2018 MID-ATLANTIC
CONFERENCE

8th ANNUAL CURRENT CONCEPTS IN
VASCULAR THERAPIES

2018

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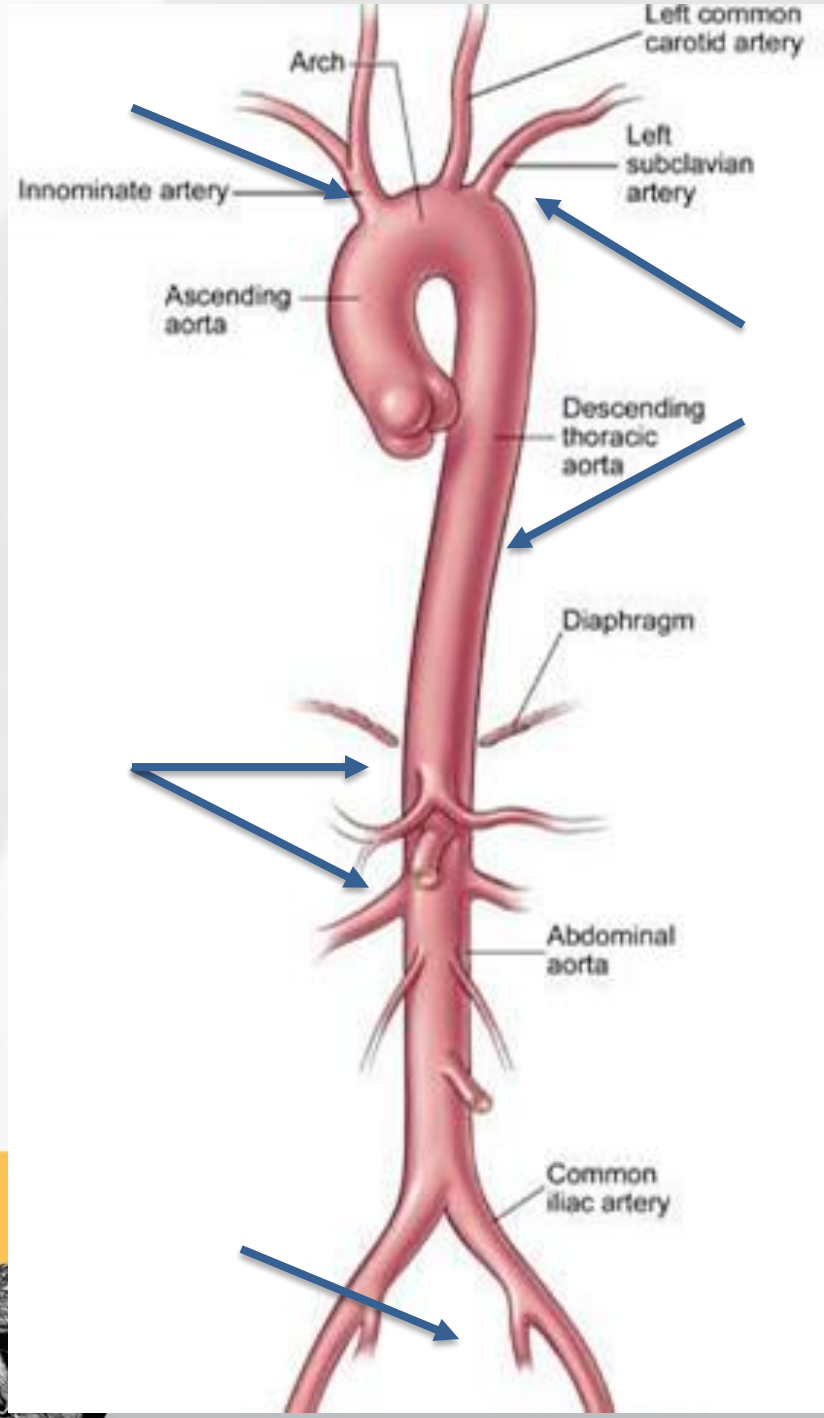
Sentara Vascular Specialists

Debate 4:
Complex endovascular aortic repair will make open surgery obsolete

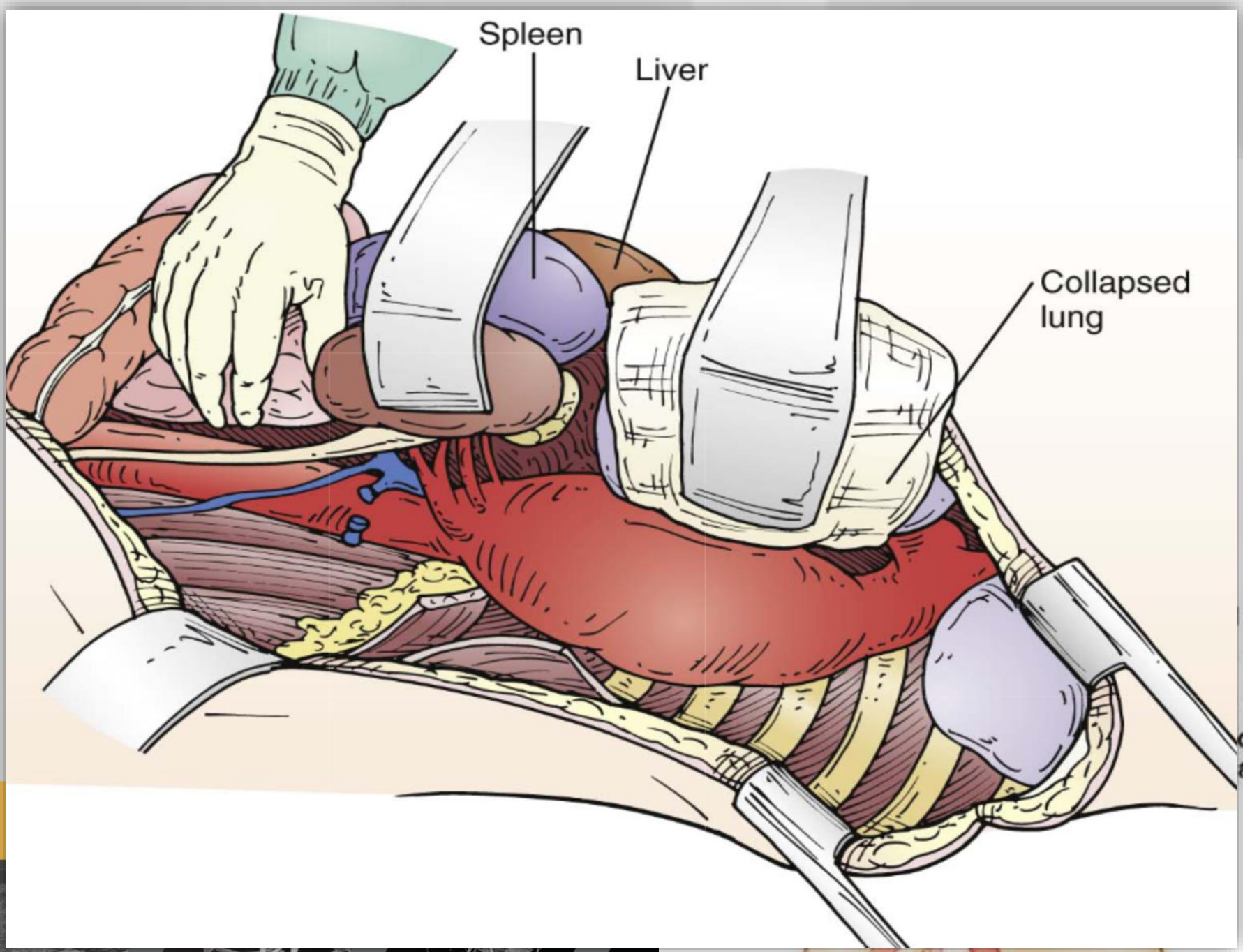
Definition

- Complex aortic pathology (aneurysms/dissection)
  - Involvement of thoracic and/or abdominal aorta involving visceral branches (celiac, SMA, renals)
  - Involvement of hypogastric arteries



