



i-MEET

NEXT GENERATION

Multidisciplinary European Endovascular Therapy

Hybrid repair for aortic dissection, indication and state of the art

On behalf of USZ vascular specialists

Felice Pecoraro, MD

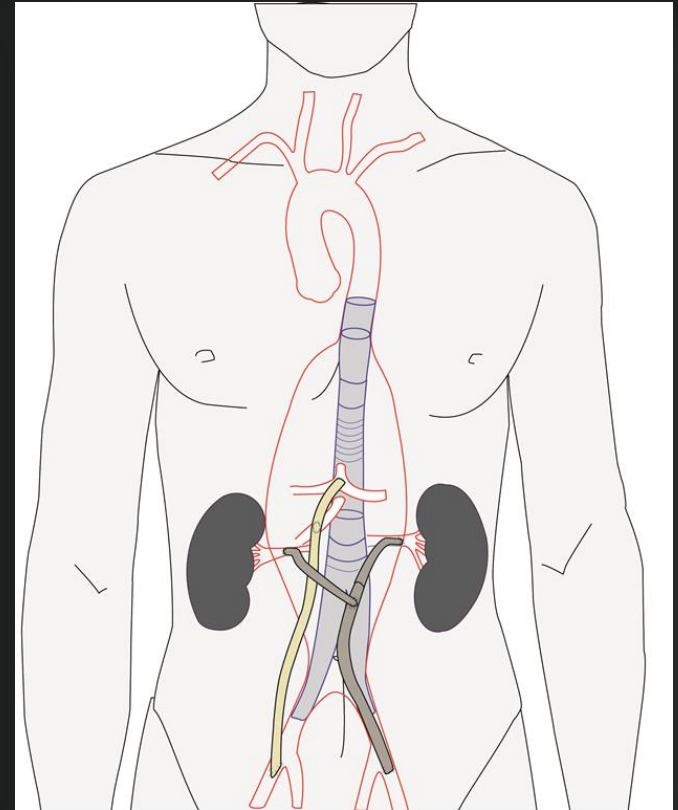
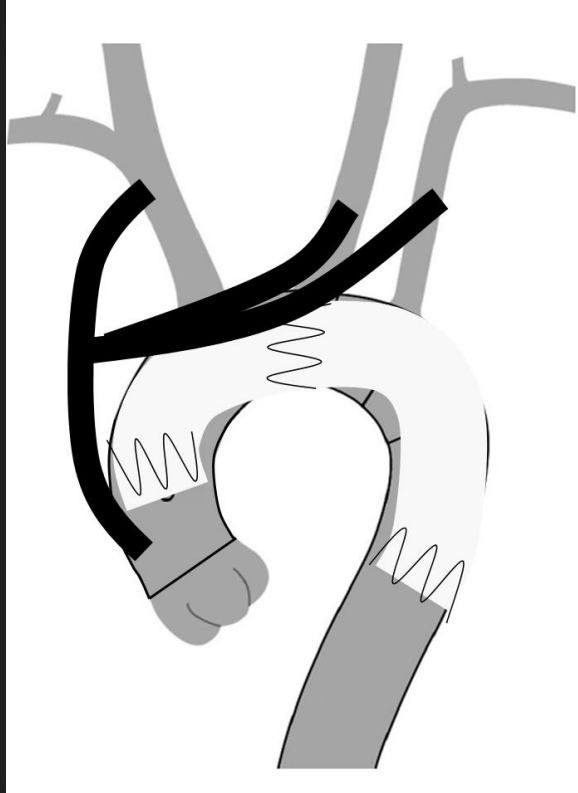
Zoran Rancic, MD, PhD

Disclosure of Interest

Speaker name: Felice Pecoraro

- I do not have any potential conflict of interest

Hybrid repair (Debranching)



HYBRID VISCERAL PROCEDURE

thoracoabdominal and pararenal aortic aneurysms

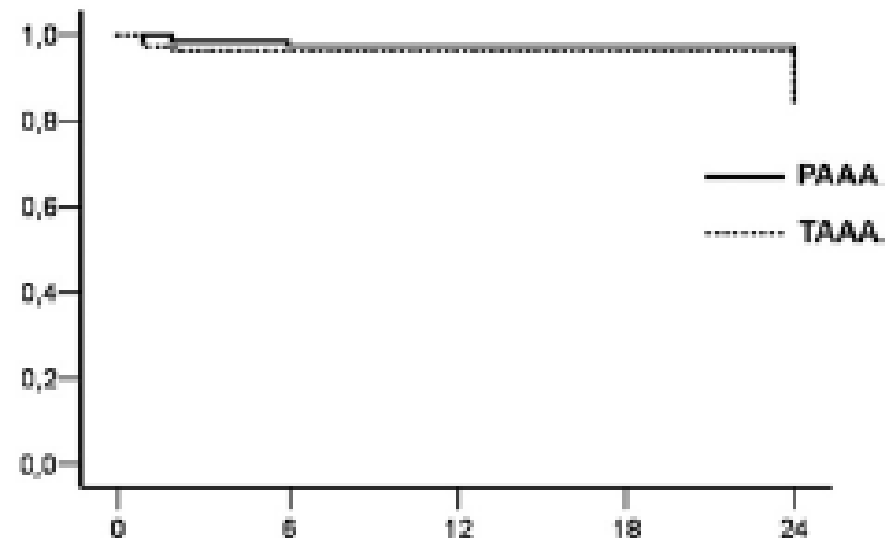
Konstantinos P. Donas, MD,^a Mario Lachat, MD,^a Zoran Rancic, MD,^a Christian Oberkofler, MD,^a Thomas Pfammatter, MD,^b Ivo Guber, MD,^a Frank J. Veith,^c and Dieter Mayer, MD,^a *Zurich, Switzerland; and Cleveland, Ohio*

n=58 (74 years)
30-day mortality
8.6%

with the main feeding graft, bypassing the aneurysm. All cases were treated by two-staged approach (endovascular debranching procedure). Computed tomography angiography was performed at three, six, and 12 months after the procedure. **Results:** Primary technical success of VORTEC was 97%. Primary patency of the Viabahn endoprosthesis in the PAAA and TAAA subgroups was 97.7% and 96.4%, respectively. Occluded Viabahn grafts were reopened by thrombolysis and hemodialysis. Thirty-day mortality rate was 8.6%. A neurologic deficit occurred in two cases (3.4%); paraparesis in three patients presented early (30-day) type I endoleak, three of them treated by coil embolization and radiological surveillance.

Conclusion: VORTEC allows performance of easy, safe, and reproducible debranching procedures and may represent a significant technical advancement for the treatment of thoracoabdominal aortic aneurysms. Further questions of reproducibility by other centers and long-term follow-up are required. (J Vasc Surg 2009;50:1280-4.)

Cumulative primary patency



vessels
at risk

PAAA:	87	74	60	45	25
TAAA:	111	96	96	76	68

Fig. Primary cumulative patency rate of the Viabahn endoprostheses in patients with thoracoabdominal and juxtarenal aortic aneurysms over a mean follow up period of 22.1 ± 12.9 months.

HYBRID ARCH PROCEDURE

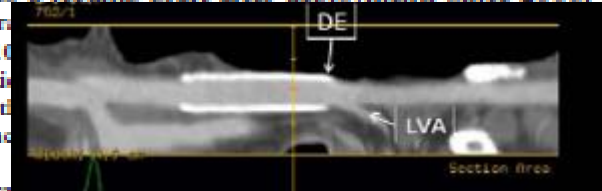
Novel sutureless telescoping anastomosis
revascularization technique of supra-aortic vessels
to simplify combined open endovascular procedures
in the treatment of aortic arch pathologies

n=20
30-day mortality
7.6%

Rancic, MD,^a Mario Lachat, MD,^a Thomas Pfammatter, MD,^b
Veith, MD,^c and Dieter Mayer, MD,^a Zurich, Switzerland; Cleveland,

ence with the use of a sutureless telescoping anastomosis, initially described as
(g. TECHnique) revascularization technique, for debranching of supra-aortic

2008, 20 patients (15 men) with an aortic arch lesion underwent trans-sternal
debranching with sutureless telescoping anastomosis performed with a Viabahn (diameter, 5-8 mm; length, 5-15 cm) or
Hemobahn (diameter, 9-13 mm; length, 10-15 cm), followed by endovascular aneurysm repair. Initially, the Viabahn/
Hemobahn was sutured to a feeding graft after deployment. Since 2008, the Viabahn/Hemobahn has been deployed
within an interposition graft. Underlying aortic pathology was (1) isolated
aortic arch aneurysm in 10, (2) ascending or descending aorta in 6, (3) floating
thrombus within the aortic arch in 2, (4) Stanford II aortic dissection in 1, and (5) Crawford II thoracoabdominal aortic
aneurysm extending into the aortic arch in 1. In all patients, the aneurysm extended into the aortic arch. Follow-up included
annual CT scans.

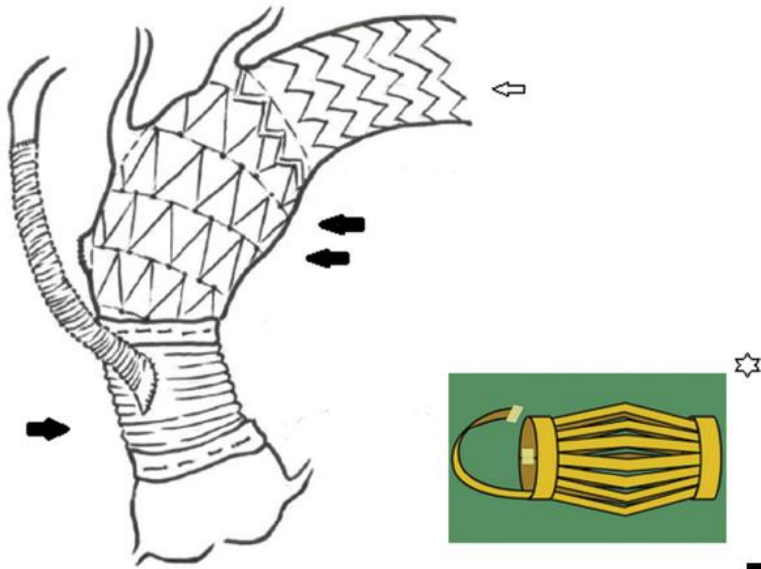


Results: Overall, 56 supra-aortic vessels in the 20 patients were debranched by
including the carotid artery in 18, subclavian artery in 13, and left vertebral artery in
mean ischemia time was 3 minutes (range, 1-9 minutes) for the debranching pro-
cedure (mean 15 minutes) for a conventional suture anastomosis. The 30-day mortality rate was 15
cases and 7.6% (1 of 12) in elective patients. Three patients (15%) had neurologic
deficits in conventionally-sutured anastomosis territories. No early (<30 days) occlusion occurred
at $\pm$ 9 months (range, 1-39 months), one patient with Takayasu disease showed a
stenosis in the left common carotid artery. Stenosis in the aortic anastomosis
was successfully treated by angioplasty and stent placement through the right brachiocephalic
artery. **Conclusions:** Sutureless telescoping anastomosis with a Viabahn or a Hemobahn in
a safe and reliable alternative to sutured anastomosis. It enables safe and fast
anastomosis in anatomically challenging situations, and requires a very short ischemia time. Quest
for technique reproducibility must be addressed. (J Vasc Surg 2010;51:836-41.)



