

STS/EACTS Latin America Cardiovascular Surgery Conference

November 15-17, 2018

Hilton Cartagena | Cartagena, Colombia



The Society
of Thoracic
Surgeons



EACTS
European Association for Gender Thoracic Surgery

Cannulation Strategy in Type A Dissection: Order Out of Chaos

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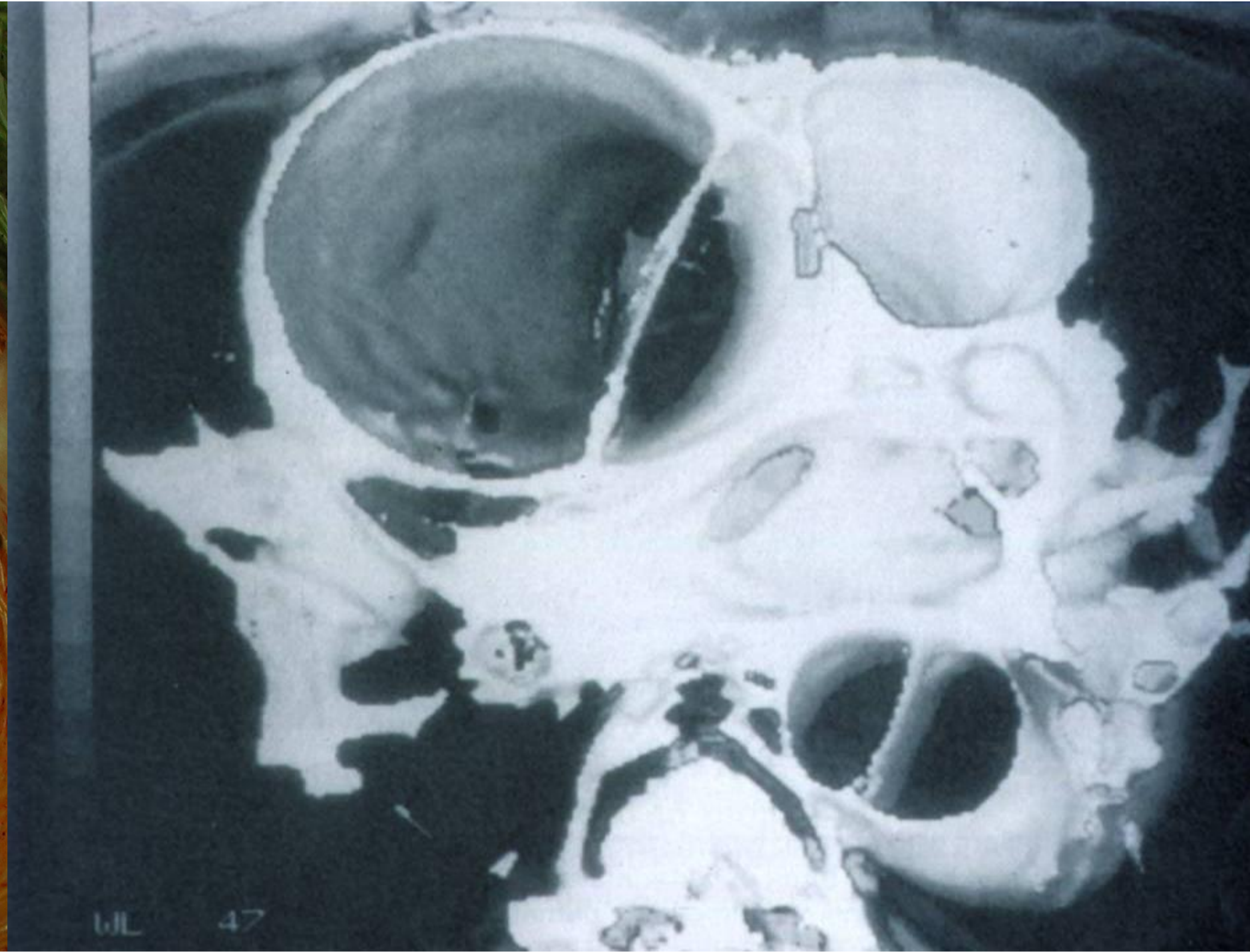
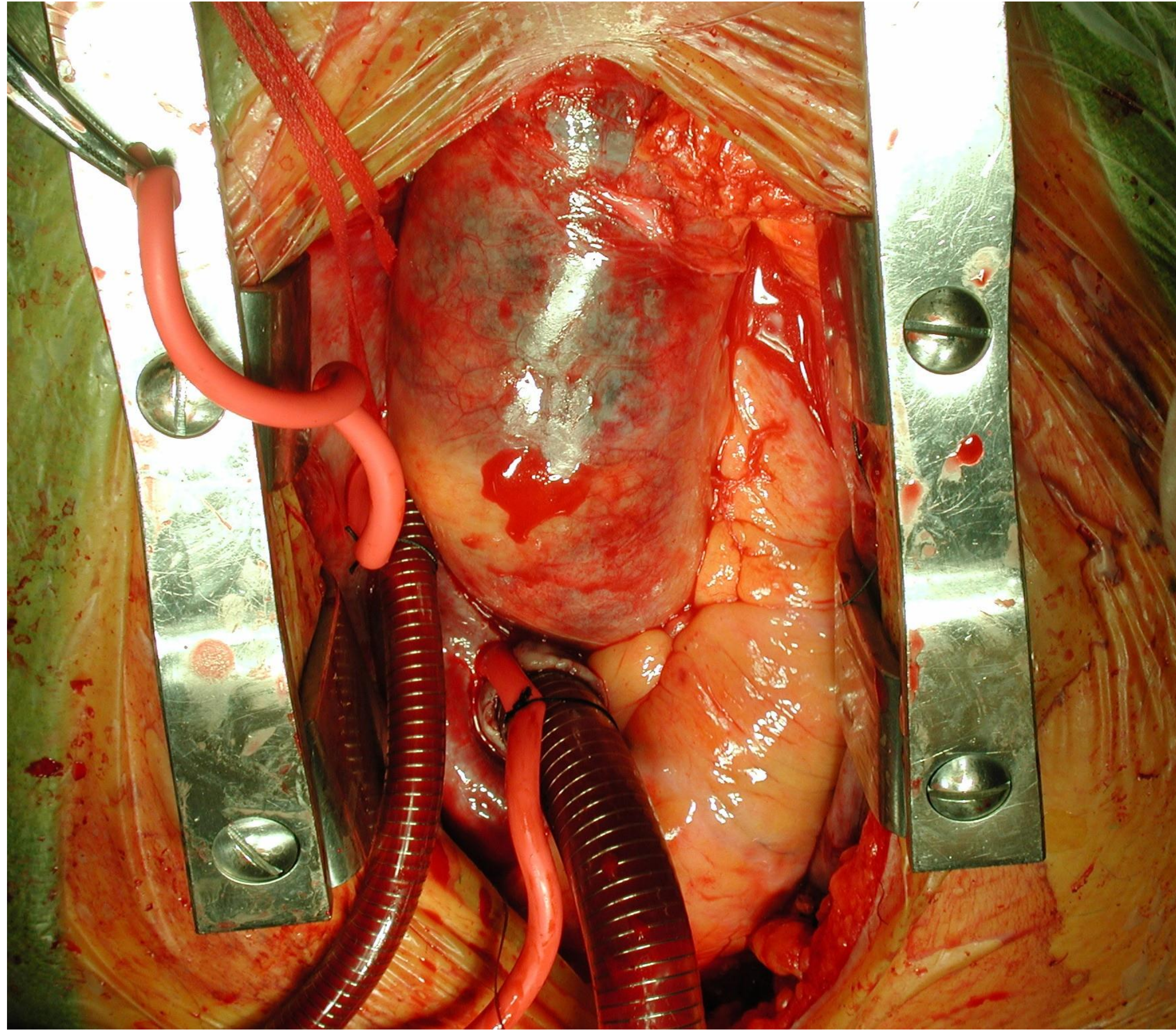
Presenter Disclosures

Thomas G. Gleason, MD

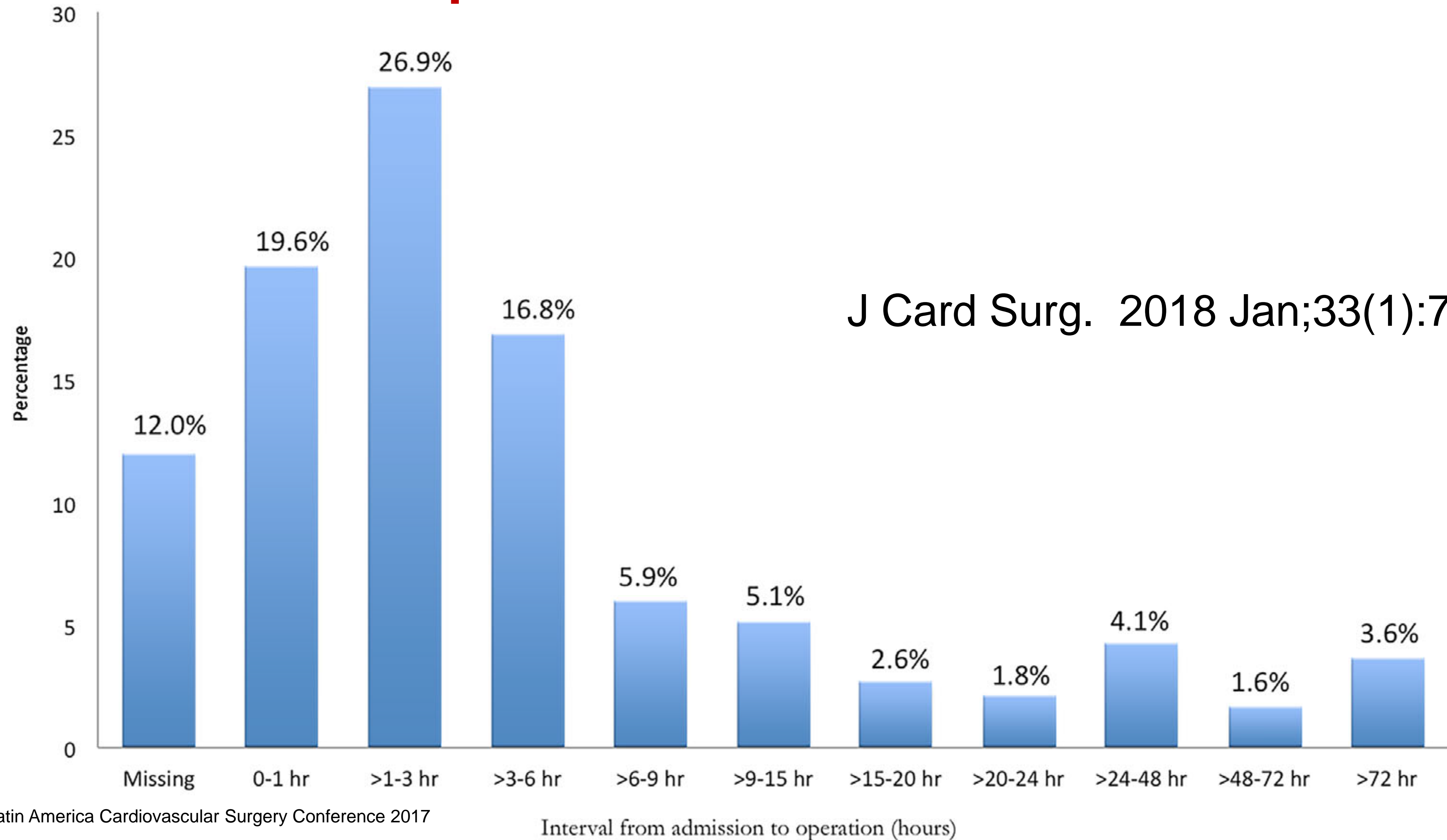
Financial disclosures: Institutional research support from Medtronic, Abbott, Boston Scientific (no personal remuneration). Nominal personal remuneration for Medical Advisory Boards of Abbott and Cytosorbents (<\$10K/yr).