Repair options

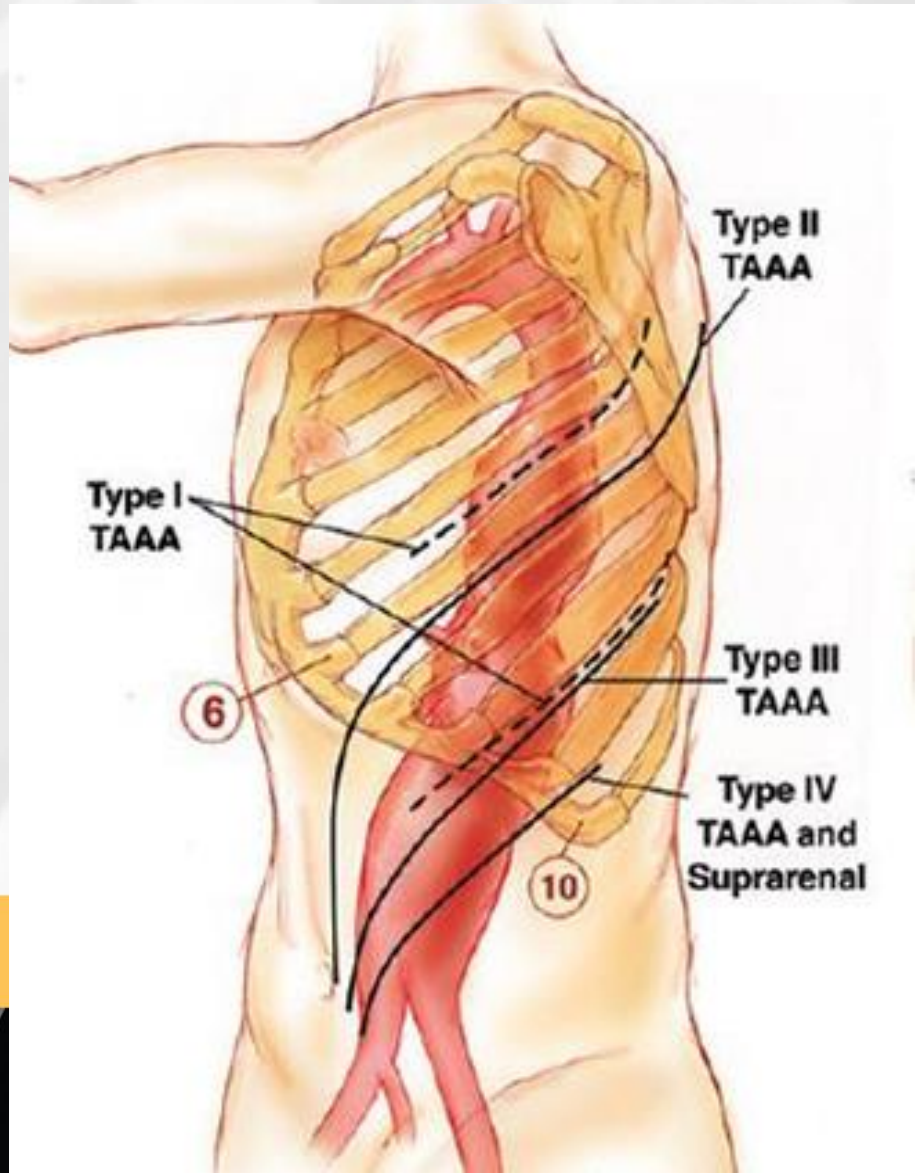
- Open repair
- Endovascular repair


Spleen
Liver
Collapsed lung

Thoraco-abdominal incision

Repair options : Open

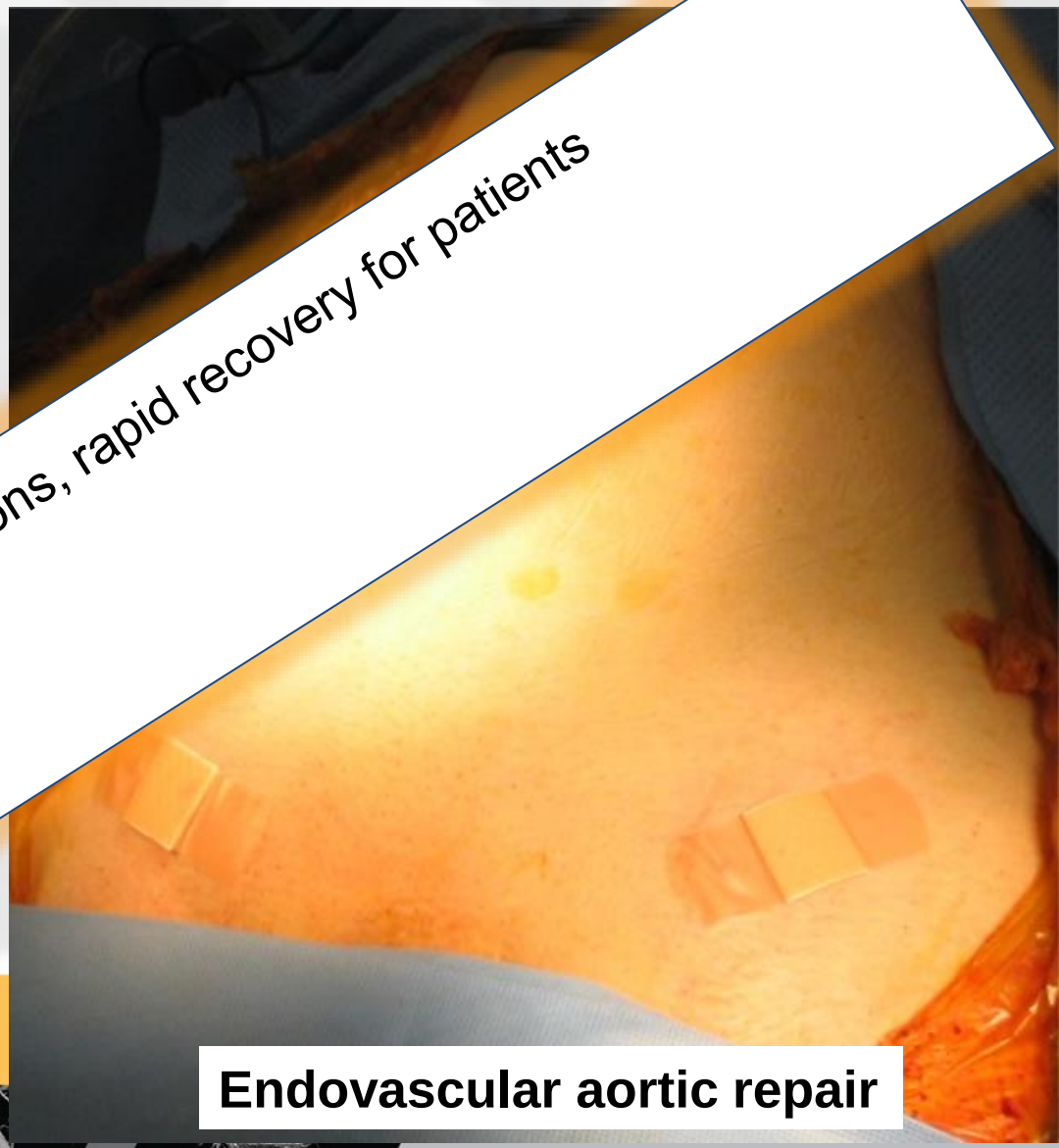
- Higher risk, long duration, slow recovery
- “more fun” for the surgeon
- **Not so much for the patient!!**



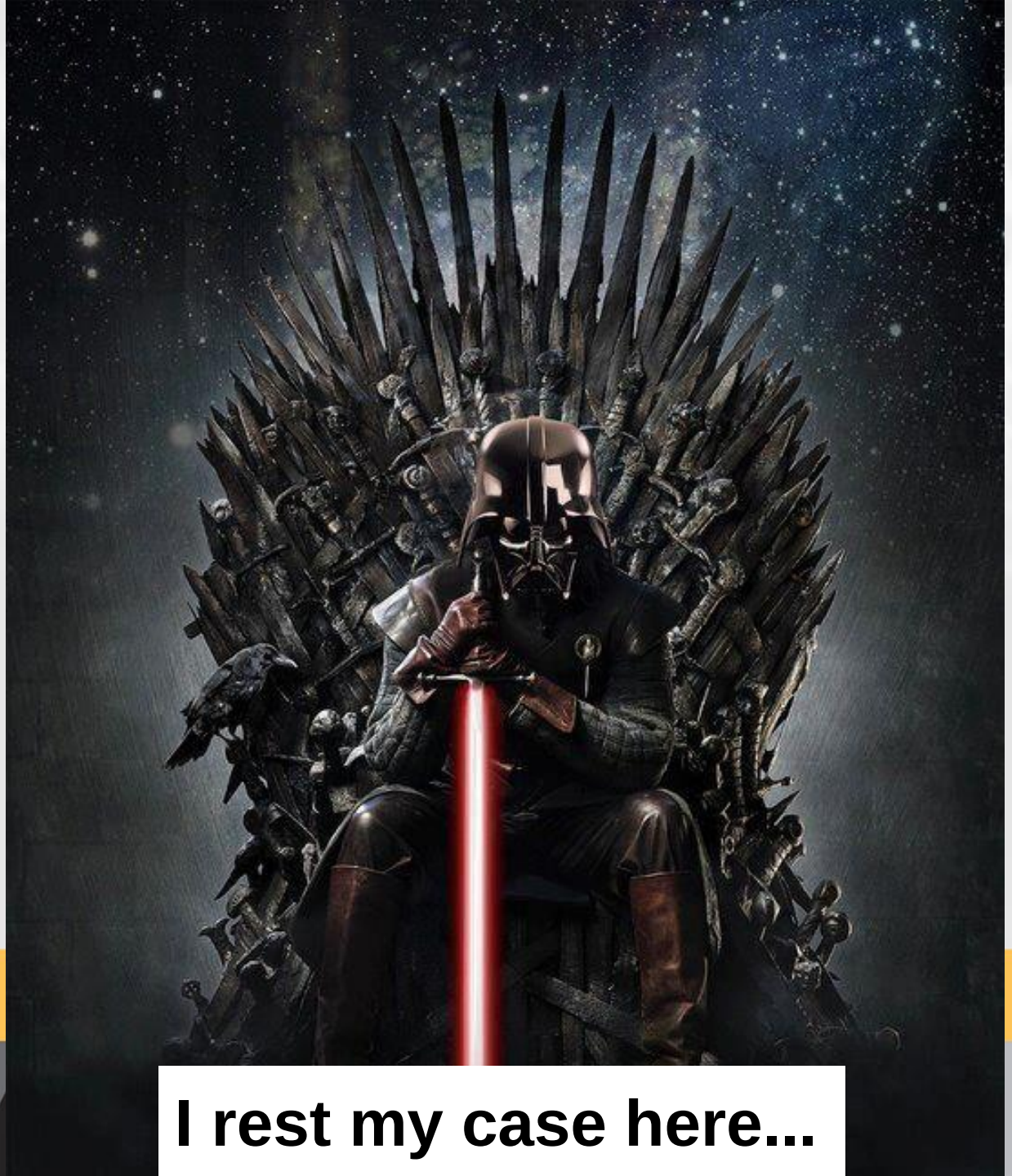
Repair options: Endovascular

- General or local anesthesia
- Percutaneous or limited groin incision (+/- brachial puncture)
- Spinal drainage
- Operative times 4 hours
- Hospit

- Lower operative risk, shorter operations, rapid recovery for patients
- "more fun" for the right surgeon
- **Patients love it!!!**



Endovascular aortic repair



I rest my case here...

