What is the real incidence and severity of spinal cord injury after endovascular management of thoracoabdominal aortic aneurysm?

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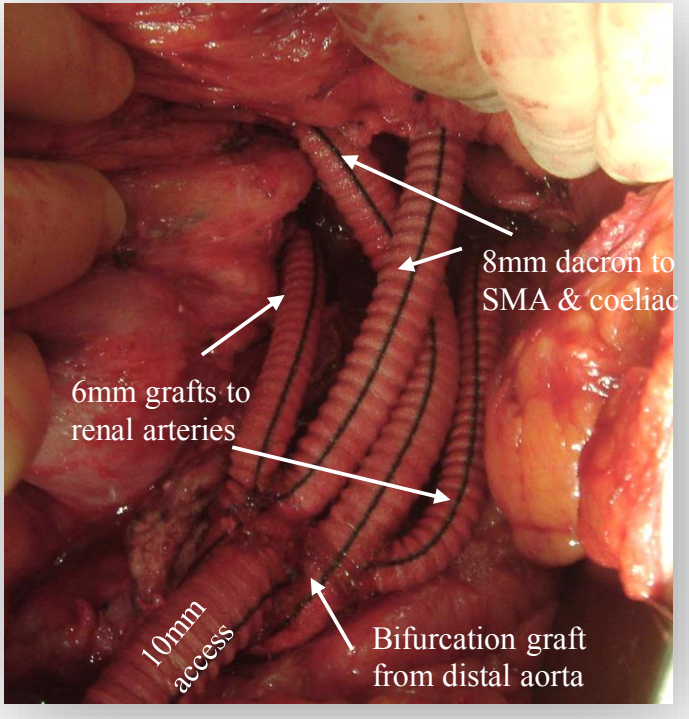
What is the real spinal cord outcome after endo-intervention for TAAA?



Only for extensive aneurysms
NO extent IV lesions

Eur J Vasc Endovasc Surg (2009) **38**, 578–585

ELSEVIER

The Visceral Hybrid Repair of Thoraco-abdominal Aortic Aneurysms – A Collaborative Approach

S.L. Drinkwater [a], D. Böckler [b], H. Eckstein [c], N.J.W. Cheshire [a,d], D. Kotelis [b], O. Wolf [c], M.S. Hamady [a], P. Geisbüsch [b], M. Clark [a], J.R. Allenberg [b], J.H. Wolfe [a], R.G. Gibbs [a], M.P. Jenkins [a,*]

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- 107 cases in 3 European centres
- Mortality 16/107 (14.9%)
- SCI 13/107 (12.1%)
- Permanent in 9 (8.4%)

HEALTH TECHNOLOGY ASSESSMENT

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The use of fenestrated and branched endovascular aneurysm repair for juxtarenal and thoracoabdominal aneurysms: a systematic review and cost-effectiveness analysis

Nigel Armstrong,[1]* Laura Burgers,[2] Sohan Deshpande,[1] Maiwenn Al,[2] Rob Riemsma,[1] SR Vallabhaneni,[3] Peter Holt,[4] Johan Severens[2] and Jos Kleijnen[1,5]

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Clinical Effectiveness

- 5253 records retrieved
- Reduced to 3268 because of duplication
- Reduced to 24 by abstract scrutiny
- None of 24 satisfied inclusion criteria
  - *16 design*
  - *6 intervention*
  - *2 comparator*

Conclusions: Despite a thorough search, no studies could be found that met the inclusion criteria. All studies that compared either fEVAR or bEVAR with either OSR or no surgery explicitly selected patients based on prognosis, i.e. essentially the populations for each comparator were not the same. Despite not being able to conduct a CEA, we have provided detailed methods for the conduct if data becomes available.

comparable at baseline given that they had selectively assigned younger, fitter patients to OSR. Therefore,

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Editor's Choice – Ten-year Experience with Endovascular Repair of Thoracoabdominal Aortic Aneurysms: Results from 166 Consecutive Patients

E.L.G. Verhoeven [a,*], A. Katsargyris [a], F. Bekkema [c], K. Oikonomou [a], C.J.A.M. Zeebregts [c], W. Ritter [b], I.F.J. Tielliu [c]

[a] Department of Vascular and Endovascular Surgery, Paracelsus Medical University, Nürnberg, Germany
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Results: 166 patients (125 male, 41 female, mean age 68.8 ± 7.6 years) were treated. The mean TAAA diameter
2%), type II, *n* = 50 (30.1%), type III, *n* = 53 (31.9%),
%) patients had an acute TAAA (11 contained rupture,
ere refused for open surgery earlier. Seventy eight
en/endovascular aortic procedures. Technical success
3% (13/166), with an in hospital mortality of 9% (15/
d in 15 patients (9%), including permanent paraplegia
ring follow up 40 patients died, two of them probably

Table 4. Summary of major peri-operative complications.