The “Lantern” Procedure to Simplify Treatment of Retrograde Type A Dissection After Thoracic Endograft Stenting

Chung-Lin Tsai, MD



(Ann Thorac Surg 2016;101:e129–31)

Staged hybrid repair of extensive thoracoabdominal aortic aneurysms secondary to chronic aortic dissection

Amit Jain, MD,^a Tanya F. Flohr, MD,^b William F. Johnston, MD,^b Margaret C. Tracci, MD,^b Kenneth J. Cherry, MD,^b Gilbert R. Upchurch Jr, MD,^b John A. Kern, MD,^b and Ravi K. Ghanta, MD,^b Cincinnati, Ohio; and Charlottesville, Va

Objective: Many patients with aortic dissection develop Crawford extent I or II thoracoabdominal aortic aneurysms (TAAA). Because open repair is associated with a high morbidity and mortality, hybrid approaches to TAAA repair are emerging. In this study, we evaluated the midterm outcomes and aortic remodeling of a hybrid technique that combines proximal thoracic endovascular aneurysm repair (TEVAR), followed by staged distal open thoracoabdominal repair for patients with Crawford extent I or II TAAAs secondary to chronic aortic dissection.

Methods: We identified 19 patients with Crawford extent I (n = 1) or extent II (n = 18) TAAAs secondary to chronic aortic dissection who underwent a staged hybrid repair from 2007 to 2014 at our institution. Nine patients had previous open ascending aortic surgery for type I aortic dissection. Stage 1 TEVAR was performed via percutaneous (n = 8), femoral cutdown (n = 8), or iliac exposure (n = 3). The left subclavian artery was covered in nine patients and revascularized in eight patients using carotid-subclavian bypass (n = 7) or laser fenestration (n = 1). Stage 2 open repair was performed a median of 18 weeks later with partial cardiopulmonary bypass via left femoral arterial and venous cannulation for visceral and lower body perfusion. The open thoracoabdominal graft was anastomosed proximally in an end to end fashion with the endograft. We then assessed surgical morbidity and mortality, midterm survival, and freedom from reintervention. Aortic remodeling was measured and change in maximum aortic and false lumen diameter at last follow-up (median, 3 years) from baseline was assessed.

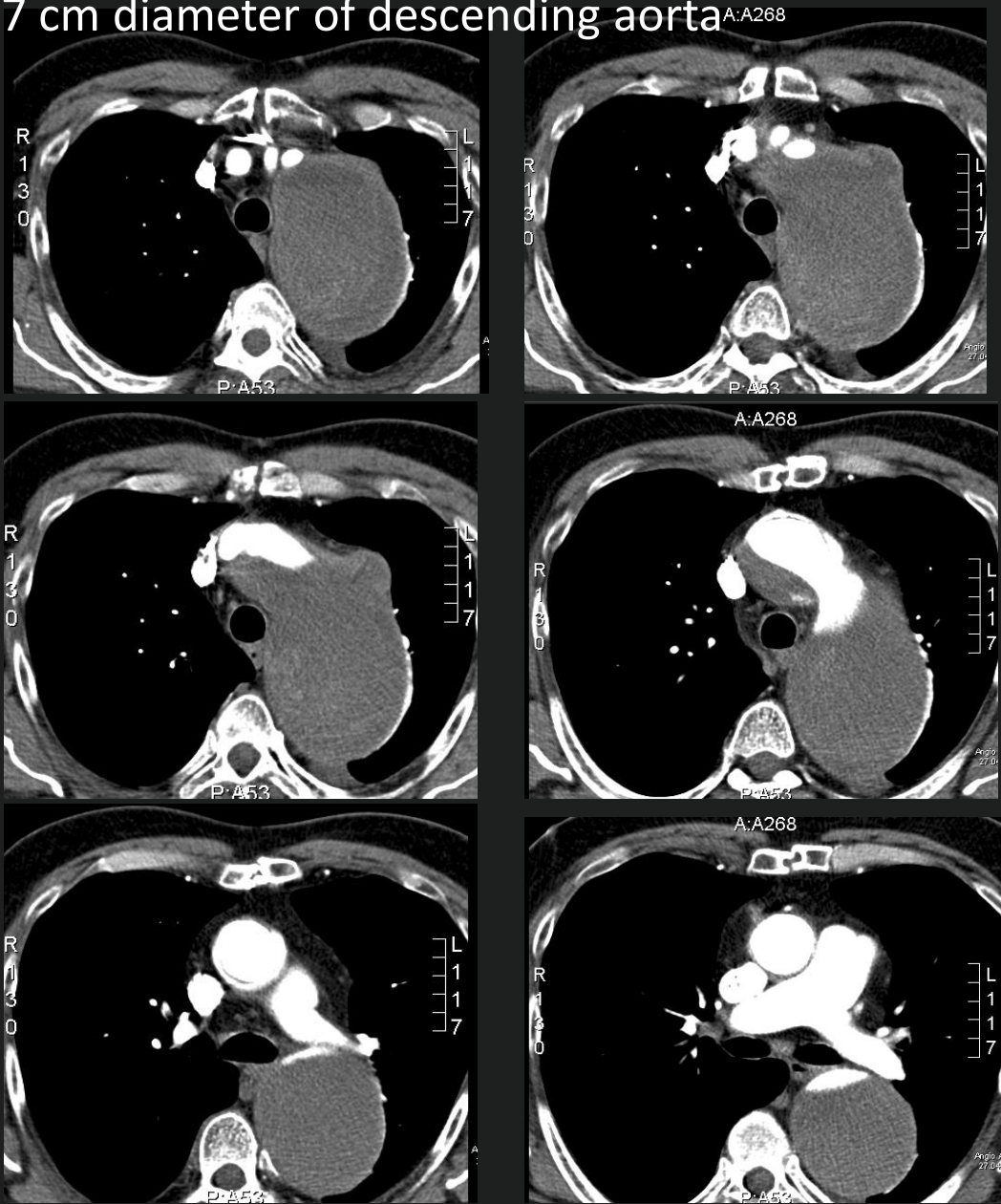
Results: There were no deaths, strokes, or chronic renal failure in this cohort. After stage 1 TEVAR, three patients repeat intervention for endoleak (type Ia, n = 1; type Ib, n = 1; type II, n = 1) before open repair. After stage 2 open repair, there was a single delayed permanent paralysis 2 weeks after discharge. At a median 3-year follow-up (range, 6 to 6.2 years), there were no deaths, neurologic events, endoleaks, or TAAA reinterventions. Complete false lumen thrombosis occurred in 100% of the patients, with maximum false lumen diameter decreasing from 34.3 ± 15.3 mm to 12.0 mm ($P < .01$) and total aortic diameter decreasing from 60.2 ± 9.0 mm to 49.4 ± 9.6 mm ($P < .01$).

Conclusions: Staged hybrid TAAA repair, using a combination of proximal TEVAR with open distal repair, can be performed using established endovascular skills and technology coupled with traditional open aortic surgical techniques with low surgical morbidity and mortality. In the midterm, staged hybrid TAAA repair was associated with favorable aortic remodeling, and freedom from reintervention. (J Vasc Surg 2016;63:62-9.)

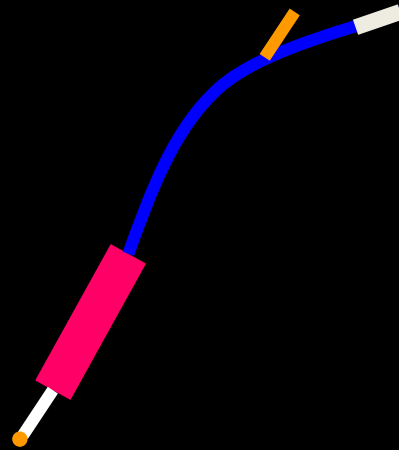


Fig 1. Stage 2: Distal open repair. A wedge of the distal thoracic aorta was removed and it is anastomosed to the multibranch graft along with the lower edge of the endograft.