Since this is a debate…

Lets talk evidence

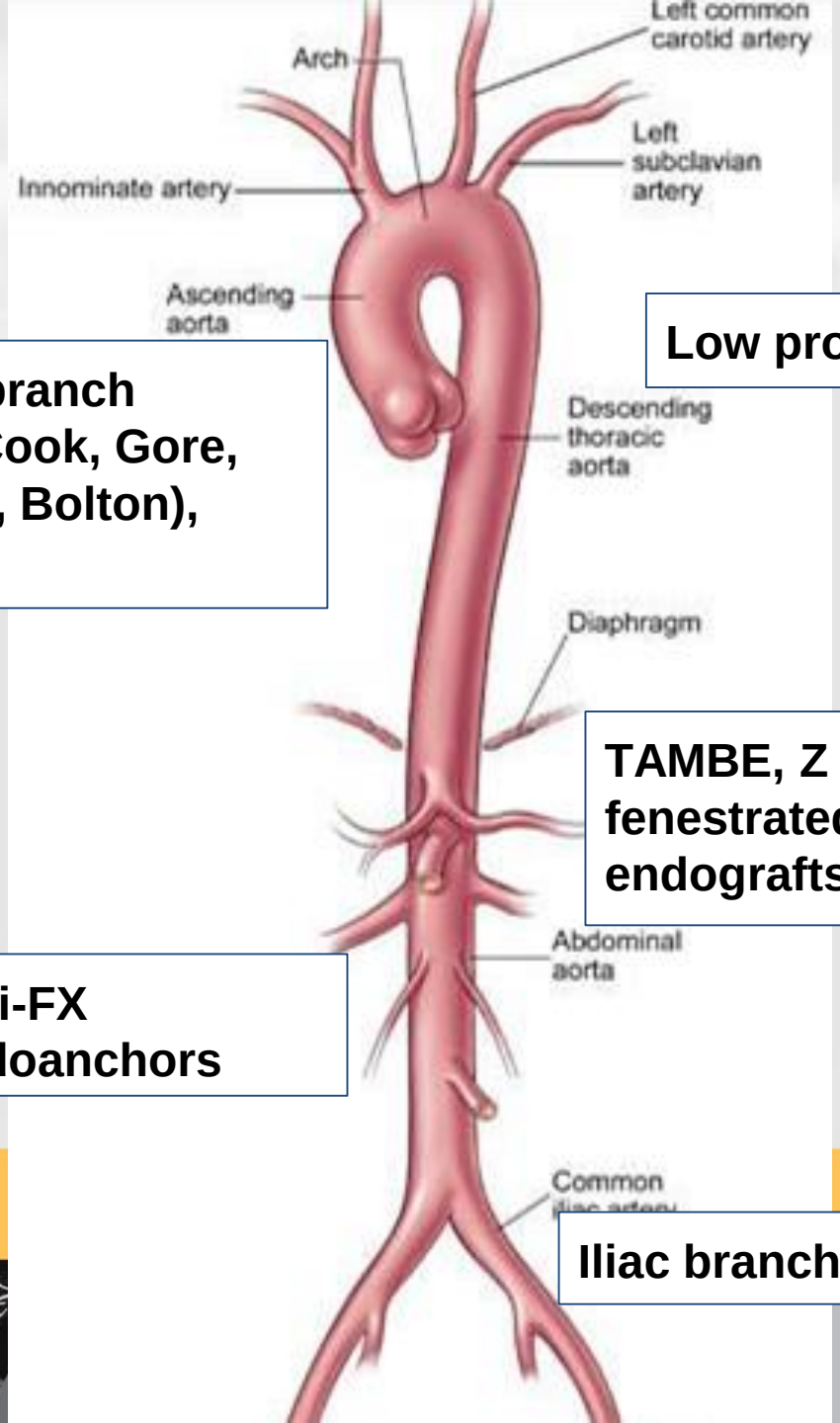

STOP
EXCUSES

Myth #1

- Technology is not available
- Endovascular technology is available for only specific anatomy

Technology is available here!

	Patient specific design	**Off the shelf**
Currently approved	Zenith Fenestrated	Heli-FX Endoanchors Gore Iliac branch device
Under trial	Cook Fenestrated/Branched Endografts	TAMBE (Gore) Cook P branch Cook T branch Thoracic Branch Devices (Cook, Gore, Bolton, Medtronic)
Physician modified	In situ fenestration Back-table modification	Parallel branch endografts (Chimney, Snorkel, Periscopes)



Low profile TEVAR

Thoracic branch devices (Cook, Gore, Medtronic, Bolton), PMEGs

TAMBE, Z fen, Patient specific fenestrated/branched endografts, CHIMPS, PMEGs

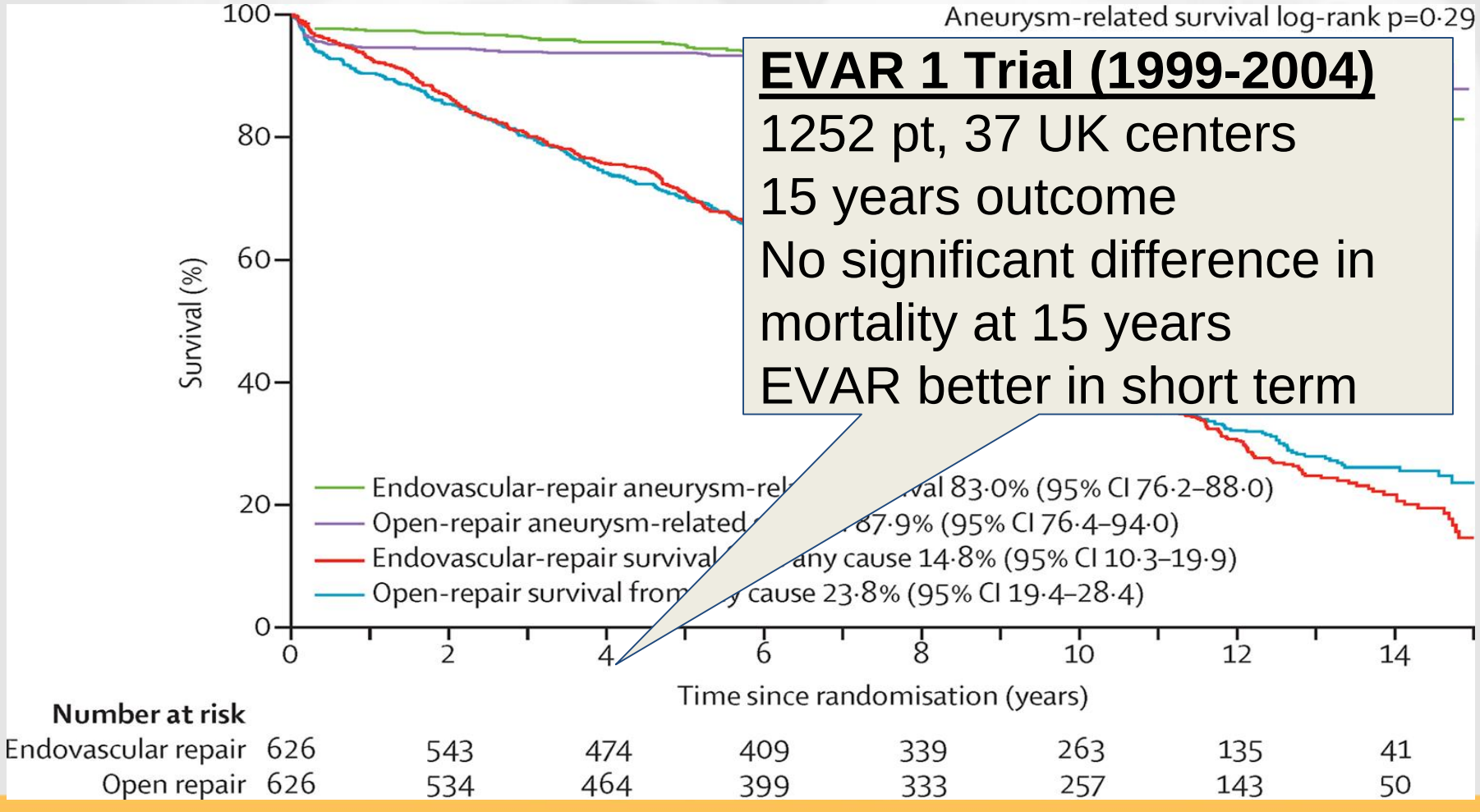
Heli-FX endoanchors

Iliac branch endoprosthesis

Myth #2

- Long term data favors open surgery

Long term clinical outcomes



EVAR 1 Trial (1999-2004)

1252 pt, 37 UK centers

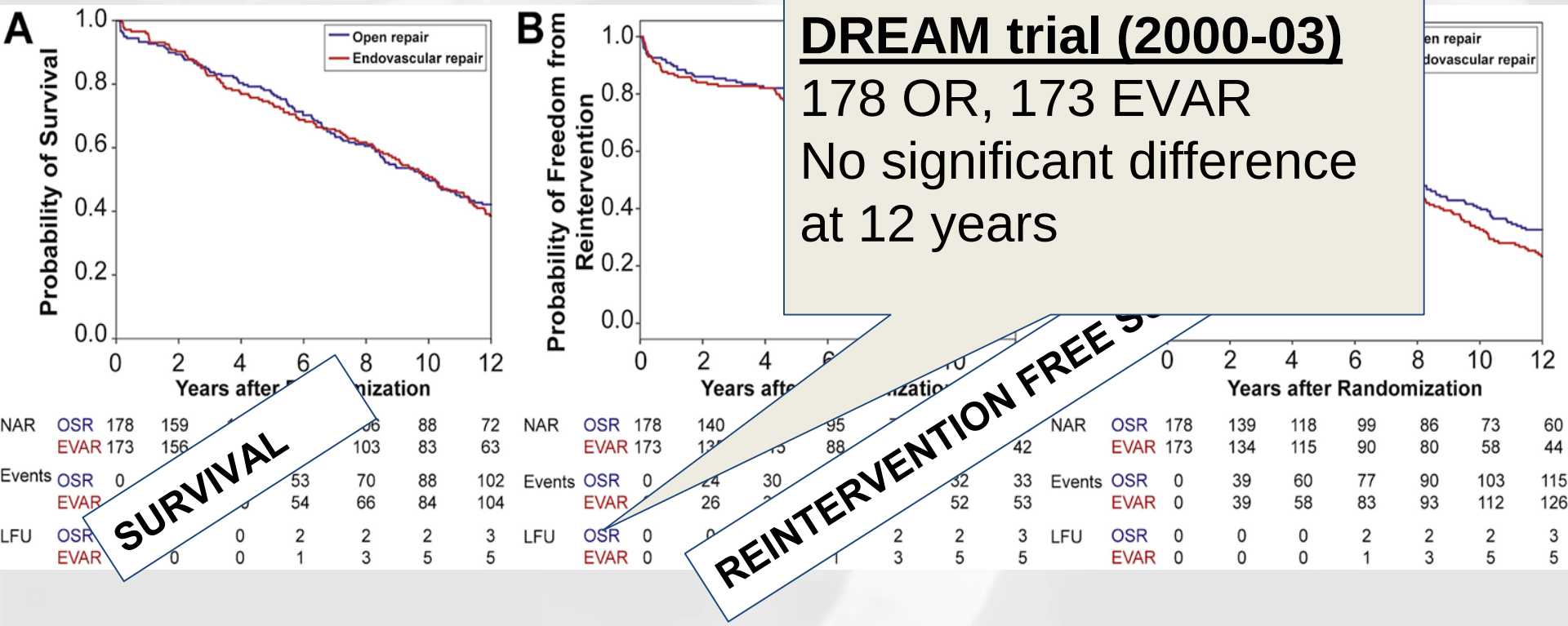
15 years outcome

No significant difference in mortality at 15 years

EVAR better in short term

Endovascular versus open repair of abdominal aortic aneurysm in 15-years' follow-up of the UK endovascular aneurysm repair trial 1 (EVAR trial 1): a randomised controlled trial Patel, Rajesh et al.The Lancet , Volume 388 , Issue 10058 , 2366 - 2374

Long term clinical outcomes



DREAM trial (2000-03)

178 OR, 173 EVAR

No significant difference at 12 years

SURVIVAL

REINTERVENTION FREE

Long-term survival and secondary procedures after open or endovascular repair of abdominal aortic aneurysms (DREAM TRIAL) *Journal of Vascular Surgery* 2017 66, 1379-1389DOI: (10.1016/j.jvs.2017.05.122)

Open repair versus fenestrated endovascular aneurysm repair of juxtarenal aneurysms

Rohini Rao, BSc, Tristan R. A. Lane, MRCS, Ian J. Franklin, FRCS(Gen Surg), and **Alun H. Davies, DM, FRCS,** *London, United Kingdom*

