Update on the Sac Perfusion Branch to Prevent SCI

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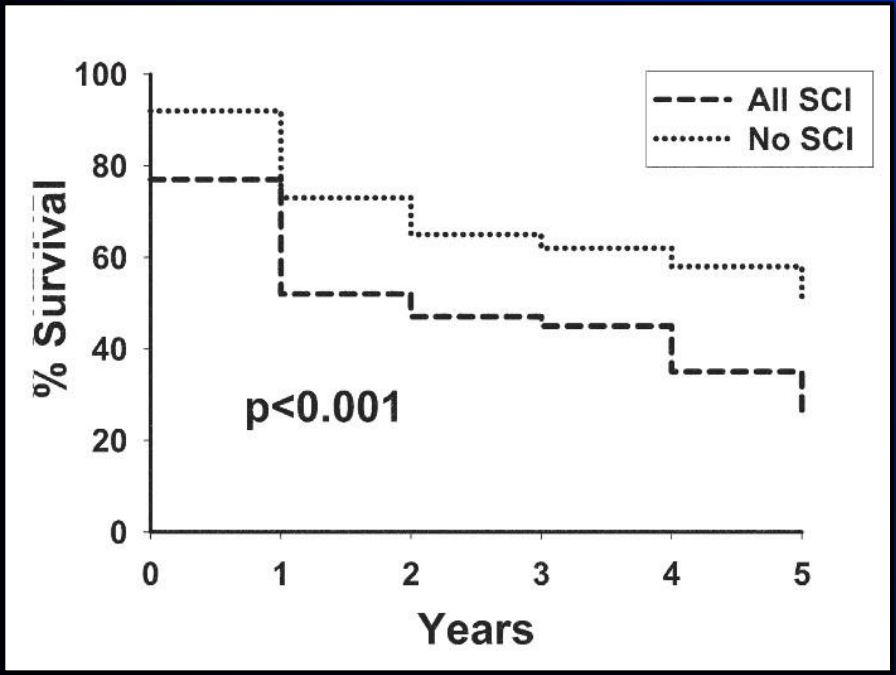
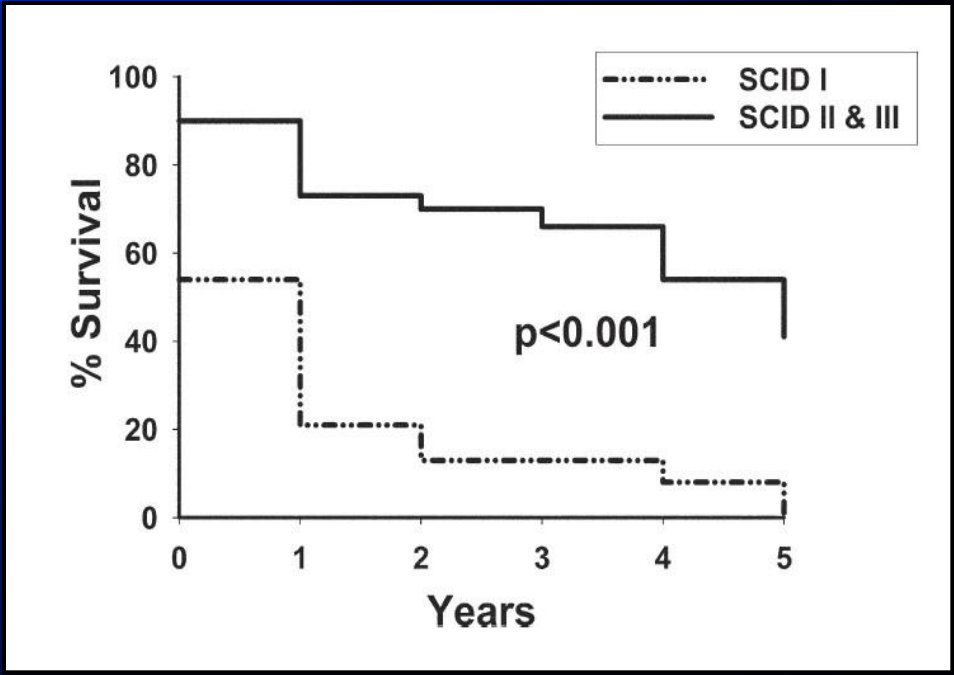
Paraplegia : a devastating complication