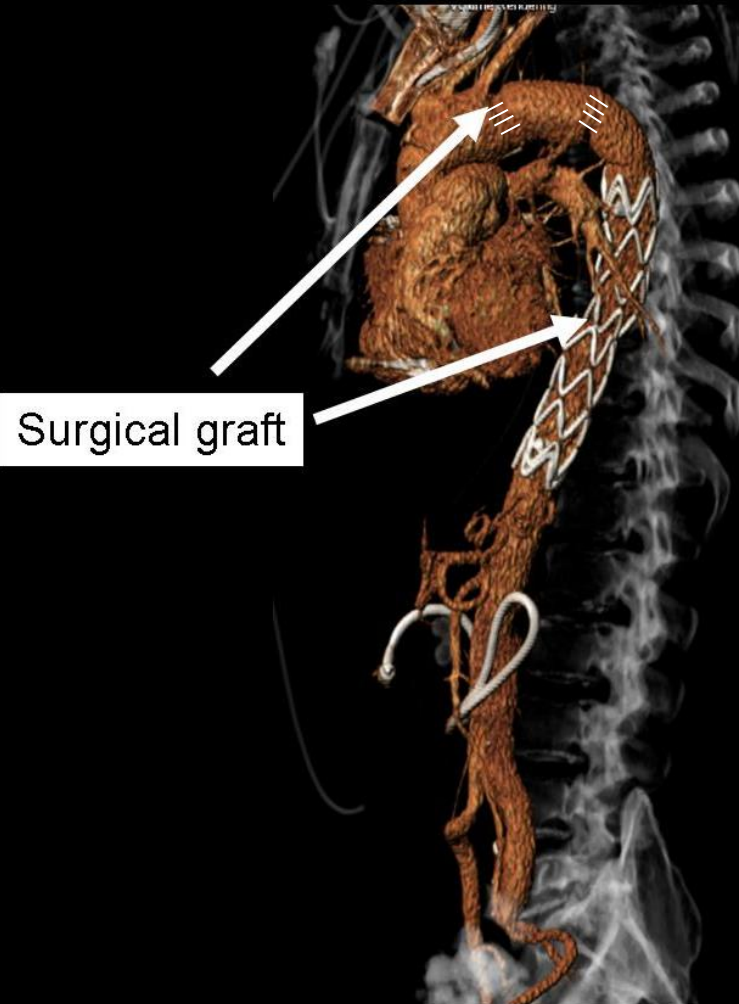
Acute type A (De Bakey 1) AD
 Ascending aorta replacement (2007)
 7 cm diameter of descending aorta



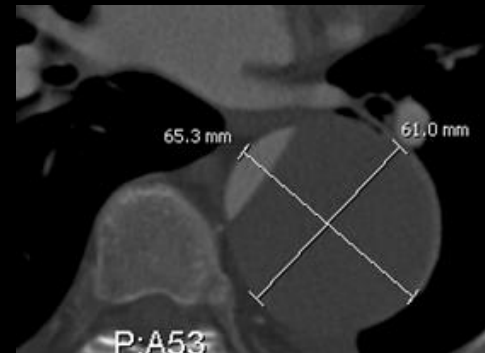
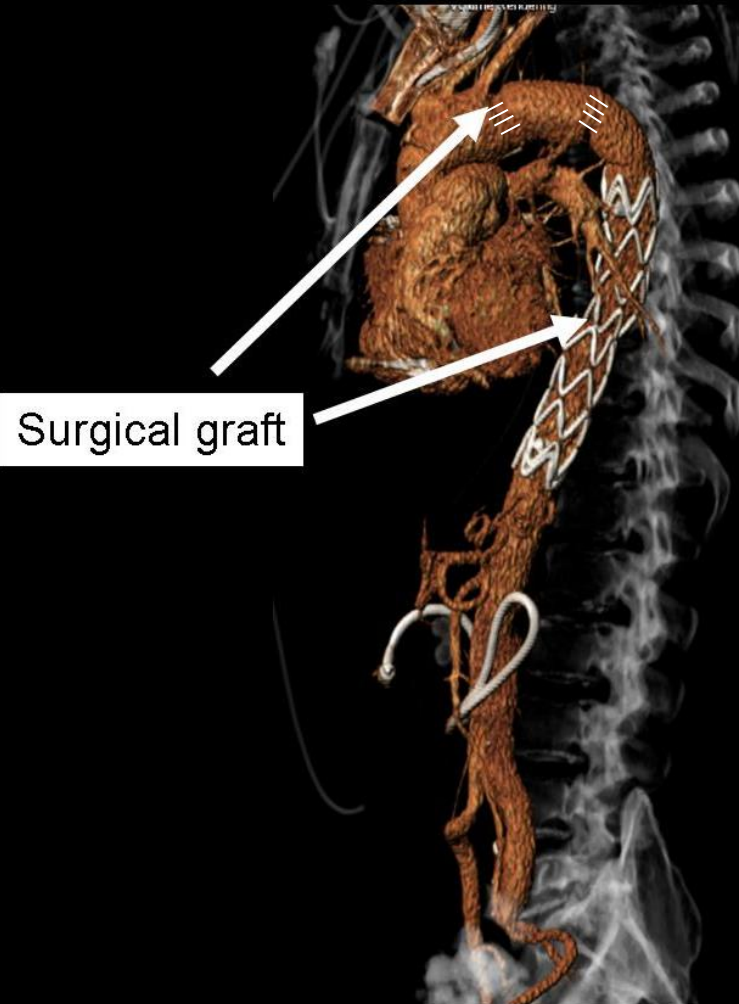
24.8.2009



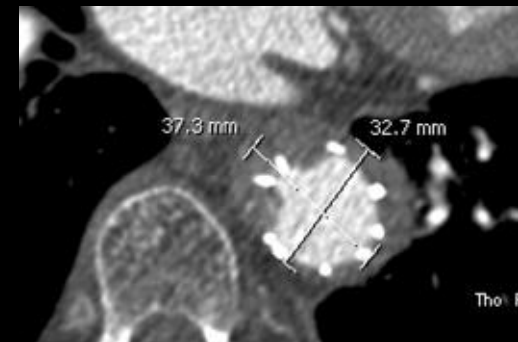
After arch repair and distal stentless
telescoping aortic anastomosis



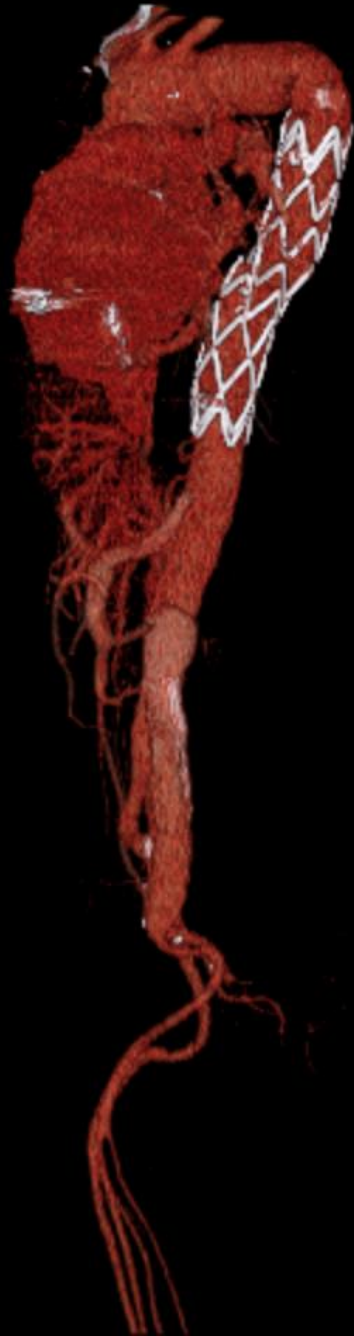
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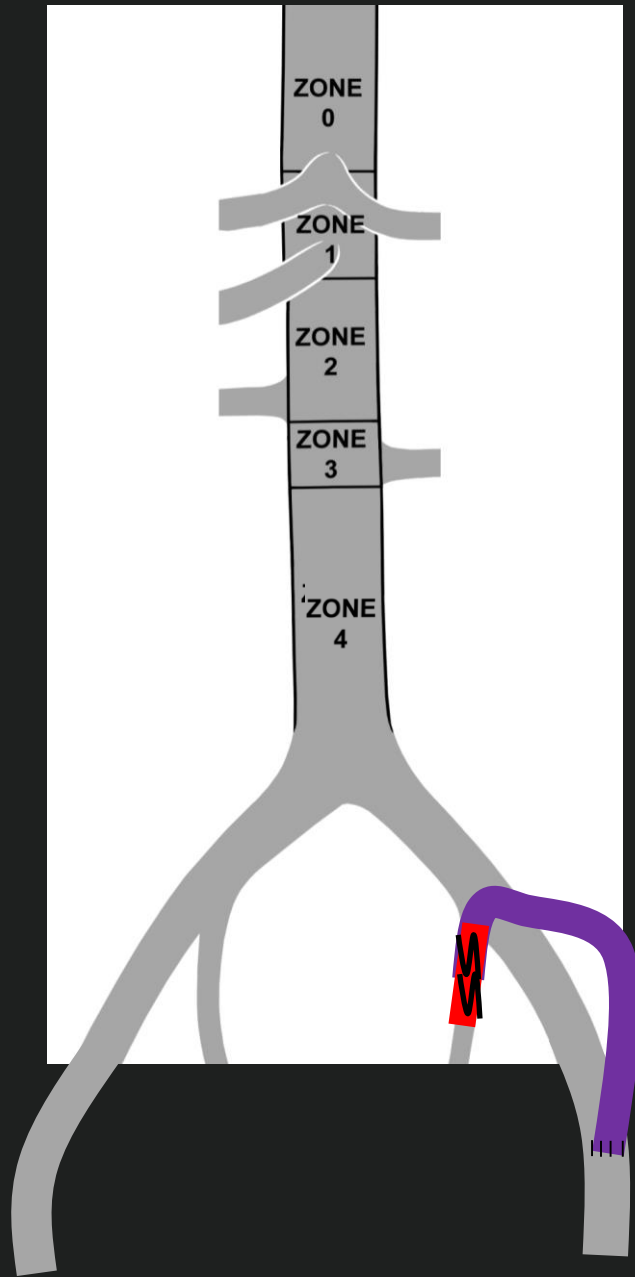


