FACULTÉ DE MÉDECINE PIERRE & MARIE CURIE

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Para renal and thoracoabdominal aneurysms: We shouldn't be doing endo surgery in fit patients...

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Team open....

With no disclosures!

The ugly duck!....

A propensity-matched comparison of outcomes for

FEVAR is associated with a significantly higher risk of mortality and morbidity compared to OR for CAAAs

Extension of the paradigm shift comparing EVAR with OR for routine AAAs with complex AAAs is not appropriate

stroke, diabetes, preoperative creatinine, and anticipated/actual aortic clamp site, the study cohort consisted of 42 FEVARs and 147 OSRs. The most frequent FEVAR construct was two renal fenestrations, with or without a single mesenteric scallop, in 50% of cases. An average of 2.9 vessels were treated per patient. Univariate analysis demonstrated FEVAR had higher rates of 30-day mortality (9.5% vs 2%; $P = .05$), any complication (41% vs 23%; $P = .01$), procedural complications (24% vs 7%; $P < .01$), and graft complications (30% vs 2%; $P < .01$). Multivariable analysis showed FEVAR was associated with an increased risk of 30-day mortality (odds ratio [OR], 5.1; 95% confidence interval [CI], 1.1-24; $P = .04$), any complication (OR, 2.3; 95% CI, 1.1-4.9; $P = .01$), and graft complications (OR, 24; 95% CI, 4.8-66; $P < .01$).

Conclusions: FEVAR, in this two-center study, was associated with a significantly higher risk of perioperative mortality and morbidity compared with OSR for management of CAAAs. These data suggest that extension of the paradigm shift comparing EVAR with OSR for routine AAAs to patients with CAAAs is not appropriate. Further study to establish proper patient selection for FEVAR instead of OSR is warranted before widespread use should be considered. (J Vasc Surg 2014;60:858-64.)

Complex AAA

5/8 complications in the open group were not directly associated with the revascularization

Outcome	FEVAR (n = 42) (%)	OSR (n = 147) (%)	P
30-day mortality	9.5	2	.04
Complication			
Any	43	23	.01
Cardiac	4.8	9.5	.2
Pulmonary	12	10	.2
Renal	7.1	2.7	.1
Procedural	24	8	.004
Graft	33	2	<.0001

FEVAR, Fenestrated endovascular aneurysm repair; *OSR*, open surgical repair.

Table IV. Type of complications (matched cohort)

FEVAR group	OSR group
1 iliac limb disconnection	1 renal artery injury
3 acute ischemia on iliac dissection	1 acute renal artery thrombosis
1 acute ischemia (femoral endarterectomy)	2 retroperitoneal hematoma
1 accidental internal iliac cover	2 postoperative bleeding
	1 renal bypass thrombosis
	1 early wound dehiscence

FEVAR, Fenestrated endovascular aneurysm repair; *OSR*, open surgical repair; *SMA*, superior mesenteric artery.

Table V. Multivariable models for 30-day outcomes in matched patients

Outcome	OR	95% CI	P
Death			
FEVAR	5.1	1.08-24	.04
Any complication			
FEVAR	2.3	1.1-4.9	.03
COPD	3.3	1.7-6.7	.0008
Cardiac complication			
FEVAR	0.47	0.1-2.2	.34
Pulmonary complication			
FEVAR	1.19	0.41-3.5	.75
Renal complication			
FEVAR	2.8	0.6-13	.2
Procedural complication			
FEVAR	4.3	1.5-12	.006
MI	3.9	1.4-11	.009
COPD	4.3	1.6-11	.004
Graft complication			
FEVAR	24	6.5-89	<.0001

CI, Confidence interval; *COPD*, chronic obstructive pulmonary disease; *FEVAR*, fenestrated endovascular aneurysm repair; *MI*, myocardial infarction; *OR*, odds ratio.

Complex AAA

Open repair of juxtarenal aortic aneurysms (JAA) remains a safe option in the era of fenestrated endografts

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Thomas C. Bower, MD,[a] Tanya L. Hoskin, MS,[b] Gustavo S. Oderich, MD,[a] and

Open surgical repair of JAA is associated with low morbidity and remains the gold standard….
Only one patient had permanent renal failure

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stay was 7 days (range 3 to 85); median intensive care unit length of stay was 2 days (1 to 64). Complications included renal insufficiency (Cr increase > 0.5 mg/dL) in 22 (18%), cardiac in 17 (13%), and pulmonary in 14 (11%). Five patients required temporary hemodialysis; only one after hospital dismissal. Mean follow-up was 48 months (range 9-80). On multivariate analysis, age ≥ 78 years (P = .001), male gender (P = .04), hypertension (P =.01), previous myocardial infarction (P = .047), and diabetes (P =.009) were predictive of cardiac complications. Renal artery revascularization (P = .01) and prior MI (P = .04) were multivariate predictors of pulmonary complications. Both prolonged operative (≥351 minutes, P = .02) and renal ischemia (≥23 minutes, P =.004) times predicted postoperative renal insufficiency. One, 3, and 5-year cumulative survival rates were 93.9%, 78.3%, and 63.8%, respectively and were not significantly different than an age- and gender-matched sample of the US population (P = .16). Mortality was not predicted by any specific risk factors.

Conclusions: Open surgical repair of JAA is associated with low mortality and remains the gold standard. Although 18% had renal complications, only one patient had permanent renal failure. Patients with a combination of physiologic and anatomic risk factors identified on multivariate analysis may benefit from fenestrated endograft repair. (J Vasc Surg 2008;47:695-701.)