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Cannulation for Type A Aortic Dissection

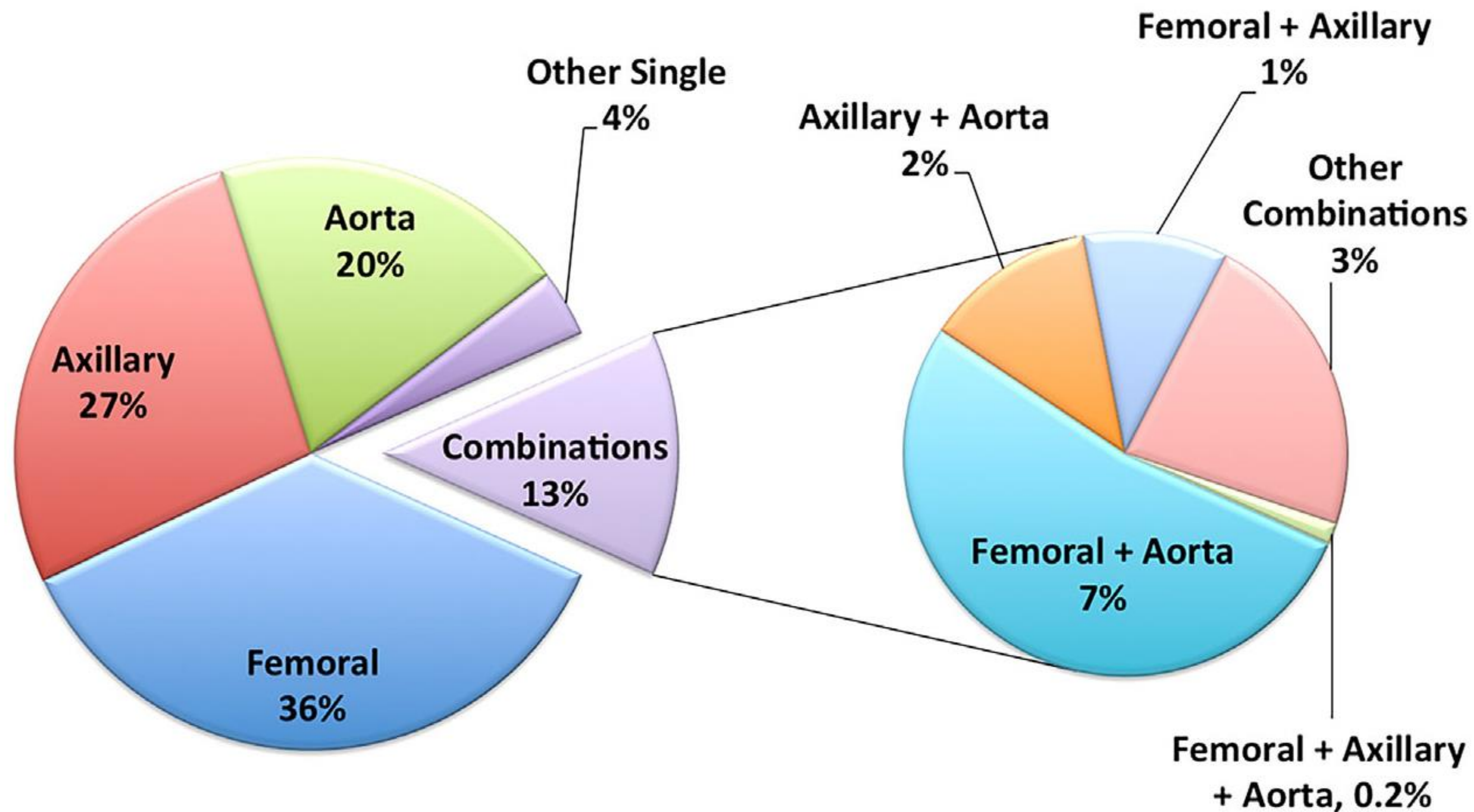


STS database on TAAD: time from admission to operation



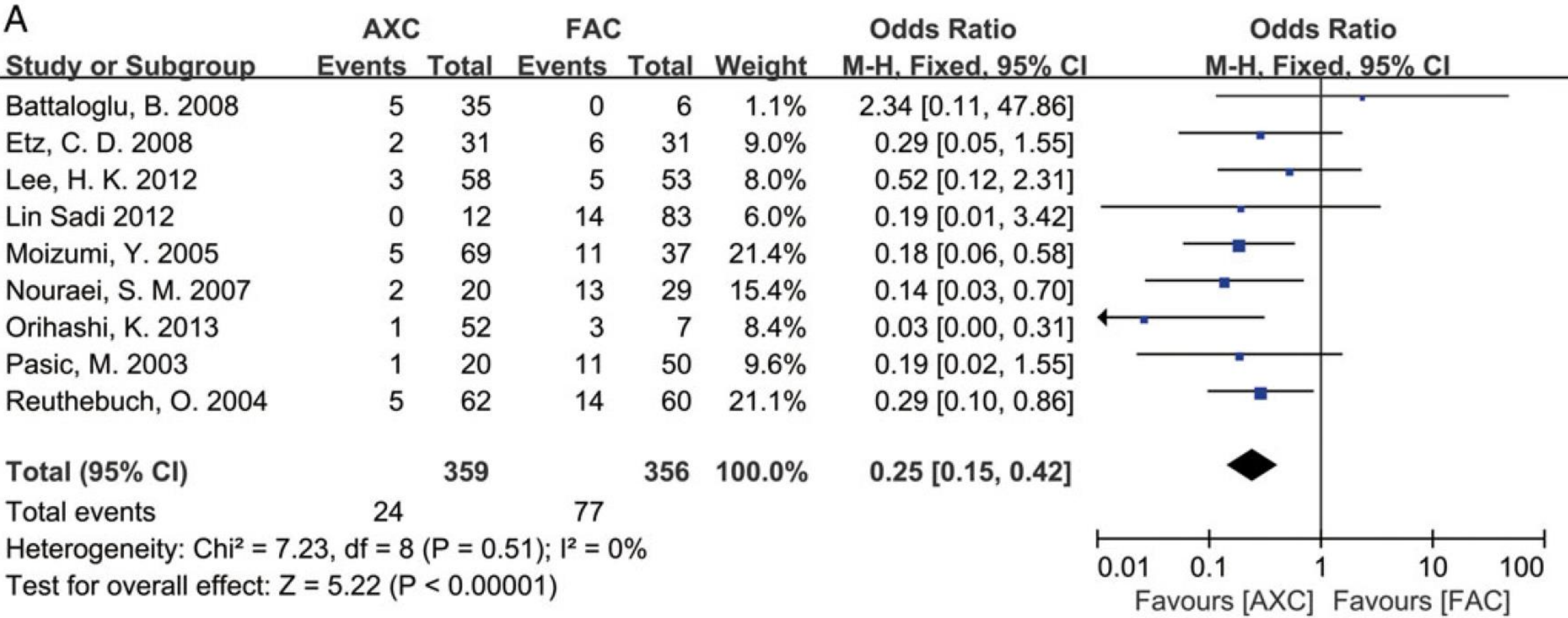
J Card Surg. 2018 Jan;33(1):7-18.