26 months FUP

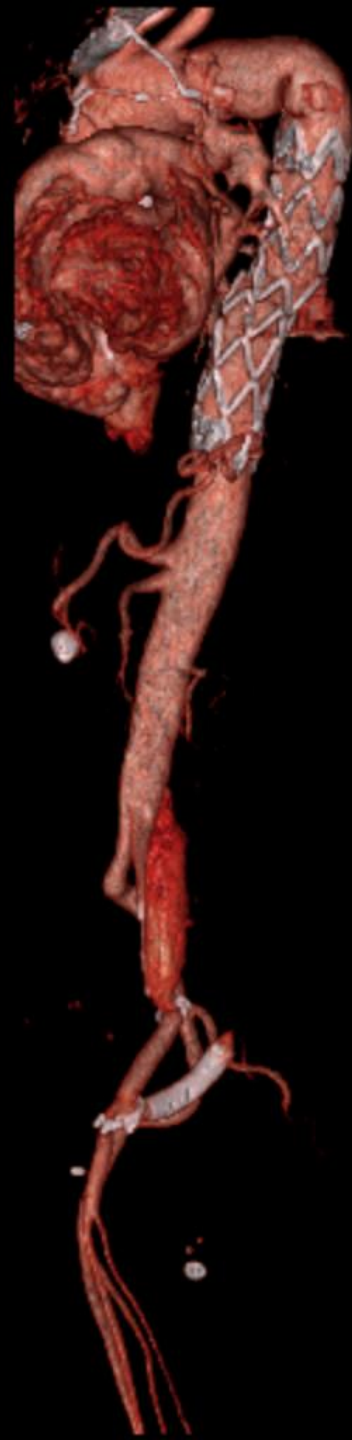


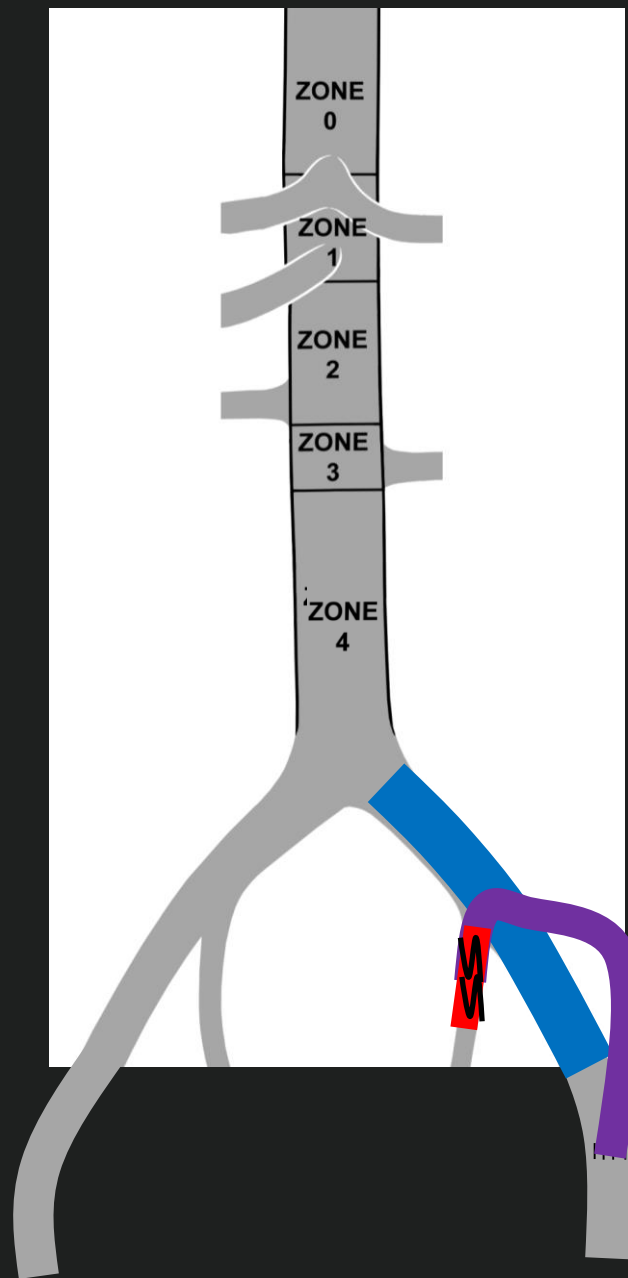
Management of distal tear





Externa-Interna Bypass VORTEC





Tear exclusion
SG EIA-CIA



5 years FUP
(6.6.2014)

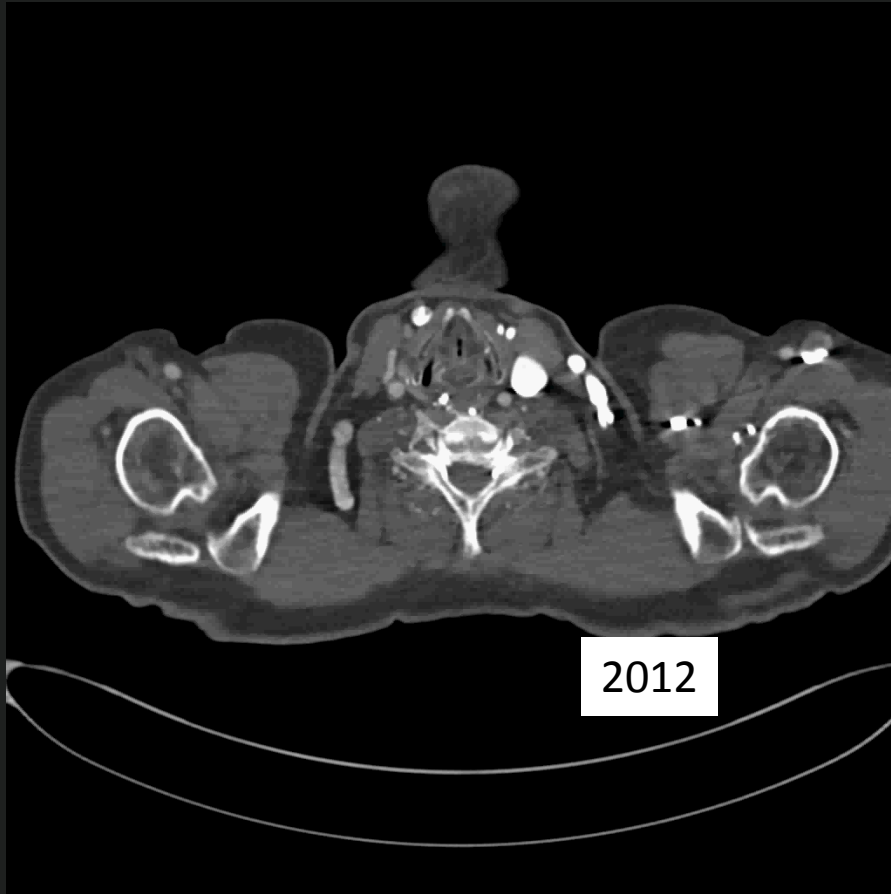


OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



- Chronic type A (DeBakey I) AD
- 2000: Composite graft & ½ Arch
 - CV and RV Malperfusion
 - Stroke, epilepsy
 - Bowel shortening
 - Acute/Chronic renal failure
- **2009: decline surgery**
 - Lost to follow-up

OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



- Chronic type A (DeBakey I) AD
- 2000: Composite graft & ½ Arch
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 - Acute/Chronic renal failure
- **2012: Symptomatic TAAA**
 - Descending max TDM 92mm

OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



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- **2012: «Symptomatic TAAA»**
 - Descending max TDM 92mm

OPEN AND ENDOVASCULAR SA & RV DEBRANCHING

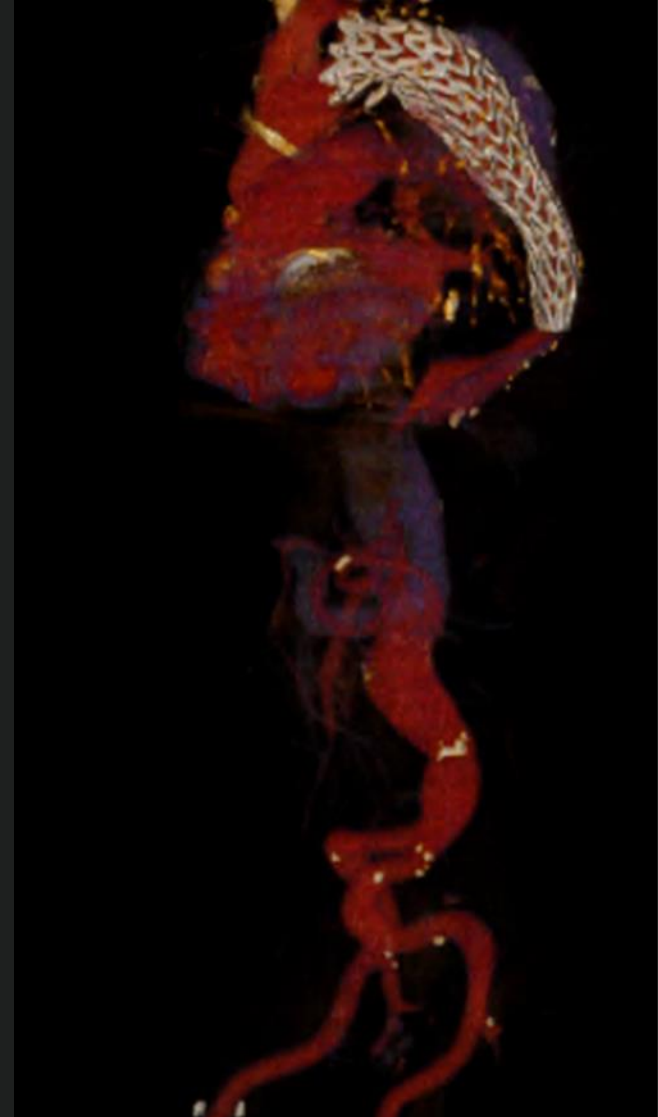


Sympt TAAA

OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



Asympt TAAA



OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



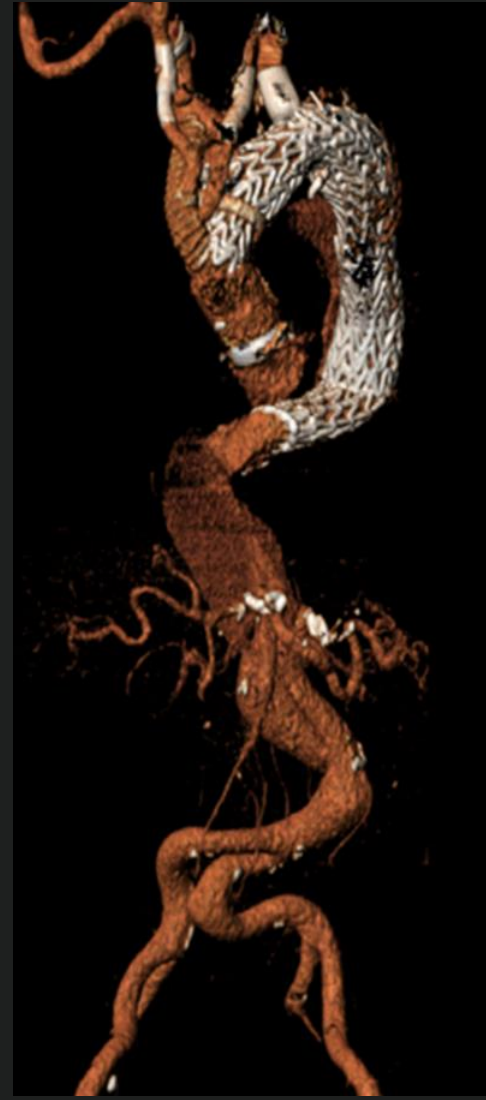
OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



