ΑΝΕΥΡΥΣΜΑ ΘΩΡΑΚΙΚΗΣ ΑΟΡΤΗΣ (ΑΘΑ)

Dr. ΜΕΛΑΣ ΝΙΚΟΛΑΟΣ, PhD
ΑΓΓΕΙΟΧΕΙΡΟΥΡΓΟΣ - ΑΓΓΕΙΟΛΟΓΟΣ
Διδάκτωρ Ιατρικής Σχολής ΑΠΘ
Στρατιωτικός Ιατρός
Επιστημονικός Συνεργάτης Α' Χ/κής Κλινικής ΑΠΘ
Αγγειοχειρουργός Ιατρικού Διαβαλκανικού Κέντρου

ΠΑΘΟΛΟΓΙΑ ΚΑΤΙΟΥΣΗΣ ΘΩΡΑΚΙΚΗΣ ΑΟΡΤΗΣ

- DTAA, dissections, tears, ulcers

  παθήσεις με σημαντική θνητότητα και αυξανόμενη συχνότητα **(1,2,3,4,5)**

  - ΑΘΑ 10 / 100,000 / έτος
  - Διαχωρισμός 9000 / έτος στις ΗΠΑ

1. Clouse WD, Hallett JW Jr, Schaff HV, Gayari MM, Ilstrup DM, Melton LJ III. Improved prognosis of thoracic aortic aneurysms: a populationbased study. JAMA 1998;280:1926-9.
2. Bickersta. LK, Pairolero PC, Hollier LH, Melton LJ, Van Peenen HJ, Cherry KJ, et al. Thoracic aortic aneurysms: a population-based study. Surgery 1982;92:1103–8.
3. Crawford ES, Hess KR, Cohen ES, Coselli JS, Sa. HJ. Ruptured aneurysm of the descending thoracic and thoracoabdominal aorta. Ann Surg 1991;213:417–25.
4. Johansson G, Markstrom U, Swedenborg J. Ruptured thoracic aortic aneurysms: a study of incidence and mortality rates. J Vasc Surg 1995;21:985–8.
5. Fann JI, Miller DC. Aortic dissection. Ann Vasc Surg 1995;9:311–23.

Ορισμός

Jonston KW, Rutherford RB et al. JVS 1991

- ***Ανεύρυσμα*** χαρακτηρίζεται μια μόνιμη εντοπισμένη αρτηριακή διάταση που οφείλεται σε δομικές αλλοιώσεις του τοιχώματος του αγγείου.

- ***Ανεύρυσμα*** θεωρείται κάθε παθολογική διάταση μιας αρτηρίας μεγαλύτερη από 50% της φυσιολογικής της διαμέτρου

Παθογένεια

- Συσχετίστηκε με αθηροσκλήρυνση
- Εκφυλιστική νόσος μη ειδικής αιτιολογίας 90%
- Φλεγμονώδη, μυκωτικά, συφιλιδικά, κυστική νέκρωση μ. χιτώνα, συγγενή σύνδρομα ελαστικού ιστού, τραυματικά, ιατρογενή (αναστομωτικά)

Προδιαθεσικοί παράγοντες

- Ηλικία
- Φύλο (x4.5)
- Φυλή
- Οικογενειακό ιστορικό
- Κάπνισμα (x6)
- Α. υπέρταση
- Υπερλιπιδαιμία
- Στεφανιαία νόσος

Φυσική εξέλιξη ΑΘΑ

καταστροφική:

- διάταση
- ρήξη
- Ισχαιμία
- shock
- Θάνατο

1- και 5- ετών επιβίωση:

- Σε ΑΘΑ μη χ/θεν 60% και 20%, αντίστοιχα. 1

Ετήσιος κίνδυνος ρήξης, διαχωρισμού, ή θανάτου (6 cm ΑΘΑ) > 14%. 2

1. Kouchoukos NT, Dougenis D. Surgery of the thoracic aorta. N Engl J Med 1997;336:1876–88
2. Elefteriades JA. Natural history of thoracic aortic aneurysms. Ann Thor Surg 2002;74:S1877–80.

Κλινική εικόνα

Ασυμπτωματικά

Συμπτωματικά

- Σύνδρομο άνω κοίλης φλέβας
- Δυσφαγία, βράγχος φωνής
- Δύσπνοια, βήχα
- Άτυπα κοιλιακά, θωρακικά άλγη
- Ραχιαλγία, οσφυαλγία
- Ατελή ειλεό
- παραπληγία
- Αιμόπτυση, αιματέμεση
- Δυσουρία
- Περιφερικές εμβολές
- Διαλείπουσα χωλότητα
- Αορτική ανεπάρκεια
- Πίεση στεφανιαίων αρτηριών
- Ρήξη 10-20% πρώτη εκδήλωση

Επιπλοκές

- ✓ Ρήξη (τελικά στο 75%-80% αν δεν αντιμετ.)
- ✓ Θρόμβωση
- ✓ Περιφερικές εμβολές
- ✓ Πίεση παρακείμενων οργάνων

Παράγοντες που αυξάνουν την πιθανότητα ρήξης

- Μέγεθος
- Ηλικία
- ΦΥΛΟ
- Υπέρταση
- COPD - Βρογχεκτασίες
- Κάπνισμα
- Ρυθμός αύξησης διαμέτρου
- Εποχιακή επίπτωση

Αντιμετώπιση

- **ΕΝΔΕΙΞΕΙΣ :**
  - **-μέγεθος (>5 cm)**
  - **-βαθμός ανάπτυξης (>1cm/έτος)**
  - **-συμπτωματικά**
  - **-ραγέντα (συγκαλυμμένη, ελεύθερη)**

Ενδείξεις – κριτήρια

Criteria for endovascular repair of descending TAA (Harbor-UCLA Medical Center. Jason T. Lee, Rodney A. White. Current status of thoracic aortic endograft repair. Surg Clin N Am 84 (2004) 1295–1318)	
Descending thoracic aneurysm > 5.5 cm in diameter	
Aneurysm 4.5–5.5 cm with increase in size by 0.5 cm in last 6 months or twice size normal	
Symptomatic / ruptured aneurysm	
Saccular aneurysm	
Nonaneurysmal proximal aortic neck > 20 mm in length that measures between 22 and 40 mm (dependent on device availability)	
No extension of aneurysm into abdominal aorta (distal neck at least 20 mm above celiac) that measures between 22 and 40 mm (dependent on device availability)	
Patent iliac or femoral arteries that allow introduction of 22–25 F delivery sheath (device dependent)	
Life expectancy at least 12 months	
Able to consent for appropriate trials and follow-up protocols	
Absence of general contraindications for every endovascular procedure: age < 18, allergy to contrast medium, coagulopathy, pregnancy-lactation, creatinine level > 1.7 mg/dl, groin infection and connective tissue disease.	

Κλασσική αντιμετώπιση

- DeBakey ME and Cooley MA in 1953. [1,2]
- open resection and graft interposition (via a left thoracotomy)
- Βελτιώνει σαφώς την επιβίωση σε σύγκριση με την συντηρητική αντιμετώπιση. [3]

1. DeBakey ME, Cooley MA. Succesfull resection of aneurysm of thoracic aorta and replacement by graft. De J Am Med Assoc. 1953 Jun 20;152(8): 673-676
2. DeBakey ME, McCollum CH, Graham JM. Surgical treatment of aneurysms of the descending thoracic aorta: long-term results in 500 patients. J Cardiovasc Surg 1978;19: 571–6.
3. Crawford ES et al. Thoracoabdominal aortic aneurysm: observations regarding the natural course of the disease. J Vasc Surg 1986;3:578–82.

Κλασσική χειρουργική αντιμετώπισης

- Γενική αναισθησία
- Σωλήνας διπλού αυλού
- Κερκιδική αρτηρία
- Κεντρική φλεβική γραμμή, Swan Ganz
- Εξωσ. κυκλοφορία
- 2 περιφερικές γραμμές
- Κεντρική θερμομέτρηση
- ΗΚΓ, ΕΚΓ, πίεση εγκ/νωτιαίου υγρού, ΣΣ δυναμικά

Αποτελέσματα κλασσικής αποκατάστασης
(MORBIDITY, MORTALITY AND SURVIVAL)

- Μικρή βελτίωση από το 1953
- Even with the advent of cardiopulmonary bypass, profound hypothermia, circulatory arrest, spinal cord protection and ICU support, the results slightly improved. 1-8

1. Crawford ES et al. Thoracoabdominal aortic aneurysm: observations regarding the natural course of the disease. J Vasc Surg 1986;3:578–82.
2. DeBakey ME, et al. Surgical treatment of aneurysms of the descending thoracic aorta: long-term results in 500 patients. J Cardiovasc Surg 1978;19: 571–6.
3. Clouse WD, et al. Improved prognosis of thoracic aortic aneurysms: a populationbased study. JAMA 1998;280:1926-9.
4. Coselli JS, et al. Thoracoabdominal aortic aneurysm repair: review and update of current strategies. Ann Thorac Surg 2002;74:S1881–4.
5. Kouchoukos NT, et al. Surgery of the thoracic aorta. N Engl J Med 1997;336:1876–88
6. Safi HJ, et al. Thoracic and thoracoabdominal aneurysm repair using cardiopulmonary bypass, profound hypothermia, and circulator arrest via left side of the chest incision. J Vasc Surg 1998;28:591–8.
7. Cambria RP, et al. Epidural cooling for spinal cord protection during thoracoabdominal aneurysm repair. J Vasc Surg 2000;31:1093–102.
8. Rectenwald JE, et al. Functional outcome after thoracoabdominal aortic aneurysm repair. J Vasc Surg 2002;35: 640–7.