TAAD Cannulation strategy: STS database

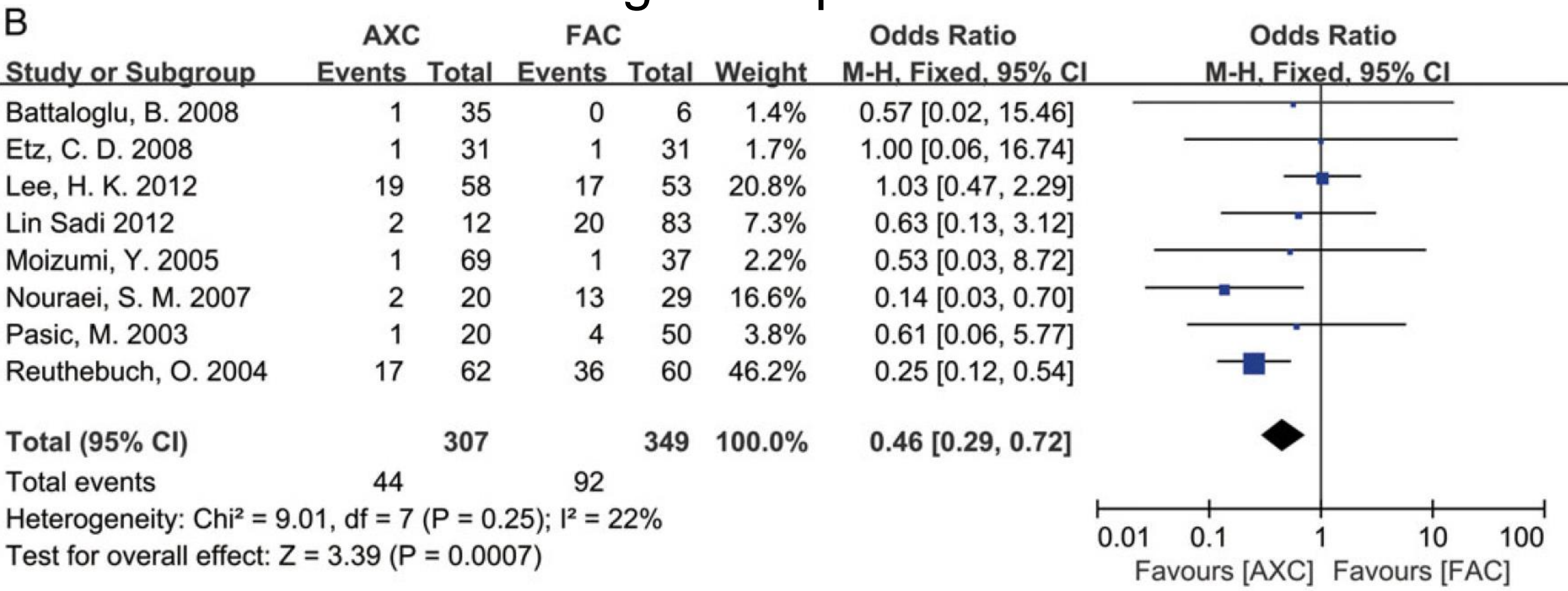


Meta-analysis Axillary v. Femoral

Mortality



Neurologic complications

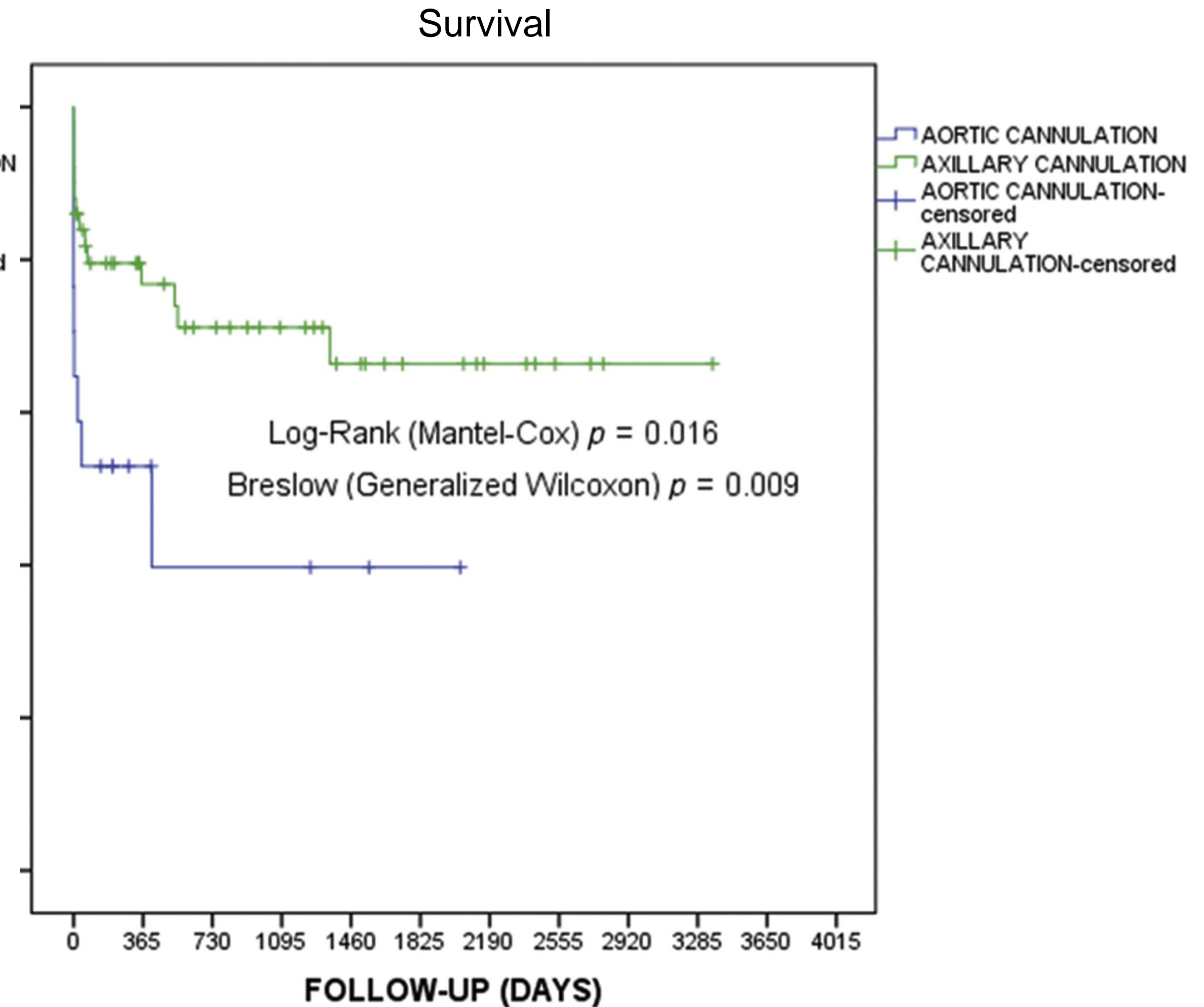
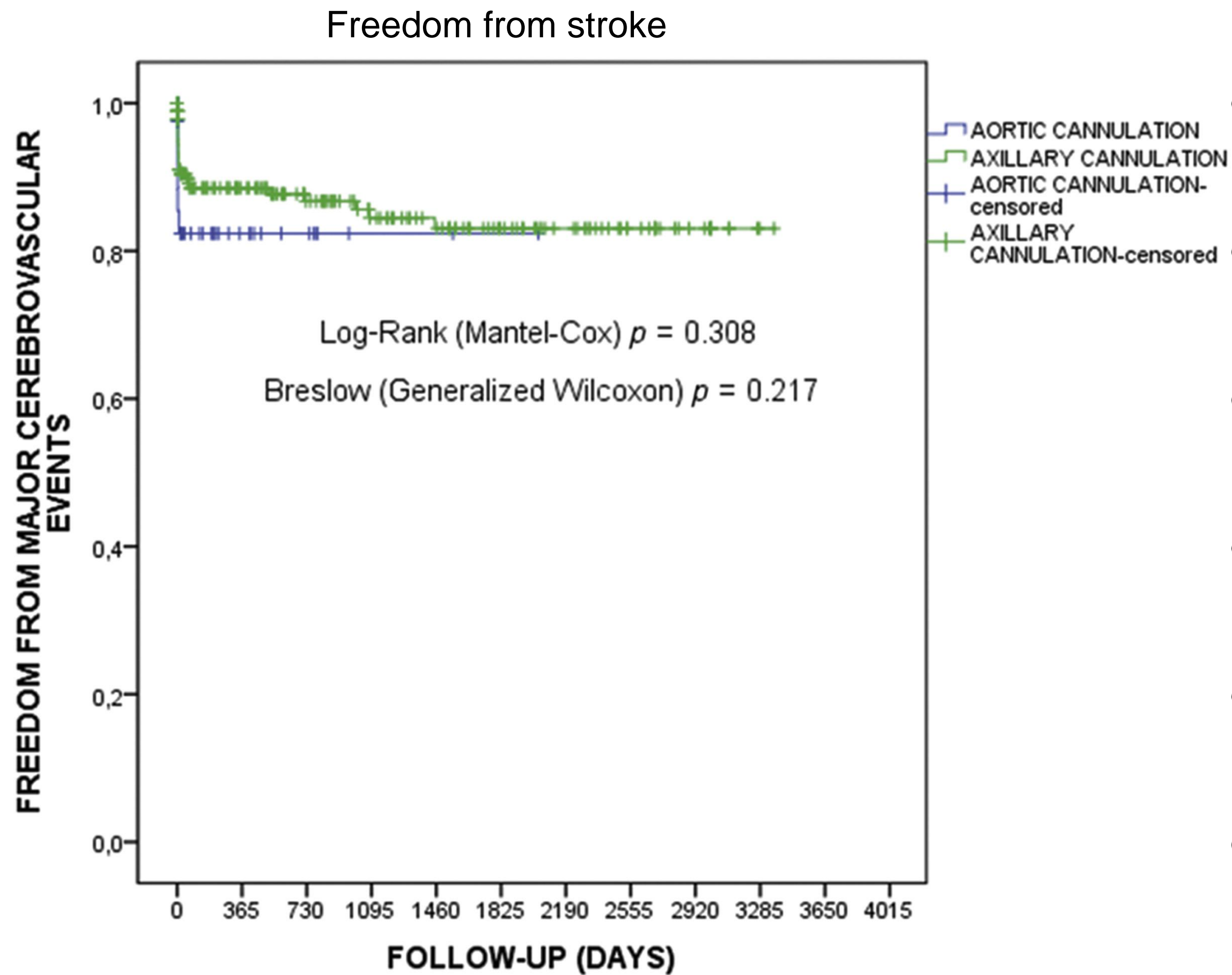


Central vs. peripheral (Sievers group)