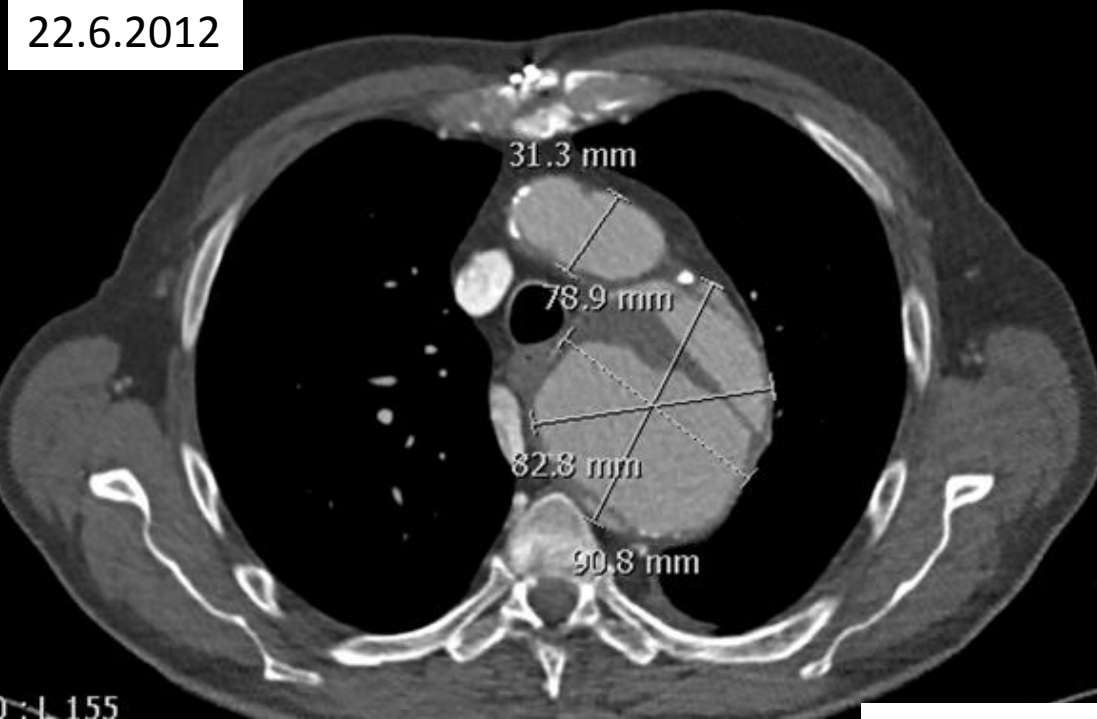
OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



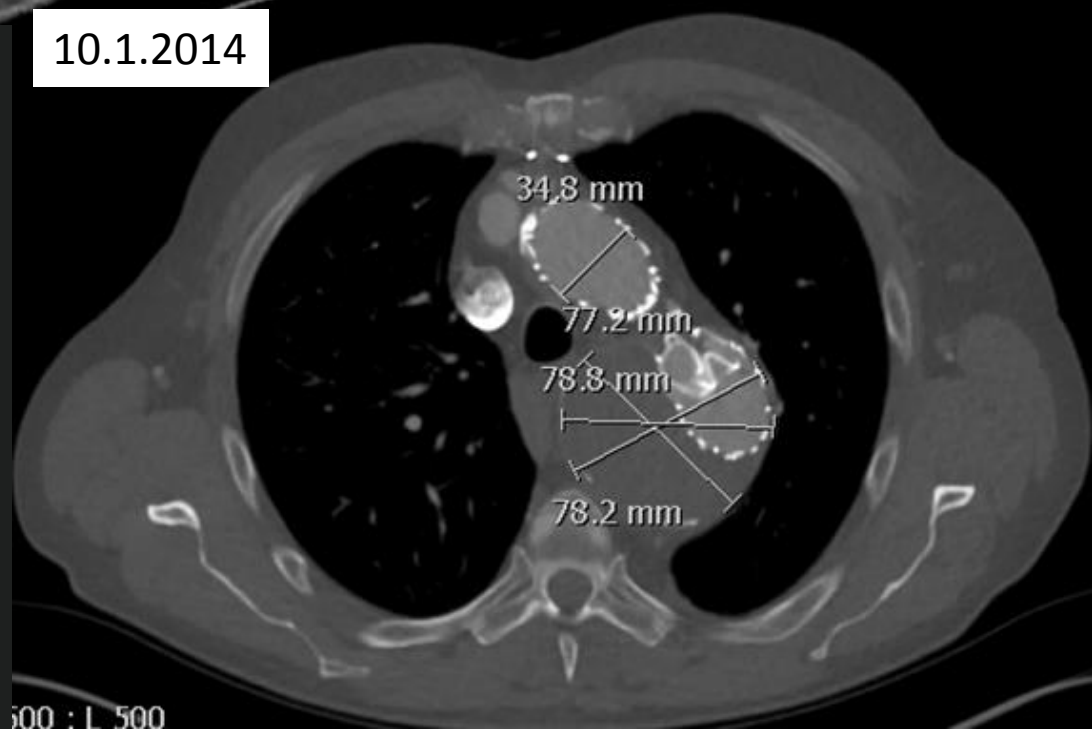
OPEN AND ENDOVASCULAR SA & RV DEBRANCHING

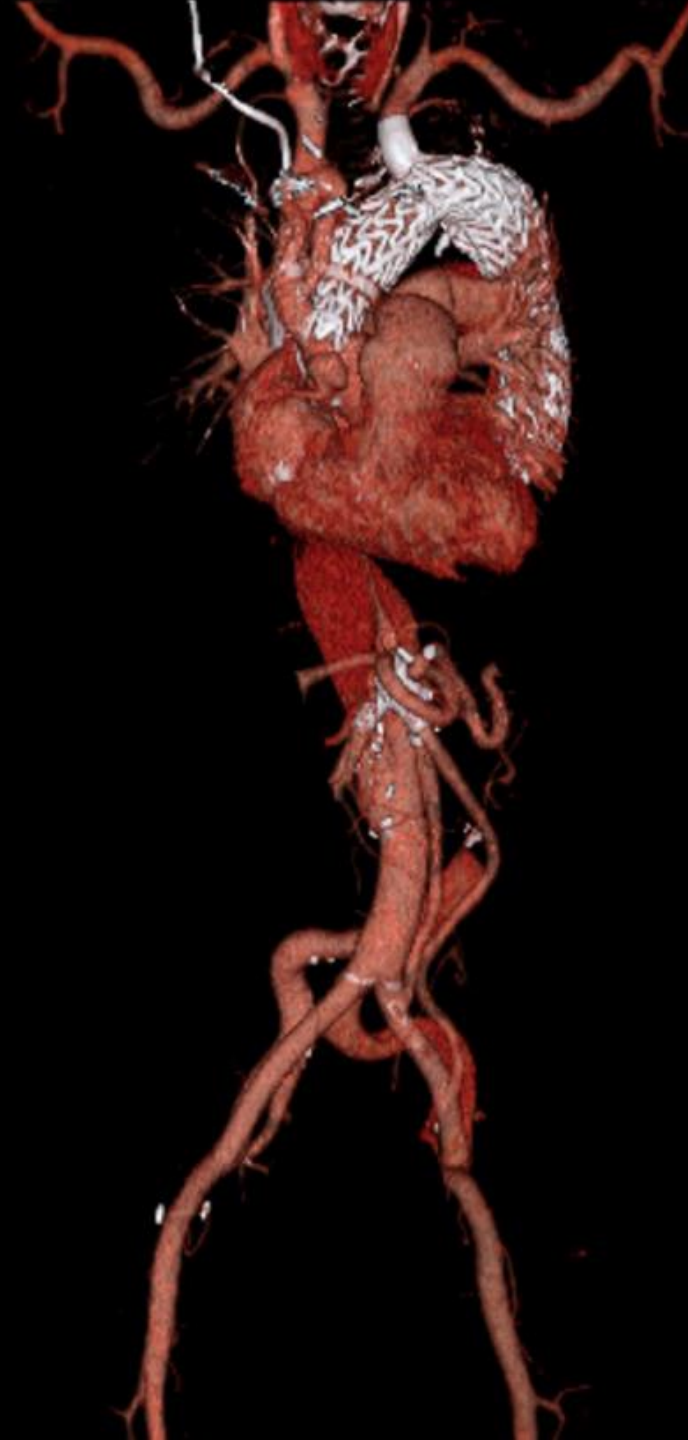
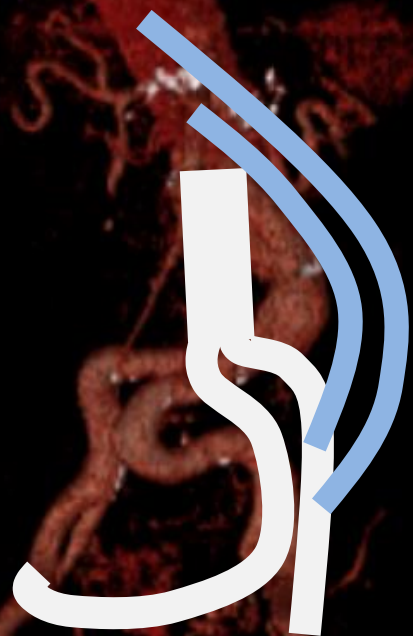