Background: **Open repair is the gold standard management for juxtarenal aneurysms. Fenestrated endovascular aneurysm repair (FEVAR) is indicated for high-risk patients. The long-term outcomes of FEVAR are largely unknown, and there is no Level I comparative evidence. This systematic review and meta-analysis of case series compares elective juxtarenal aneurysm surgery by open repair and FEVAR.**

Methods: **A systematic literature search was conducted for all published studies on elective repair of juxtarenal aneurysms by FEVAR and open repair. The MEDLINE, EMBASE, and Cochrane databases were searched from 1947 to April 2013. The exclusion criteria were case series of <10 patients or ruptured aneurysms. The primary outcomes were perioperative mortality and postoperative renal insufficiency. The secondary outcomes were secondary reinterventions and long-term survival.**

Results: **We identified 35 case series with data on 2326 patients. Perioperative mortality was 4.1% in open repair and FEVAR case series (odds ratio for open repair with FEVAR, 1.059; 95% confidence interval, 0.642-1.747; $P = .822$). Postoperative renal insufficiency was not significantly different (odds ratio for open repair with FEVAR, 1.136; 95% confidence interval, 0.754-1.713; $P = .542$). FEVAR patients had higher rates of secondary reintervention, renal impairment during follow-up, and a lower long-term survival compared with open repair patients.**

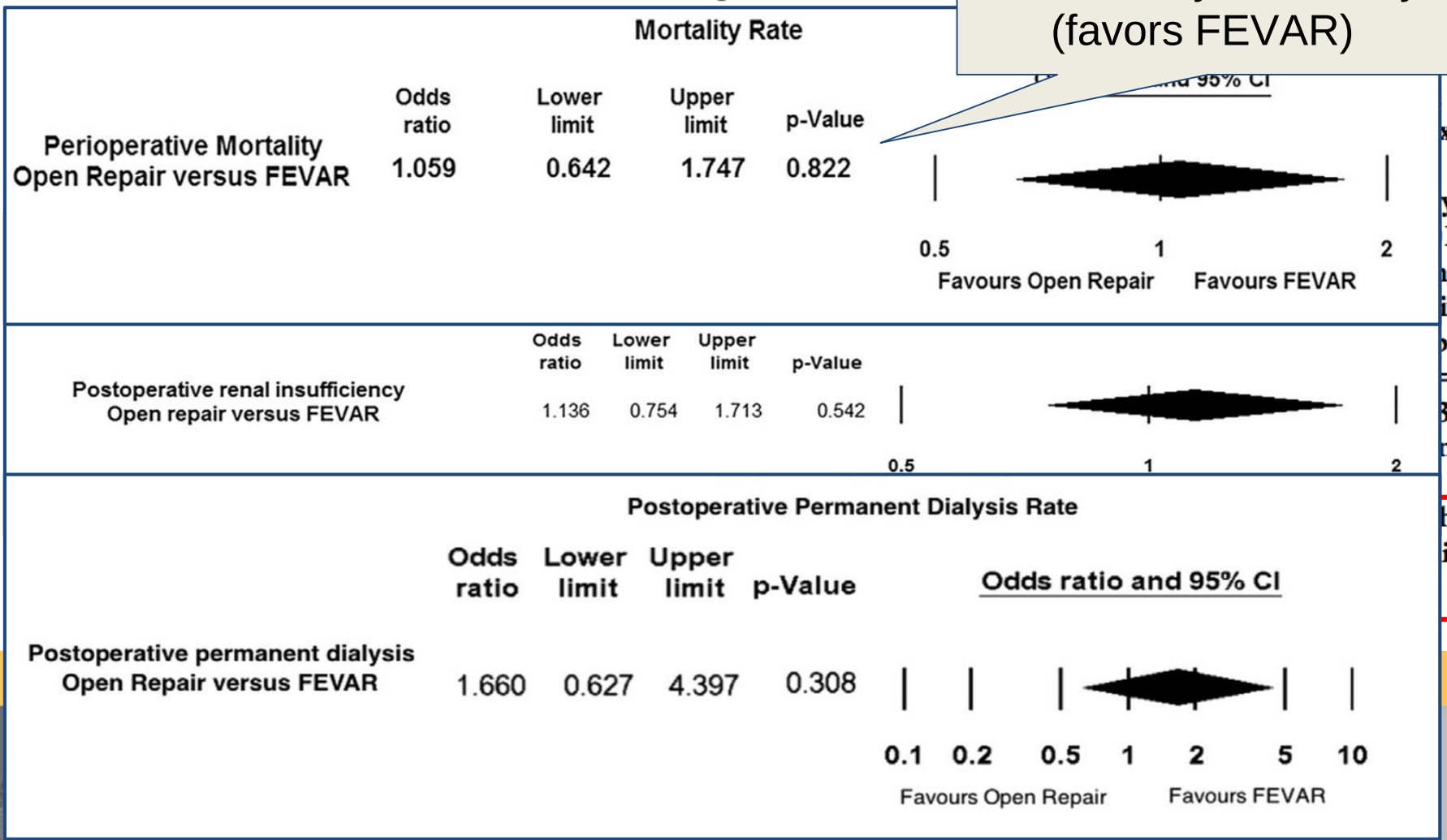
Conclusions: **FEVAR and open repair have similar short-term outcomes but have diverging long-term outcomes that may be secondary to the selection bias of FEVAR being offered to high-risk patients. FEVAR is a favorable option in high-risk patients, and open repair remains viable as the gold standard. (J Vasc Surg 2015;61:242-55.)**

Open repair versus fenestrated
aneurysm repair of juxtarenal a

Rohini Rao, BSc, Tristan R. A. Lane, MRCS, Ian J. Franklin, FR
Alun H. Davies, DM, FRCS, *London, United Kingdom*

Metanalysis of 35 series comparing FEVAR (750) and Open repair (1575)

- published upto 2013
- similar short term mortality, AKI, dialysis (favors FEVAR)



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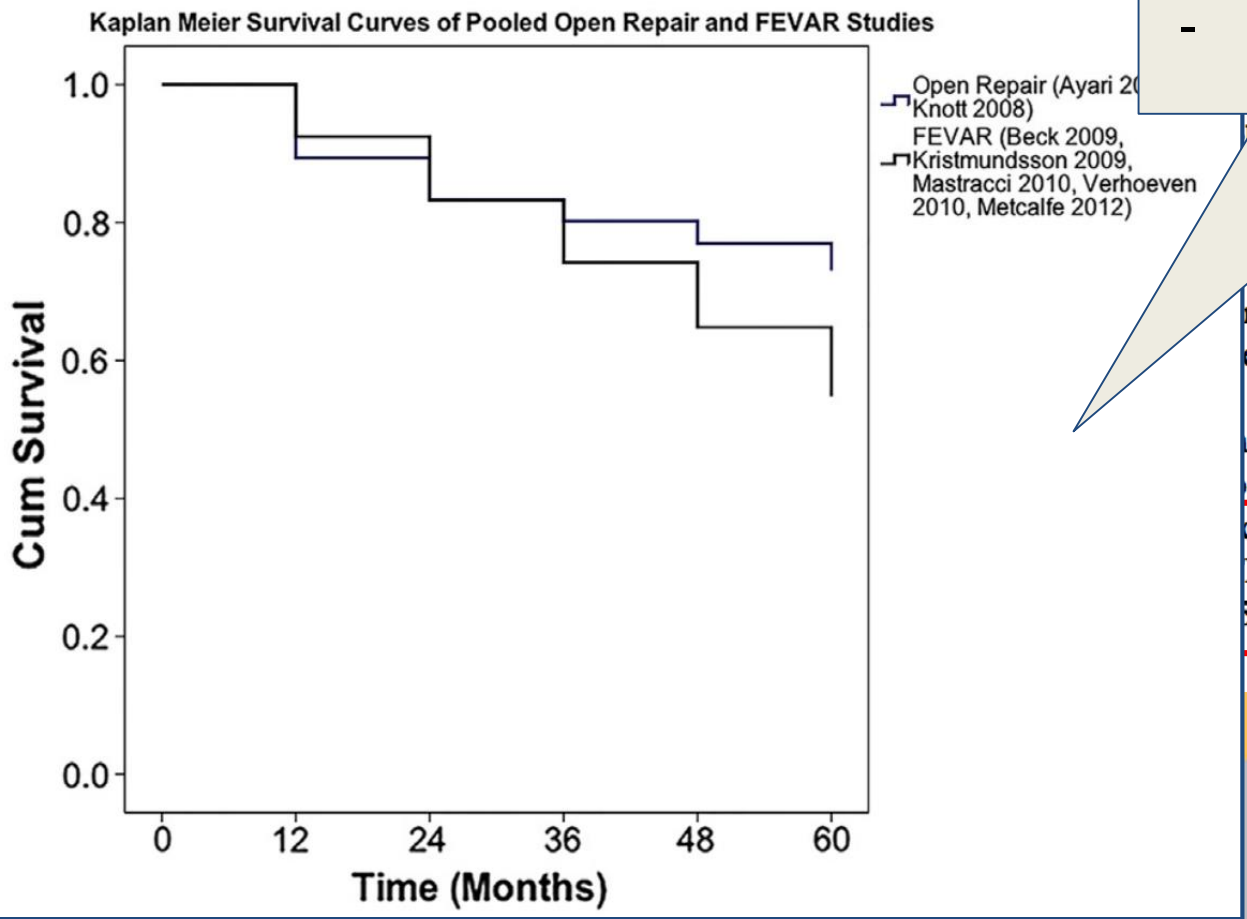
Metanalysis of 35 series comparing FEVAR (750) and Open repair (1575)

- Similar survival at 5 years
- Target vessel patency in FEVAR 95-98 % in long term
- Type I and III endoleak 5.8 % and 3.2 %



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Prospective, nonrandomized study to evaluate endovascular repair of pararenal and thoracoabdominal aortic aneurysms using fenestrated-branched endografts based on supraceliac sealing zones

Gustavo S. Oderich, MD,[a] Mauricio Ribeiro MD, PhD,[a,b] Jan Ho
Julia Chini,[a] Thanila A. Macedo, MD,[d] *and* Peter Gloviczki, M

Mayo Clinic prospective study

127 patients (47 pararenal, 42 type IV, 38 type I-III) aneurysms repaired with patient specific endografts

- 1.5 % paraplegia
- 96 % survival at 1 year

ABSTRACT

Purpose: To investigate outcomes of manufactured fenestrated a endografts based on supraceliac sealing zones to treat pararenal eurysms (TAAAs).

Methods: A total of 127 patients (91 male; mean age, 75 ± 10 years single-center study using manufactured F-BEVAR (November 2013- sealing zone in all patients with ≥ four vessels in 111 (89%). Follow- duplex ultrasound, and computed tomography imaging at dischar dicated by independent clinical event committee included morta infarction, stroke, paraplegia, acute kidney injury, respiratory failu reintervention, and branch-related instability (occlusion, stenosis, e target vessel patency, sac aneurysm enlargement, and aneurysm rupture.