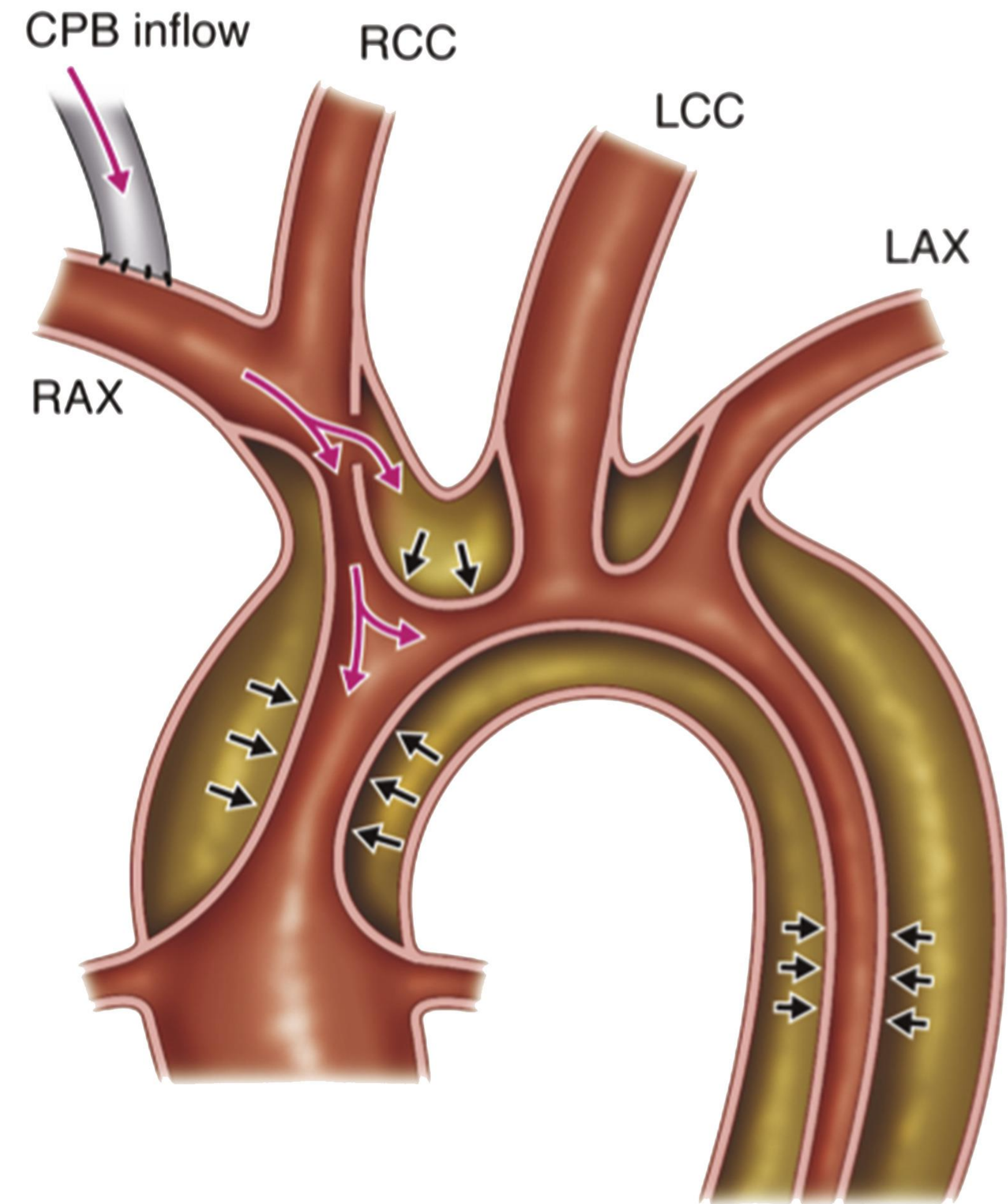
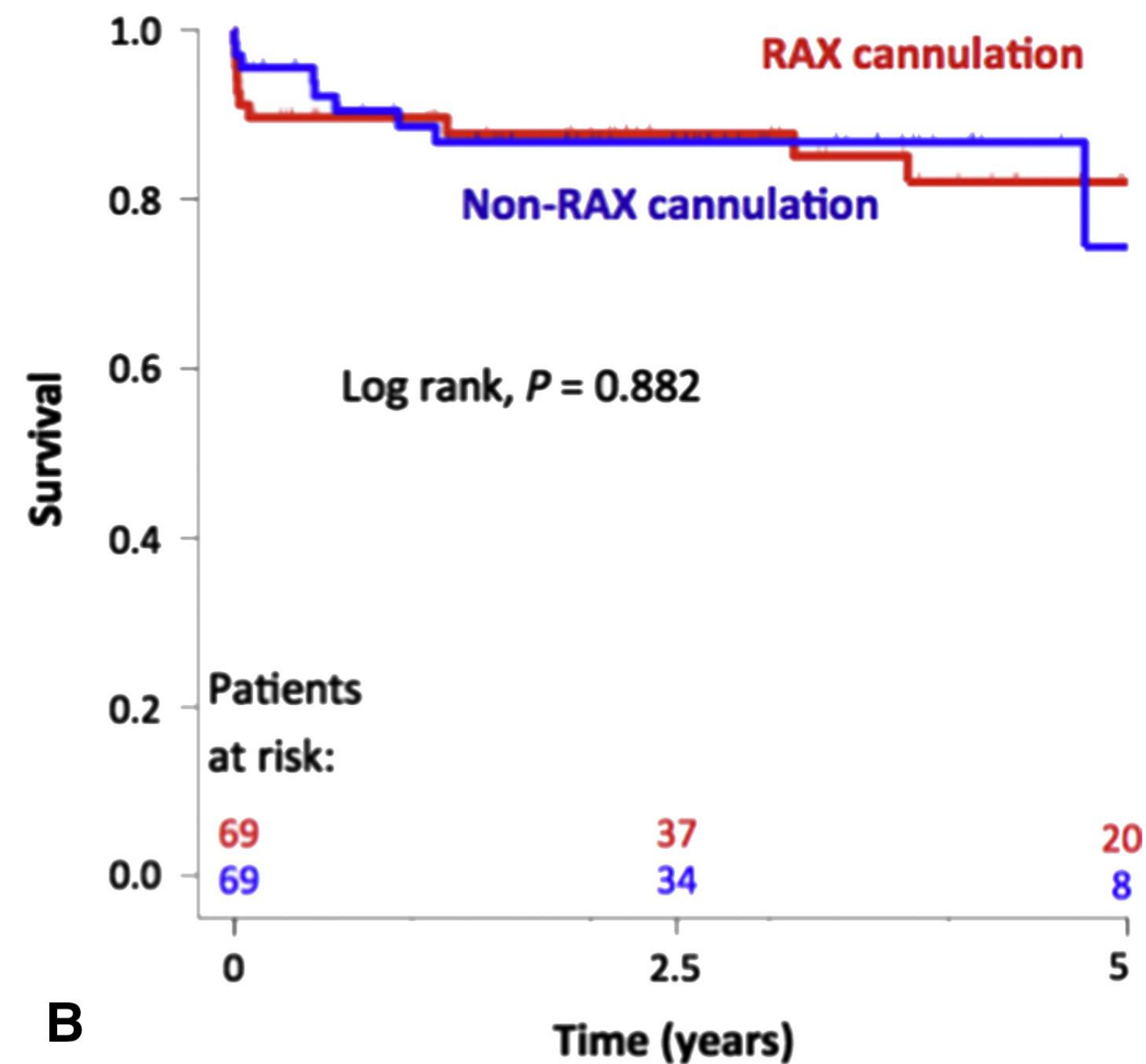
Variables	All patients	Central cannulation	Peripheral cannulation	P value
30-day mortality	33 (16.8%)	19 (20.2%)	14 (16.9%)	0.699
ICU stay (days)	9.8±10.0	9.3±9.4	10.3±10.5	0.538
IABP	4 (2.3%)	2 (2.1%)	2 (2.4%)	0.561
ECMO	5 (2.8%)	3 (3.2%)	2 (2.4%)	0.561
New cerebral event	17 (7.2%)	11 (8.7%)	6 (5.6%)	0.449
Rankin scale	3.5±1.4	3.3±1.4	4.0±1.4	0.401
Psycho-syndrome	57 (24.3%)	29 (22.8%)	28 (25.9%)	0.852
Re-thoracotomy	20 (8.5%)	9 (7.1%)	11 (10.2%)	0.477
Dialysis on ICU	57 (24.3%)	25 (19.7%)	32 (29.6%)	0.073
Days on dialysis	3.0±6.7	2.7±6.4	3.3±7.1	0.576
Creatinine (mmol/L)	130±78	125±72	135±84	0.406
ICU, intensive care unit; IABP, intra-aortic balloon pump; ECMO, extracorporeal membrane oxygenation.				

Ann Cardiothorac Surg. 2016 Jul;5(4):310-6.

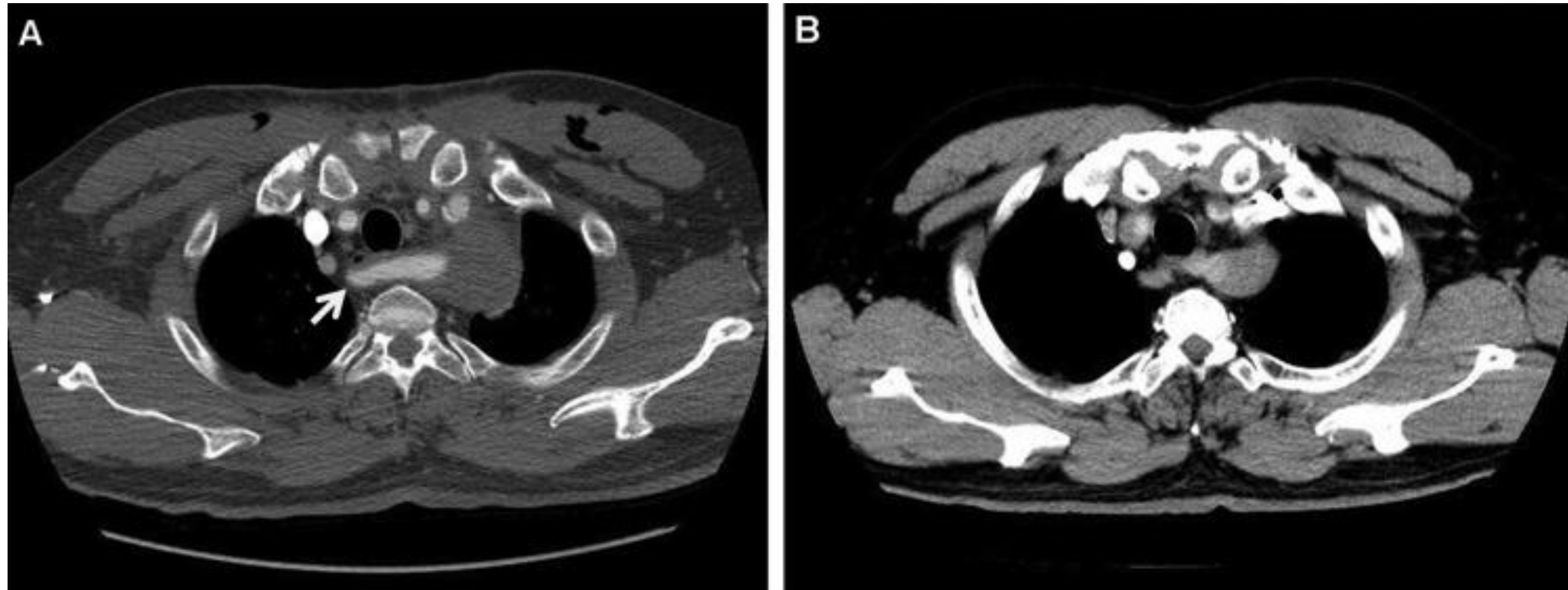
Axillary vs. aortic cannulation



Axillary cannulation with innominate dissection



Poor perfusion with axillary cannulation when aberrant RSCA



Transapical cannulation

Surgical outcomes of aortic repair via transapical cannulation and the adventitial inversion technique for acute Type A aortic dissection[†]

Junichi Shimamura^{a,*}, Shin Yamamoto^a, Susumu Oshima^a, Kensuke Ozaki^a, Takuya Fujikawa^a,
Shigeru Sakurai^a, Yuki Hirai^a, Tomohiro Hirokami^a, Nobukazu Moriya^a, Soichiro Hase^a, Tassei Nakagawa^a,
Motoshige Yamasaki^a, Wataru Takayama^b and Shiro Sasaguri^a