Conrad MF J Vasc Surg 2008;48:47-53



SCID I : Flaccid Paralysis

SCID II & III: Partial functional recovery

Mortality and incidence of paraplegia/paraparesis after TEVAR (1999-2009)

Author	Year	N	Mortality	Paraplegia/Paraperesis	
Mitchell	1999	103	9 (9%)	3	3%
Leurs	2004	443	41 (9%)	11	2.5%
Morales	2007	186	15 (8%)	7	3.7%
Buth	2007	606	60 (9.9%)	15	2.5%
Feezor	2008	326	24 (7.4%)	33	10%
Fairman	2008	195	4 (2.1%)	17	8.7%
Preventza	2009	346	-	14	4%
Chaikof	2009	197	12 (6%)	4	2%
Kische	2009	180	9 (5%)	5	2.8%

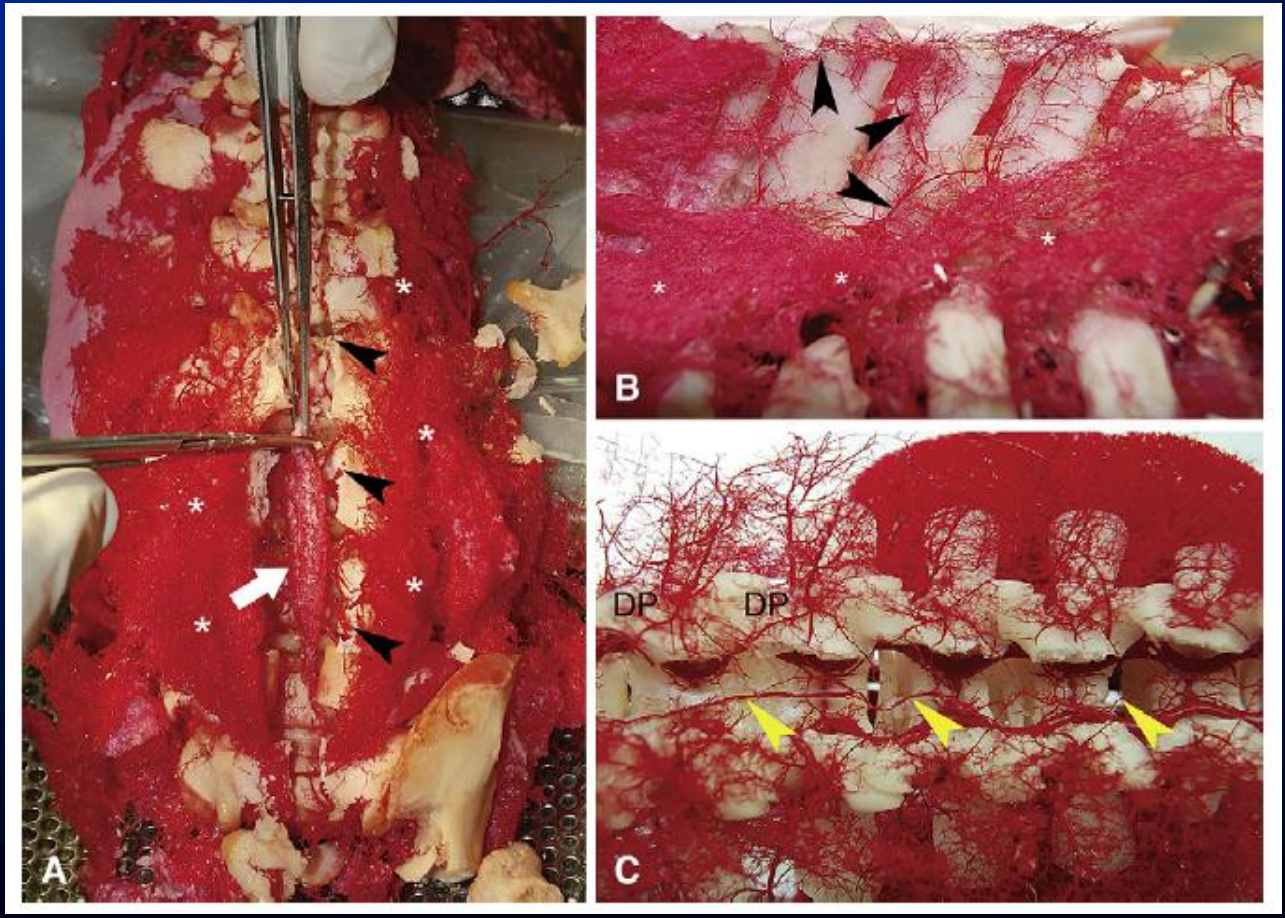
SCI in TEVAR Series

Author	Year	N	SCI	Onset	Comment
Matsuda	2009	81	3.7%	2 of 3 delayed	2 of 3 assoc. with post- op bleeding