Results: There were 47 pararenal, 42 type IV, and 38 type I-III TAAAs with mean diameter of 59 ± 17 mm. A total of 496 renal-mesenteric arteries were incorporated by 352 fenestrations, 125 directional branches, and 19 celiac scallops, with a mean of 3.9 ± 0.5 vessels per patient. Technical success of target vessel incorporation was 99.6% (n = 493/496). There were no 30-day or in-hospital deaths, dialysis, ruptures or conversions to open surgical repair. Major adverse events occurred in 27 patients (21%). Paraplegia occurred in two patients (one type IV, one type II TAAAs). Follow-up was >30 days in all patients, >6 months in 79, and >12 months in 34. No patients were lost to follow-up. After a mean follow-up of 9.2 ± 7 months, 23 patients (18%) had reinterventions (15 aortic, 8 nonaortic), 4 renal artery stents were occluded, five patients had type Ia or III endoleaks, and none had aneurysm sac enlargement. Primary and secondary target vessel patency was 96% ± 1% and 98% ± 0.7% at 1 year. Freedom from any branch instability and any reintervention was 93% ± 2% and 93% ± 2% at 1 year, respectively. Patient survival was 96% ± 2% at 1 year for the entire cohort.

Conclusions: Endovascular repair of pararenal aortic aneurysms and TAAAs, using manufactured F-BEVAR with supra-celiac sealing zones, is safe and efficacious. Long-term follow-up is needed to assess the impact of four-vessel designs on device-related complications and progression of aortic disease. (J Vasc Surg 2017;65:1249-59.)

Prospective, nonrandomized study to evalua
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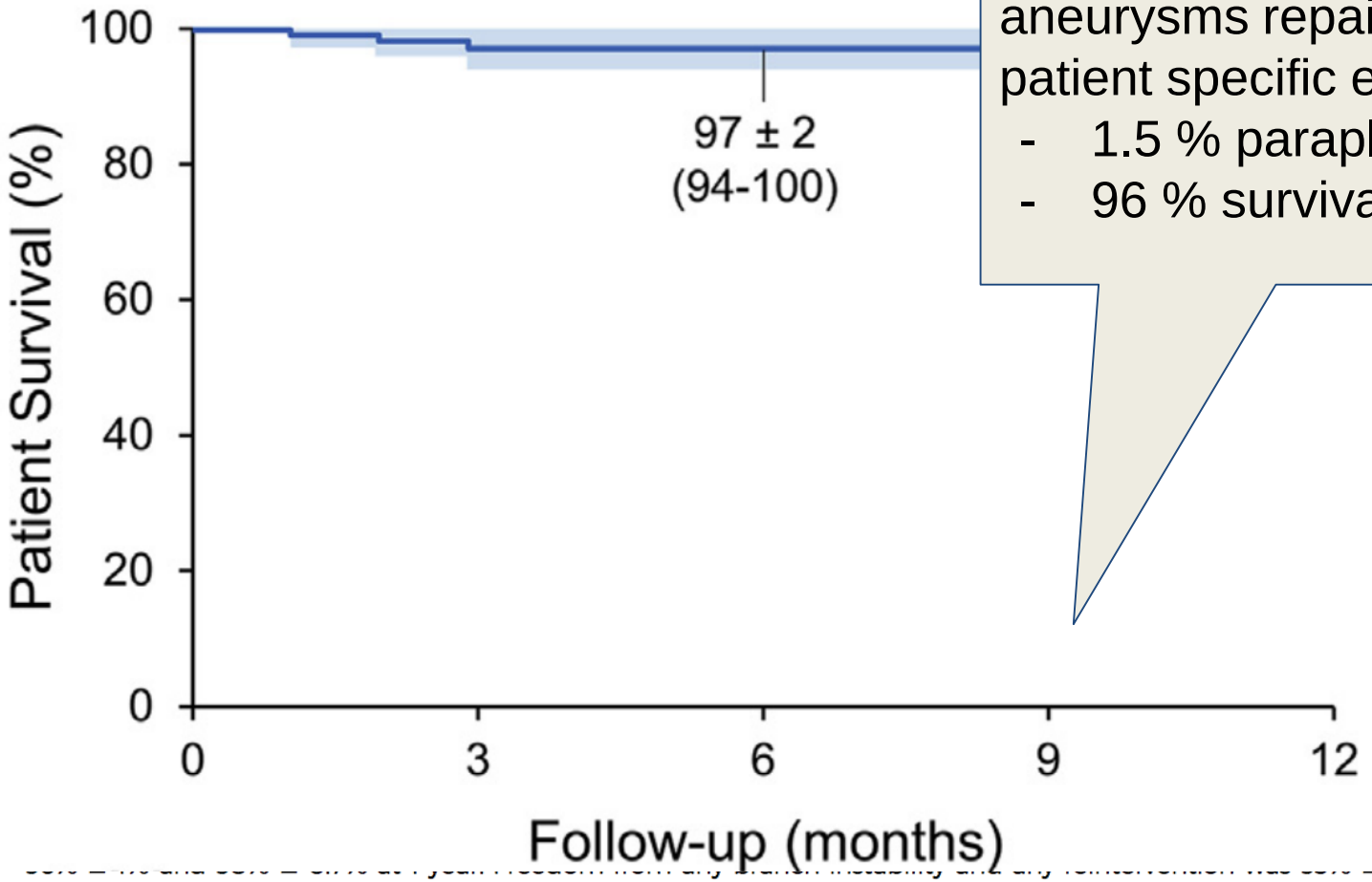

Mayo Clinic prospective study

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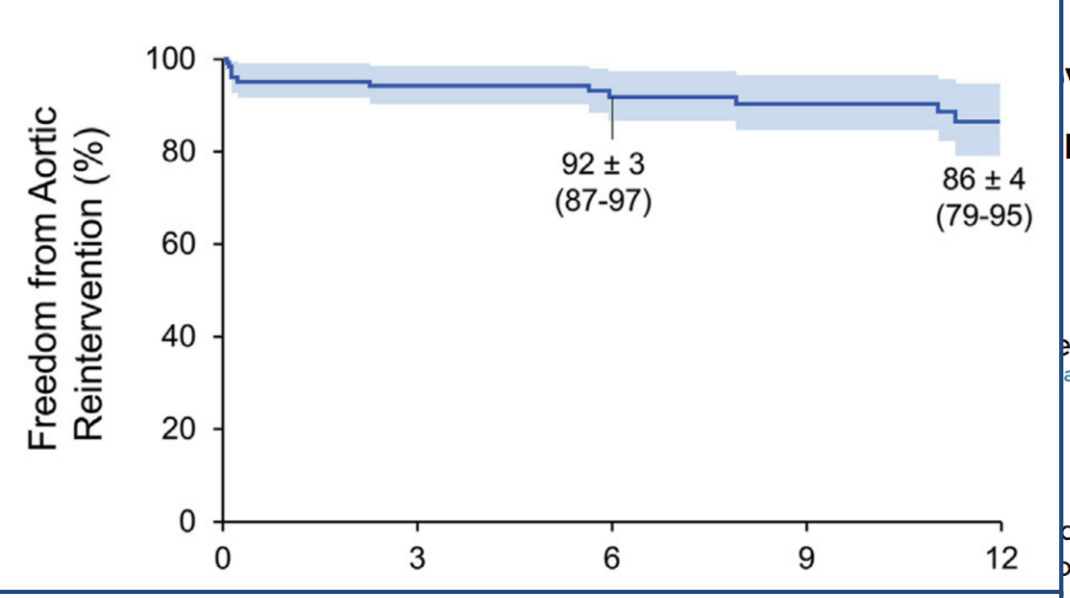