Juxtarenal AAA

Open repair versus fenestrated endovascular aneurysm repair of juxtarenal aneurysms

FEVAR and OR have similar short-term outcomes but have diverging long-term outcomes

FEVAR is a favorable option in high-risk patients and OR remains viable as the gold standard

ase series at completion angiography within the first 6 months after surgery and after 6 months

		Endoleaks at completion angiography			*Early endoleaks (≤6 months)*			*Late endoleaks (>6 months)*		
Study	*Year*	*Type I, No. (%)*	*Type II, No. (%)*	*Type III, No. (%)*	*Type I, No. (%)*	*Type II, No. (%)*	*Type III, No. (%)*	*Type I, No. (%)*	*Type II, No. (%)*	*Type III, No. (%)*
Donas[10]	2012					1 (3.4)				
Coscas[37]	2012	2 (5.3)	2 (5.3)	1 (2.6)	6 (15.8)	7 (18.4)	1 (2.6)	1 (2.6)	4 (10.5)	1 (2.6)
Metcalfe[36]	2012	3 (12.5)	3 (12.5)	1 (4.2)					2 (8.3)	1 (4.2)
Greenberg[41]	2009		8 (26.7)			6 (20.0)			4 (13.3)	
Kristmundsson[42]	2009	3 (5.6)	13 (24.1)	1 (1.9)					3 (5.6)	
Chisci[16]	2009	2 (3.8)						1 (1.9)	13 (25.0)	
Scurr[43]	2007		4 (8.9)							
Semmens[44]	2006	4 (6.9)	2 (3.4)							
Halak[45]	2006	0 (0.0)								
Total endoleak rate, %		5.8	12.9	2.6	15.8	14.4	2.6	2.2	13.1	3.2

Juxtarenal AAA

EBM / pararenal and TAAAs?

- Crucial lack of robust data regarding outcomes in fit patients after open or endo repair of pararenal and thoracoabdominal aneurysms

- No RCT's comparing open and endo results in fit patients

Contemporary Analysis of Descending Thoracic and Thoracoabdominal Aneurysm Repair

A Comparison of Endovascular and Open Techniques

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No significant difference in the incidence of mortality of SCI was found between ER and OR techniques

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f 724 patients (352 ER, 372 SR) underwent repair. The mean age was 67 years, and 65% were male. ER patients were on average 9 years older ($P<0.001$), had more comorbid conditions, and more frequently had prior distal repair ($P<0.001$) or underwent a type I or IV repair. SR patients more commonly had chronic dissection or required type II or type III repairs ($P<0.001$). Mortality at 30 days (5.7% ER versus 8.3% SR, $P=0.2$) and 12 months (15.6% ER versus 15.9% SR, $P=0.9$) was similar. A borderline difference in SCI was found between repair techniques: 4.3% of ER and 7.5% of SR patients ($P=0.08$) had SCI. In patients with ER, prior distal aortic operation was associated with the development of SCI in univariable analysis (odds ratio 4.1, 95% confidence interval 1.4 to 11.7). Multivariable analysis showed that the type of required repair (type I, II, III, or IV) was the primary factor associated with the development of SCI in ER and SR patients.

Conclusion—No significant difference in the incidence of mortality or SCI was found between ER and SR techniques. The strongest factor associated with SCI remains the extent of the disease. Further studies are indicated to compare ER with patients considered eligible for SR. (***Circulation*. 2008;118:808-817.**)

Who are the fit patients?

- Young patients?
- No coronary artery disease?
- No chronic obstructive pulmonary disease?
- No renal dysfunction?
- No liver function impairement?
- Elective patients?

Contemporary outcomes of open repair of thoracoabdominal aortic aneurysm in young patients

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Age < 60 yo

Mortality: 5%

Median critical care stay : 5 d

Permanent paraplegia: 0%

No further aortic events within 72 mo (13 – 171)

« It is against these results that evolving endovascular interventions must be compared »

Conclusions: The outcome of open TAAA repair in patients aged less than 60 years is favorable. It is against these results that evolving endovascular interventions must be compared.

Keywords: Thoracoabdominal, Aorta, Aneurysm, Young

J Cardiothoracic Surg. 2014;9:195

Open Repair of Descending and Thoracoabdominal Aortic Aneurysms and Dissections in Patients Aged Younger Than 60 Years: Superior to Endovascular

. Mortality: 4.5%
. Paraplegia: 0.9%

. Open repair should be the modality of choice in patients aged younger than 60 yo

. Early mortality and neurologic complication rates are similar if not superior to ER for descending aortic and TAAAs

. OR has proven durability and a very low rate of required reintervention, in contrast with ER

s 4.7%. Stroke
egia in 1 (0.9%).
TAAA was 0.22/
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.4% and 80.5%,
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rg 2013;95:12–9)

years (range, 2 days to 7.9 years).

A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

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Objective: The aim of this study was to investigate outcomes of patients treated with endovascular repair (ER) with the use of fenestrated and branched stent grafts or open surgery (OS) for thoracoabdominal aortic aneurysm (TAAA) in a current series of patients.

Methods: All TAAA patients undergoing repair at three centers between January 2007 and December 2014 were included in a prospective database. Patients were stratified according to treatment by ER or OS, and outcomes were compared using propensity score matching (1:1). Covariates included age, sex, aneurysm extent, hypertension, coronary disease, chronic pulmonary disease, diabetes, and renal function. The primary end points were mortality and paraplegia. Secondary end points included any spinal cord ischemia (SCI), renal and respiratory insufficiency, and a composite of these complications or death at 30 days. All-cause survival and freedom from reintervention were compared in the two groups.

Results: Of 341 patients, 84 (25%) underwent ER and 257 underwent OS (75%). After propensity score matching (65 patients per group), no significant differences were observed in rates of 30-day mortality (7.7% in ER and 6.2% in OS; $P = 1$) and paraplegia (9.2% and 10.8%; $P = 1$). Any SCI, renal insufficiency, and respiratory insufficiency were 12.3% and 20% ($P = .34$), 9.2% and 12.3% ($P = .78$), and 0% and 12.3% ($P = .006$) in ER and OS, respectively. The incidence of the composite end point was significantly lower in ER patients (18.5% in ER vs 36.0% in OS; $P = .03$). According to Kaplan-Meier estimates, all-cause survival at 24 months was 82.8% in ER and 84.9% in OS, with rates unchanged at 42 months ($P = .9$). Rates of freedom from reintervention were 91.0% vs 89.7% at 24 months and 80.0% vs 79.9% at 42 months in ER vs OS, respectively ($P = .3$).