Ενδαγγειακή αποκατάσταση

- Parodi in 1991, 1
- So, Volodos was the pioneer in endovascular treatment of DTA in 1991. 2
- Dake et al in 1992 used homemade devices that combined polyester grafts and modified Gianturco Z-stents with promising results. 3
- Since then, many studies have shown the technical feasibility and effectiveness of DTAA endovascular repair, as well as the potential complications. 3-28

1. Parodi JC, et al Transfemoral intraluminal graft implantation for abdominal aortic aneurysms. Ann Vasc Surg 1991;5: 491-9.
2. Volodos NL, et al. Clinical experience of the use of self-fixing synthetic prostheses for remote endoprosthetics of the thoracic and abdominal aorta and iliac arteries through femoral artery and intraoperative endoprosthesis for aortia reconstruction. Vasa Suppl 1991;33: 93-5.
3. Dake MD, et al. Transluminal placement of endovascular stent-grafts for the treatment of descending thoracic aortic aneurysms. N Engl J Med 1994;331:1729–34.
4. Ehrlich M, et al. Endovascular stent graft repair for aneurysms on the descending thoracic aorta. Ann Thorac Surg 1998;66:19–25.
5. Mitchell RS, et al. Thoracic aortic aneurysm repair with an endovascular stent graft: the ".rst generation." Ann Thorac Surg 1999;67:1971–4.
6. Temudom T, et al. Endovascular grafts in the treatment of thoracic aortic aneurysms and pseudoaneurysms. Ann Vasc Surg 2000;14:230–8.
7. Grabenwoger M, et al. Thoracic aortic aneurysms: treatment with endovascular self-expandable stent-grafts. Ann Thor Surg 2000;69:441–5.
8. Taylor PR, et al. Thoracic aortic stent grafts—early commercial experience from two centers using commercially available devices. Eur J Vasc Endovasc Surg 2001;22:70–6.
9. Greenberg R, et al. Endovascular repair of descending thoracic aortic aneurysms: an early experience with intermediate-term follow-up. J Vasc Surg 2000;31:147–56.
10. Bortone AS, et al. Endovascular stent-graft treatment for diseases of the descending thoracic aorta. Eur J Cardiovasc Thorac Surg 2001;20:514–9.
11. White RA, et al. Endovascular exclusion of descending thoracic aortic aneurysms and chronic dissections: Initial clinical results with the AneuRx device. J Vasc Surg 2001;33:927–34.
12. Won JY, et al. Elective endovascular treatment of descending thoracic aortic aneurysms and chronic dissections with stentgrafts. J Vasc Interv Radiol 2001;12:575–82.
13. Cambria RP, et al. Evolving experience with thoracic aortic stent graft repair. J Vasc Surg 2002;35:1129–36.
14. Thompson CS, et al. Endoluminal stent grafting of the thoracic aorta: initial experience with the Gore Excluder. J Vasc Surg 2002;35:1163–70.
15. Totaro M, et al. Endoluminal stent grafting of the descending thoracic aorta. Ital Heart J 2002;3:366–9.
16. Najibi S, et al. Endoluminal versus open treatment of descending thoracic aortic aneurysms. J Vasc Surg 2002;36:732–7.
17. Criado FJ, Clark NS, Barnatan MF. Stent graft repair in the aortic arch and descending thoracic aorta: a 4-year experience. J Vasc Surg 2002;36:1121–8.
18. Herold U, et al. Endoluminal stent graft repair for acute and chronic type B aortic dissection and atherosclerotic aneurysm of the thoracic aorta. Eur J Cardiothorac Surg 2002;22:891–7.
19. Chabbert V, et al. Midterm outcomes of thoracic aortic stent-grafts. J Endovasc Ther 2003;10:494–504.
20. Fattori R, et al. Descending thoracic aortic diseases: stent-graft repair. Radiology 2003;229:176–83.
21. Scharrer-Pamler R, et al. Complications after endovascular treatment of thoracic aortic aneurysms. J Endovasc Ther 2003;10:711–8.
22. Lamme B, et al. Endovascular treatment of thoracic aortic pathology. Eur J Vasc Endovasc Surg 2003;25:532–9.
23. Lepore V, et al. Treatment of descending thoracic aneurysms by endovascular stent grafting. J Cardiovasc Surg 203;18: 436–43.
24. Krohg-Sorensen K, et al. Acceptable short-term results after endovascular repair of diseases of the thoracic aorta in high risk patients. Eur J Cardiothorac Surg 2003;24:379–87.
25. Lambrechts D, et al. Endovascular treatment of the descending thoracic aorta. Eur J Vasc Endovasc Surg 2003; 26:437–44.
26. Ellozy SH, et al. Challenges of endovascular tube-graft repair of thoracic aortic aneurysm: midterm follow-up and lessons learned. J Vasc Surg 2003;38:676–83.
27. Czerny M, Cejna M, Hutschala D, Fleck T, Holzenbein T, Schoder M, et al. Stent-graft placement in atherosclerotic descending thoracic aneurysms: midterm results. J Endovasc Ther 2004;11:26–32.
28. Melissano et al. Disappointing results with a new commercially available thoracic endograft. J Vasc Surg 2004;39:124–30.

Πλεονεκτήματα Ενδαγγειακής αποκατάστασης

- avoidance of major thoracic or thoracoabdominal incisions
- decreased need for general anesthesia
- shorter operative time
- minimal blood lose and need for transfusions
- lack of aortic crossclamping, avoidance of cardiopulmonary bypass
- less postoperative pain
- shorter hospital and ICU stays and quicker recuperation.
- 30-day mortality
- Morbidity
- paraplegia

} especially

OPEN vs EVAR	Open surgery[1-10] Centers of excellence	EVAR (DTAA)[11-36] All reports (25 Centers)
30-day mortality	8-20% (elective) 60% (ruptured)	10% (0-25%)
Morbidity	50%	10 %
Paraplegia	Up to 8%	0% (only 7 out of 25 reports with approximately 5% paraplegia).
5–year survival	60-70%	To be determined (equal or increased with K-M analysis)

1. DeBakey ME, et al. J Cardiovasc Surg 1978;19: 571–6.
2. Clouse WD, et al. JAMA 1998;280:1926-9.
3. Svensson LG, et al. J Vasc Surg 1993;17:357–70.
4. Coselli JS, et al. Ann Thorac Surg 2002;74:S1881–4.
5. Kouchoukos NT, Dougenis D. N Engl J Med 1997;336:1876–88
6. Safi HJ, et al. J Vasc Surg 1998;28:591–8.
7. Cambria RP, et al. J Vasc Surg 2000;31:1093–102.
8. Rectenwald JE, et al. J Vasc Surg 2002;35: 640–7.
9. Sa. HJ, et al. Semin Thorac Cardiovasc Surg 1998;10:41–4.
10. Hamilton IN, Hollier LH. Semin Thorac Cardiovasc Surg 1998;10:35–9.
11. Dake MD, et al. N Engl J Med 1994;331:1729–34.
12. Ehrlich M, et al. Ann Thorac Surg 1998;66:19–25.
13. Mitchell RS, et al." Ann Thorac Surg 1999;67:1971–4.
14. Temudom T, et al. Ann Vasc Surg 2000;14:230–8.
15. Grabenwoger M, et al. Ann Thor Surg 2000;69:441–5.
16. Taylor PR, et al. Eur J Vasc Endovasc Surg 2001;22:70–6.
17. Greenberg R, et al. J Vasc Surg 2000;31:147–56.
18. Bortone AS, et al. Eur J Cardiovasc Thorac Surg 2001;20:514–9.
19. White RA, et al. J Vasc Surg 2001;33:927–34.
20. Won JY, et al. J Vasc Interv Radiol 2001;12:575–82.
21. Cambria RP, et al. J Vasc Surg 2002;35:1129–36.
22. Thompson CS, et al. J Vasc Surg 2002;35:1163–70.
23. Totaro M, et al. Ital Heart J 2002;3:366–9.
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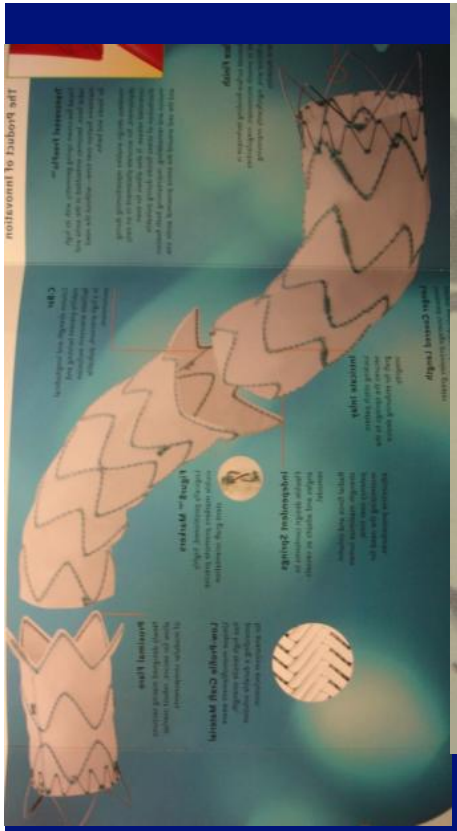
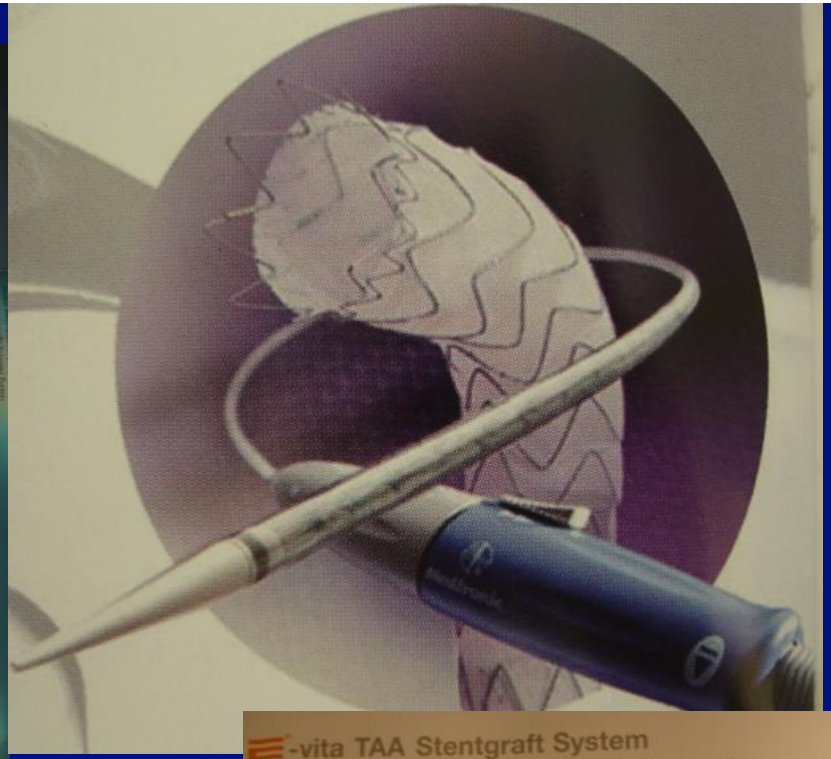
25. Criado FJ, Clark NS, Barnatan MF. J Vasc Surg 2002;36:1121–8.
26. Herold U, et al. Eur J Cardiothorac Surg 2002;22:891–7.
27. Chabbert V, et al. J Endovasc Ther 2003;10:494–504.
28. Fattori R, et al. Radiology 2003;229:176–83.
29. Scharrer-Pamler R, et al. J Endovasc Ther 2003;10:711–8.
30. Lamme B, et al. Eur J Vasc Endovasc Surg 2003;25:532–9.
31. Lepore V, et al. J Cardiovasc Surg 203;18: 436–43.
32. Krohg-Sorensen K, et al. Eur J Cardiothorac Surg 2003;24:379–87.
33. Lambrechts D, et al. Eur J Vasc Endovasc Surg 2003; 26:437–44.
34. Ellozy SH, et al. J Vasc Surg 2003;38:676–83.
35. Czerny M,, et al. J Endovasc Ther 2004;11:26–32.
36. Melissano et al. J Vasc Surg 2004;39:124–30.