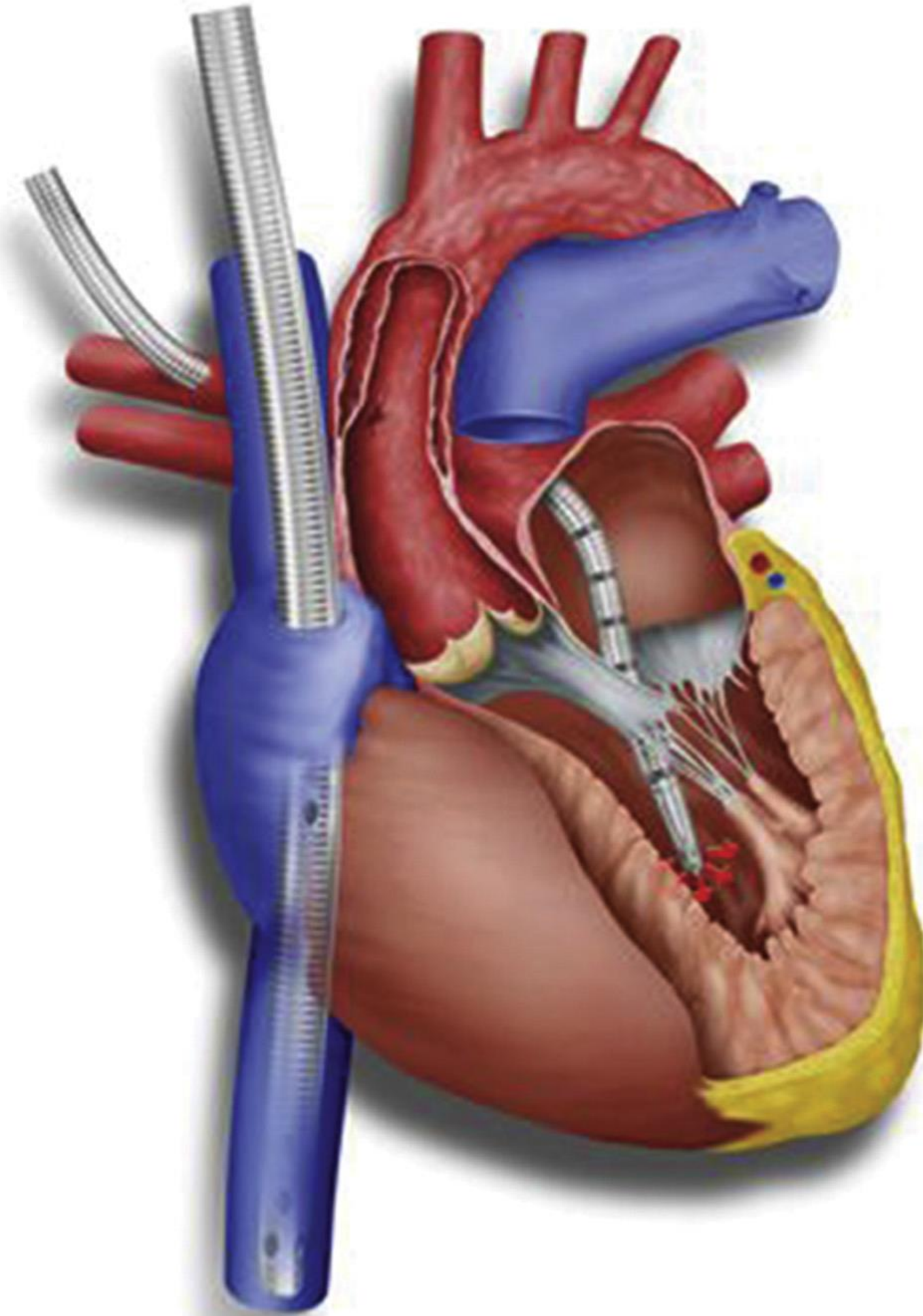
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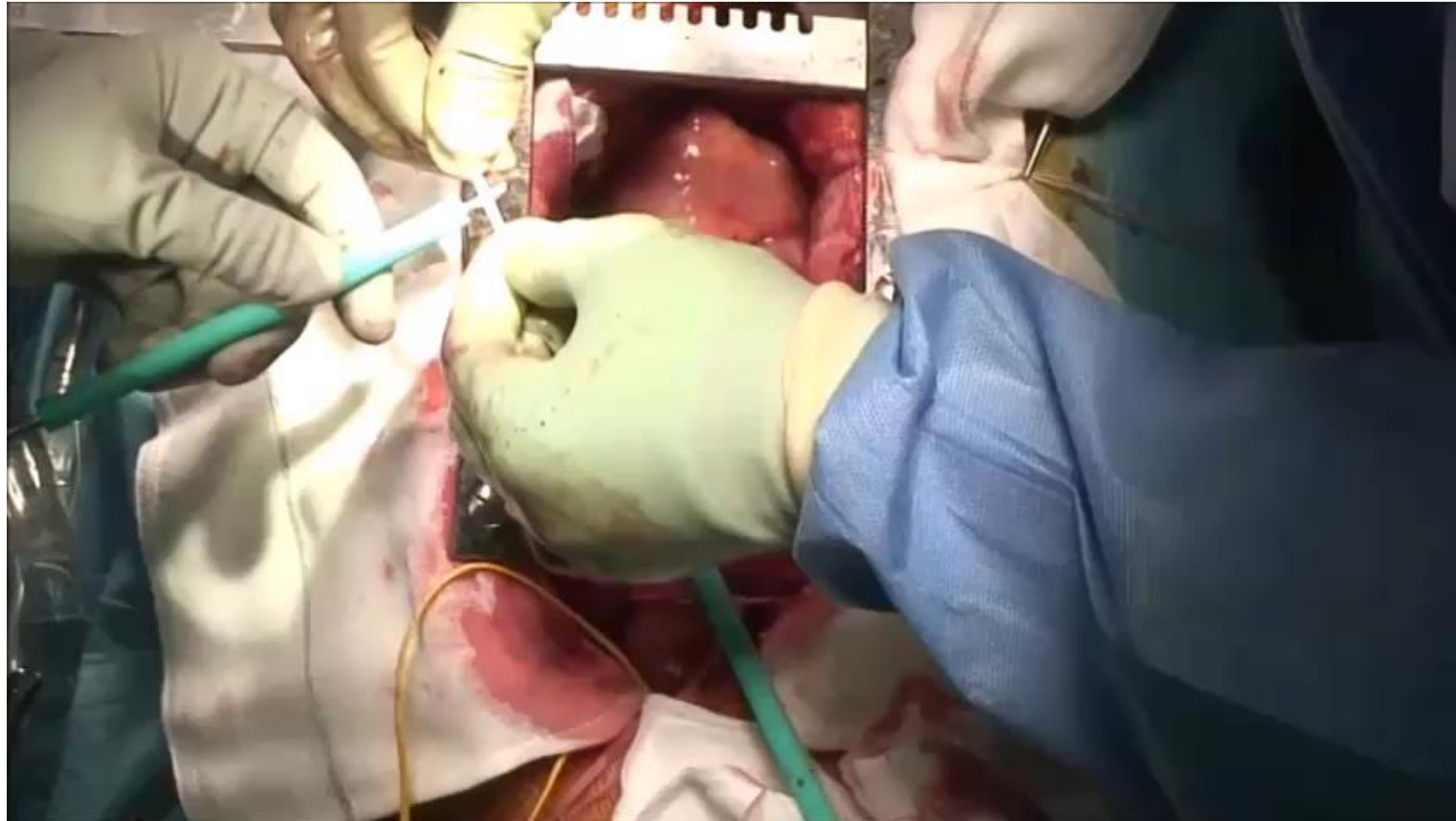
Received 16 September 2017; received in revised form 16 December 2017; accepted 4 January 2018

Transatrial cannulation for TAAD?

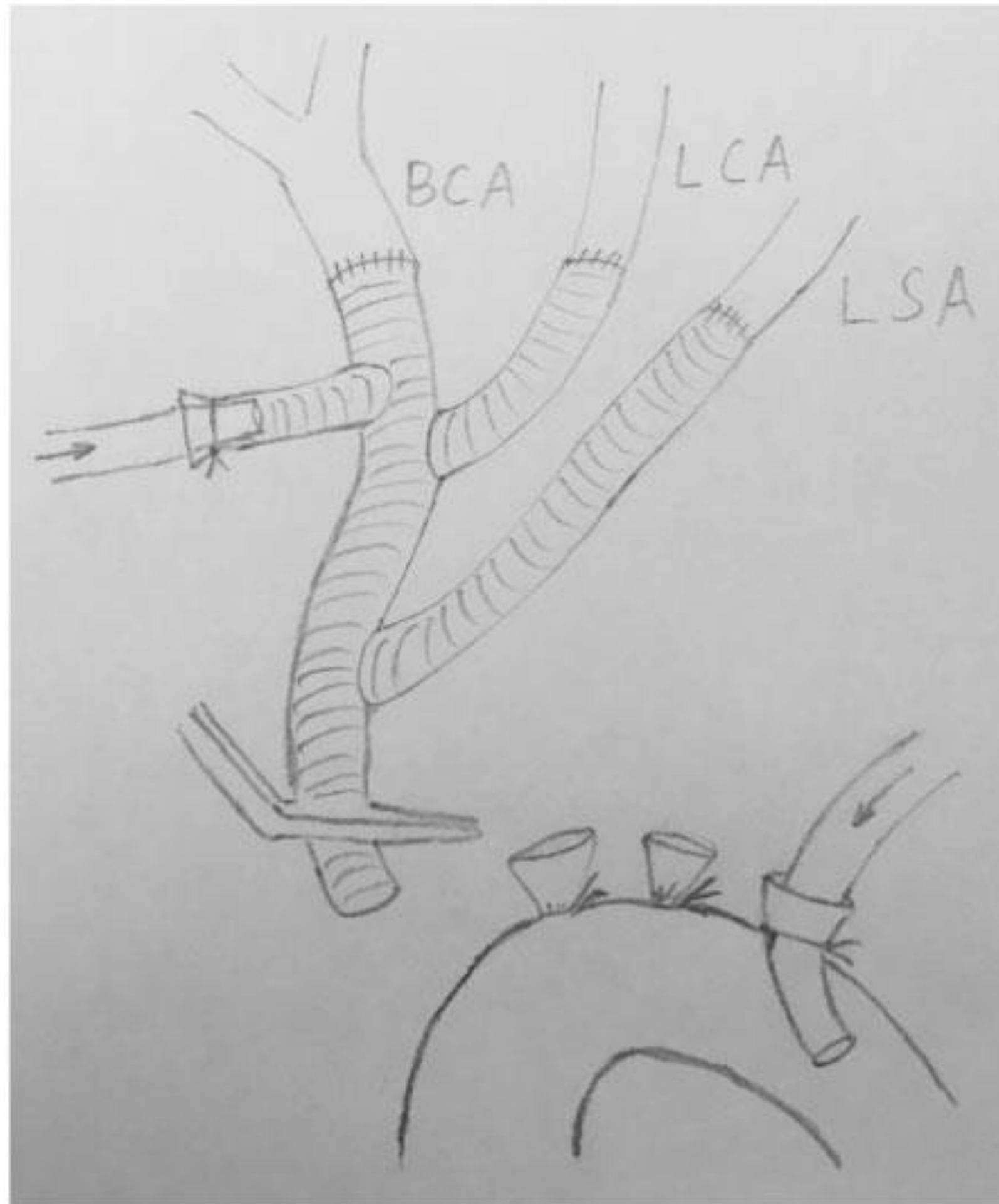


	New Cannulation Method (n = 46)		Previous Cannulation Methods (n = 73)		<i>p</i> Value
	n	(%)	n	(%)	
Mortality					
Overall mortality	8	17.7	33	45.2	0.003
Intraoperative mortality	0	0	5	6.8	0.16
30-day mortality	4	8.9	7	10.3	1.00
Follow-up	4	9.8	21	34.4	0.08