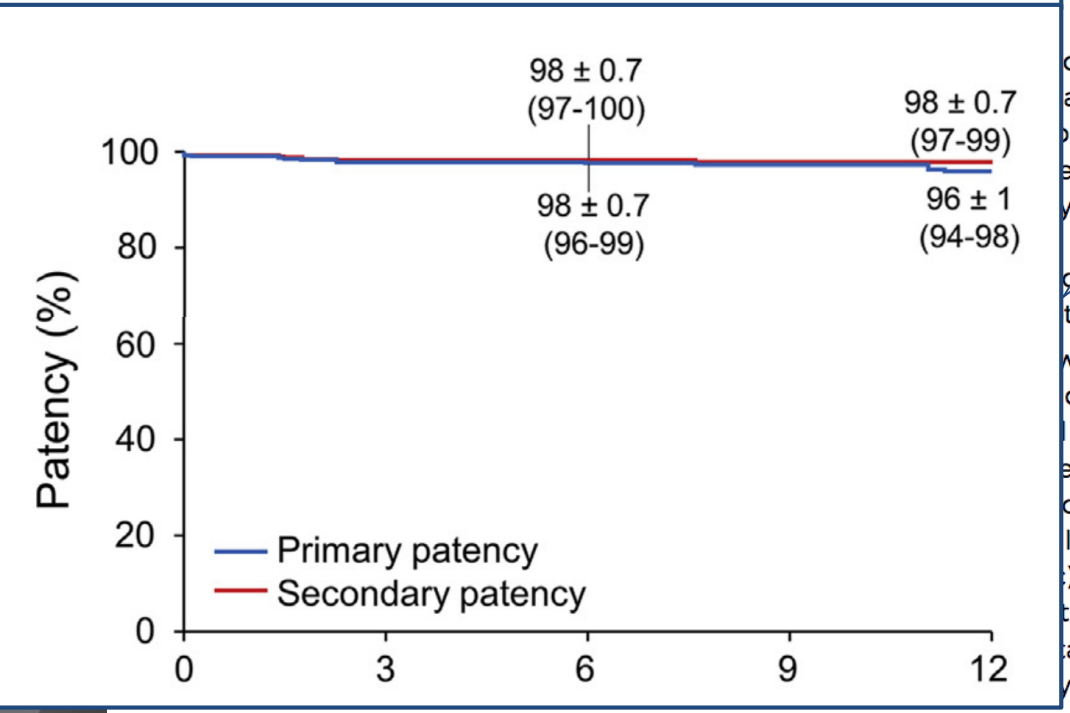

Mayo Clinic prospective study

- Low reintervention
- Target vessel patency 98%
- 89% without renal dysfunction

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y, m… …dverse events (any mortality, myocardial
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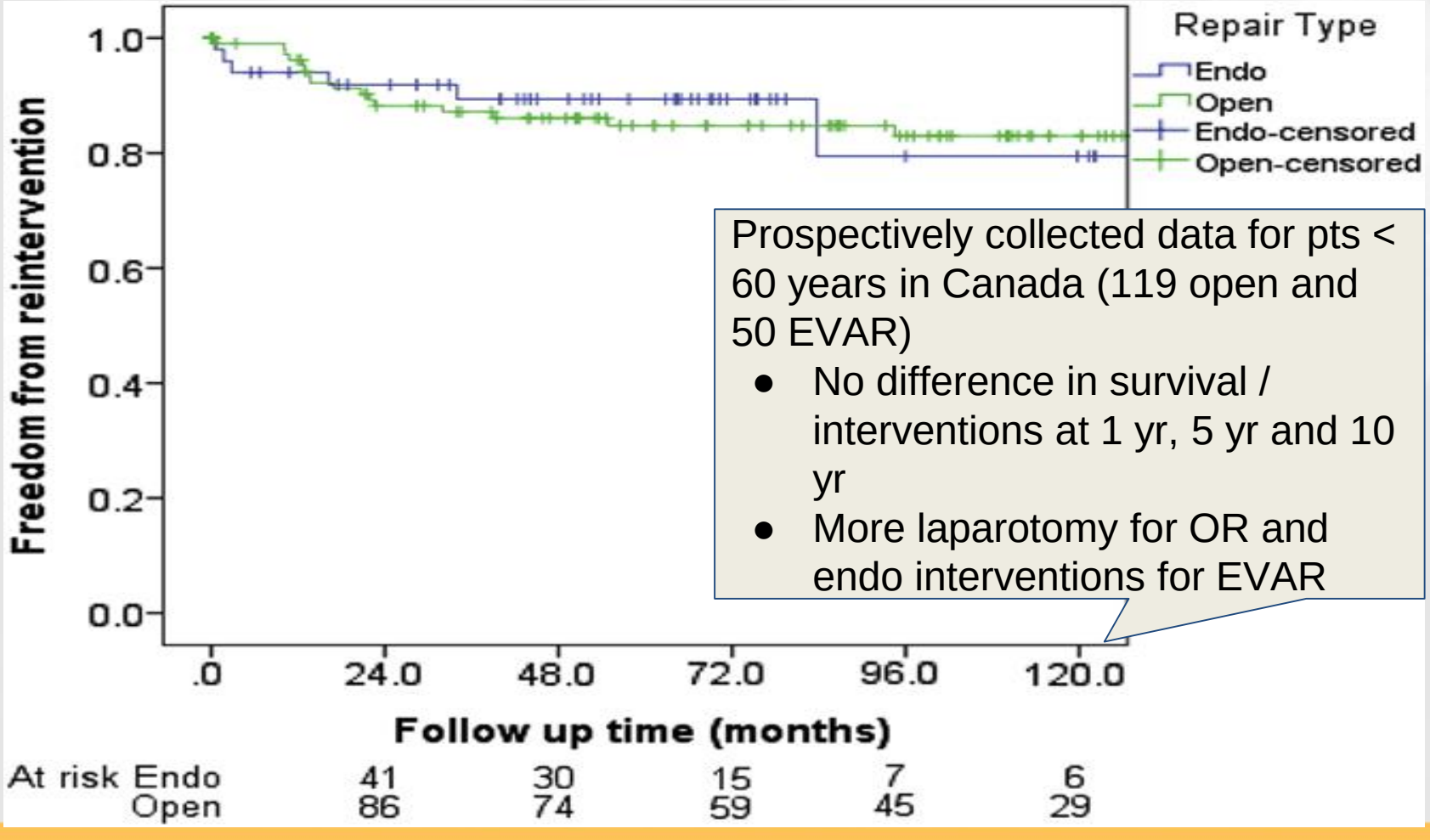
Myth #3

Endovascular surgery only applicable for elderly patients with short term survival

EVAR for younger patients



Prospectively collected data for pts < 60 years in Canada (119 open and 50 EVAR)

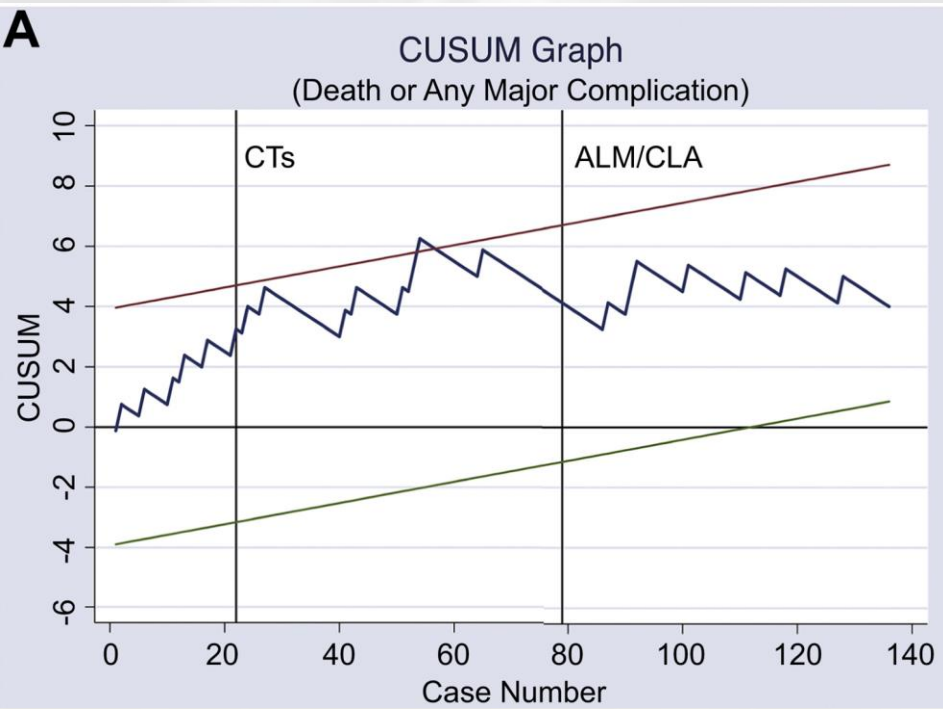
- No difference in survival / interventions at 1 yr, 5 yr and 10 yr
- More laparotomy for OR and endo interventions for EVAR

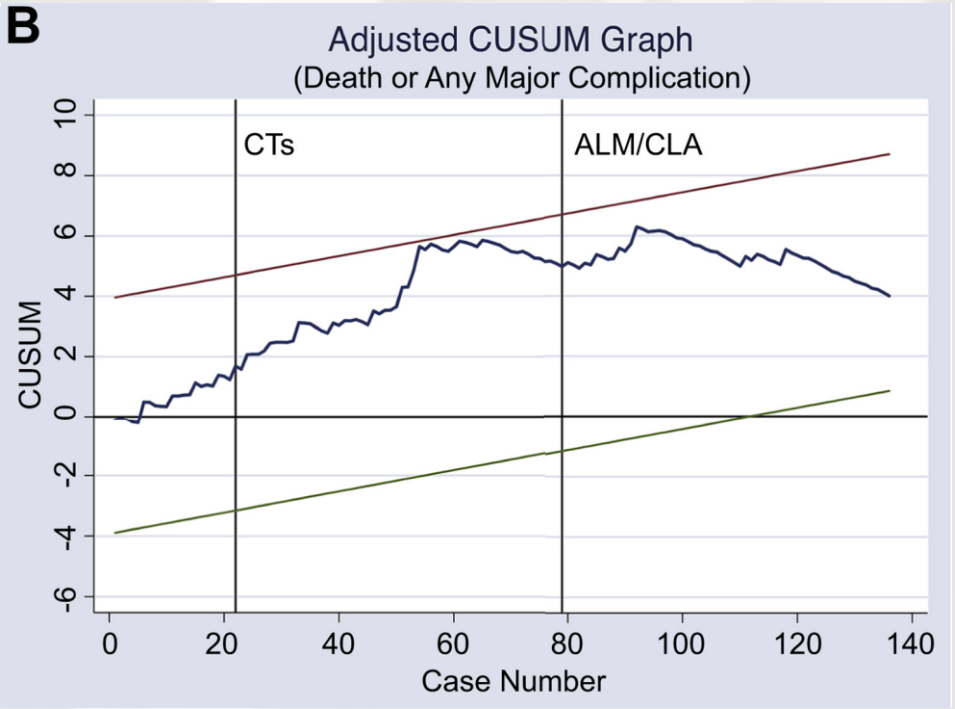
Durability and survival are similar after elective endovascular and open repair of abdominal aortic aneurysms in younger patients Journal of Vascular Surgery 2015 61, 636-641DOI: (10.1016/j.jvs.2014.10.012)

Myth #4

Endovascular surgery has a steep learning curve

Learning curve for FEVAR





Evaluation of the learning curve for fenestrated endovascular aneurysm repairJournal of Vascular Surgery 2016 64, 1219-1227DOI: (10.1016/j.jvs.2016.04.049