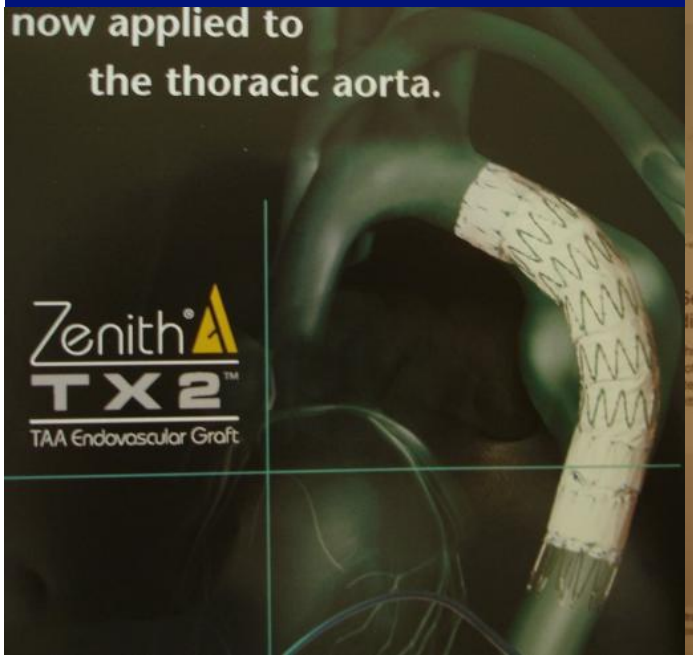
Μειονεκτήματα Ενδαγγειακής αποκατάστασης

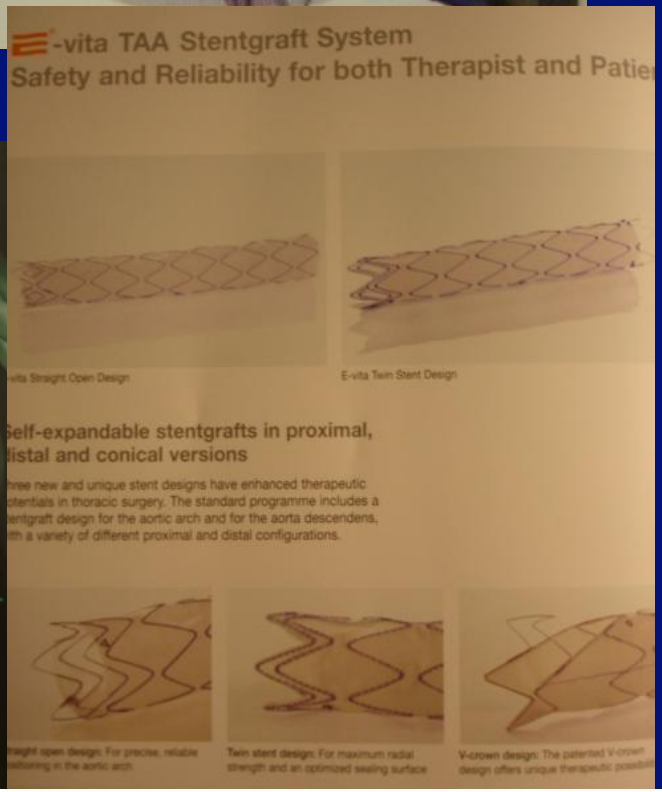
- long-term data is still lacking.

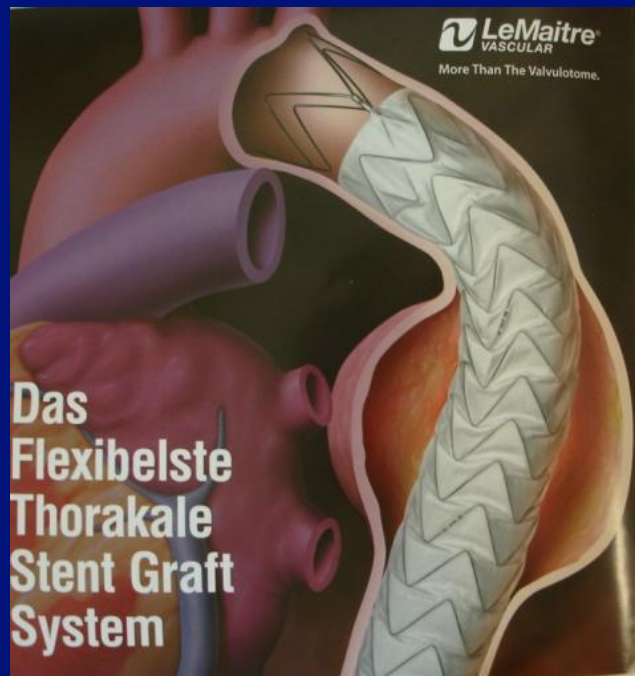
- Endoleak,
- migration,
- material fatigue
- sac pressurization






now applied to
the thoracic aorta.
Zenith
TX2
TAA Endovascular Graft


-vita TAA Stentgraft System
Safety and Reliability for both Therapist and Patie
E-vita Twin Stent Design
elf-expandable stentgrafts in proximal,
istal and conical versions
ree new and unique stent designs have enhanced therapeutic
otentials in thoracic surgery. The standard programme includes a
entgraft design for the aortic arch and for the aorta descendens,
th a variety of different proximal and distal configurations.
Twin stent design: For maximum radial
strength and an optimized sealing surface


LeMaitre
VASCULAR
More Than The Valvulotome.
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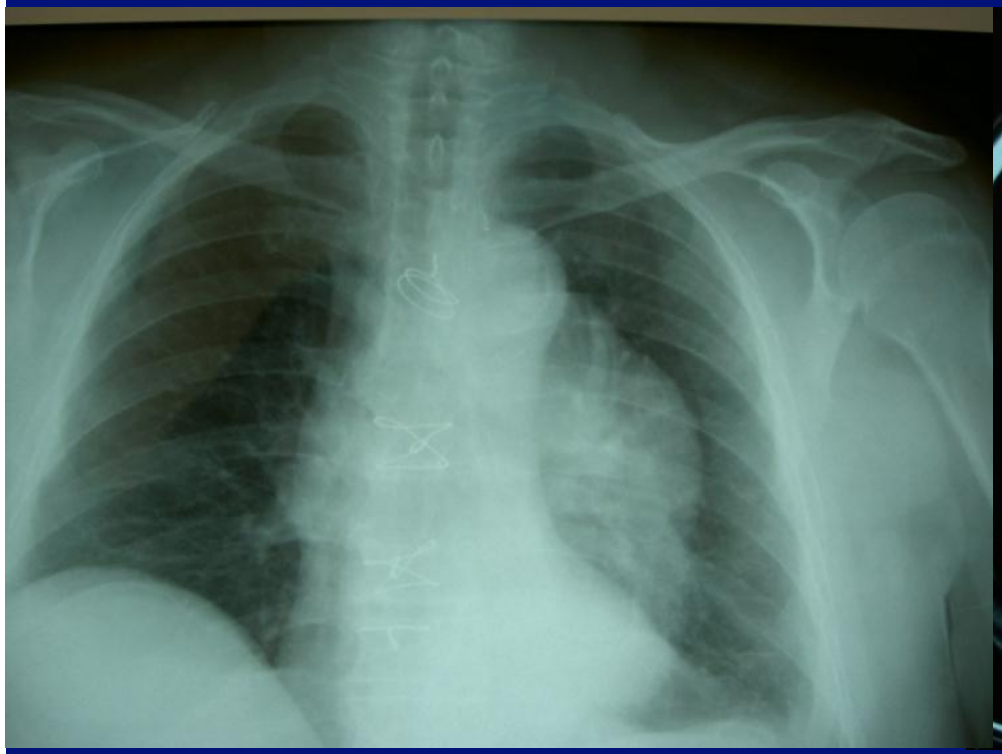
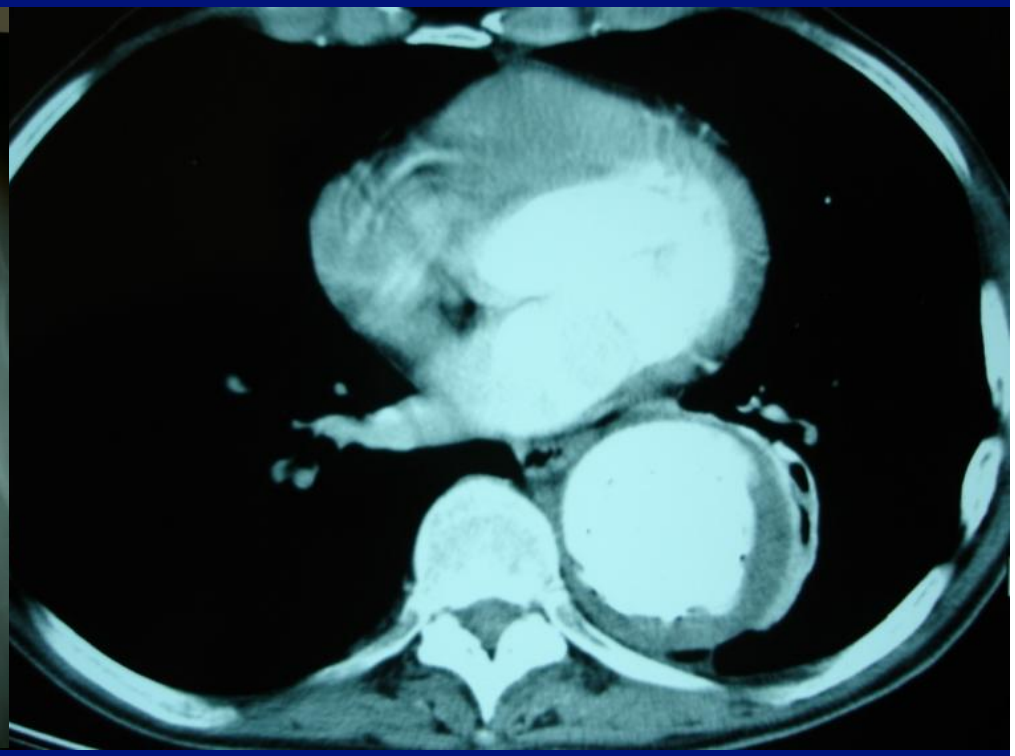
Thorakale
Stent Graft
System