Peri-operative complication	*N* (%)
Cardiac complications (MI, arrythmias)	9 (5.4)
Pulmonary insufficiency	6 (3.6)
Renal function deterioration (>30% from baseline)	9 (5.4)
Spinal cord ischemia (SCI)	15 (9)
Permanent paraplegia	2 (1.2)
Temporary paraparesis/paresthesia/urinary incontinence	10 (6)
Permanent paraparesis/paresthesia/urinary incontinence	3 (1.8)
Stroke	2 (1.2)
CSF leakage	1 (0.6)
Bleeding complications	7 (4.2)
Retroperitoneal hematoma	4 (2.4)
Mesenteric hematoma	2 (1.2)
Renal hematoma	2 (1.2)
Access site hematoma requiring revision	1 (0.6)
Colon ischemia	2 (1.2)
Lower extremity ischemia	2 (1.2)
Upper extremity ischemia	4 (2.4)
Brachial nerve injury	1 (0.6)
Groin infection	1 (0.6)
Surgical wound dehiscence	1 (0.6)
Retrograde dissection	1 (0.6)

Nurenberg/Groningen 166 TAAA 2004-14

- 2/3 extent II or III TAAA
- 7.8% 30day & 9% in hospital mortality
- Early lower limb revascularisation
- Selective CSF drainage

Eur J Vasc Endovasc Surg (2015) 49, 248–254

Editor's Choice – The Impact of Early Pelvic and Lower Limb Reperfusion and Attentive Peri-operative Management on the Incidence of Spinal Cord Ischemia During Thoracoabdominal Aortic Aneurysm Endovascular Repair

B. Maurel [a], N. Delclaux [a], J. Sobocinski [a], A. Hertault [a], T. Martin-Gonzalez [a], M. Moussa [a], R. Spear [a], M. Le Roux [a], R. Azzaoui [a], M. Tyrrell [b], S. Haulon [a,*]

[a] Aortic Centre, Hôpital Cardiologique, CHRU de Lille, INSERM U1008, Université Lille Nord de France, 59037 Lille Cedex, France
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Methods: Between October 2004 and December 2013, 204 endovascular TAAA repairs were performed using custom made devices manufactured with branches and fenestrations to maintain visceral vessel perfusion. D from all of these procedures were prospectively collected in an electronic database. Early post-operative resu in patients treated before (group 1, $n = 43$) and after (group 2, $n = 161$ patients) implementation of the modif implantation and peri-operative protocols were compared.

Results: Patients in groups 1 and 2 had similar comorbidities (median age at repair 70.9 years [range 65.2–7 years]), aneurysm characteristics (median diameter 58.5 mm [range 53–65 mm]), and length of procedure (median 190 minutes [range 150–240 minutes]). The 30 day mortality rate was 11.6% in group 1 versus 5.6% group 2 ($p = .09$). The SCI rate was 14.0% versus 1.2% ($p < .01$). If type IV TAAAs were excluded from this analysis, the SCI rate was 25.0% (6/24 patients) in group 1 versus 2.1% (2/95 patients) in group 2 ($p < .01$

Lille 204 TAAA 2004-13

- 1/2 extent II or III
- 85 extent IV
- 6.9% 30 day mortality
- Before & after spinal cord protocol

Table 3. Thirty day outcomes of patient with type I, II, and III thoracoabdominal aortic aneurysms.

	Group 1 ($n = 24$)	Group 2 ($n = 95$)	RR (95% CI)	p
Major complications	12 (50.0)	27 (28.4)	1.4316 (0.9409–2.1781)	.04
Spinal cord ischemia	6 (25.0)	2 (2.1)	1.3053 (1.0341–1.6475)	<.001
30 day mortality	5 (20.8)	7 (7.4)	0.3537 (0.1229–1.10175)	.06
Minor complications	8 (33.3)	30 (31.9)	1.0213 (0.7454–1.3993)	.54

Note. Values are given as *n* (%). RR = relative risk; CI = confidence interval.

