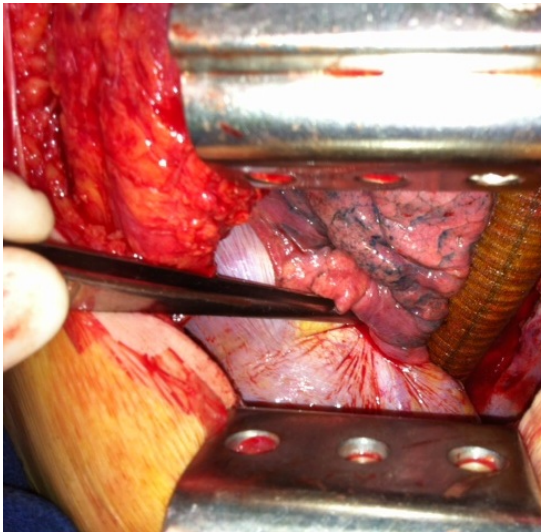
- Surgical conversion:

n:1

- Stent graft explant and replacement of the DTA (CBP)

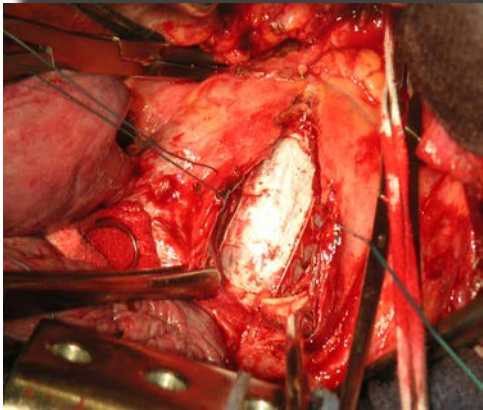
*Uneventful postoperative course*

- Exclusion and bypass of the DTA



# Thoracic stent graft collapse

n:1



- **28 years old man**

Traumatic rupture of the thoracic aorta

- **30th day following implantation pseudocoarctation syndrome**

- **Favoring factors:**

- Severe aortic arch angulation:  $104.5^\circ$
- Excessive oversizing: 24.75%
- **Poor apposition of the stent-graft**



- **Conversion**

- Thoracic stent graft explant and open repair
- On femoro-femoral cardiopulmonary bypass

- **Uneventful postoperative course**

# Aortoesophageal fistula

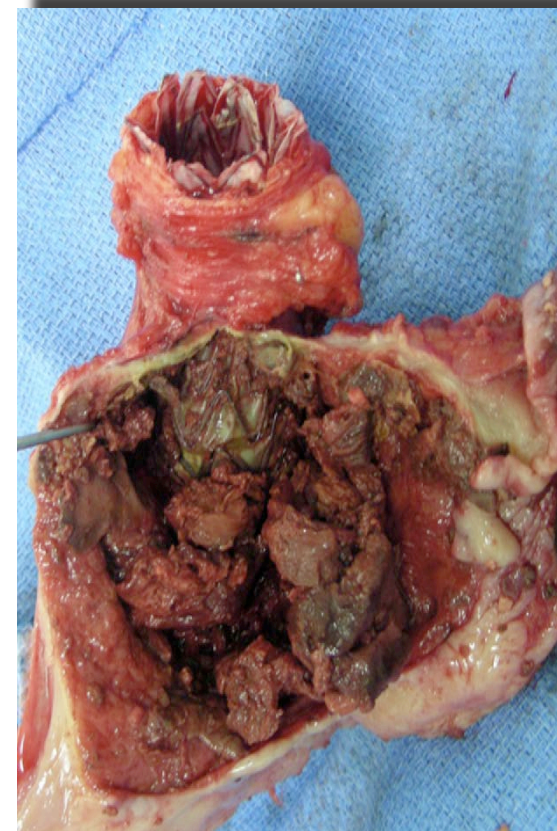
n:1

- **TEVAR for ruptured DTA: 18 months**

- **Surgical converion:**

- Graft explantation of the infected stent-graft,
- DTA silver coated graft replacement
- Total esophagectomy
- On femoro-femoral cardiopulmonary bypass

- *Early acute respiratory distress syndrome*
- *Death 5<sup>th</sup> psoperative day*