Aortic surgery in the US

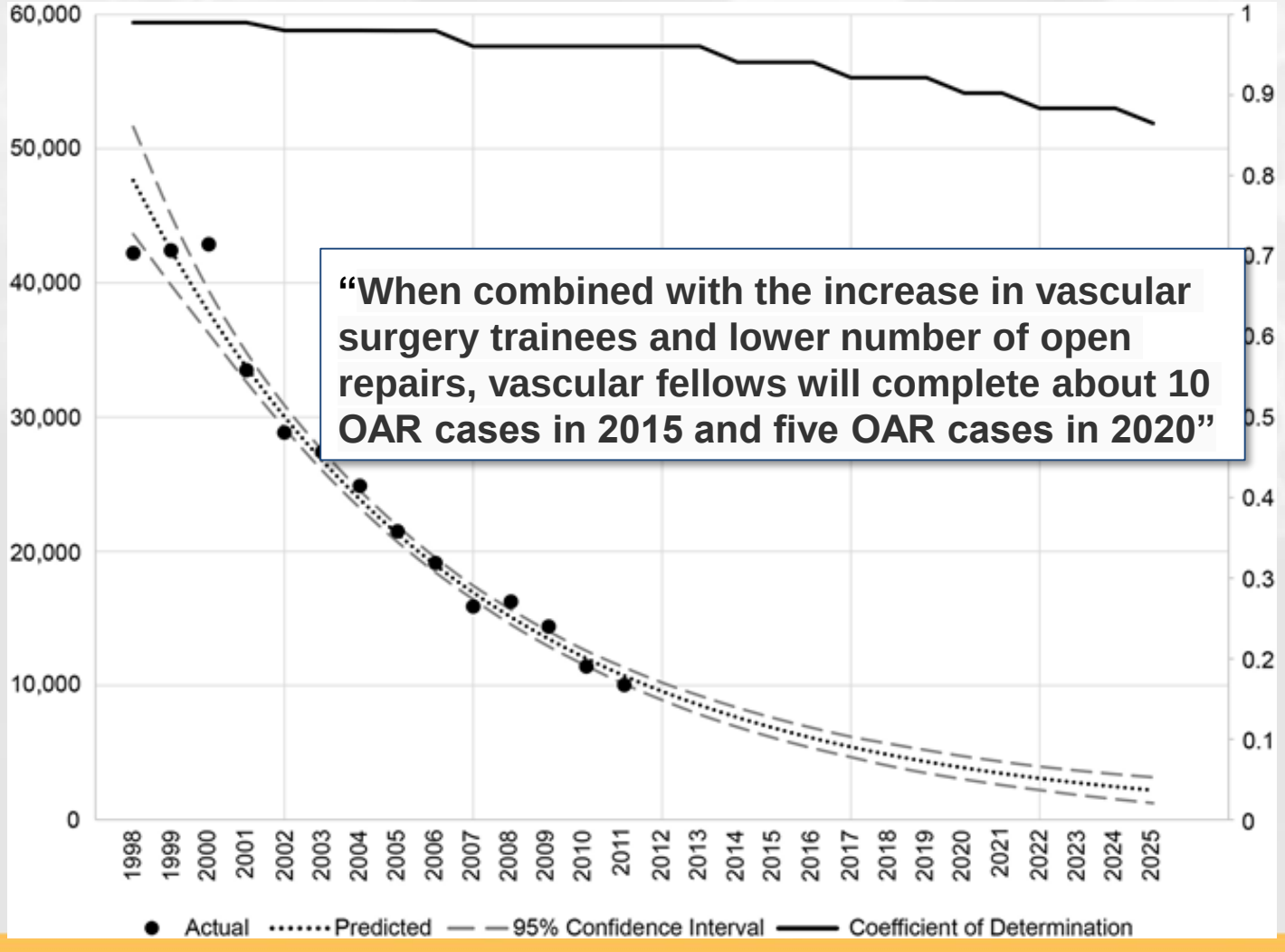
Year	National cases							
	OAR, No.	EVAR, No.	FEVAR/BREVAR, No.	Total, No.				
1998	42,213	N/A	N/A	42,213	2			2)
1999	42,415	N/A	N/A	42,415	2			7)
2000	42,872	2358	N/A	45,230	2			7)
2001	33,499	13,845	N/A	47,344	1			6)
2002	28,842	13,821	N/A	42,663	1			5)
2003	27,404	17,119	N/A	44,523	1			6)
2004	24,881	19,414	N/A	44,295	13,759		N/A	26,799 (61)
2005	21,485	21,332	N/A	42,817	10,369		N/A	22,158 (52)
2006	19,126	27,845	N/A	46,971	10,325		N/A	26,268 (56)
2007	15,895	29,769	N/A	45,664	8408	,852	N/A	26,260 (58)
2008	16,253	34,888	N/A	51,141	8840	18,947	N/A	27,788 (54)
2009	14,389	32,403	N/A	46,792	834	18,711	N/A	27,055 (58)
2010	11,428	32,521	N/A	43,949	7128	17,776	N/A	24,904 (57)
2011	10,039	35,028	722	45,788	6055	19,876	469	26,400 (58)

Year	OAR	95% Confidence interval	OAR	95% Confidence interval
2012	9570	8922-10,218	5356	4994-5719
2013	8541	7841-9241	4780	4389-5172
2014	7623	6903-8343	4267	3864-4670
2015	6805	6065-7545	3809	3394-4223
2020	3863	3006-4721	2162	1682-2642
2025	2200	1236-3163	1231	692-1770

Decreasing OPEN REPAIR and increasing ENDO REPAIR

Predicted shortfall in open aneurysm experience for vascular surgery trainees Journal of Vascular Surgery 2014 60, 945-949DOI: (10.1016/j.jvs.2014.04.057)

Trends in open aortic repair



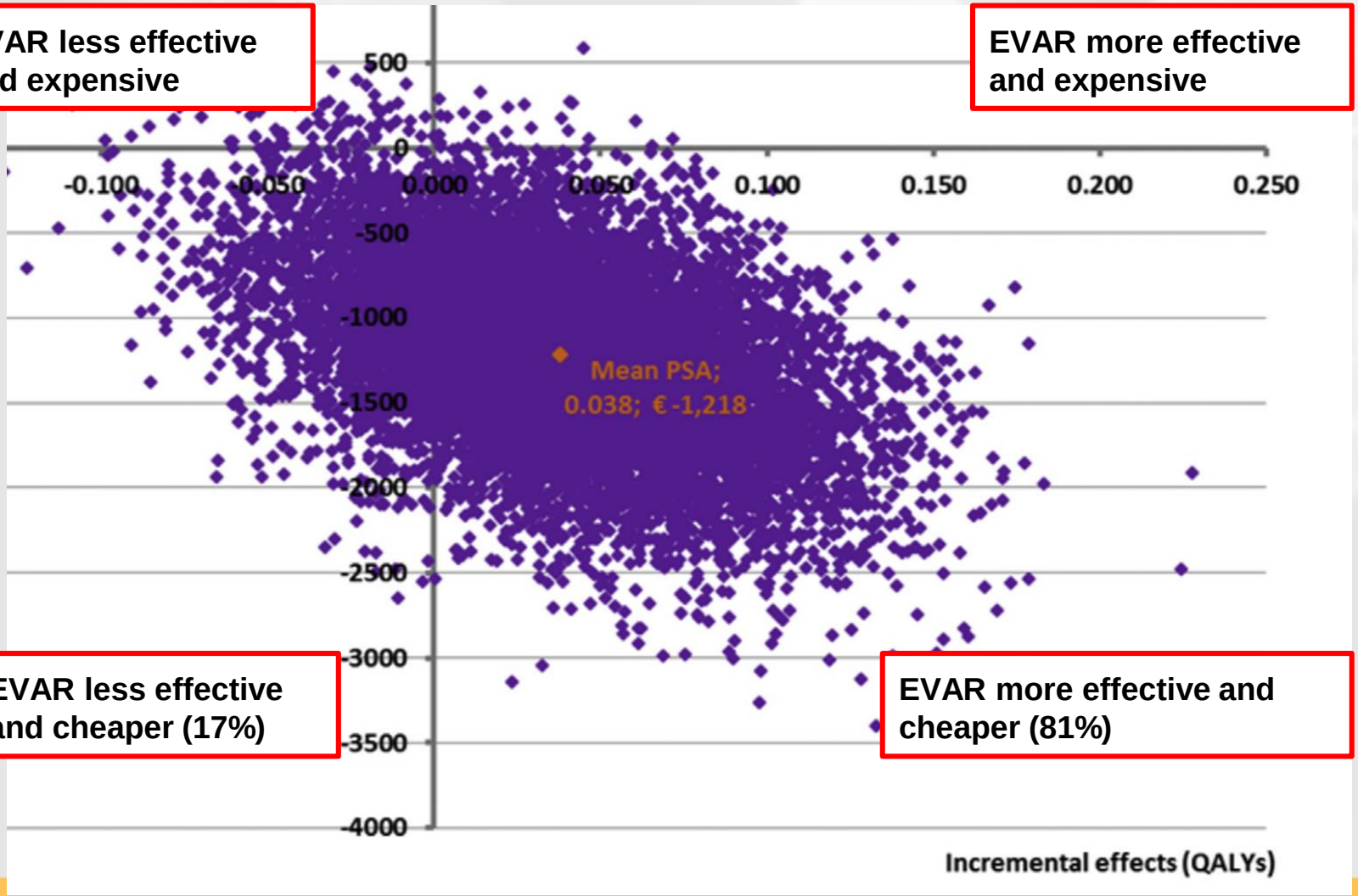
"When combined with the increase in vascular surgery trainees and lower number of open repairs, vascular fellows will complete about 10 OAR cases in 2015 and five OAR cases in 2020"

Predicted shortfall in open aneurysm experience for vascular surgery trainees Journal of Vascular Surgery 2014 60, 945-949DOI: (10.1016/j.jvs.2014.04.057)

Myth #5

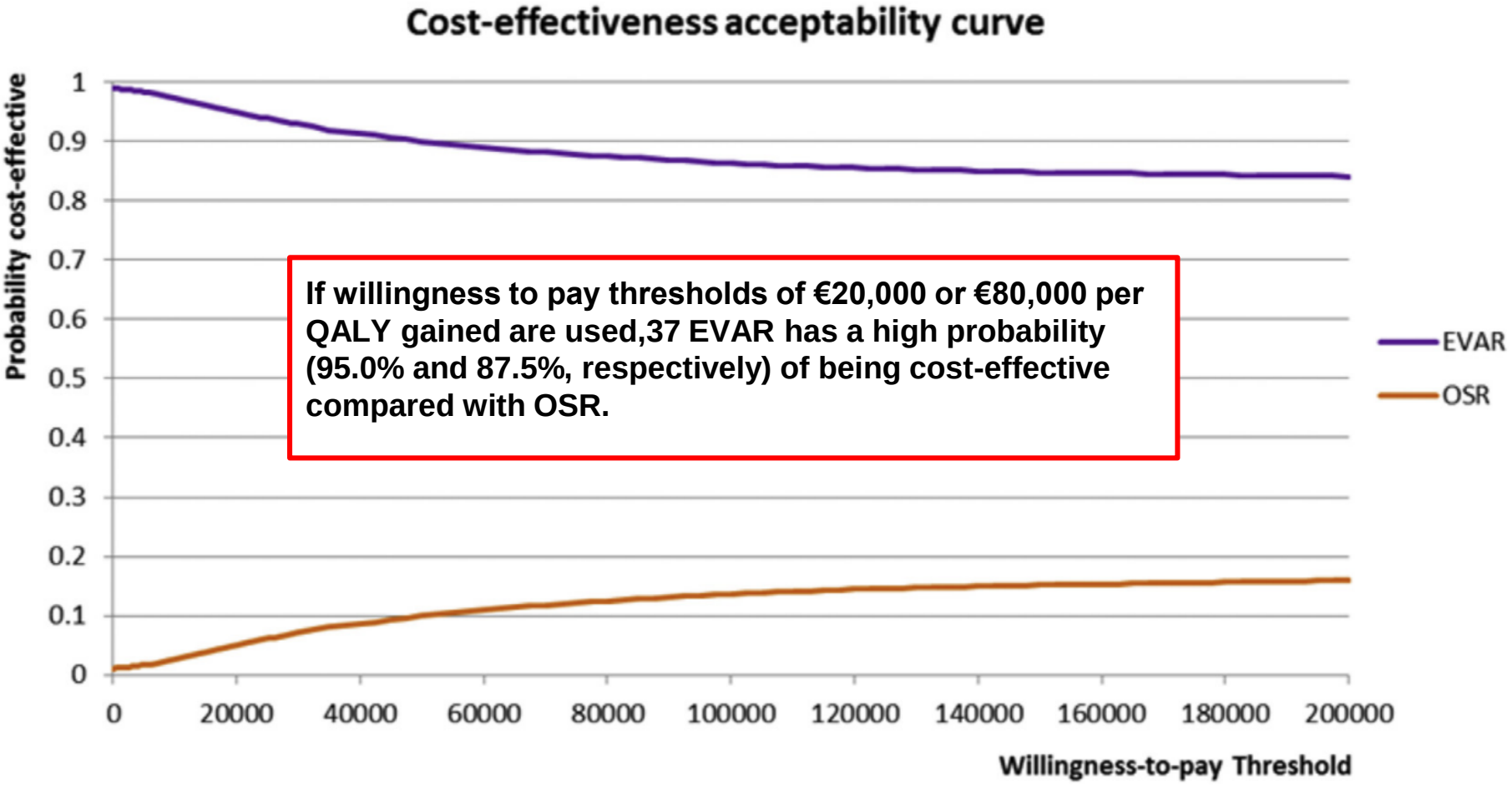
Endovascular repair is expensive

Cost effectiveness



Cost-effectiveness of Elective Endovascular Aneurysm Repair Versus Open Surgical Repair of Abdominal Aortic Aneurysms Burgers, L.T. et al.
European Journal of Vascular and Endovascular Surgery , Volume 52 , Issue 1 , 29 - 40