Fenestrated and branched endovascular aneurysm repair outcomes for type II and III tic aneurysms

ee, BS, Katherine Wolski, MPH, Tara Mastracci, MD, and

AA) repair remains a challenging clinical pathology. Endovascular ed and branched (F/B) endografts used in endovascular aneurysm d of treating these complex aneurysms. This study evaluated the tensive type II and III TAAA.
a physician-sponsored investigational device exemption trial (2004- TAAA were evaluated. Technical success, perioperative clinical out- nch patency, reintervention, aneurysm-related death, and all-cause n ± standard deviation and were assessed using Kaplan-Meier uni-

Table II. Major perioperative morbidity

Morbidity	*No. (%)*
Return to operating room	13 (3.7)
SCI	31 (8.8)
Permanent	14 (4)
Renal failure	18 (5.1)
Requiring hemodialysis	10 (2.8)
Increase in creatinine[a]	8 (2.3)
Myocardial infarction	10 (2.8)
Non-ST elevation	7 (2.0)
ST elevation	3 (0.8)
Cardiac dysrhythmia	24 (6.8)
Atrial fibrillation	16 (4.5)
Other	8 (2.3)
Respiratory failure	32 (9.0)
Branch vessel occlusion (without reintervention)	4 (1.1)
Hematologic	9 (2.5)
DVT/PE	3 (0.8)
Hemorrhage not requiring return to operating room	2 (0.6)
Wound complications	9 (2.5)
Dehiscence	2 (0.6)
Hematoma	7 (2.0)
Gastrointestinal disorder	13 (3.7)
Gastrointestinal bleeding	3 (0.8)
Ileus	6 (1.7)
Pancreatitis	1 (0.3)
Liver failure	1 (0.3)
Ischemic colitis	2 (0.6)
Postoperative stroke	8 (2.3)
Infectious	19 (5.4)
Urinary tract infection	10 (2.8)
Pneumonia	5 (1.4)
Clostridium difficile colitis	4 (1.1)

DVT/PE, Deep venous thrombosis/pulmonary embolism; *SCI*, spinal cord ischemia.
[a]Serum creatinine increase of >30%.

Cleveland 354 TAAA 2004-13

- ¾ had fenestrated devices
- 4.8% 30 day mortality

SCI occurred in 31 patients (8.8%) and was permanent in 14 (4%). SCI developed in 21 patients (16.4%) undergoing type II repair, but occurred in only 10 (4.4%) of the type III repairs ($P < .001$). SCI symptoms were permanent in 10 patients (7.8%) with type II TAAA repair and in four patients (1.8%) with type III TAAA repair ($P = .005$). SCI

Fenestrated and branched endovascular aneurysm repair outcomes for type II and III

tic aneurysms

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Wound complications	
Dehiscence	
Hematoma	
Gastrointestinal disord	
Gastrointestinal blee	
Ileus	
Pancreatitis	
Liver failure	
Ischemic colitis	
Postoperative stroke	
Infectious	
Urinary tract infectic	
Pneumonia	
Clostridium difficile	

DVT/PE, Deep venous th
ischemia.
[a]Serum creatinine increase of >50%.

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Neuromonitoring, Cerebrospinal Fluid Drainage, and Selective Use of Iliofemoral Conduits to Minimize Risk of Spinal Cord Injury During Complex Endovascular Aortic Repair

6% SCI Advocate staged approach

Peter V. Banga, MD[1,2], Gustavo S. Oderich, MD[1], Leonardo Reis de Souza, MD[1,3], Jan Hofer, RN[1], Meaghan L. Cazares Gonzalez, R.NCS.T[4], Juan N. Pulido, MD[5], Stephen Cha, MS[6], and Peter Gloviczki, MD[1]

patients (1.8%) with type III TAAA repair ($P = .005$). SCI

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Summary analysis

Most experienced centres doing 10—20 TAAA per year
SCI results in mixed groups ½-2/3 of which are extensive

	n=	All SCI	Permanent SCI	Mortality*
Nurnberg	166	15	3	15
Lille	204	8	6	14
London	69	12	4	
Toronto	84	7	2	3
San Francisco	133		6	
Cleveland	354	31	14	17
Mayo	49	3	2	
		76/926	37/1059	49/808
		8.2%	3.5%	6%

What does it mean?

- Endo therapy for TAAA is still developing
- Thoracoabdominal endografts remain niche
  - 7 major centres to reach 1000 reports; many extent IV lesions
- SCI as important after endo as open surgery
  - >8% injury rate. Double in extensive aneurysm
- Experience and attention to every detail is crucial
  - CSF drainage, early pelvic and lower limb revascularisation, cardiovascular stability, MAP control, staged procedures

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Temporary Perfusion Branches to Decrease Spinal Cord Ischemia in the Endovascular Treatment of Thoraco-Abdominal Aortic Aneurysms

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The anatomy of the spinal cord collateral circulation

Eva B. Griepp, Gabriele Di Luozzo, Deborah Schray, Angelina Stefanovic, Sarah Geisbüsch, and Randall B. Griepp