# Discussion



- The conversion rate was 3.9%

- Aortobronchial and aortooesophageal fistula

- Favoring factors: TEVAR for very large aneurysm

- Endovascular repair:

- *TEVAR alone: hypothetical repair*

- *Stent-graft explant and DTA replacement*

- Definitive but morbid procedure*

- **TEVAR combined with pulmonary segmentectomy and coverage of the SG**

- Can be a lasting procedure*

- n: 3/4*

# ■ Retrograde ascending aortic dissection

□ Prevalence between 1% and 6.8%

■ *Open repair in fit patients with risk factors*

□ Causative factors

■ Hybrid repair 4/4

■ Aneurysm of the ascending aorta 3/4

□ *Careful lateral cross clamping*  
 ■ Lateral cross clamping

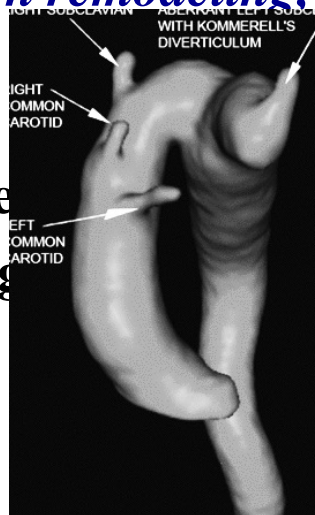
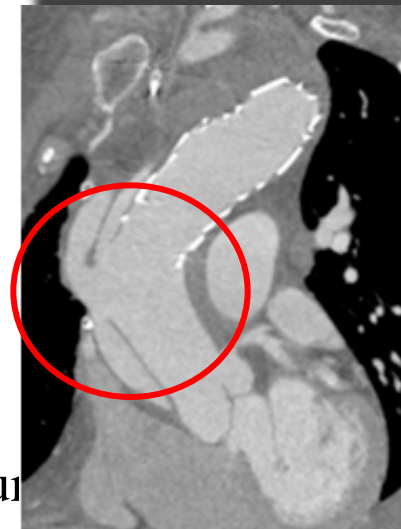
■ Proximal bare stent ??  
 □ *Choice of the Stent-graft choice and moderate oversizing*

■ Balloon remodeling, oversizing, aortic dissection

□ Repair:

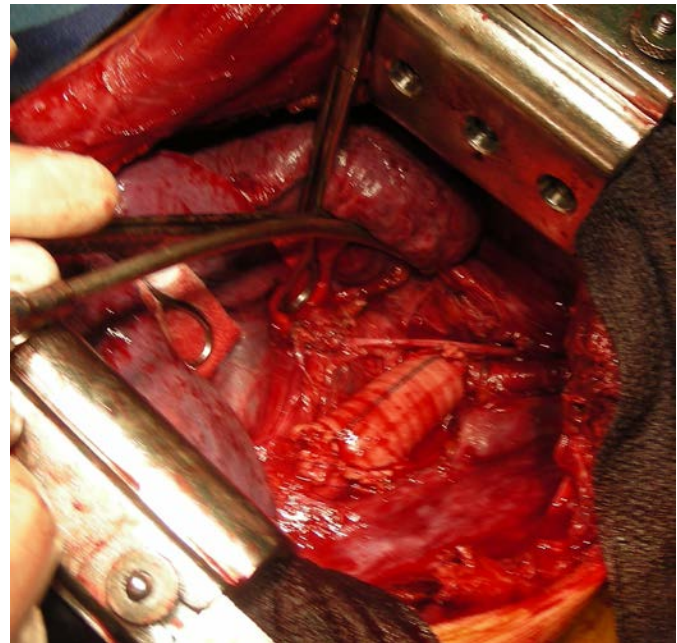
■ Delayed repair all discharged home

■ Stent-graft repair not be removed to worsen the injury



## ■ *Thoracic stent-graft collapse*

- Poor apposition of the stent-grafts in a highly angulated
- **Confomable SG** and availability small diameter stent-graft
- **Severe aortic arch angulation: open repair**





# Conclusion

## *Surgical repair of failed thoracic stent-graft*

- **Complex procedure**
- **Extracorporeal circulation and adjunctive modalities** to provide organ protection
- Although **infrequent will increase**: widespread of TEVAR
- **Encouraging results:**
  - *Mean Follow up 23 months*
  - *Mortality 2/14: 14%*