Conclusions: A propensity score analysis in patients with TAAA undergoing repair suggests an early benefit from ER compared with OS with regard to the composite end point because of reduced 30-day respiratory complications. No significant differences were found in SCI and renal insufficiency at 30 days and in survival and reintervention rates at midterm. (J Vasc Surg 2016;63:1201-7.)

Table IV. Characteristics and outcome of patients excluded from propensity score matching compared with the matched groups

	ER			*OS*		
	Propensity matched, No. (%)	*Not matched, No. (%)*	P *value*	*Propensity matched, No. (%)*	*Not matched, No. (%)*	P *value*
Patients	65	19		65	192	
Mean age, years	70.7	76.8	<.001	70.7	64.6	<.001
Male	51 (78.5)	12 (63.2)	.23	49 (75.4)	145 (75.5)	1
Smoking	21 (32.3)	8 (42.1)	.43	22 (33.8)	79 (41.1)	.88
Hypertension	59 (90.8)	17 (89.5)	1	61 (93.8)	173 (90.1)	.46
Dyslipidemia	34 (52.3)	3 (15.8)	.008	36 (55.4)	120 (62.5)	.38
CAD	31 (47.7)	16 (84.2)	.008	33 (50.8)	30 (15.6)	<.001
COPD	34 (52.3)	9 (47.4)	.80	30 (46.2)	97 (50.5)	.57
Diabetes	5 (7.7)	3 (15.8)	.37	7 (10.8)	43 (22.4)	.05
Renal impairment	10 (15.4)	2 (10.5)	.73	12 (18.5)	43 (22.4)	.73
Previous aortic surgery	23 (35.4)	5 (26.3)	.58	15 (23.1)	40 (20.8)	.73
Urgent/emergent	1 (1.5)	0 (0)	1	3 (4.6)	9 (4.7)	1
Perioperative results						
Death	5 (7.7)	3 (15.8)	.37	4 (6.2)	12 (6.3)	1
Paraplegia	6 (9.2)	1 (5.3)	1	7 (10.8)	22 (11.5)	1
Dialysis	1 (1.5)	1 (5.3)	.40	1 (1.5)	11 (5.7)	.31
Respiratory complications	0 (0)	2 (10.5)	.05	8 (12.3)	17 (8.9)	.47
Composite end point	12 (18.5)	6 (31.6)	.22	24 (36.9)	52 (27.1)	.16

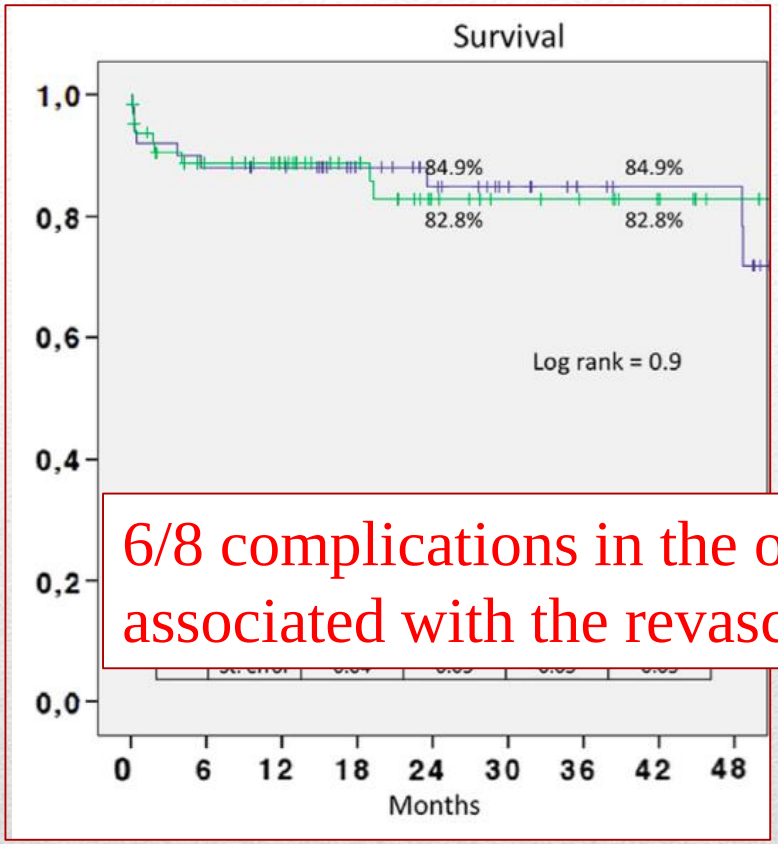
CAD, Coronary artery disease; *COPD,* chronic obstructive pulmonary disease; *ER,* endovascular repair; *OS,* open surgery.
Composite end point: death, spinal cord ischemia (SCI), renal and respiratory insufficiency.