Khoynezhad	2007	153	5.2%	4 of 8 delayed	-
Chiesa R	2005	103	4%	All delayed onset	Post-op Hypotension only sig RF on univariate analysis
Gravereaux	2001	53	5.6%	All delayed onset	-
Conrad	2008	105	7%	6 of 7 delayed	-

TEVAR associated SCI is delayed onset.

- The aneurysm sac is perfused until the end of the procedure
- Experimental data show that the highest risk for SCI is at the end of the procedure reaching a nadir 5 hours post-operatively

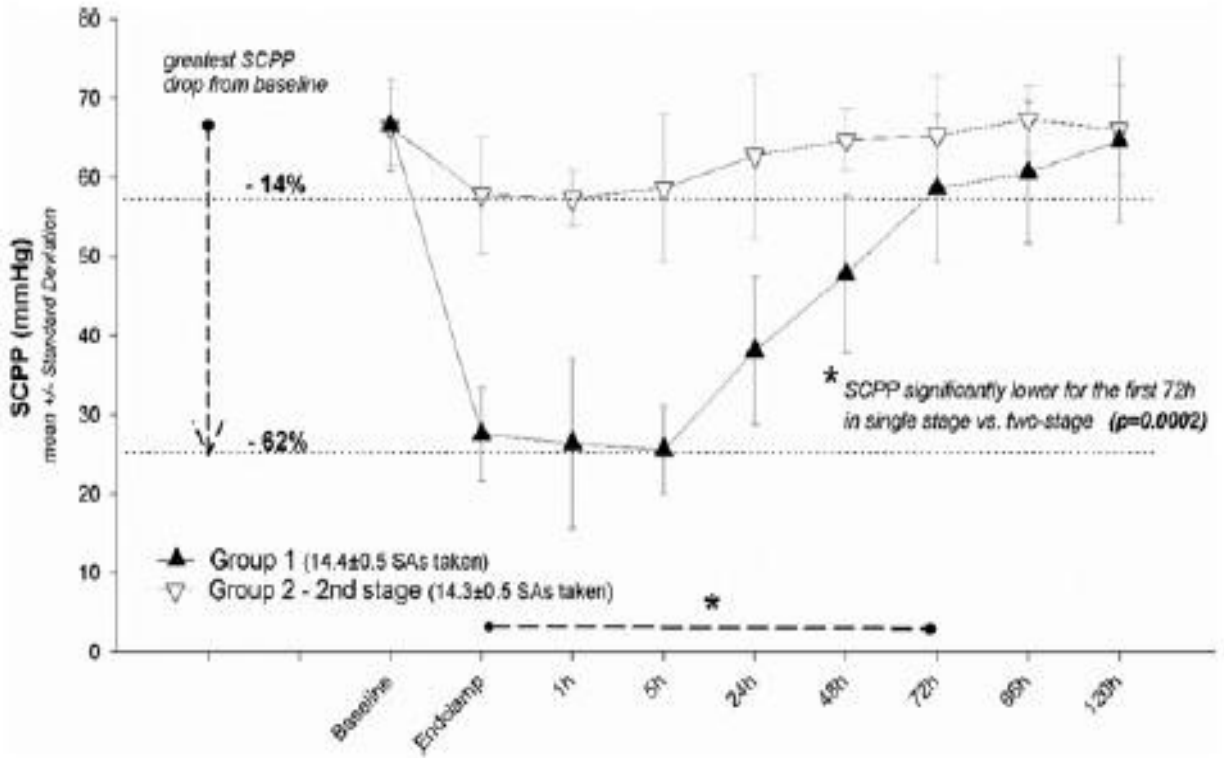
An intact collateral network is more critical than a small number of critical segmental arteries



Courtesy of Dr. C Etz.