PROCEDURE



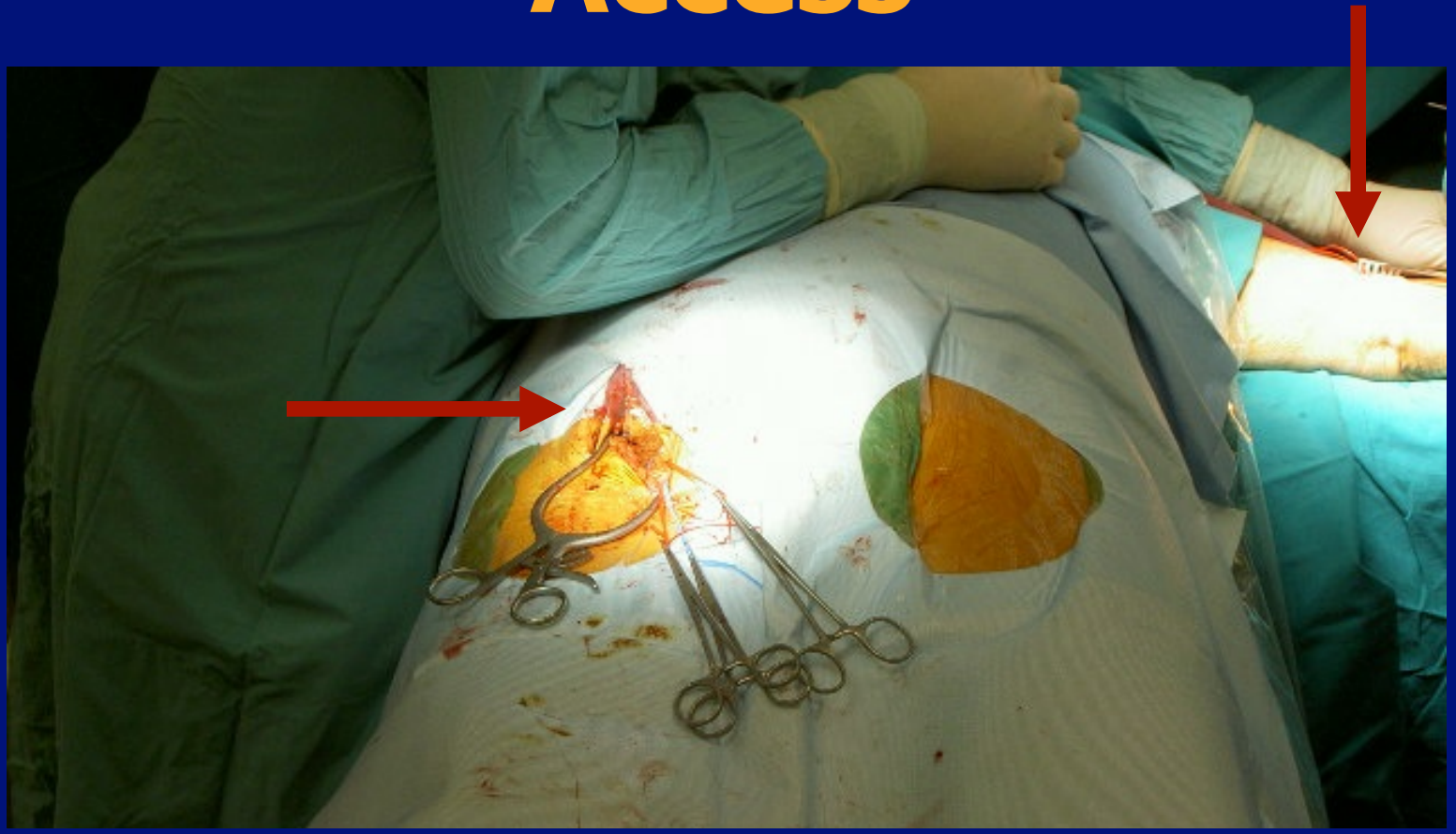


Preparation

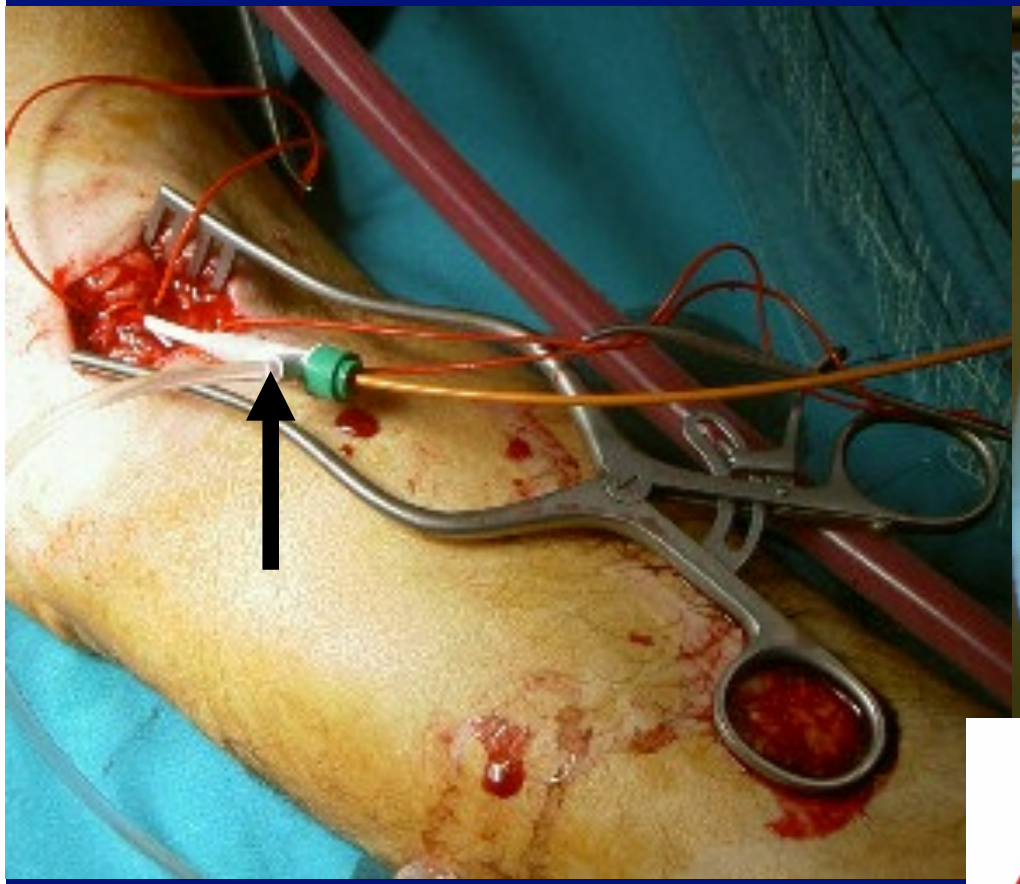
In a fully image guided OR

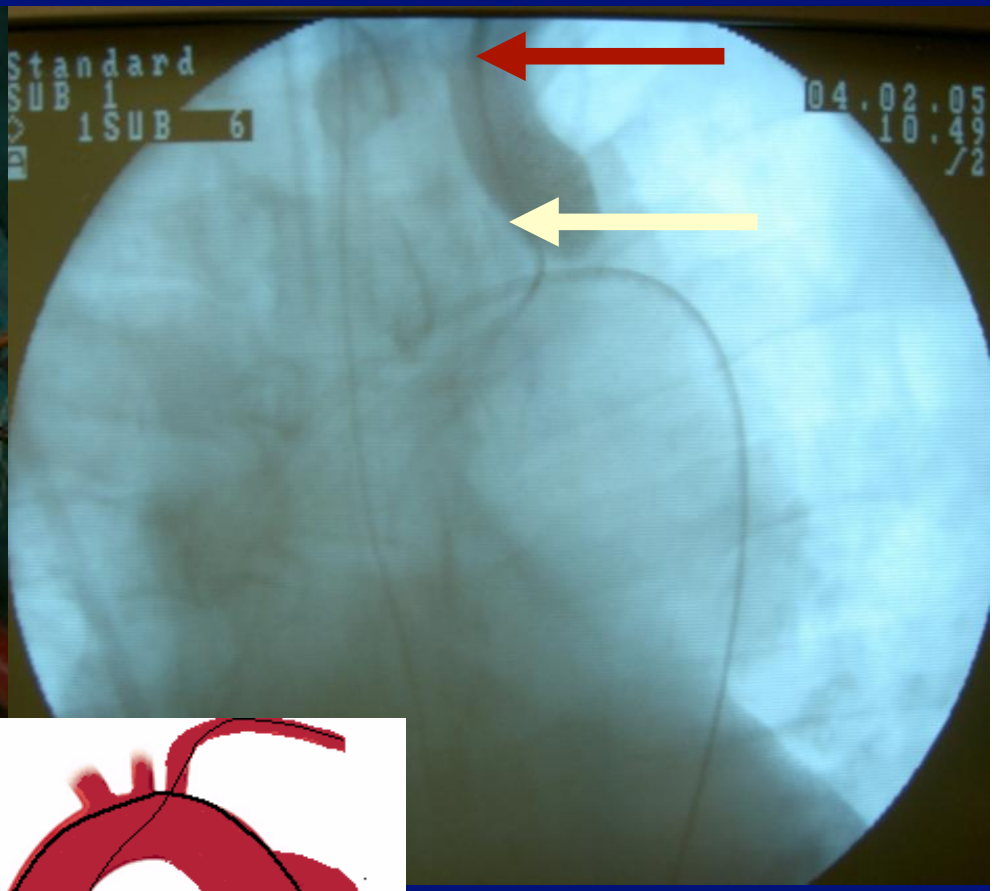
Both groins and left arm are prepared

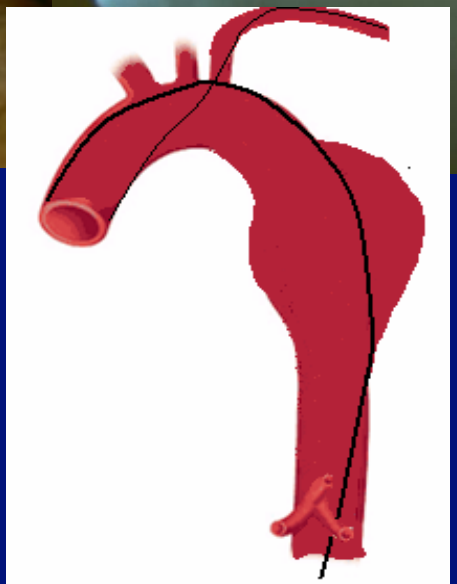
Access



Surgical exposure of right femoral and left brachial artery