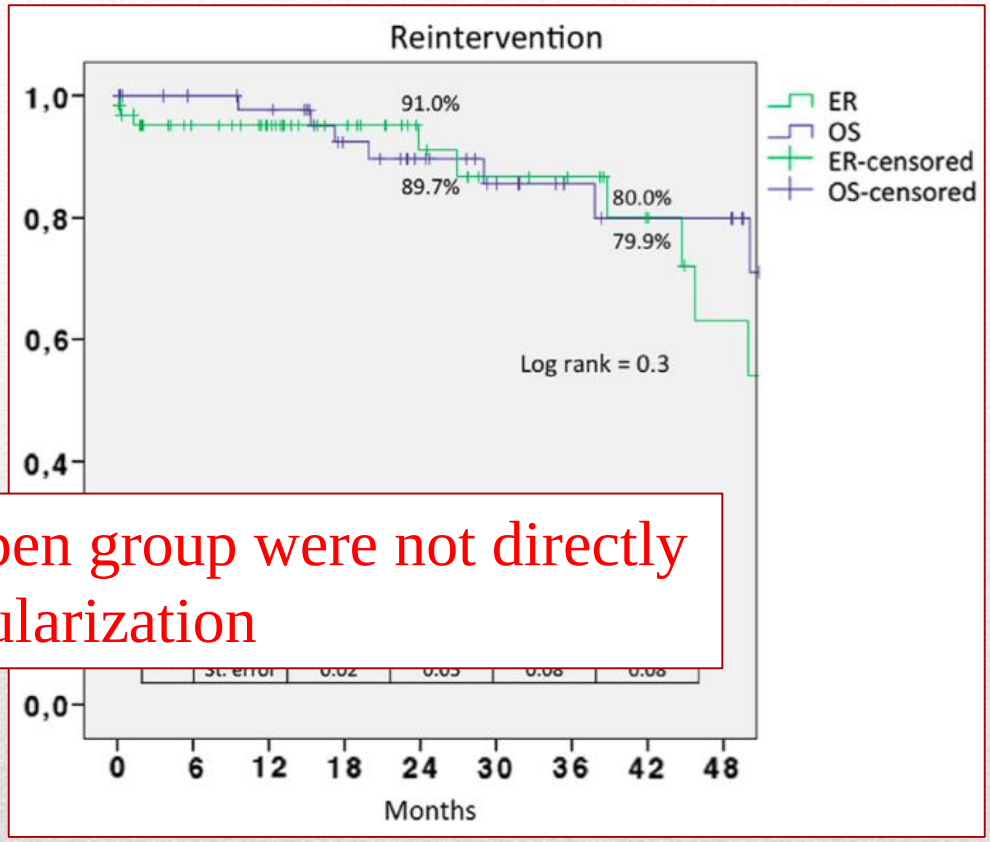
Table V. Perioperative results

	ER (n = 65), No. (%)	*OS (n = 65), No. (%)*	P *value*
			4
			8
Respiratory complications	0 (0)	8 (12.3)	.006
Composite end point	12 (18.5)	24 (36.9)	.03

ER, Endovascular repair; *OS*, open surgery; *SCI*, spinal cord ischemia.
Composite end point: death, SCI, renal and respiratory insufficiency.

No significant differences were found in SCI and renal insufficiency at 30d and in survival and **reintervention rates** at midterm





6/8 complications in the open group were not directly associated with the revascularization

ER (10)		OR (8)	
Type 3 endoleak	5	Bleeding	2
Type Ib endoleak	1	Thoracotomy related	4
Bleeding / access site	2	Bilateral renal stenting	1
Iliac leg occlusion	2	Distal pseudoaneurysm	1

Critical issues in fit patients…

- Early and late morbidity
- Durability

Open Repair of Thoracoabdominal Aortic Aneurysm in the Modern Surgical Era: Contemporary Outcomes in 509 Patients

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BACKGROUND: Recent technologic advances in endovascular devices have led to alternative approaches to thoracoabdominal aortic aneurysm (TAAA) repair; these innovative approaches must be compared with the "gold standard" of conventional open TAAA repair. To facilitate such comparisons, we evaluated contemporary outcomes of open TAAA repair.

STUDY DESIGN: We retrospectively reviewed and analyzed data collected prospectively between May 2006 and October 2010 regarding 509 consecutive patients who underwent TAAA repair. Standard univariate statistical comparisons were performed, as well as multivariable modeling, to identify predictors of survival.

RESULTS: A total of 305 patients (59.9%) had degenerative aneurysms without dissection, and 204 (40.1%) had aortic dissection. There were 104 (20.4%) urgent or emergent repairs and 26 (5.1%) ruptured aneurysms. Operative adjuncts were used selectively. Of the 290 patients (57.0%) who underwent extensive repairs (Crawford extents I and II), 282 (97.2%) had cerebrospinal fluid drainage, 257 (88.6%) had left heart bypass, and 213 (73.4%) had intercostal/lumbar artery reattachment. The overall operative survival rate was 92.1% (469 of 509), and survival was better after elective repairs (93.8% [380 of 405]) than after urgent or emergent operations (85.6% [89 of 104], $p = 0.005$). Renal failure necessitating hemodialysis at discharge developed in 30 patients (5.9%). Permanent paraplegia occurred in 13 patients (2.6%). Actuarial survival was 79.1% $\pm$ 2.0% at 2 years.

CONCLUSIONS: Contemporary open TAAA repair is characterized by respectable early outcomes, particularly when repair is elective. Such results should be compared with those of evolving approaches, including endovascular and hybrid repairs. (J Am Coll Surg 2011;212:569–581. © 2011 by the American College of Surgeons)

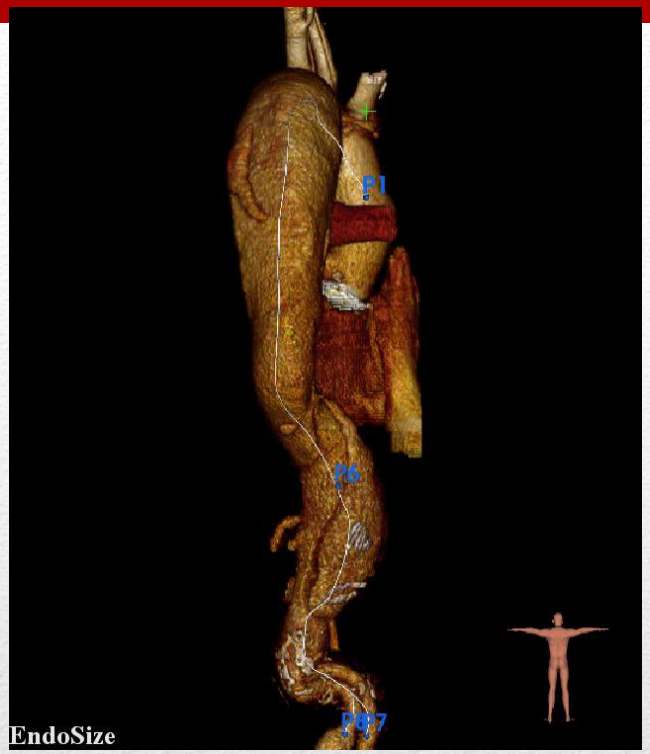
Table 6. Preoperative Clinical Characteristics of 509 Patients Who Underwent Thoracoabdominal Aortic Aneurysm Repair and Unadjusted Associations with the Composite End Point (Adverse Outcome)