Collateral Network Pressure (CNP, L1)

after extensive *single vs. two stage SA sacrifice*



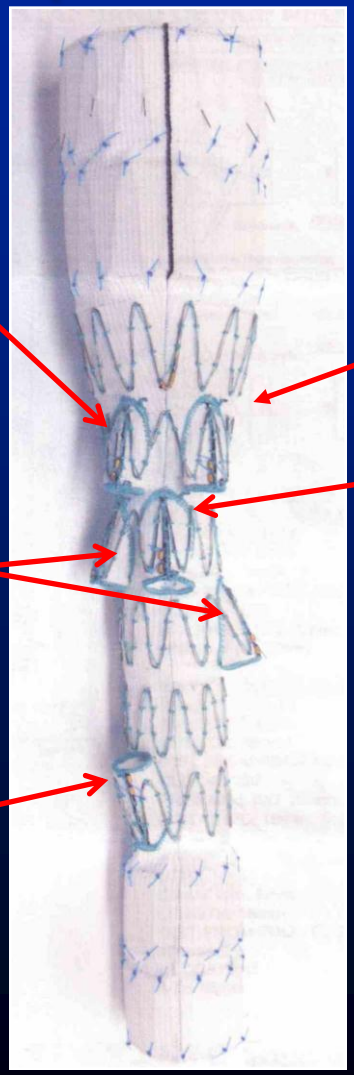
Porcine model

Courtesy of Dr. C Etz.

Hypothesis

- Perfusion of the Aortic Sac in the early post-operative period following branches stent-graft repair of TAAA, will protect against developing spinal cord ischaemia

Sac Perfusion Branches (SPBs)