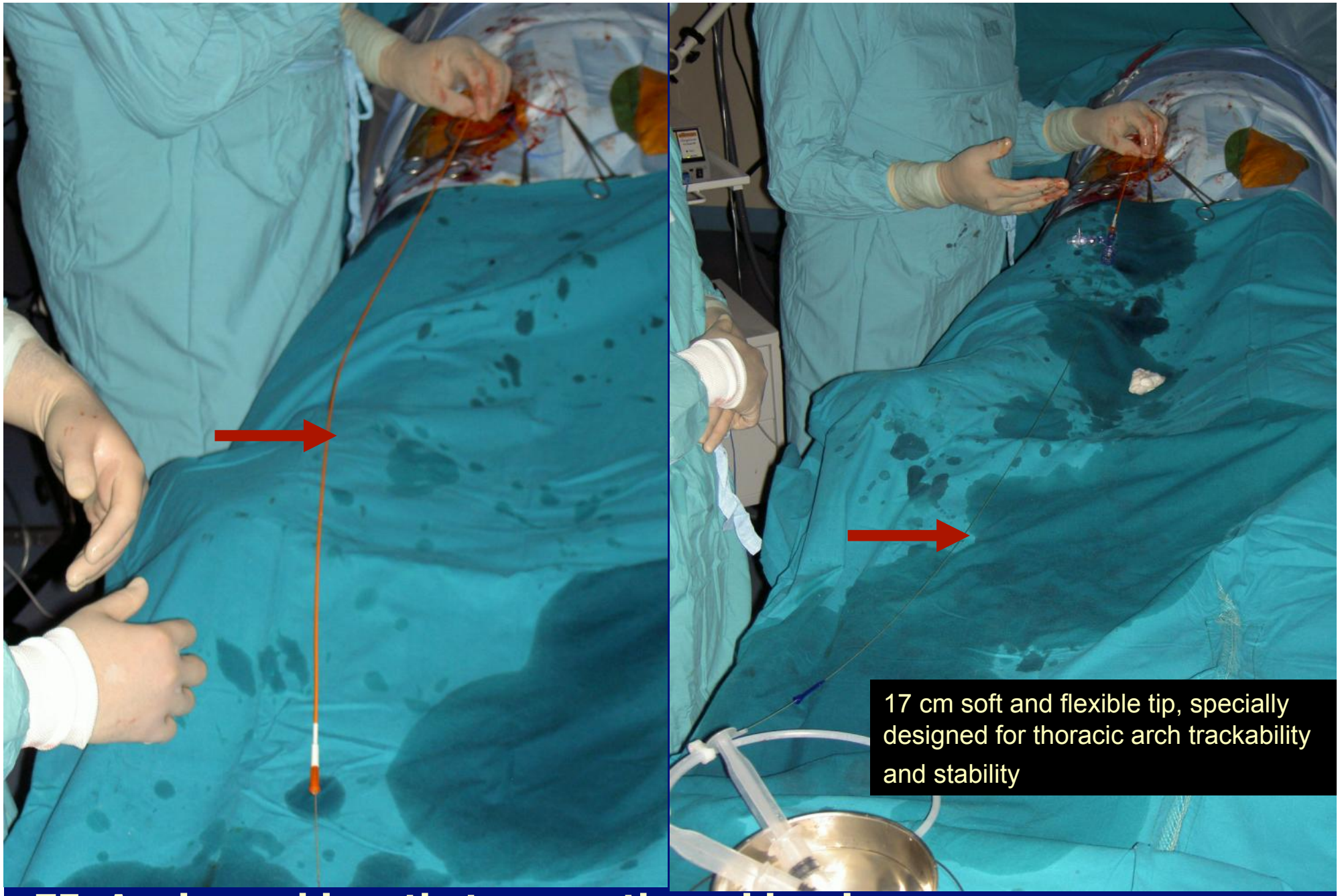




6 / 7 Fr sheath

Guide wire or Terrumo 150cm

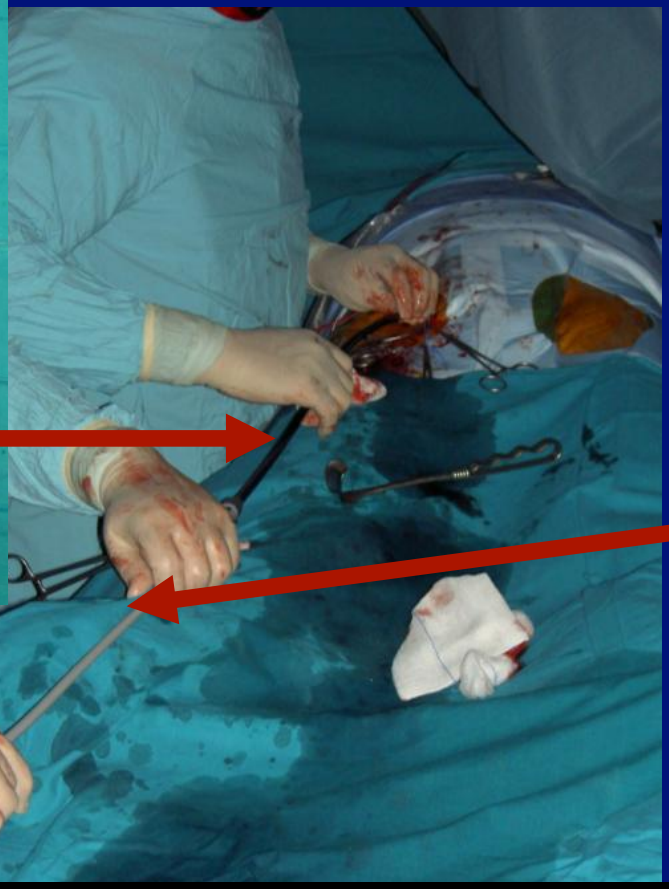
6 / 7 Fr Angiographic catheter

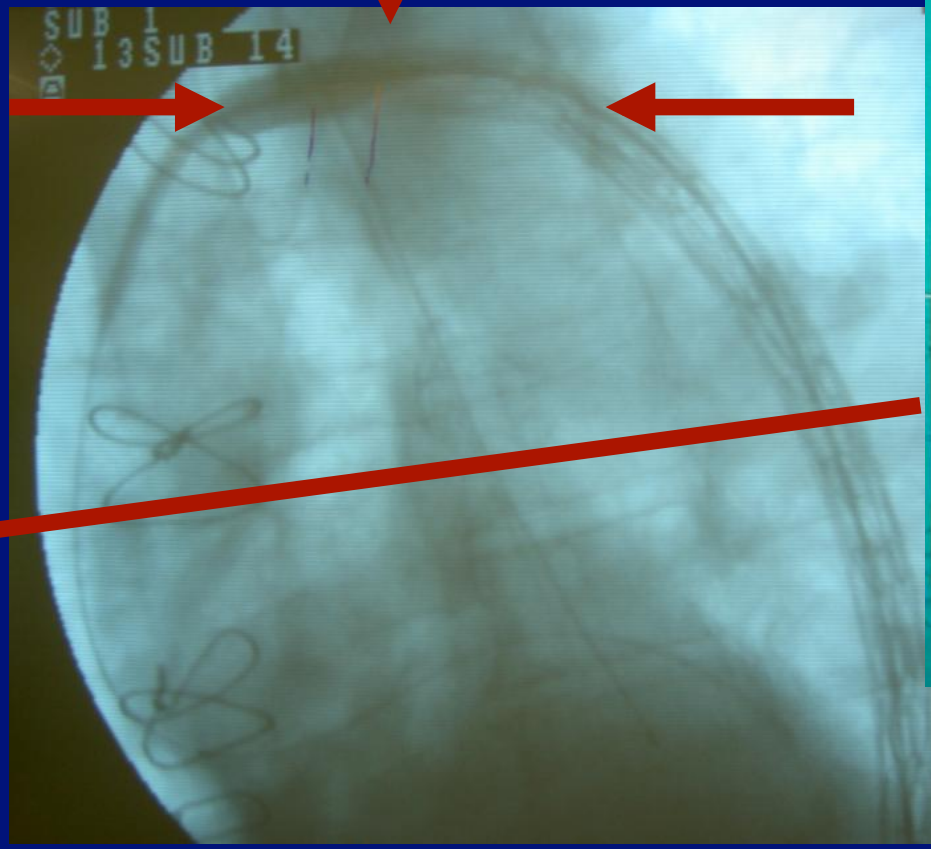


- **7Fr Angiographic catheter over the guide wire**
- **The guide wire is exchanged with a Supra core extra stiff 260cm wire**