	No adverse outcome (n = 410)	Adverse outcome (n = 99)	p Value
Age, y, mean ± SD	62.4 ± 13.3	69.2 ± 9.6	<0.0001
Age, ≥65 y	218 (53.2)	73 (73.7)	0.0002
Male	270 (65.9)	56 (56.6)	0.08
Female	140 (34.2)	43 (43.4)	0.08
Connective tissue disease	57 (13.9)	6 (6.1)	0.03
Marfan syndrome	24 (5.8)	3 (3.0)	0.26
Degenerative aneurysm without dissection	235 (57.3)	70 (70.7)	0.02
Acute or subacute dissection	11 (2.7)	4 (4.0)	
Chronic dissection	164 (40.0)	25 (25.2)	
Diabetes mellitus	41 (10.0)	12 (12.0)	0.54
Hypertension	349 (85.1)	91 (91.9)	0.08
Chronic renal insufficiency	11 (2.7)	4 (4.0)	0.51
Dialysis	5 (1.2)	2 (2.0)	0.63
Pulmonary disease	177 (43.2)	64 (64.6)	0.0001
Coronary artery disease	152 (37.1)	42 (42.4)	0.33
Cerebrovascular disease	57 (13.9)	25 (25.2)	0.006
Extent			0.06
I	107 (26.1)	22 (22.2)	0.43
II	127 (31.0)	34 (34.3)	0.52
III	68 (16.6)	26 (26.3)	0.03
IV	108 (26.3)	17 (17.2)	0.06
Maximum aortic diameter, mm, mean ± SD (n = 350)	63.0 ± 12.0	64.1 ± 12.7	0.37
Quartile 1 (<55 mm)	66 (24.0)	15 (20.0)	0.33*
Quartile 2 (55–60 mm)	67 (24.4)	19 (25.3)	
Quartile 3 (61–69 mm)	73 (26.6)	15 (20.0)	
Quartile 4 (≥70 mm)	69 (25.1)	26 (34.7)	
Branch-vessel involvement	112 (27.3)	32 (32.3)	0.32
Acute symptoms	52 (12.7)	21 (21.2)	0.03
Rupture	9 (2.2)	17 (17.2)	<0.0001
Elective	332 (81.0)	73 (73.7)	0.11
Urgent	48 (11.7)	6 (6.1)	0.10
Emergent	30 (7.3)	20 (20.2)	0.0001

*p value for all 4 quartiles together.

Table 5. Independent Predictors of Late Mortality and the Composite End Point (Adverse Outcome) for 509 Patients Who Underwent Thoracoabdominal Aortic Aneurysm Repair

	Hazard ratio	Odds ratio	95% Confidence interval	p Value
Late mortality				
Age ≥65 y	2.07		1.22–3.50	0.007
Chronic renal insufficiency	3.31		1.41–7.78	0.006
Pulmonary disease	2.65		1.60–4.38	0.0002
Coronary artery disease	1.72		1.08–2.74	0.02
Nonelective surgery	2.13		1.27–3.57	0.004
Composite end point				
Age (per decade)		1.64	1.29–2.10	<0.0001
Pulmonary disease		2.49	1.48–4.18	0.0006
Cerebrovascular disease		1.85	1.03–3.31	0.04
Extent IV repair		0.39	0.21–0.73	0.004
Rupture		12.1	4.73–30.9	<0.0001



Endovascular treatment of acute and chronic aortic pathology in patients with Marfan syndrome

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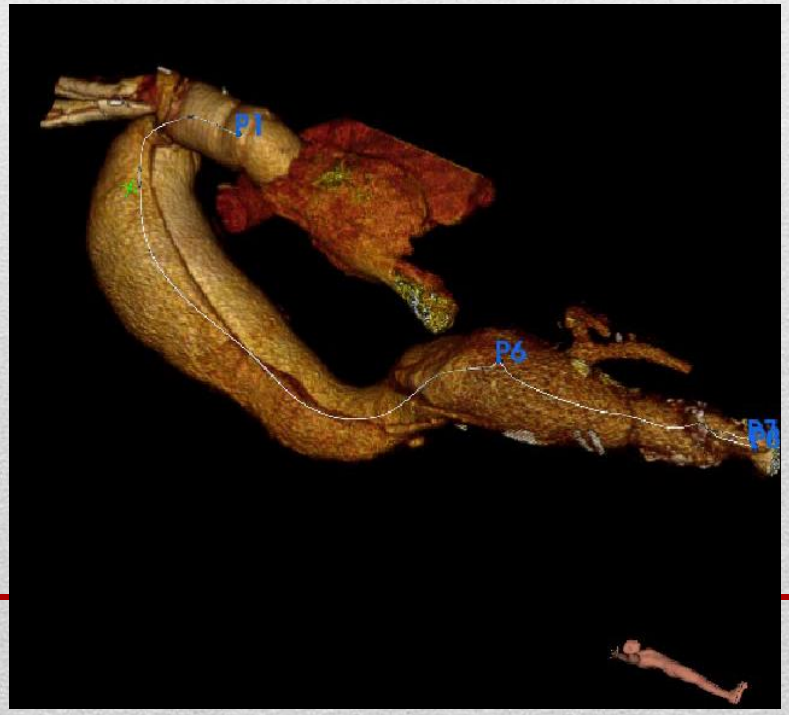
Background: In patients with Marfan syndrome, the complications of aortic degeneration, including dissection, aneurysm, and rupture represent the main cause of mortality. Although contemporary management of ascending aortic disease requires open surgical reconstruction, endovascular repair is now available for management of descending thoracic and abdominal aortic pathology (ie, thoracic endovascular aortic repair [TEVAR], endovascular aneurysm repair [EVAR]). The short- and long-term benefit of endovascular repair in Marfan patients remains largely unproven. We examine our outcomes after EVAR in this patient population.

Methods: All patients with a diagnosis of Marfan syndrome who were treated with TEVAR/EVAR were evaluated in a retrospective review. Perioperative, procedure-specific and patient covariate data were aggregated. Primary endpoints were overall mortality and procedural success as divided into three categories: (1) successful therapy, (2) primary failure, or (3) secondary failure.