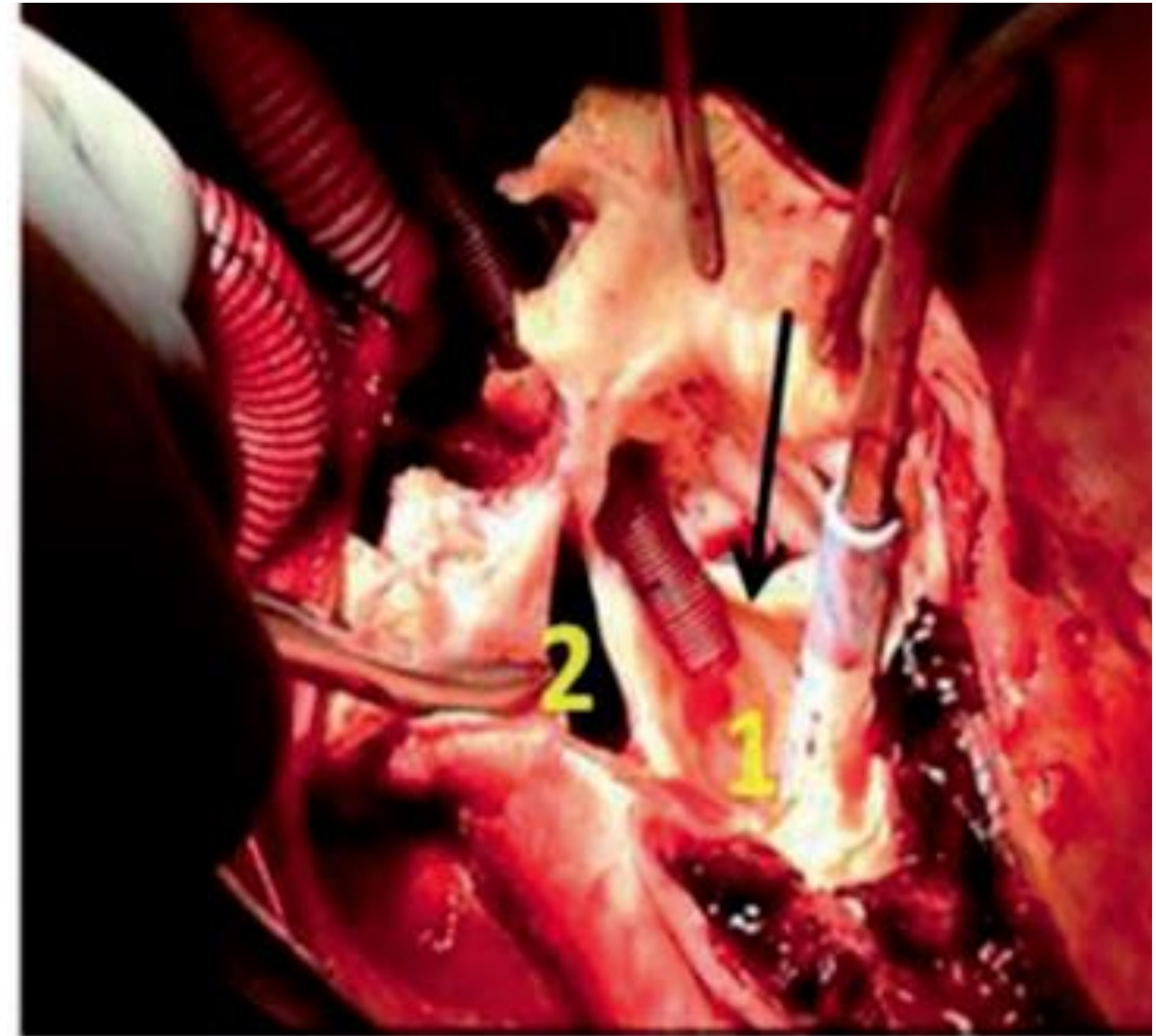
Direct True Lumen Cannulation ("Samurai" Cannulation)



“Penza” cannulation



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Asian Cardiovasc Thorac Ann. 2018 Sep;26(7):584-586.

UPMC goals with TAAD

Focus on stroke rate reduction and standardization of approach to improve overall outcomes

1. Rapid transport to incision and CPB
2. **Central cannulation**
3. Neurocerebral protection including
liberal use total arch/carotid replacement
4. Native valve preservation
5. Reduce use of blood products

Transfer Protocol

1. System-wide aortic catastrophe hotline
2. Immediate thoracic aortic surgeon communication
3. Minimize Diagnosis-to-Incision Time
 - a) Direct helicopter transfer to quaternary OR
 - b) Dedicated aortic dissection OR team expedite prep