Sheath positioning

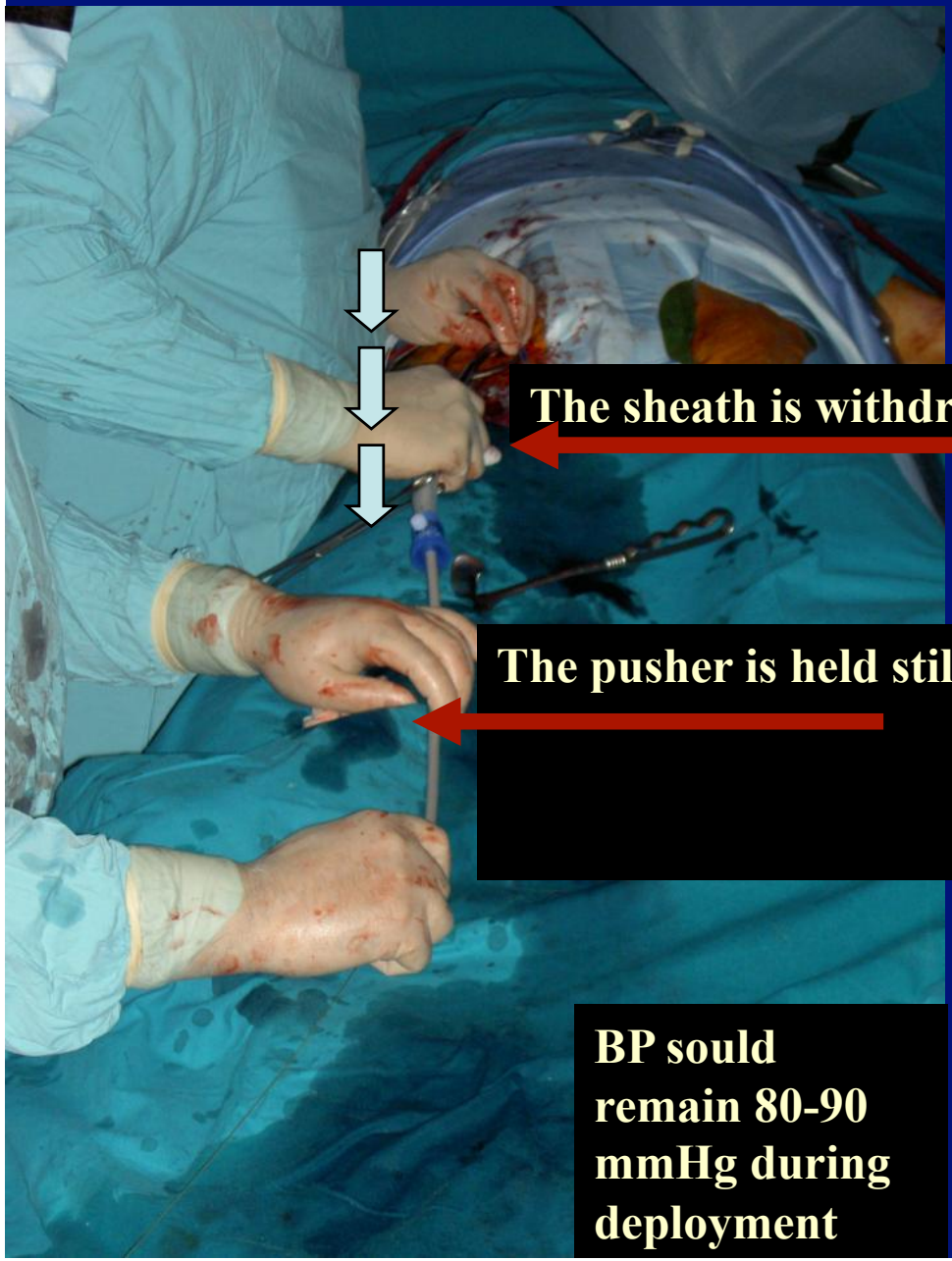
Simultaneous DSA assists positioning





An "empty" 22-24Fr Endomed hydrophyllum sheath with dialator over the supra core wire and advanced proximally to the desired position

Graft deployment

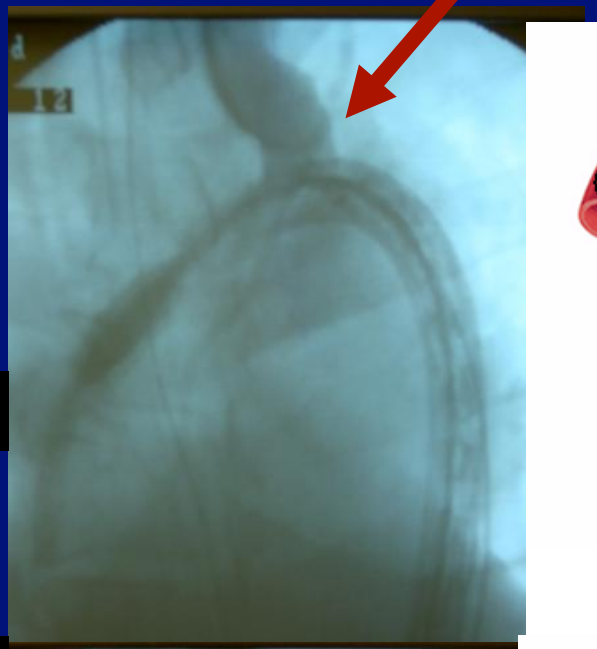


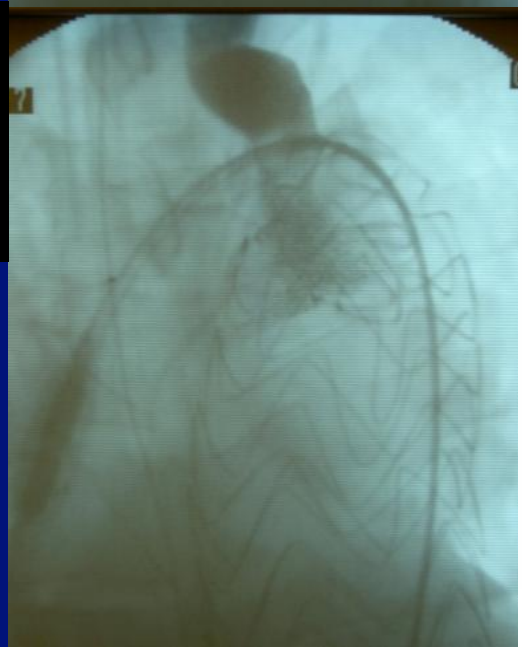
The sheath is withdrawn

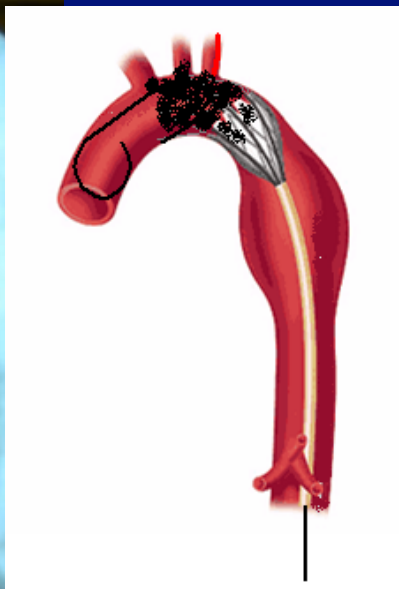
The pusher is held still

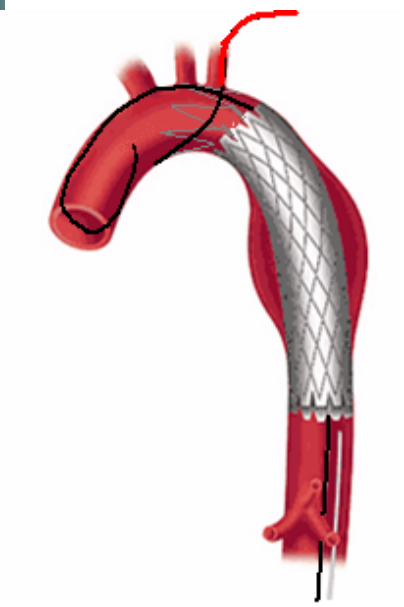
BP sould remain 80-90 mmHg during deployment