Results: Between 2000 and June 2010, 16 patients were identified as having undergone 19 TEVAR/EVAR procedures. These included three emergent operations (two for acute dissection/malperfusion and one for anastomotic disruption early after open repair). All 16 patients had previously undergone at least one (range, 1-5) open operation of the ascending aorta or arch at a time interval from 33 years to 1 week prior to the index endovascular repair. During a median follow-up of 9.3 months (range, 0-46 months), there were four deaths (25%). Six patients (38%) had successful endovascular interventions. Despite early success, there was one death in this group at 1 month postintervention. Seven patients (44%) experienced primary treatment failure with five undergoing open conversion and one undergoing left subclavian coil embolization (the seventh was lost to follow-up and presented 4 months later in cardiac arrest and expired without repair). There were three deaths in the primary treatment failure group. Two patients experienced secondary treatment failure. One underwent the index TEVAR for acute dissection with malperfusion and required a subsequent TEVAR for more distal aortic pathology. He is stable without disease progression. The other patient underwent open conversion after a second EVAR with four-vessel "chimney" stent grafts and is stable with his entire native aorta having been replaced.

Conclusions: Aortic disease associated with Marfan syndrome is a complex clinical problem and many patients require remedial procedures. Endovascular therapy can provide a useful adjunct or bridge to open surgical treatment in selected patients. However, failure of endovascular therapy is common, and its use should be judicious with close follow-up to avoid delay if open surgical repair is required. (J Vasc Surg 2012;55:1234-41.)



Early and Late Results of Graft Replacement for Dissecting Aneurysm of Thoracoabdominal Aorta in Patients With Marfan Syndrome

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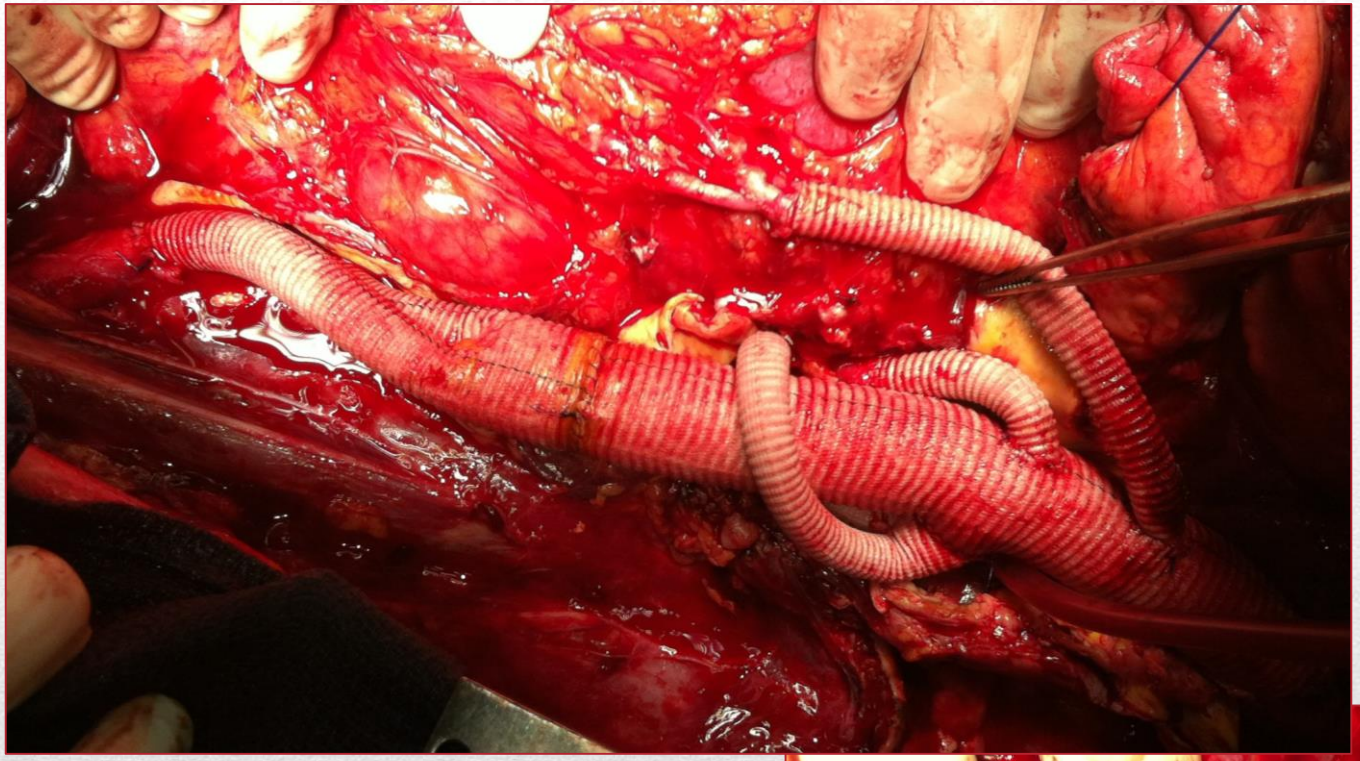
Background. When treating dissecting aneurysm of the thoracoabdominal aorta surgically in patients with Marfan syndrome, we have usually performed graft replacement— including the entire thoracoabdominal aorta and reconstruction of all visceral branches, even if dilatation is mild in some segments—to avoid further aortic operations in the follow-up period.

Methods. From October 1999 through July 2011, 20 consecutive patients with Marfan syndrome underwent repair of dissecting aneurysm of the thoracoabdominal aorta (median age, 45 years; range, 19–65 years). All patients underwent surgical intervention with cerebrospinal fluid (CSF) drainage and distal aortic and selective organ perfusion. Deep hypothermia was used in 13 patients for spinal cord protection.

Results. No in-hospital mortality was observed. One patient had temporary spinal cord ischemia but was fully recovered by discharge. Other complications included exploration for bleeding (n = 1), prolonged ventilation (n = 1), and graft infection (n = 1). At a mean follow-up of 54 months (range, 9–129 months), 1 patient had died of interstitial pneumonia at 38 months postoperatively. Survival at 8% years was 91.2 ± 9.0%. Two patients required additional aortic procedures (total arch replacement and aortic valve-sparing surgery). Actuarial rate of freedom from aortic operations at 8 years was 83.9% ± 10.5%, but no patient needed required repeated thoracotomy for an aortic procedure. Neither false nor patch aneurysms were observed using computed tomography (CT) during follow-up surveillance.