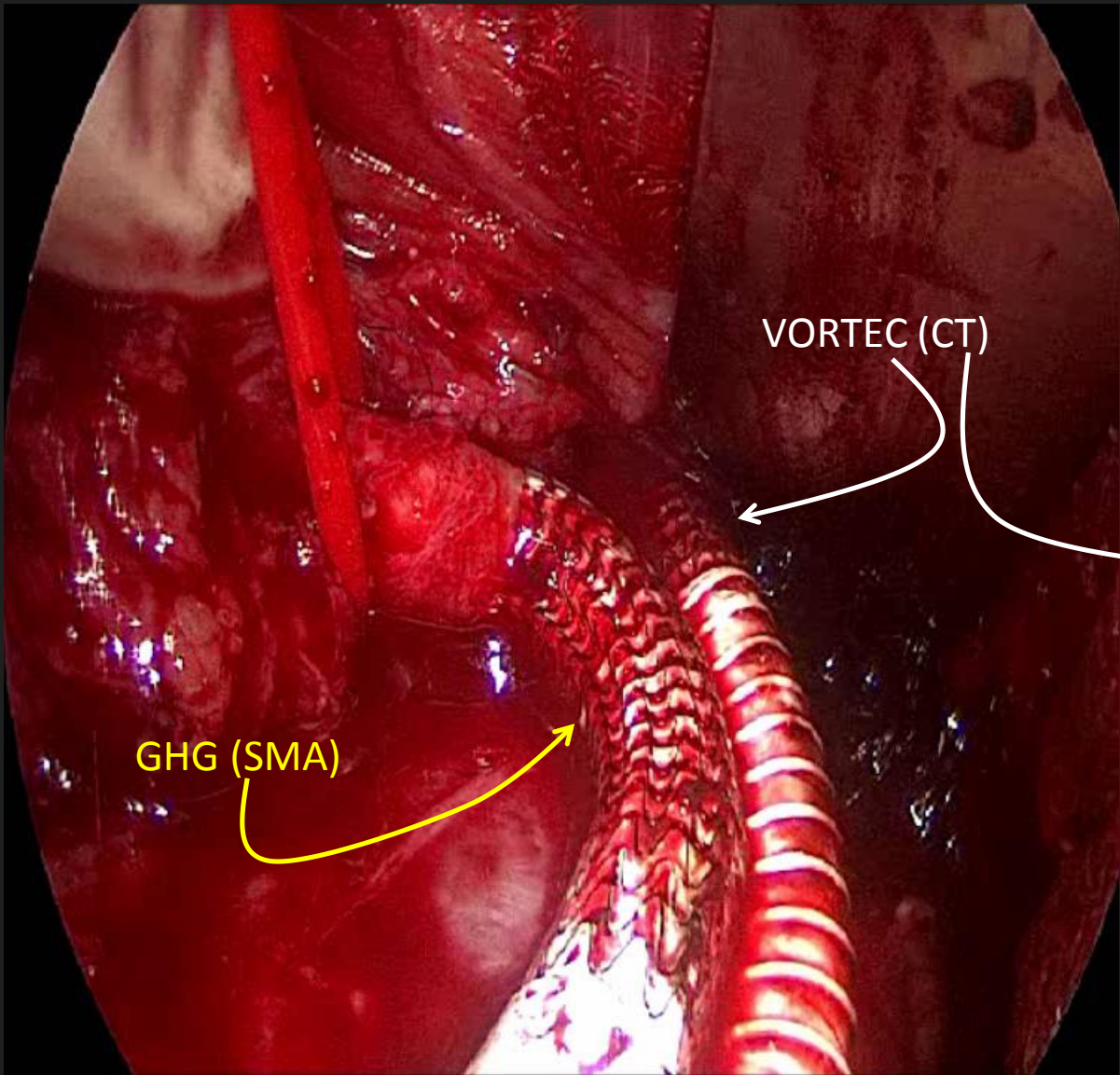
22.6.2012



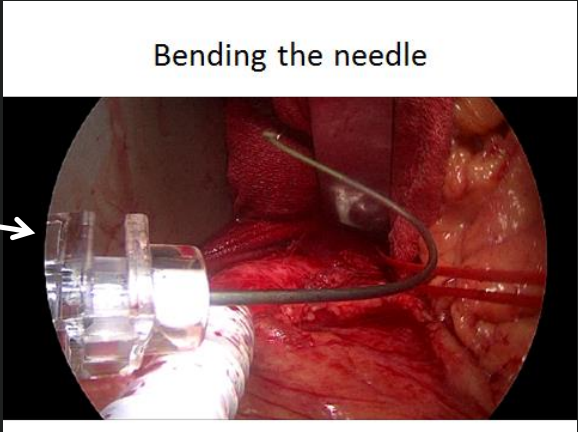
10.1.2014



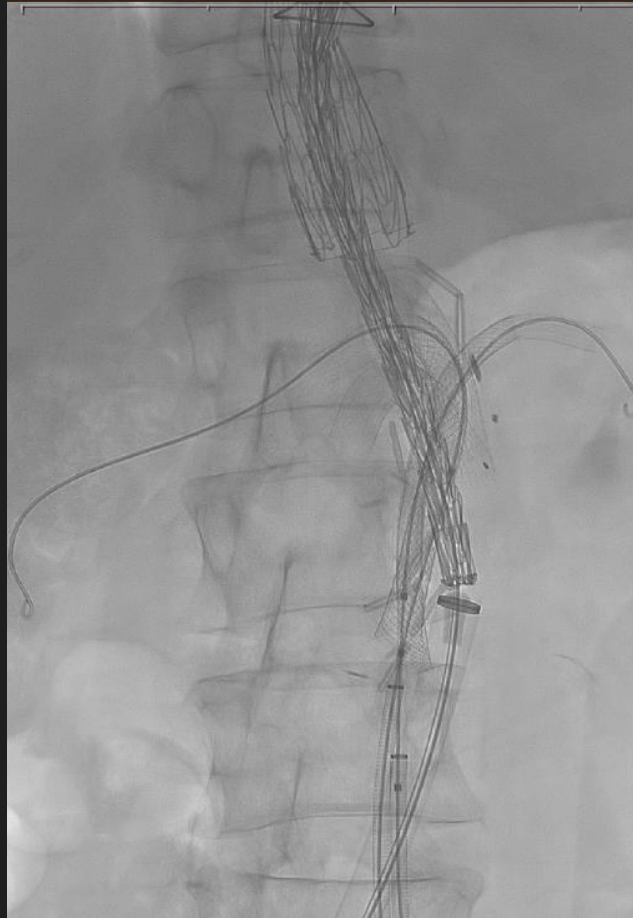




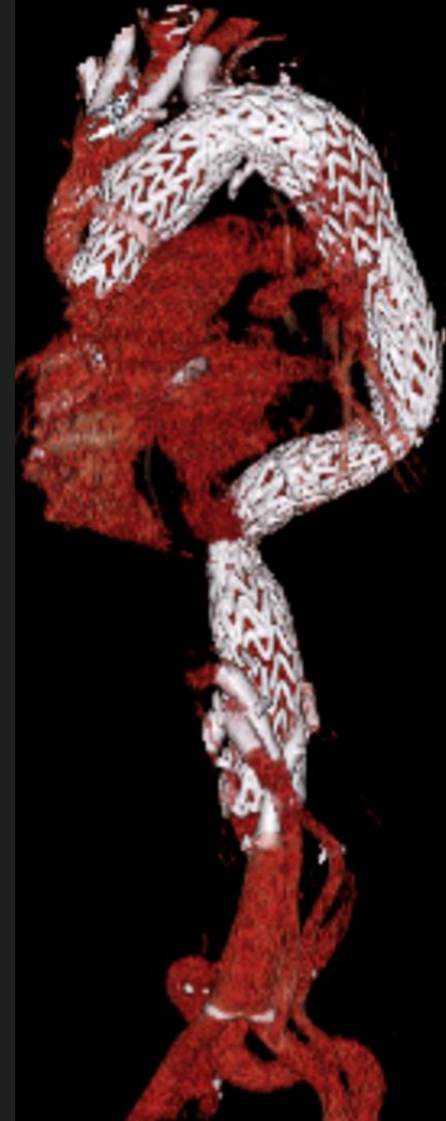
Full midline laparotomy

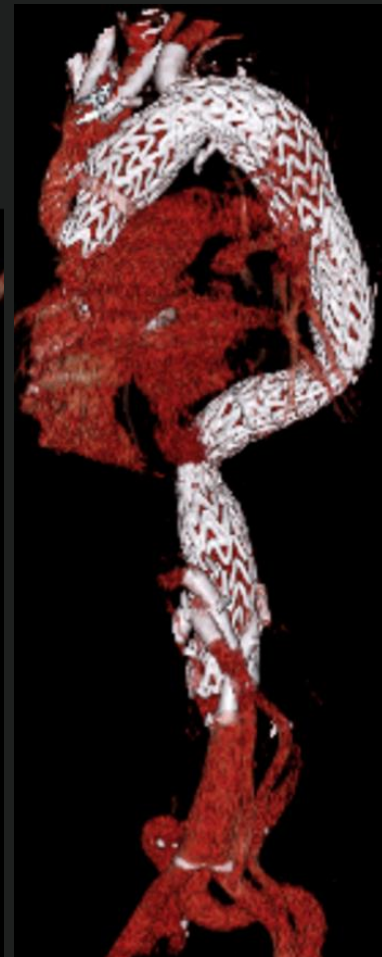
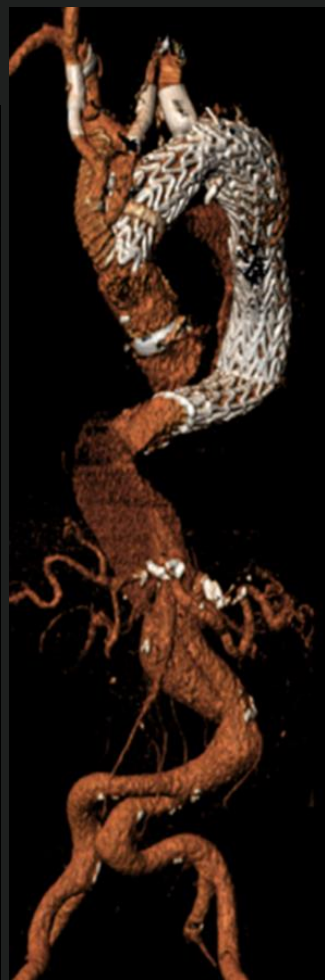
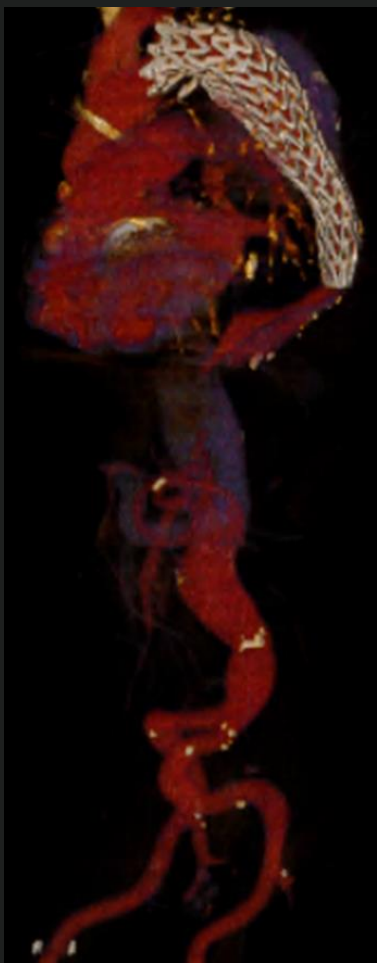