↓Perfusion Branch

Coeliac

SMA

Renals

↑Perfusion Branch

Staged Repair

> 4 hours

INSERTION OF BRANCHED STENT GRAFT

Stage 1
- GA
- CSF drain
- ITU

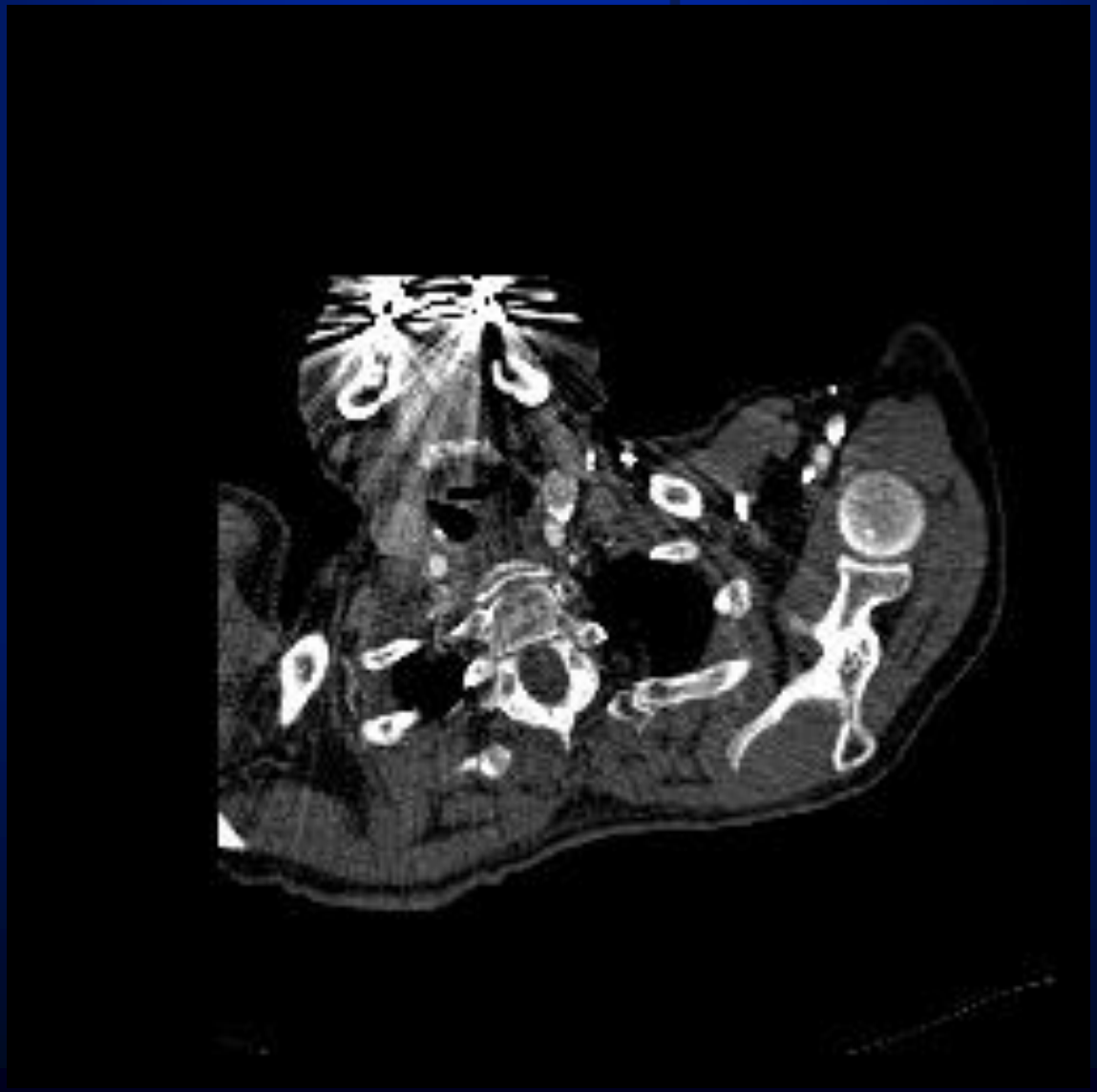
7-14 days

< 1 hour

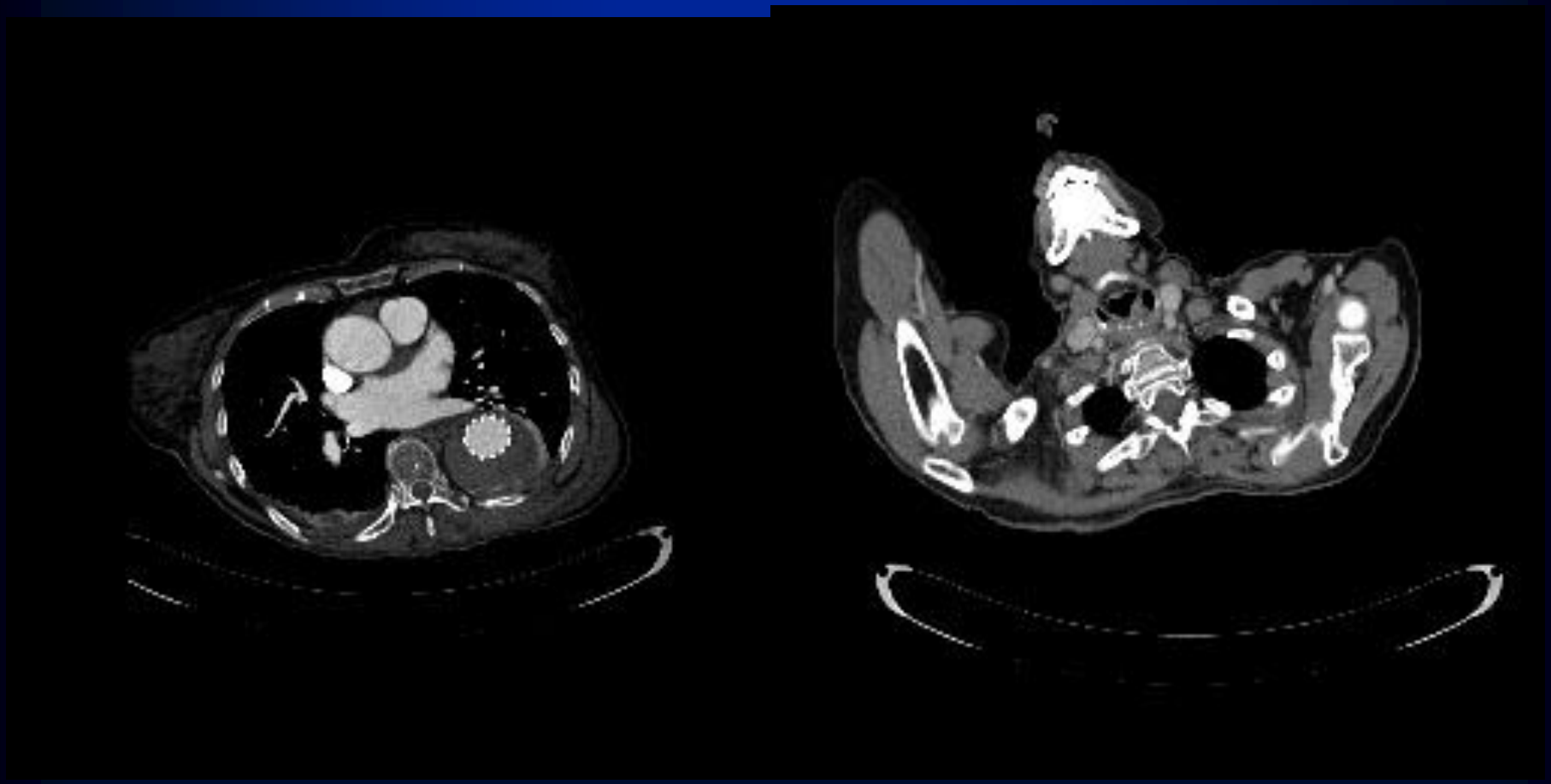
CLOSURE OF PERFUSION BRANCHES

Stage 2
- LA
- CSF drain
- Completion angio

Pre-op



Sac Perfusion



Cases

Age	Sex	Diam. (mm)	Extent	Target Vessels
78	M	68	3	4
85	F	62	2	3