Conclusions. Graft replacement for dissecting aneurysm of the thoracoabdominal aorta in Marfan syndrome offers good early and long-term results. We believe total aortic replacement including the entire thoracoabdominal aorta and reconstruction of all visceral arteries should be recommended for selected patients with Marfan syndrome.

(Ann Thorac Surg 2012;94:759–65)



Outcomes of 3309 thoracoabdominal aortic aneurysm repairs

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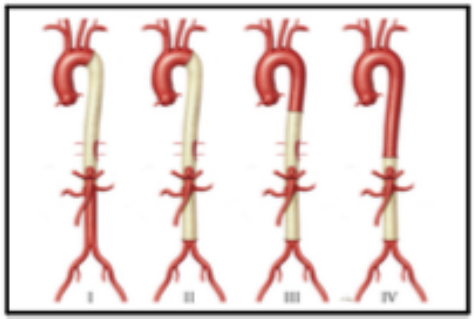
ABSTRACT

Objective: Since the pioneering era of E. Stanley Crawford, our multimodal strategy for thoracoabdominal aortic aneurysm repair has evolved. We describe our approximately 3-decade single-practice experience regarding 3309 thoracoabdominal aortic aneurysm repairs and identify predictors of early death and other adverse postoperative outcomes.

Methods: We analyzed retrospective (1986-2006) and prospective data (2006-2014) obtained from patients (2043 male; median age, 67 [59-73] years) who underwent 914 Crawford extent I, 1066 extent II, 660 extent III, and 669 extent IV thoracoabdominal aortic aneurysm repairs, of which 723 (21.8%) were urgent or emergency. Repairs were performed to treat degenerative aneurysm (64.2%) or aortic dissection (35.8%). The outcomes examined included operative death (ie, 30-day or in-hospital death) and permanent stroke, paraplegia, paraparesis, and renal failure necessitating dialysis, as well as adverse event, a composite of these outcomes.

Results: There were 249 operative deaths (7.5%). Permanent paraplegia and paraparesis occurred after 97 (2.9%) and 81 (2.4%) repairs, respectively. Of 189 patients (5.7%) with permanent renal failure, 107 died in the hospital. Permanent stroke was relatively uncommon (n = 74; 2.2%). The rate of the composite adverse event (n = 478; 14.4%) was highest after extent II repair (n = 203; 19.0%) and lowest after extent IV repair (n = 67; 10.2%; $P < .0001$). Estimated postoperative survival was 83.5% ± 0.7% at 1 year, 63.6% ± 0.9% at 5 years, 36.8% ± 1.0% at 10 years, and 18.3% ± 0.9% at 15 years.

Conclusions: Repairing thoracoabdominal aortic aneurysms poses substantial risks, particularly when the entire thoracoabdominal aorta (extent II) is replaced. Nonetheless, our data suggest that thoracoabdominal aortic aneurysm repair, when performed at an experienced center, can produce respectable outcomes. (J Thorac Cardiovasc Surg 2016;151:1323-38)



Outcomes of TAAA repair differ by Crawford extent.

Central Message

Open TAAA repair produces respectable outcomes, but there is clearly room for improvement. Outcome differs by repair extent.

Perspective

We present the results of 3309 open TAAA repairs to elucidate operative risk. These repairs require interrupting blood flow to vital organs, which incurs the risk of postoperative paraplegia, renal failure, and other complications. Our data suggest that open TAAA repair performed at an experienced center can produce respectable outcomes, but further improvement is needed.

See Editorial Commentary page 1339.

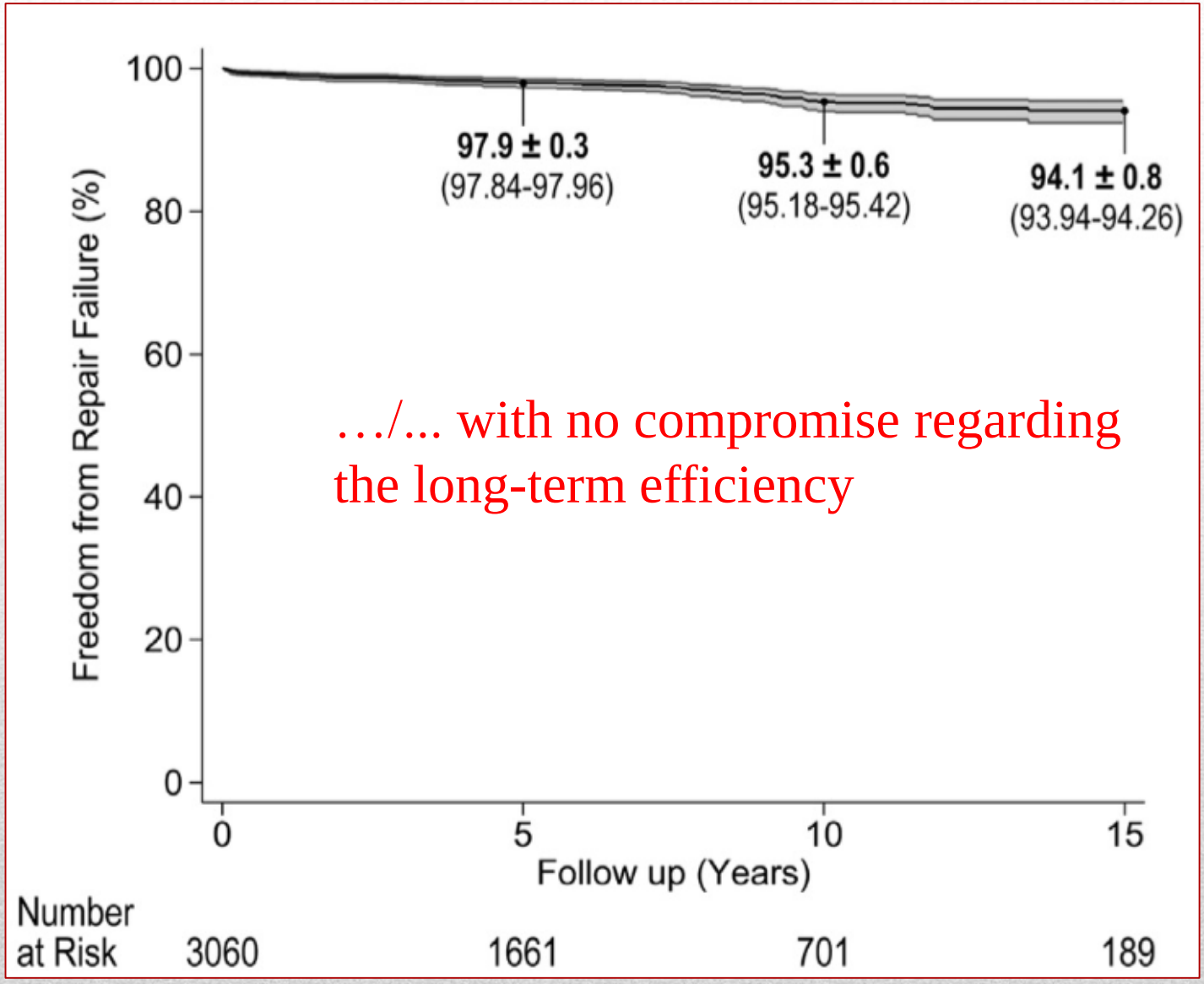
See Editorial page 1232.