Cost effectiveness



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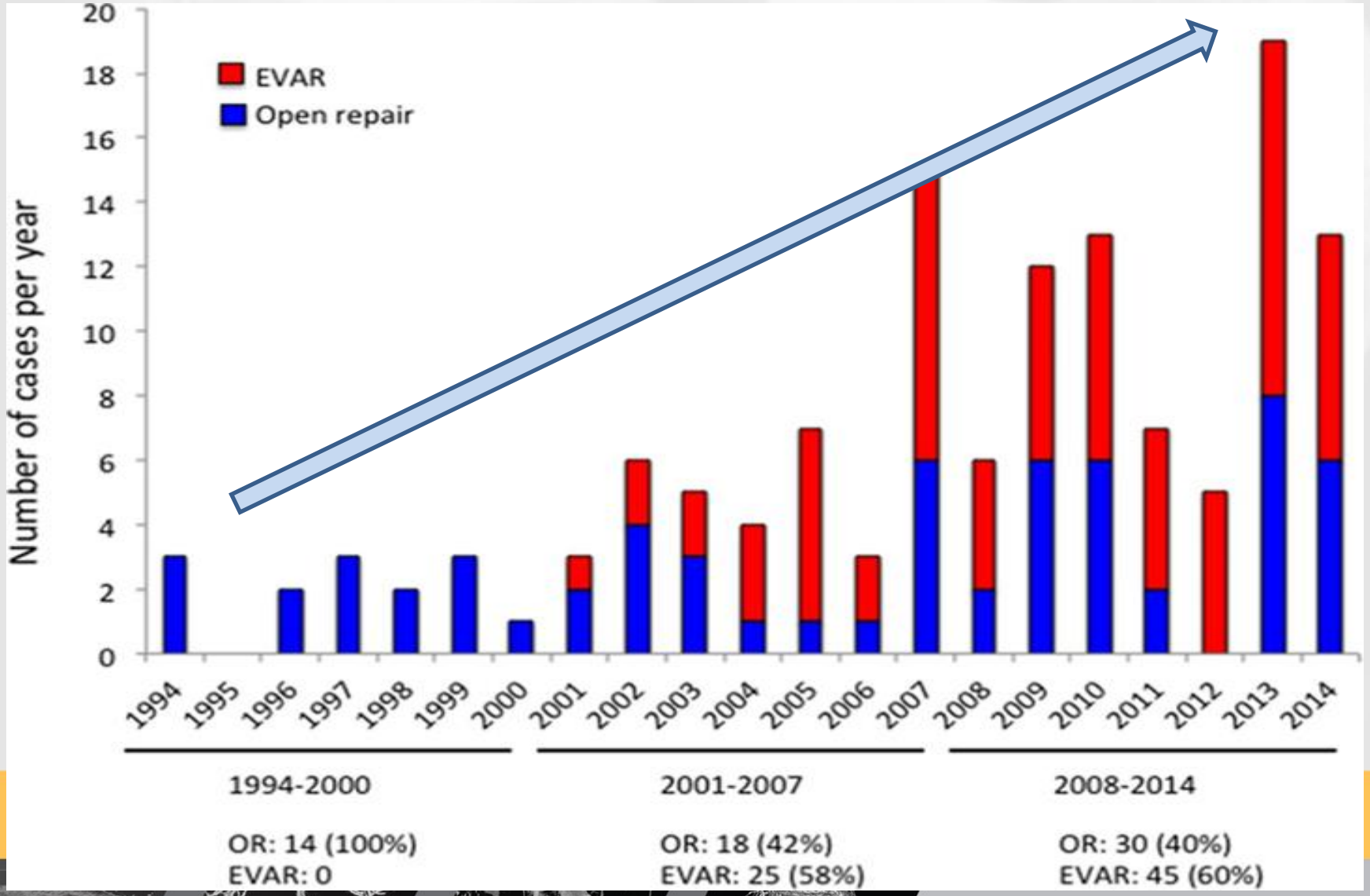
Cost effectiveness

- Data remains unclear in US literature
- QALY added by EVAR not studied well so far in the US system.
- Similar outcomes for complex EVAR are not available

Myth #6

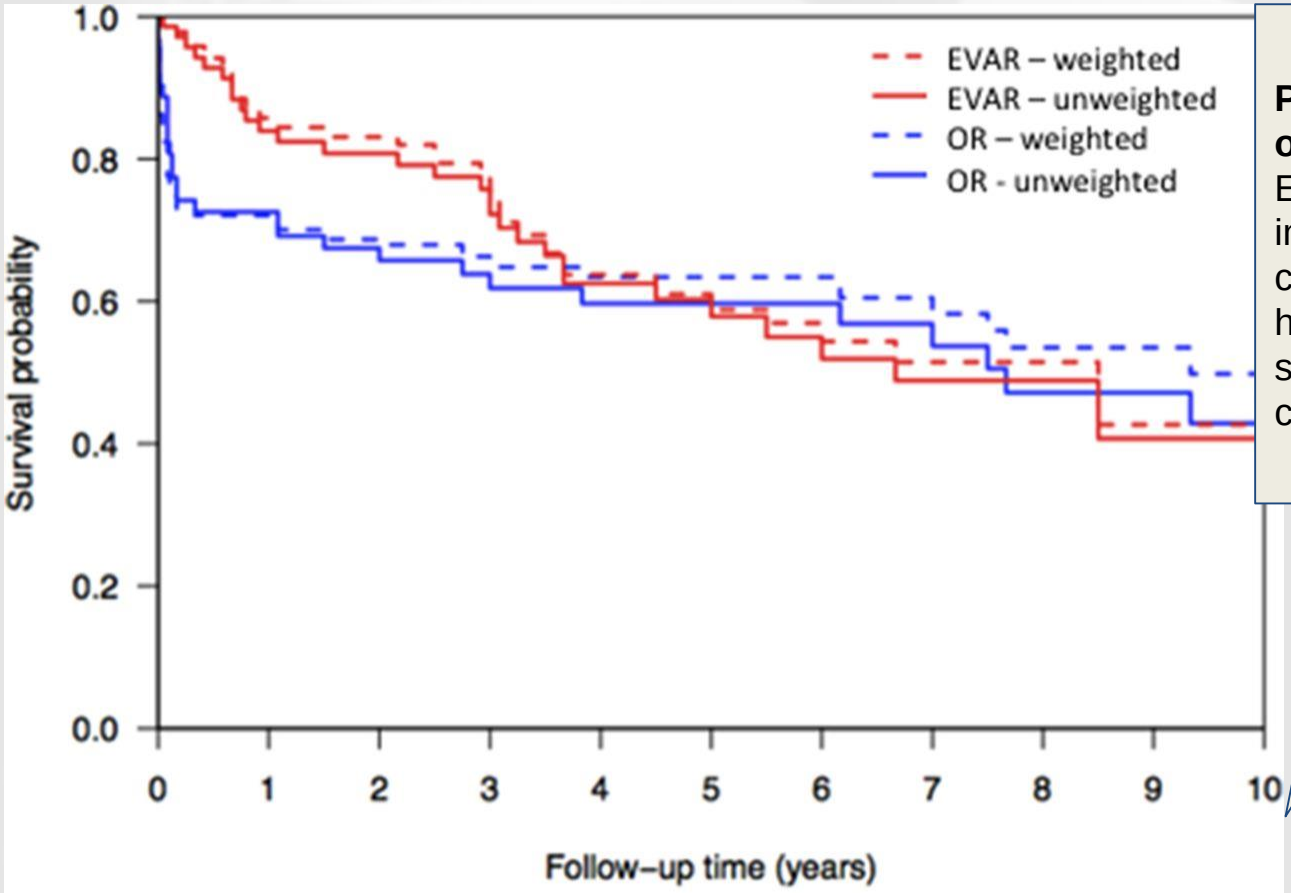
Endovascular surgery is not an options for infection, connective tissue disorders, vasculitis

Nationwide Study of the Treatment of Mycotic Abdominal Aortic Aneurysms Comparing Open and Endovascular Repair



Karl Sörelius et al. Circulation. 2016;134:1822-1832

EVAR for mycotic aneurysms



Propensity score weighted estimates of survival at respective time interval after surgery. Numbers within parenthesis indicate the 95% confidence interval.

	3-months	1-year	5-years	10-years
OR	72.8 (65.9-80.5)	72.1 (65.1-79.8)	63.4 (55.5-72.5)	38.4 (26.7-55.1)
EVAR	96.9 (93.7-99.9)	85.8 (79.4-92.6)	58.8 (49.4-70.0)	42.7 (31.8-57.2)
p	<0.001	0.110	0.687	0.782
Numbers at risk	113	100	52	15

Paradigm shift in treatment of MAAA in Sweden
EVAR was associated with improved short-term survival in comparison with OR, without higher associated incidence of serious infection-related complications or reoperations.

Infections, CTD and Vasculitis

- Endovascular repair is being applied for challenging medical conditions worldwide
- Careful planning, staging and diligent follow up allows for safe outcome with these conditions

Conclusion

Complex EVAR is

- Available for all anatomy
- Safe, effective and durable
- Applicable for all patient population (young age, vasculitis etc)
- Comparable in cost
- READY FOR PRIME TIME!!!

Complex endovascular aortic repair will make the open aortic surgery obsolete


BRACE YOURSELVES
THE EXCUSES ARE COMING

THANK YOU

Outcomes

http://www.jvascsurg.org/article/S0741-5214(17)30381-6/fulltext

http://www.jvascsurg.org/article/S0741-5214(16)31286-1/fulltext

http://www.jvascsurg.org/article/S0741-5214(18)30257-X/fulltext

http://www.jvascsurg.org/article/S0741-5214(16)30290-7/fulltext

http://www.jvascsurg.org/article/S0741-5214(14)01634-6/fulltext