76	M	76	2	4
79	F	76	2	4
80	M	64	3	3
77	F	75	2	3
49	M	65	3	1
72	F	79	2	4
75	M	61	3	4
83	M	66	2	5
42	M	60	3	3
74	F	63	2	4

All patients treated with Cook Custom Made Branched Endografts

Cases with neurology - 1

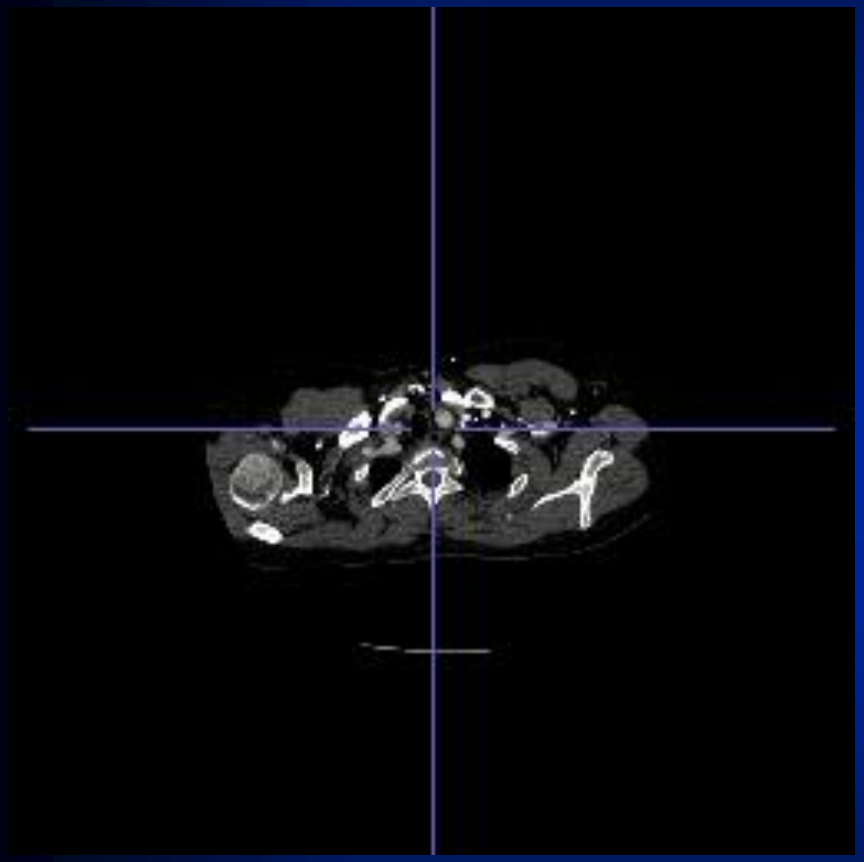
- Type 2 TAAA
- Developed monoparesis after postoperative circulatory instability
- CTA- intrasac thrombosis with very little flow from SPBs
- Deceased day 7 from multi-organ failure