TABLE 4. Results of consecutive elective cases (n = 2586)

Variable	All n = 2586	Extent I n = 700	Extent II n = 866	Extent III n = 504	Extent IV n = 516	*P* value
Adverse event	329 (12.7)	63 (9.0)	154 (17.8)	73 (14.5)	39 (7.6)	<.001
Operative mortality	161 (6.2)	32 (4.6)	72 (8.3)	41 (8.1)	16 (3.1)	<.001
Permanent paraplegia*	66 (2.6)	8 (1.1)	37 (4.3)	18 (3.6)	3 (0.6)	<.001
Permanent paraparesis*	57 (2.2)	14 (2.0)	25 (2.9)	10 (2.0)	8 (1.6)	.4
Permanent renal failure necessitating dialysis*	132 (5.1)	17 (2.4)	64 (7.4)	28 (5.6)	23 (4.5)	<.001
Permanent stroke*	60 (2.3)	17 (2.4)	31 (3.6)	5 (1.0)	7 (1.4)	.007
Survival with life-altering complication†	168 (6.5)	31 (4.4)	82 (9.5)	32 (6.3)	23 (4.5)	<.001

Values are n (%). Outcomes of interest (paraplegia, paraparesis, renal failure necessitating dialysis, and stroke) are permanent complications present at discharge or present in those patients with early death. *Excludes 5 patients who died during the operation. †Discharge with permanent paraplegia, paraparesis, renal failure, or stroke in 2425 early survivors of elective repair.

Open repair yields respectable results to which endo should now be compared with …/...



Freedom from open repair failure @ … 15y!

Eur J Vasc Endovasc Surg (2015) 50, 189–196

Editor's Choice — Thirty day Outcomes and Costs of Fenestrated and Branched Stent Grafts versus Open Repair for Complex Aortic Aneurysms

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[b] Department of Vascular Surgery, CHU Henri Mondor, Créteil, France
[c] UPEC, CHU Henri Mondor, Créteil, France

Cost effectiveness ?

f/b EVAR does not appear justified for patients with pararenal and infradiaphragmatic TAAA fit for OR

…

by survival analysis and uni/multivariate Cox regression analyses using pre- and post-operative characteristics. Bootstrap methods were used to estimate the cost-effectiveness of f/b EVAR versus OSR.

Results: Two hundred and sixty eight cases and 1,678 controls were included. There was no difference in 30 day mortality (6.7% vs. 5.4%, $p = 0.40$), but costs were higher with f/b EVAR (€38,212 vs. €16,497, $p < .001$). After group stratification, mortality was similar with both treatments for para/juxtarenal AAA (4.3% vs. 5.8%, $p = .26$) and supradiaphragmatic TAAA (11.9% vs. 19.7%, $p = .70$), and higher with f/b EVAR for infradiaphragmatic TAAA (11.9% vs. 4.0%, $p = .010$). Costs were higher with f/b EVAR for para/juxtarenal AAA (€34,425 vs. €14,907, $p < .0001$) and infradiaphragmatic TAAA (€37,927 vs. €17,530, $p < .0001$), but not different for supradiaphragmatic TAAA (€54,710 vs. €44,163, $p = .18$).

Conclusion: f/b EVAR does not appear justified for patients with para/juxtarenal AAA and infradiaphragmatic TAAA fit for OSR but may be an attractive option for patients with para/juxtarenal AAA not eligible for surgery and patients with supradiaphragmatic TAAA. Clinical Trial Registration: http://www.clinicaltrials.gov/ct2/show/

Is open repair still the standard for the descending and thoracoabdominal aorta?

Anthony L. Estrera, MD

	Open	Endovascular	Non-op
Age	Younger	Older	Old
Anatomy	Any	Adequate	Poor
Robustness	Good	Adequate	Poor
Pathology	Any	Aneurysm	Any

FIGURE 1. "Individualized standard" for aneurysm treatment.

- Contemporary open TAAA surgery performed in a specialist thoracoabdominal unit with careful pre-operative assessment, meticulous intraoperative technique and close postoperative support leads to good results in fit « low-risk » patients.
- It is against current results that emerging endovascular techniques should be compared with due consideration given to the long-term risks.
- Endovascular techniques pioneered in the elderly and unfit patients may clearly not represent the best long-term option for fit patients with a pararenal or thoracoabdominal aneurysm.

Conclusions

Conclusions: the white flag…

- Open and endo techniques are complementary
- Open and endo techniques should not be offered at random, but more likely the choice should be individualized to achieve the best outcomes in different patients
- We still always think open repair first and switch to endo in patients proved at high risk for surgery due to cumulative comorbidities


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