OPEN AND ENDOVASCULAR SA & RV DEBRANCHING



OPEN AND ENDOVASCULAR SA & RV DEBRANCHING





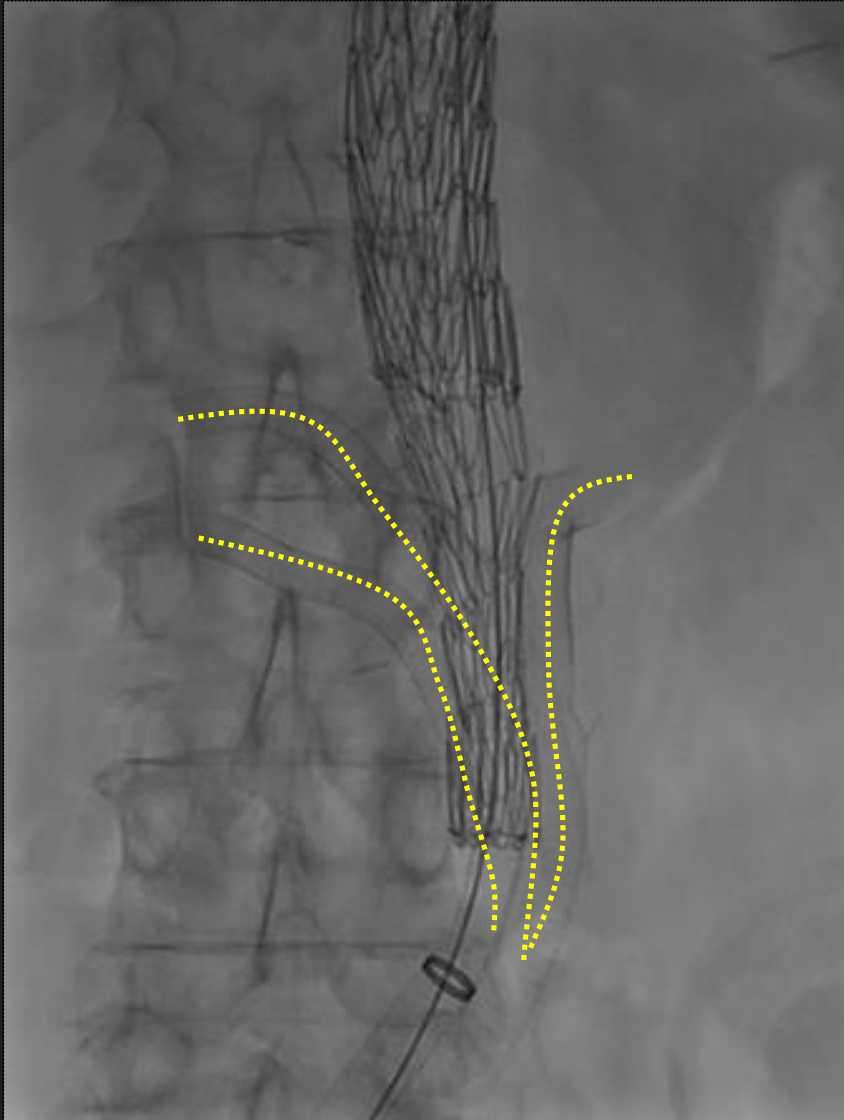
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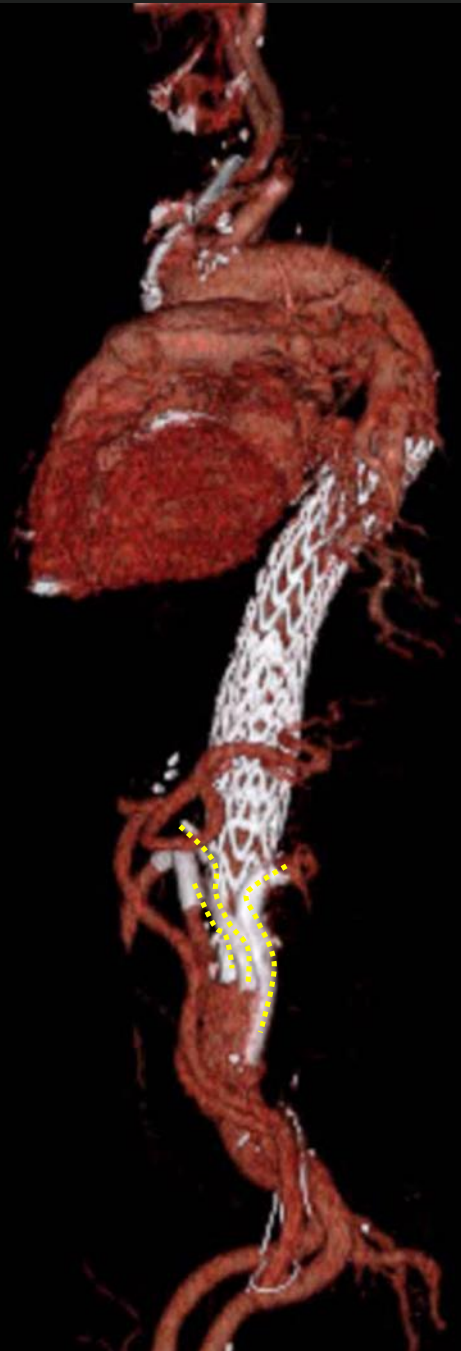
- Chronic type A (DeBakey I) AD
- 1997: Ascending & hemiarch
- 2005: composite graft & arch replacement
- **Symptomatic TAAA**
 - Visceral aorta max DM 60mm



- Infrarenal Y graft
- Visceral debranching
 - SMA VORTEC
 - TC conventional



- TAAA EVAR
 - Renal periscopes (3)

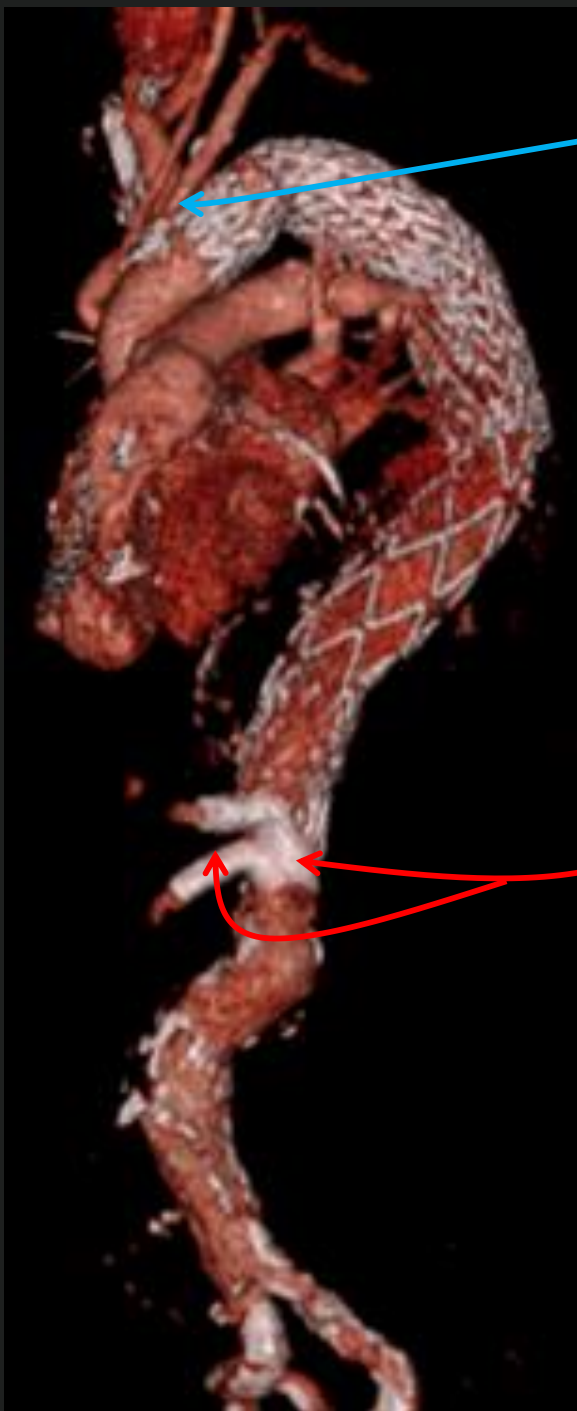


- TAAA EVAR
 - Renal periscopes (3)

9 months FUP (Mai 2013)