Central Cannulation

Lesser Curve Arch

Seldinger

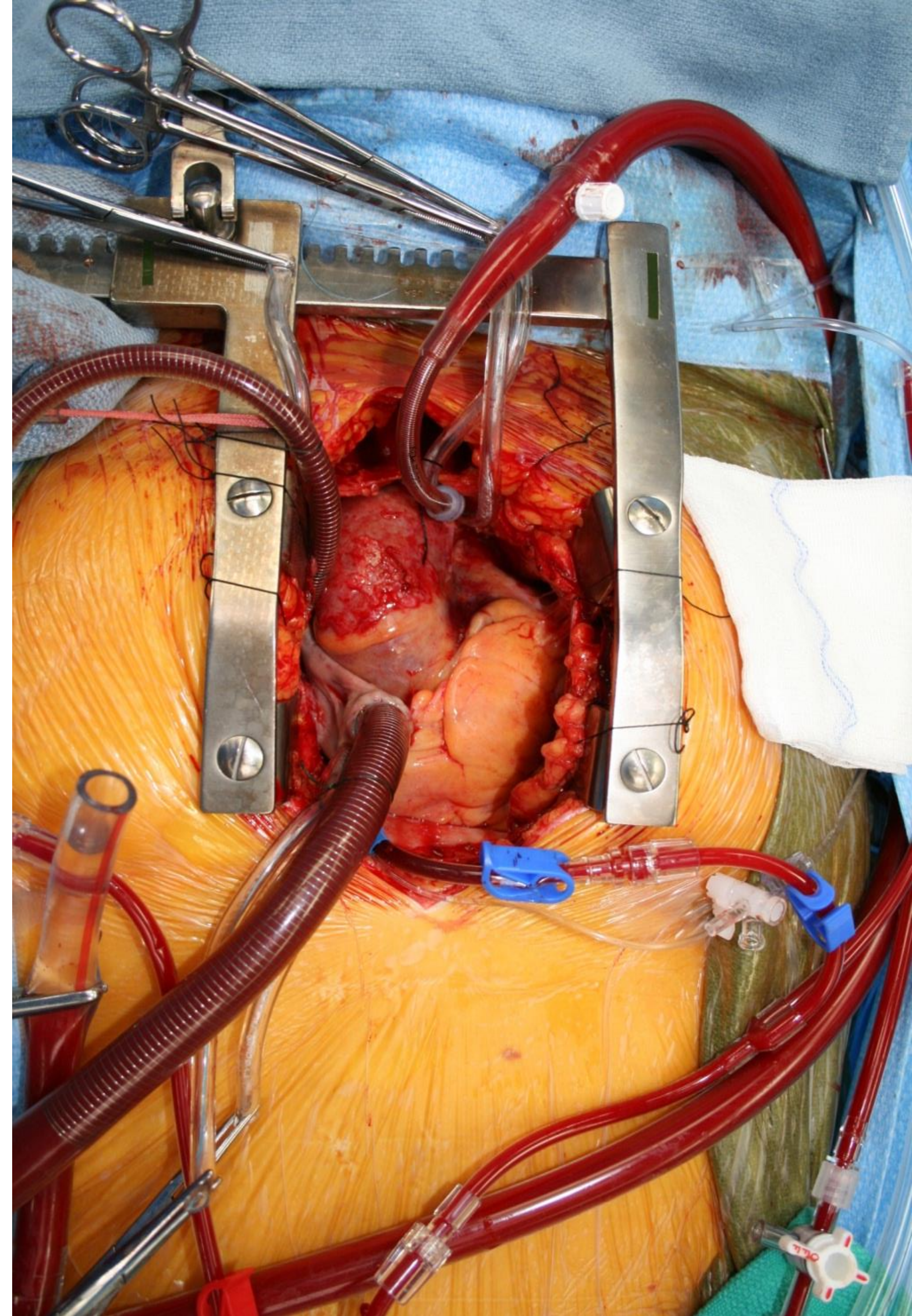
TEE Guidance

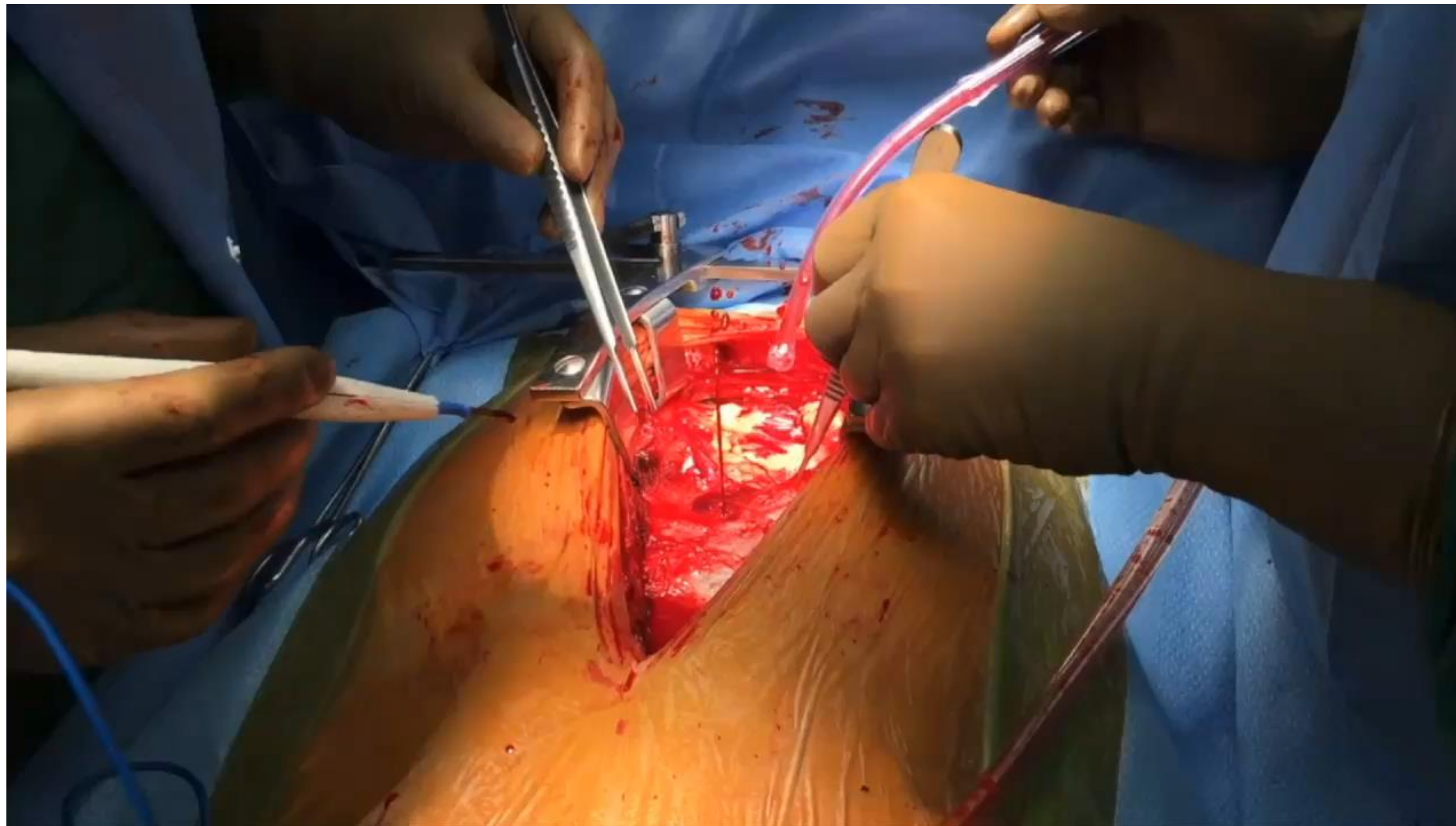
18-20 Fr Cannula

RA-Venous return

SVC- 26Fr angled for RCP

Y'd arterial circuit to allow ACP





Courtesy of Dr. Ibrahim Sultan

Central Cannulation Technique

Central cannulation **77%**

no rupture/intraoperative catastrophes related to cannulation

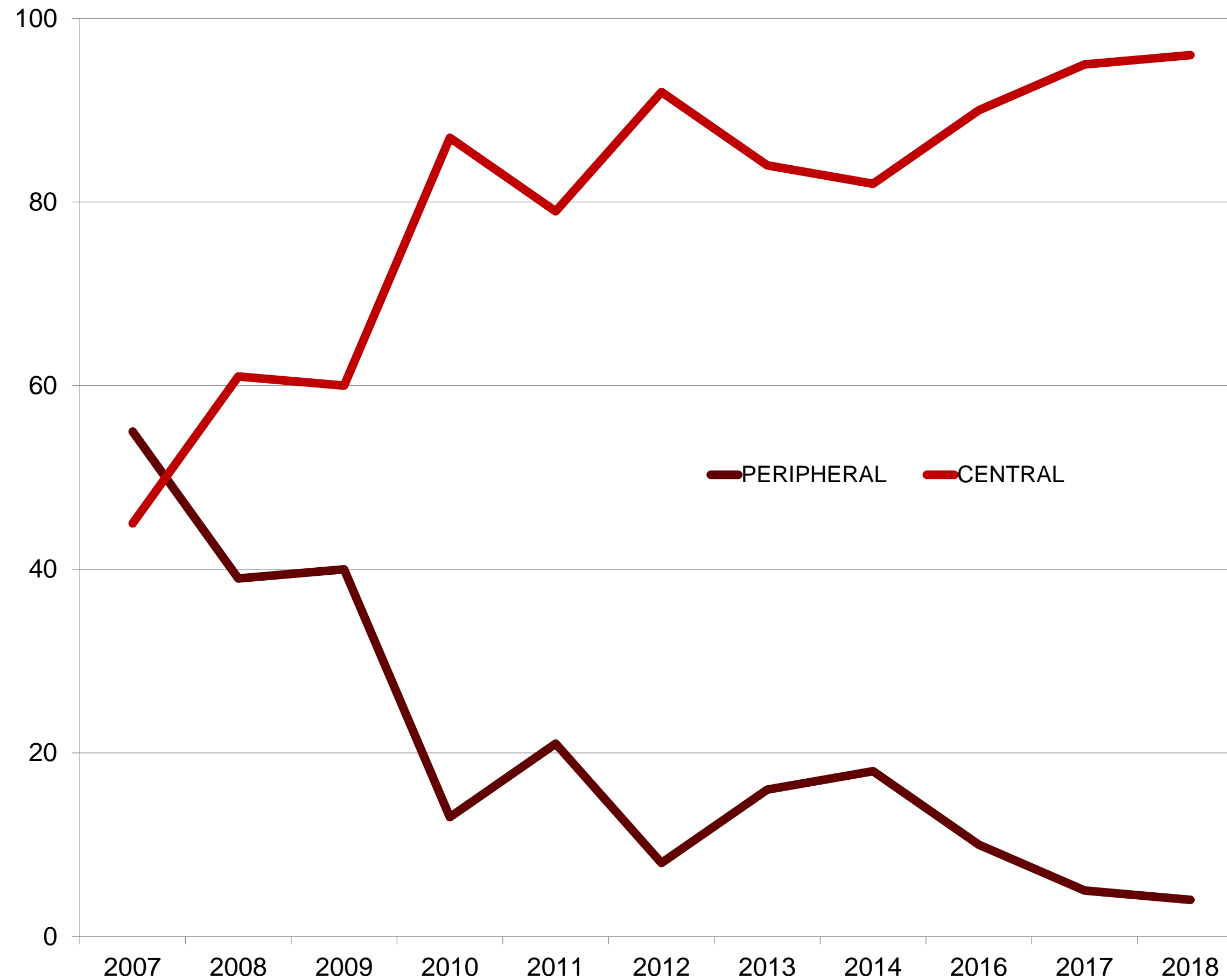
Subclavian cannulation **18%**

10mm silo graft

Femoral cannulation **5%**

Ann Thorac Surg. 2016 Mar;101(3):896-903.