Simultaneous DSA assists accurate deployment

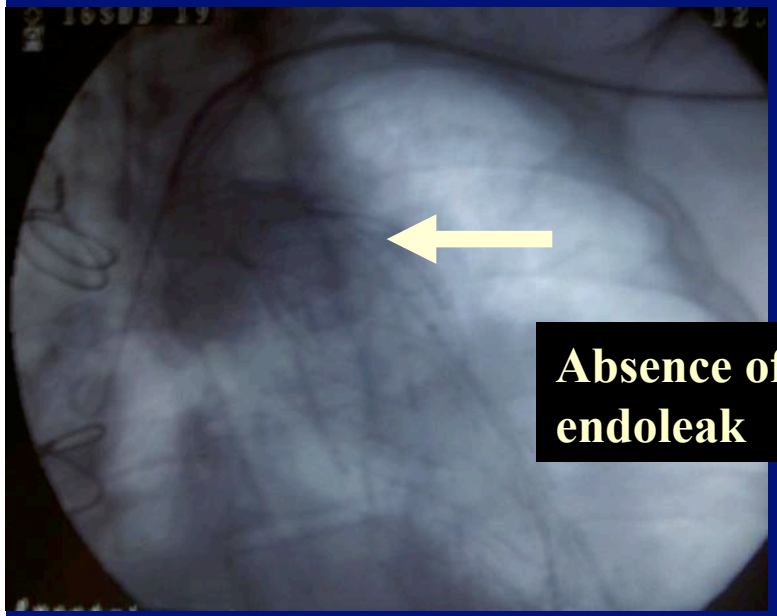




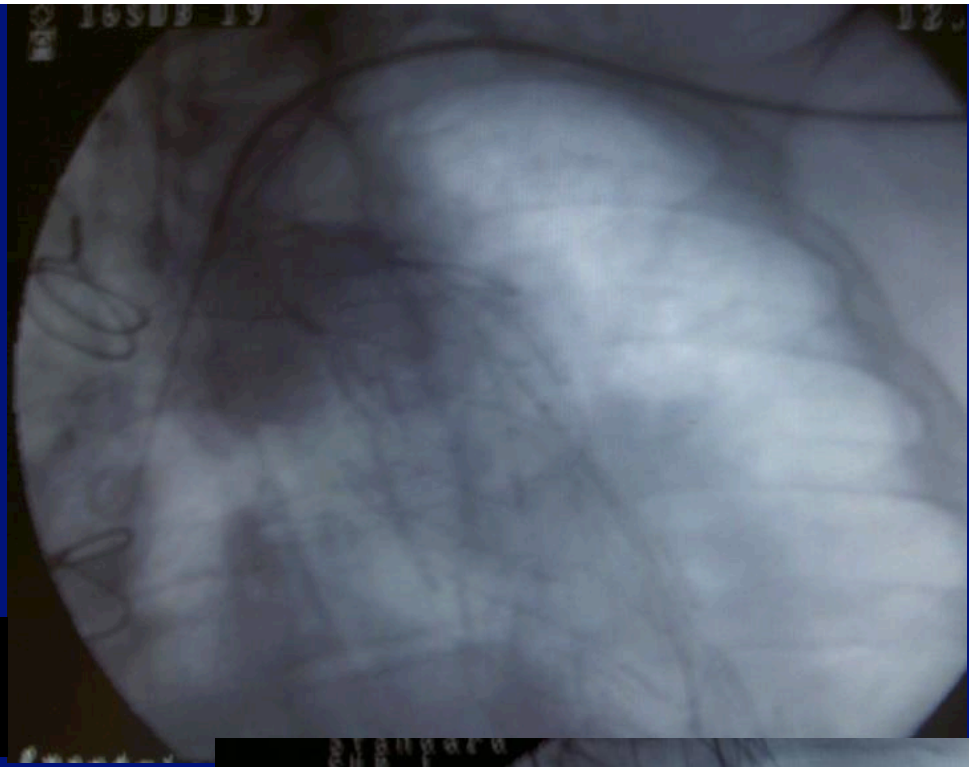


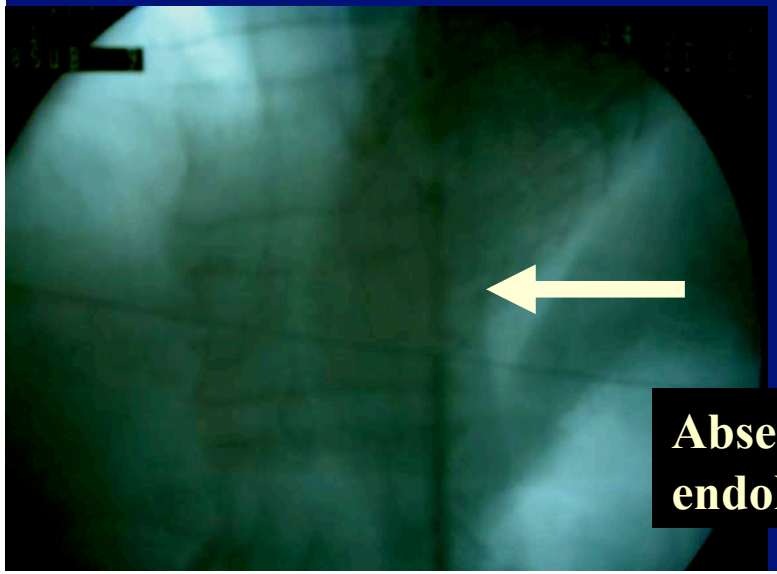


Completion DSA

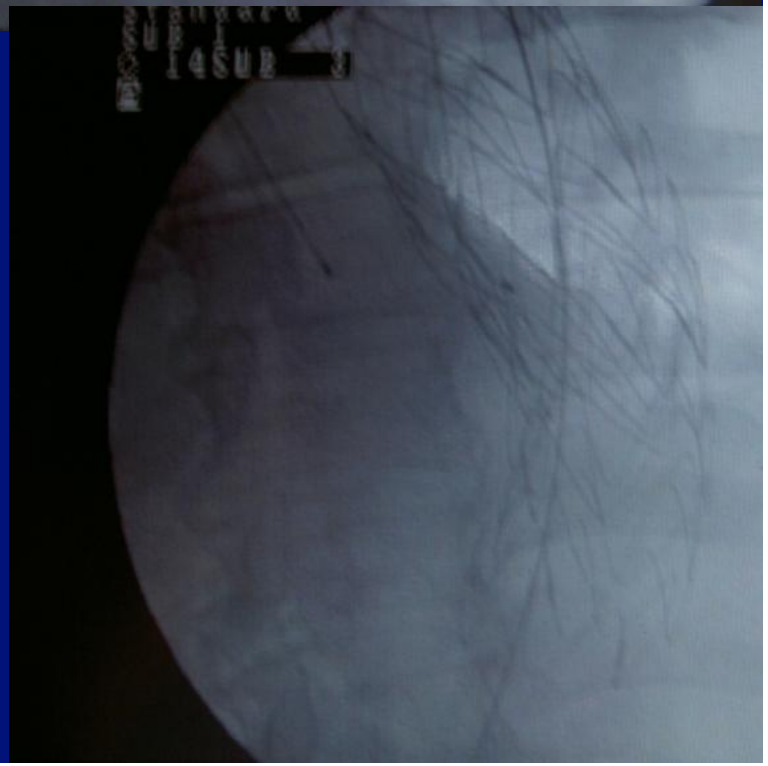


Absence of proximal endoleak

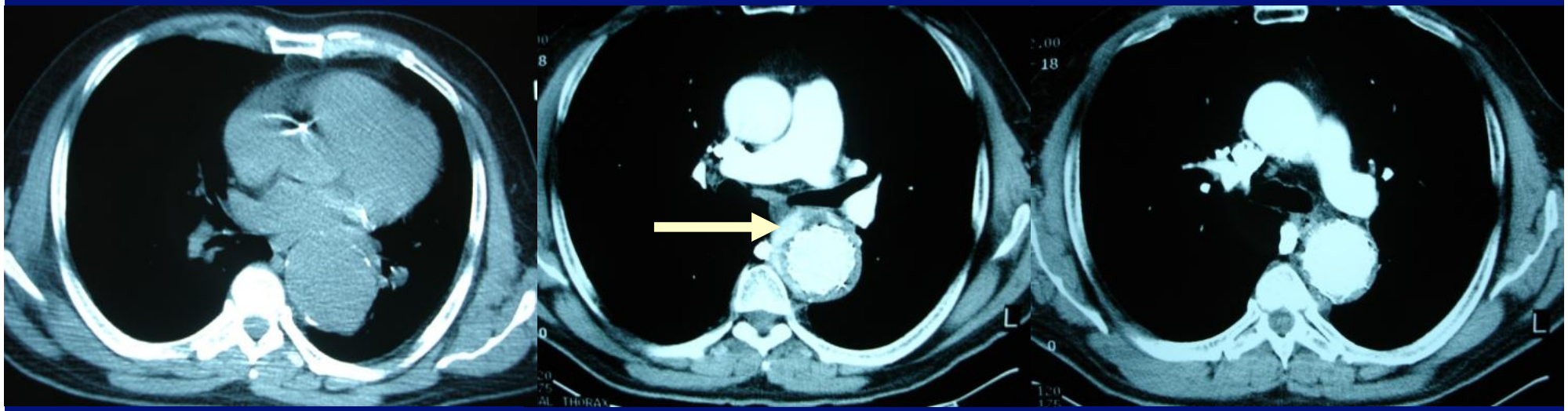




Absence of distal endoleak



Endoleak type I distal (1st month), repaired with an extension

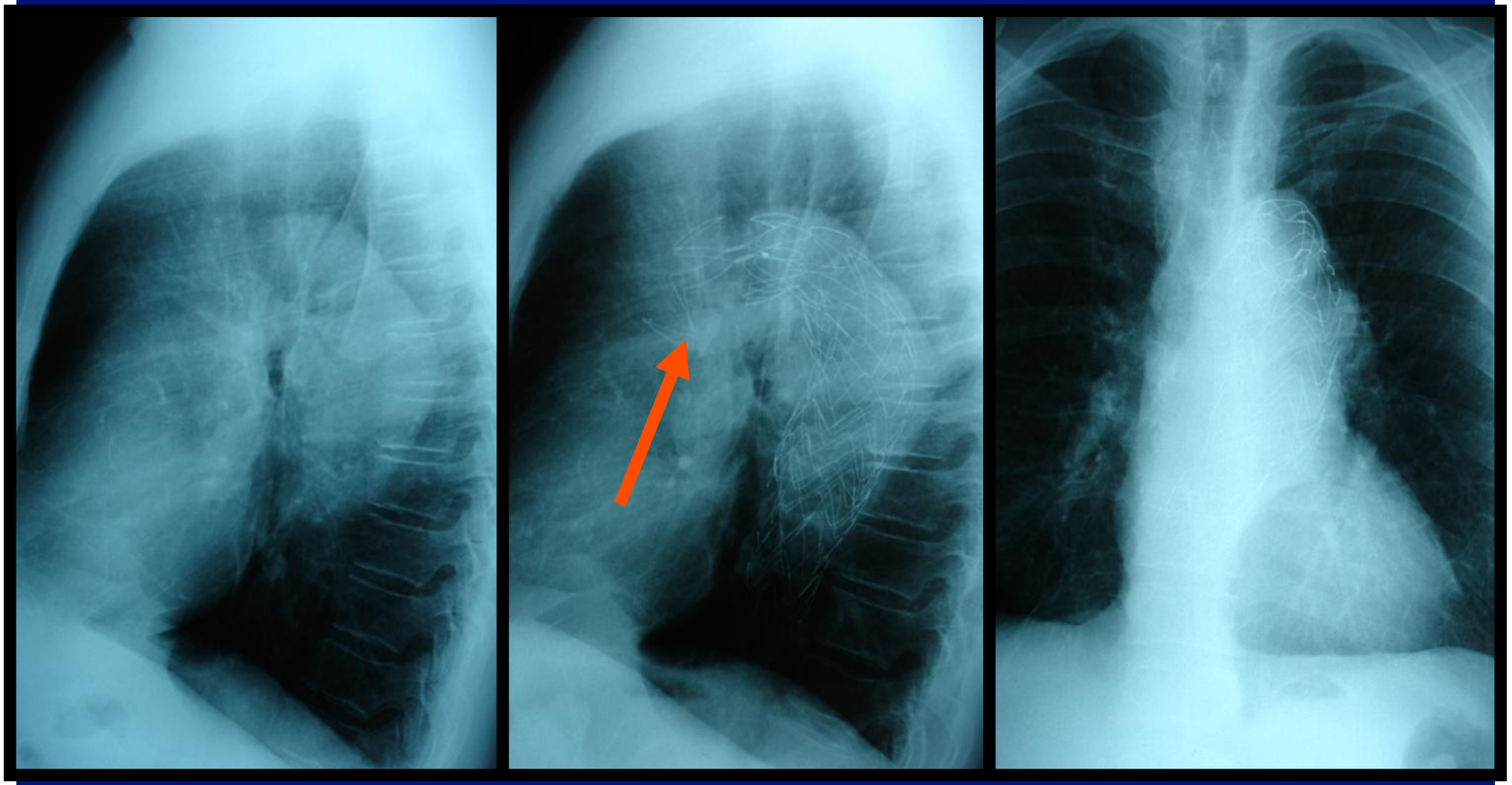


Preop Ct

1st month PO Ct angio

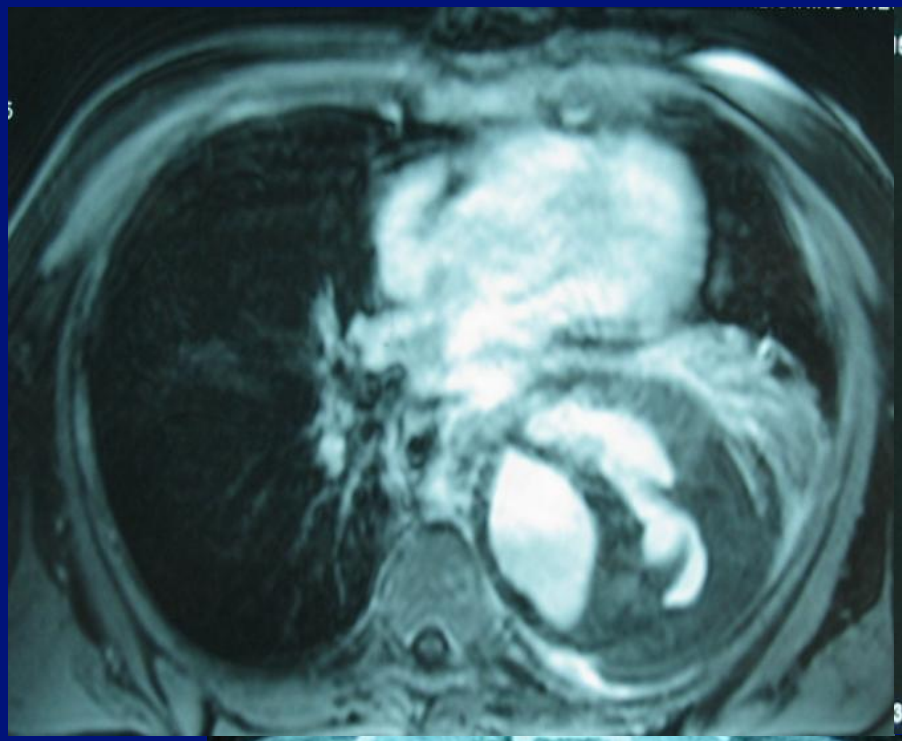
6th month PO Ct angio

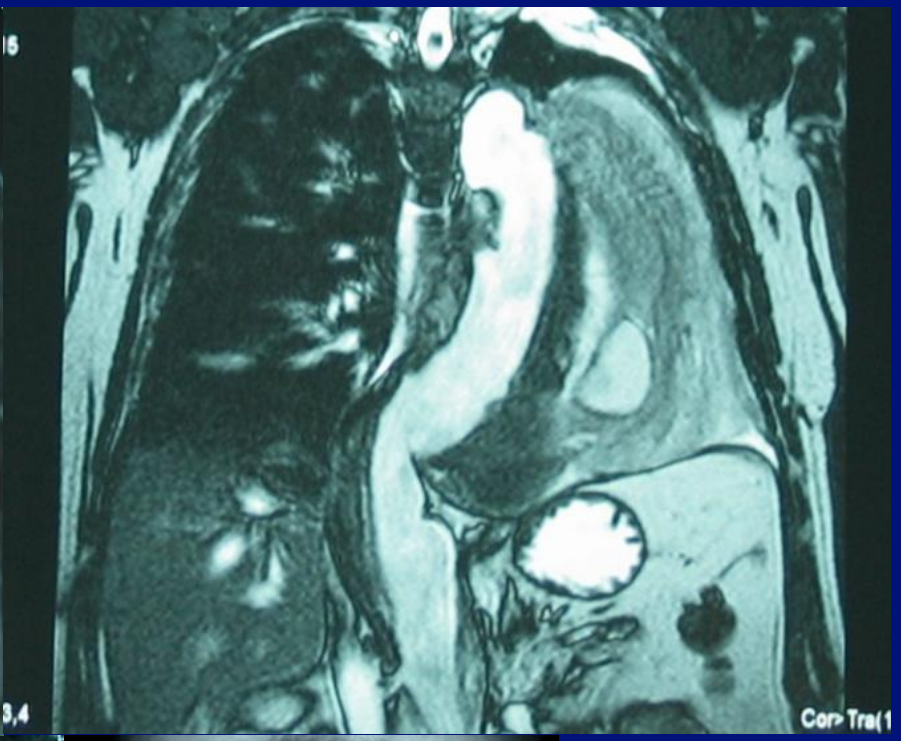
Frame kinking at the proximal bare stent / Surveillance

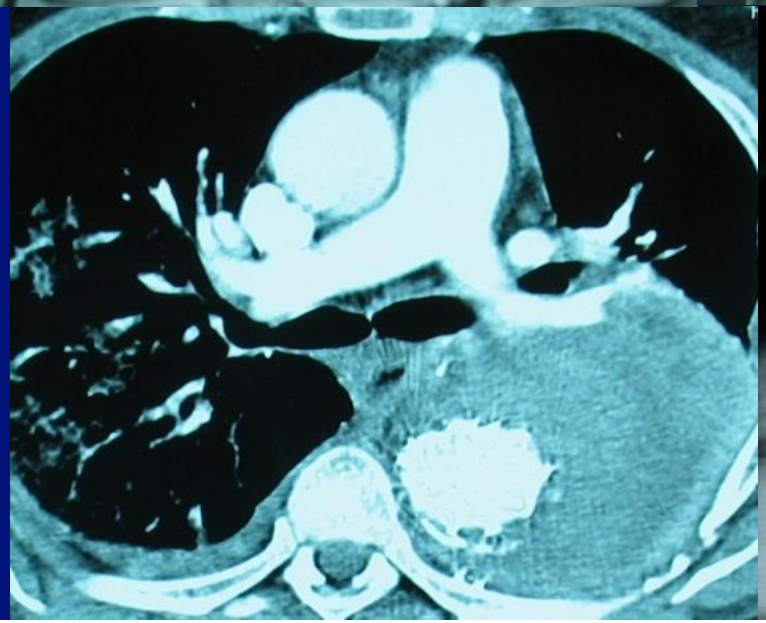


Preoperative and postoperative plain chest radiogram. No graft migration was identified. On the contrary the proximal bare stent was slightly kinked, probably because of the arch morphology, causing no further complications.

A-B fistula







Comparison to other cohorts

Table 2
Comparison of 26 series of thoracic aneurysms treated with en[redacted]evic[redacted]

Series	Device	Number of patients	Procedural success	Paraplegia	Other morbidity	Length of stay	30-Day mortality	Endoleak	F/U
Dake [37] '92–'94	Home-made	13	100%	0%	0%	4.8 d	0%	15%	12 m
Ehrlich [38] '97	Talent	10	100%	0%	10%	6 d	10%	20%	6 m
Mitchell [39] '92–'97	Home-made	103	73%	3%	25%	8 d	9%	24%	22 m
Temudom [40] '97–'98	Vanguard/Gore	14	78%	0%	14%	2.9 d	14%	14%	6 m
Grabenwoger [41] '96–'99	Talent/Gore	21	100%	0%	9.5%	9.8 d	9.5%	5%	n/a
Taylor [42] '97–'00	AneuRx/Gore	23	100%	0%	4.3%	4 d	8.7%	13%	18 m