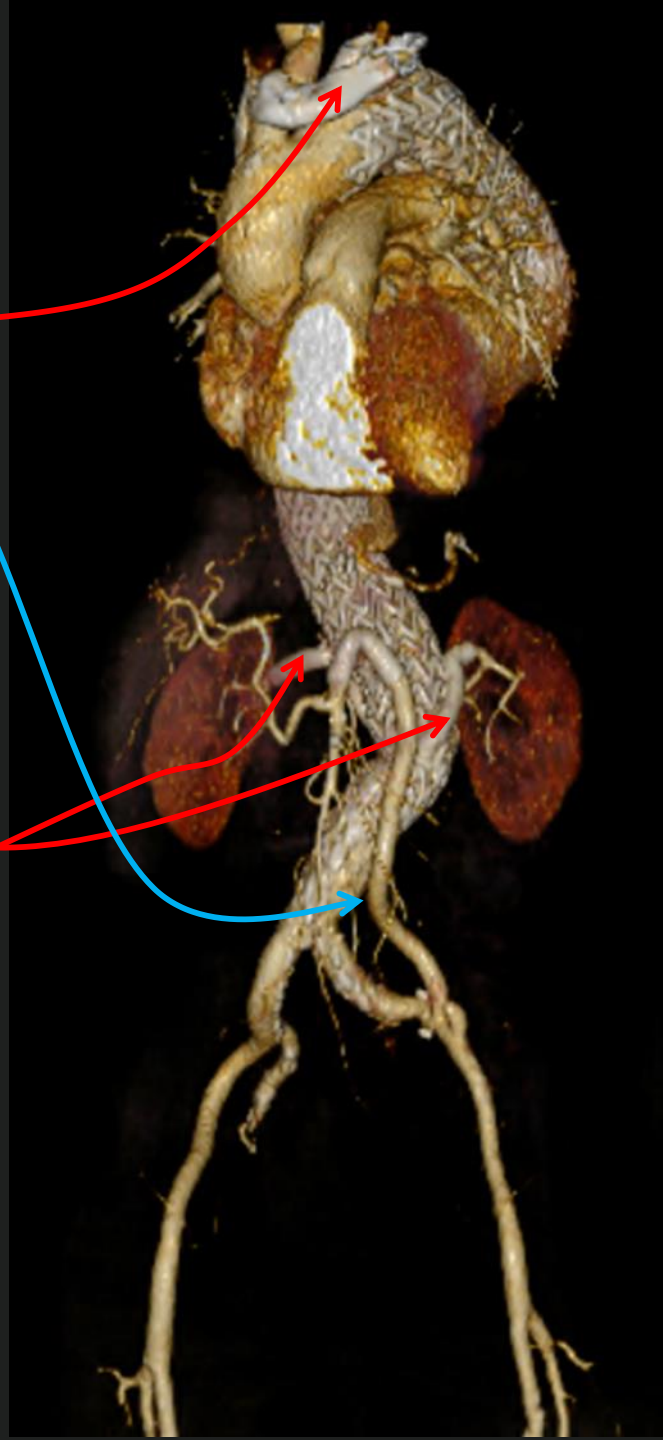
22 months FUP (juni 2014)

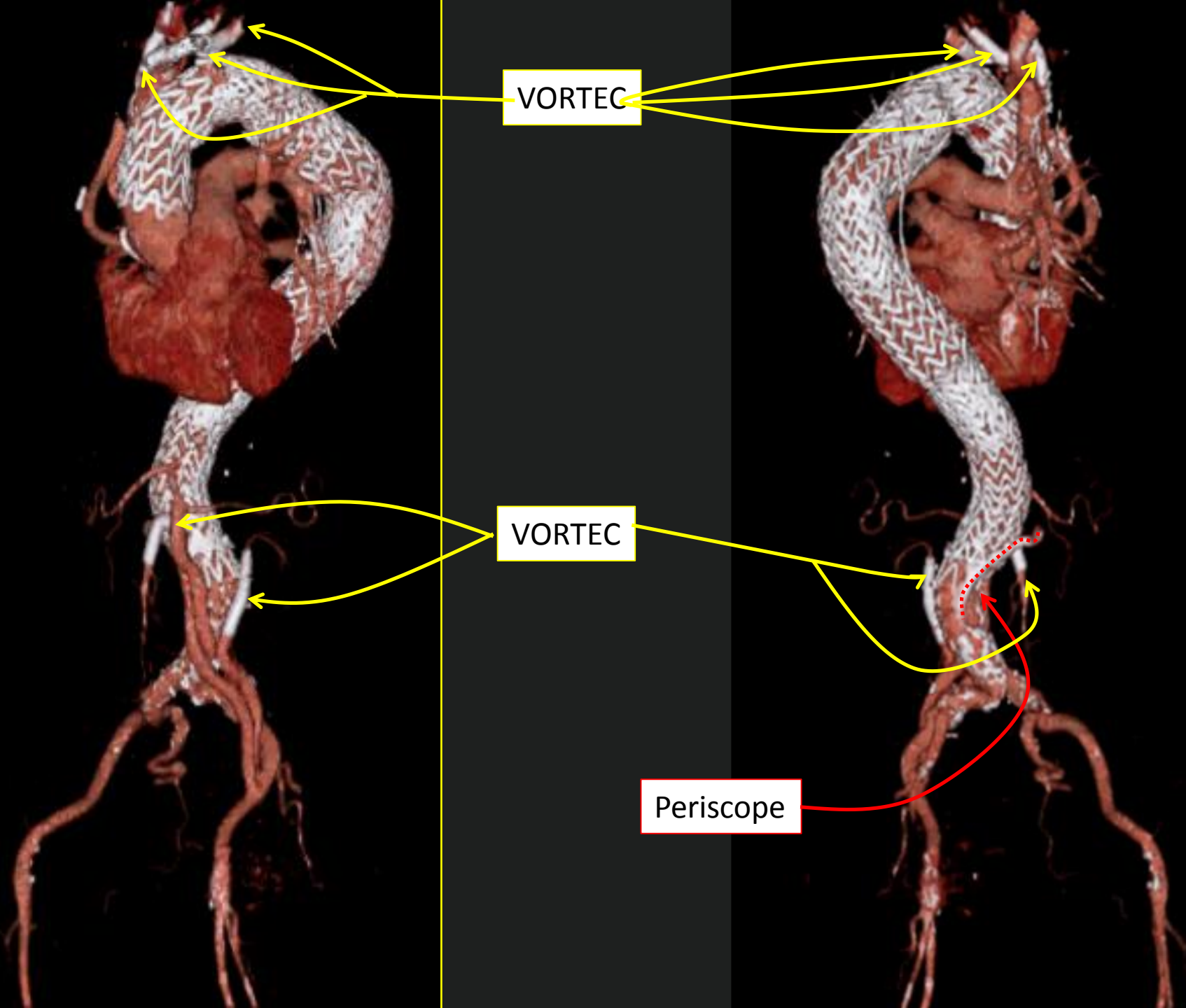


debranching

chimney

periscope





Rationale for ≥ 2 procedures

- Reduce complexity of
 - Open surgery (HR)
 - (T)EVAR
- Renal protection
 - reduce amount of contrast (EVAR)
- «Reduces risk of paraplegia»

Results

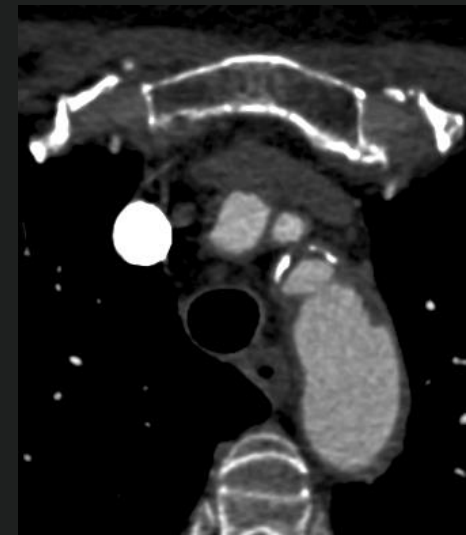
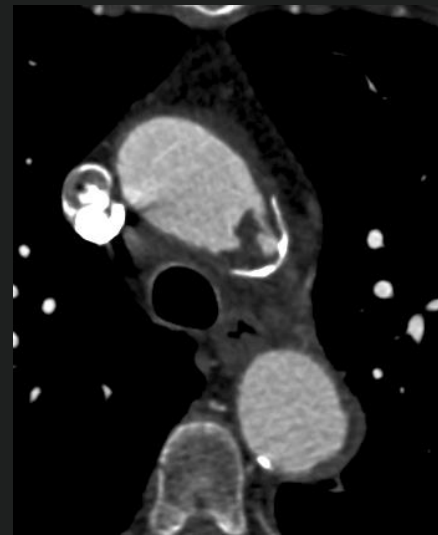
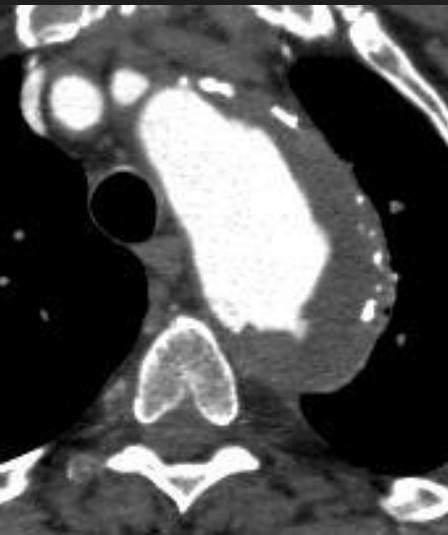
- 36 patients
 - 15 PRAA, 11 TAAA, 4 Descending
 - 6 A&V
 - 5 B-Dissection
- 30d results
 - mortality: 3 deaths (9%)
 - 2x intestinal 1x respiratory and MOF
 - 1x B-dissection

Conclusion

- Hybrid Repair allows treating complex aortic dissection
 - Unfortunately still quite invasive procedure
 - VORTEC and Gore Hybrid Graft facilitate challenging anastomosis
- Combined open/endovascular debranching
 - Promising new option
 - Allows staging complex aortic surgery
 - Allows addressing patients unfit for open surgery or EVAR
 - Reduces invasiveness of open surgery and complexity of EVAR

Limitations

- Diseased arch and branches



THANK YOU FOR YOUR ATTENTION

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