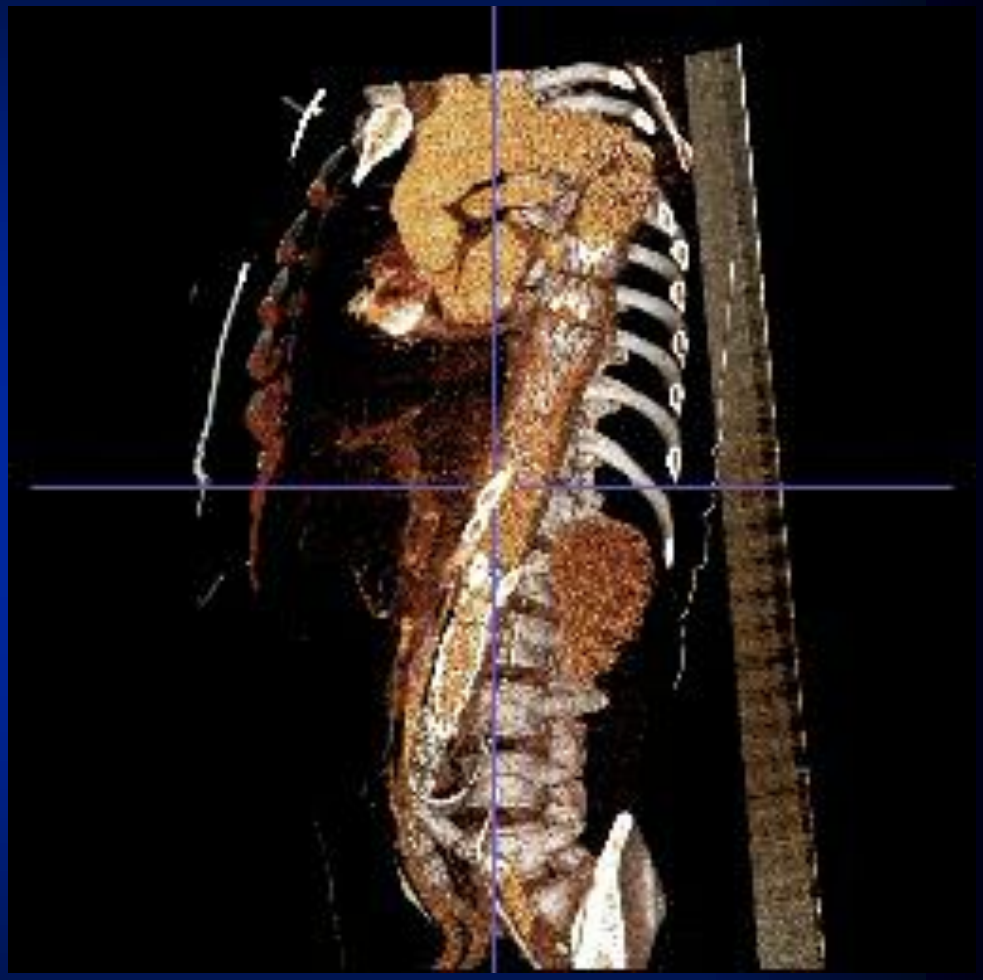
Cases with neurology - 2

- Type 2 TAA
- LSCA intentionally covered, no bypass performed
- Developed paraparesis after closure of SPBs and removal of spinal drain
- Reversed SCI by carotid-subclavian bypass

Cases with neurology - 3

- Type 3 TAAA after total arch repair for Type A dissection extending to the iliacs
- Developed immediate monoparesis after closure of lower SPB – resolved with aggressive CSF drainage (upper SPB left patent)





Conclusions/Future Perspectives

- Controlled temporary perfusion of sac is safe and feasible
- Early experience promising
- But it adds complexity
- Could be achieved by staging
- Still requires CSF drainage & BP control