Greenberg [43] '93–'97	Cook	25	88%	4%	n/a	n/a	25%	12%	15 m
Bortone [44] '99–'00	Gore	11	100%	0%	9%	n/a	9%	0%	6 m
White [45] '97–'99	AneuRx	16	94%	6%	6%	5 d	12%	12%	9 m
Won [46] '94–'99	Tae-woong	11	100%	0%	9%	n/a	0%	0%	14 m
Cambria [47] '96–'01	Cook/Gore	18	100%	0%	28%	n/a	5.5%	21%	11 m
Thompson [48] '00–'01	Gore	23	100%	0%	23%	5 d	4%	8%	9 m
Totaro [49] '00–'01	Gore	7	100%	0%	0%	10 d	0%	30%	12 m
Najibi [50] '99–'00	Gore/Talent	19	95%	0%	16%	6 d	5%	0%	12 m
Criado [51] '99–'02	Talent	31	97%	0%	15%	n/a	3%	13%	18 m
Herold [52] '99–'01	Talent	7	100%	0%	9%	3 d	0%	0%	8 m
Chabbert [53] '97–'01	Talent/Gore	14	100%	7%	9%	n/a	21%	25%	11 m
Fattori [54] '97–'02	Talent	18	94%	0%	5%	5 d	0%	16%	25 m
Scharrer [55] '97–'02	Talent/Gore	45	100%	0%	9%	8 d	7%	18%	24 m
Lamme [56] '98–'02	Gore/Talent	17	100%	6%	17%	6 d	0%	11%	24 m
Lepore [57] '99–'01	Gore/Talent	21	100%	5%	19%	n/a	10%	19%	17 m
Krohg [58] '00–'02	Gore/Talent	9	100%	0%	11%	n/a	0%	11%	11 m
Lambrechts [59] '00–'02	Talent/Gore	12	100%	0%	19%	6 d	0%	25%	n/a
Ellozy [60] '98–'02	Talent/Gore	51	90%	4%	14%	n/a	6%	4%	15 m
Czerny [61] '96–'02	Talent/Gore	54	94%	n/a	n/a	9 d	4%	29%	38 m
Melissano [62] '02	Endomed	9	100%	0%	11%	n/a	9%	33%	n/a

Other morbidity refers to cardiopulmonary, renal, infectious, and neurologic complications. Endoleaks include those found during follow-up CT scanning and requiring secondary intervention for resolution. F/U indicates length of mean follow-up in months for the each individual series.

Abbreviations: d, days; m, months.

100% 0% 10% 10% 10-15%