Cannulation Strategy at UPMC

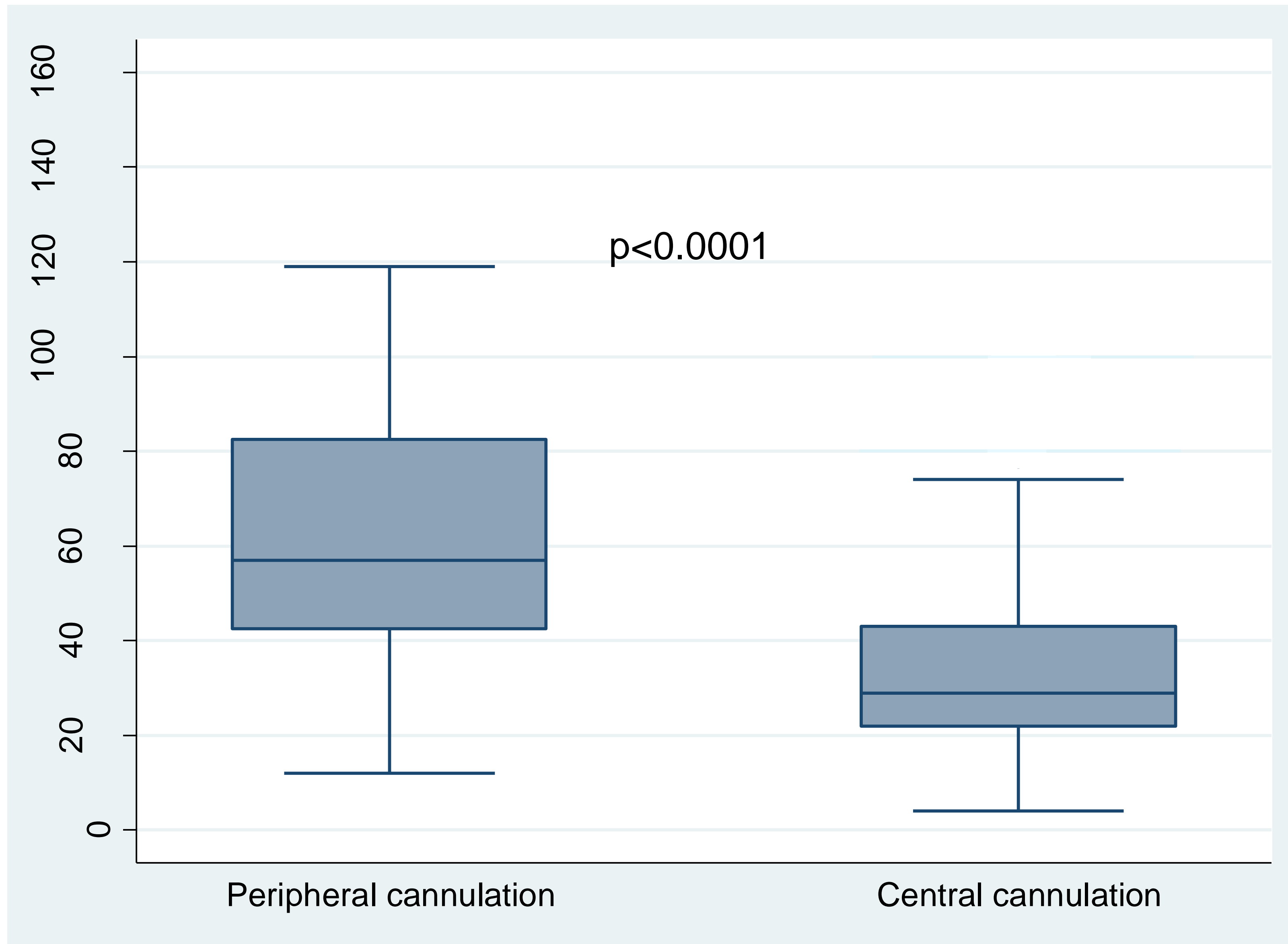


2007: 45% Central

2010: >80% Central

2016: >90% Central

Central cannulation shortens time to incision



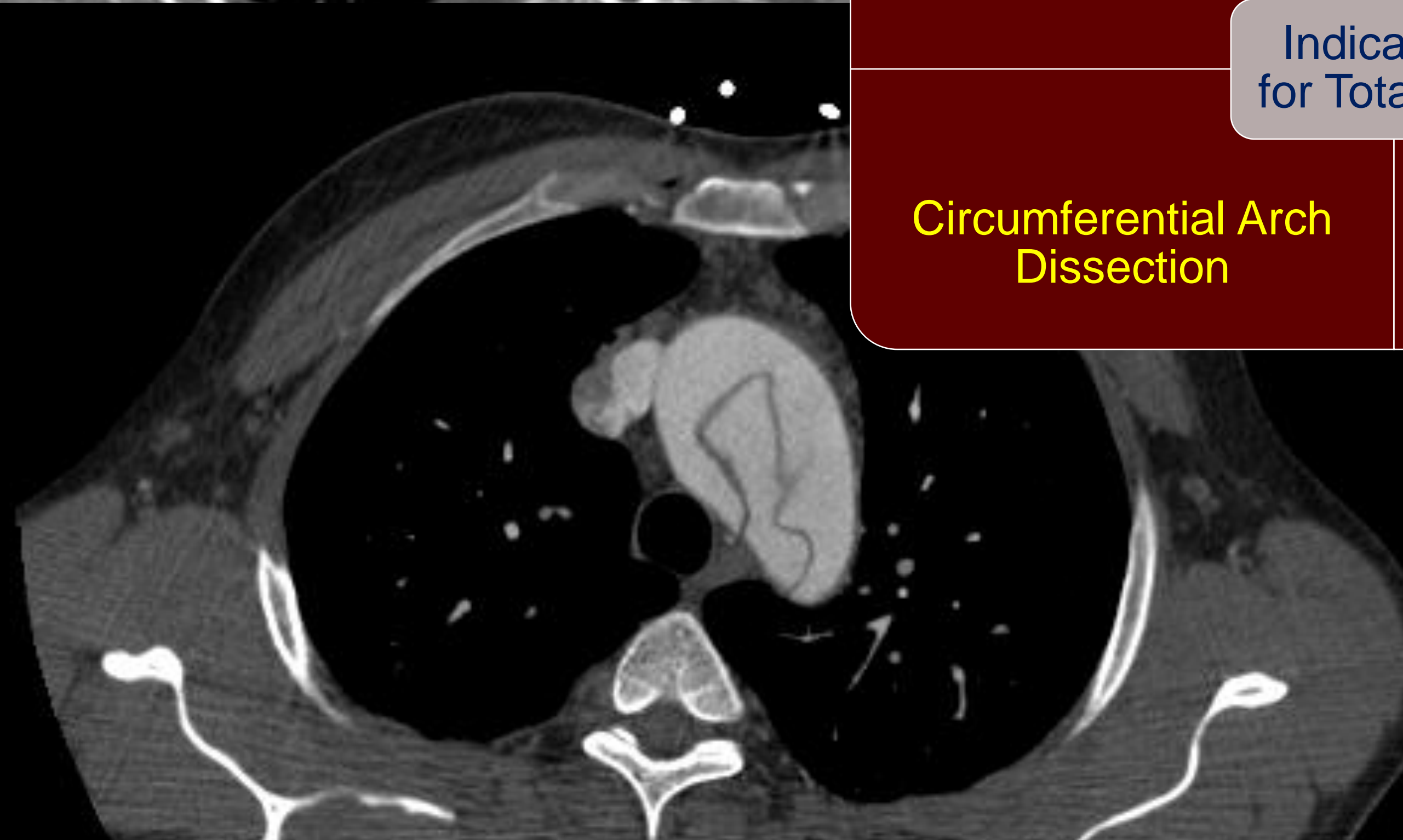


1° or 2° Arch Tear

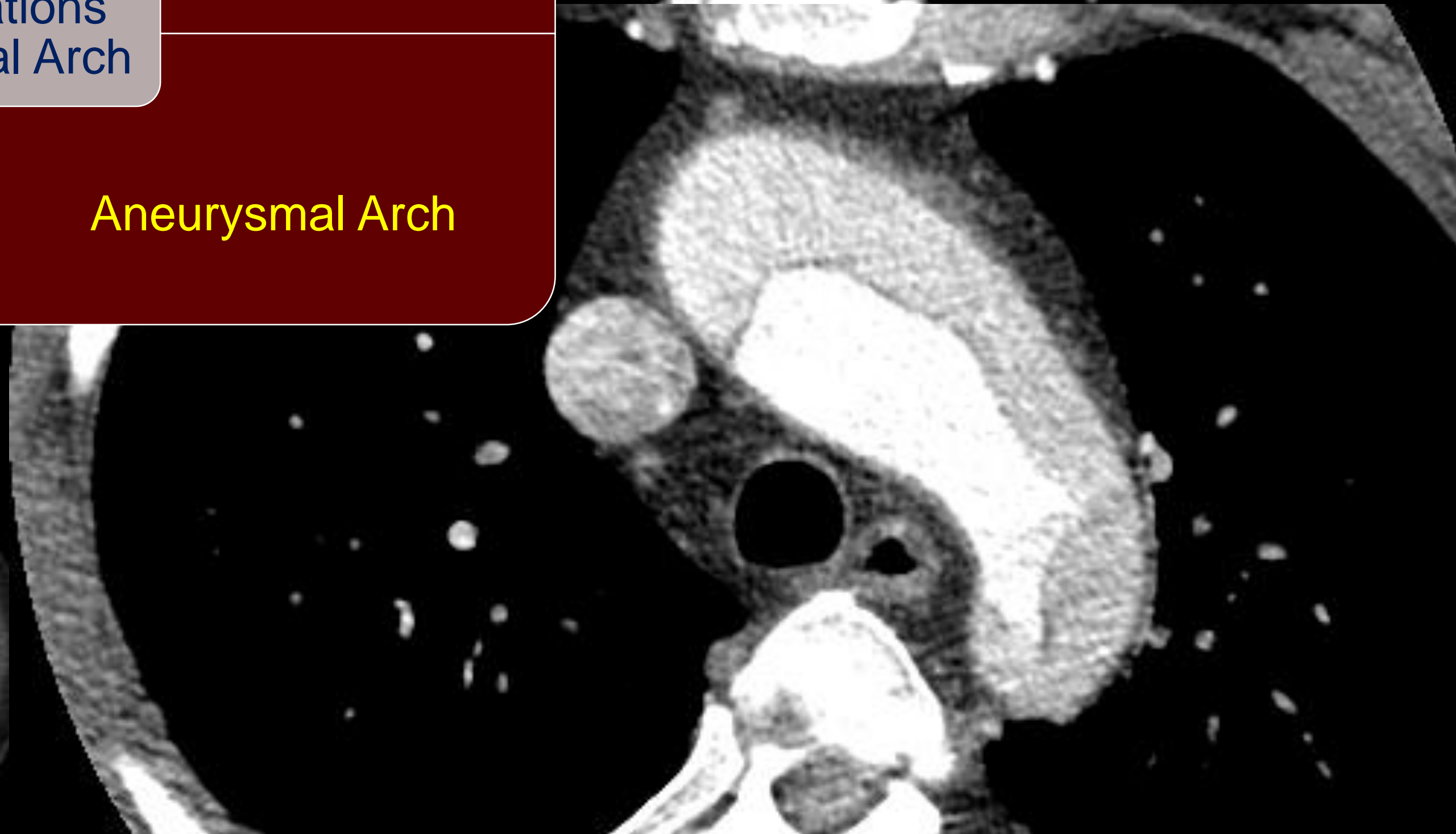


Carotid Dissection

Indications
for Total Arch

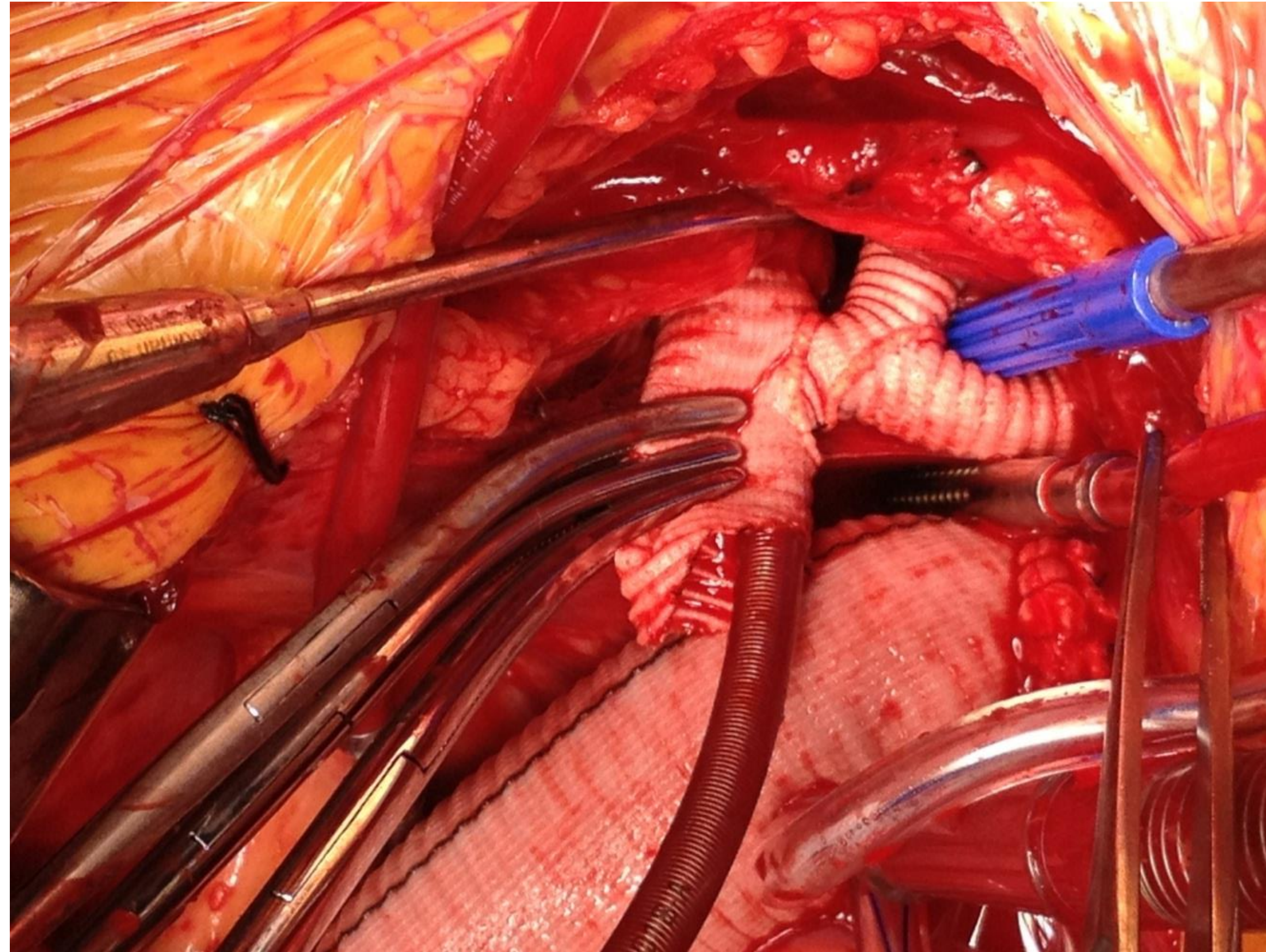


Circumferential Arch
Dissection



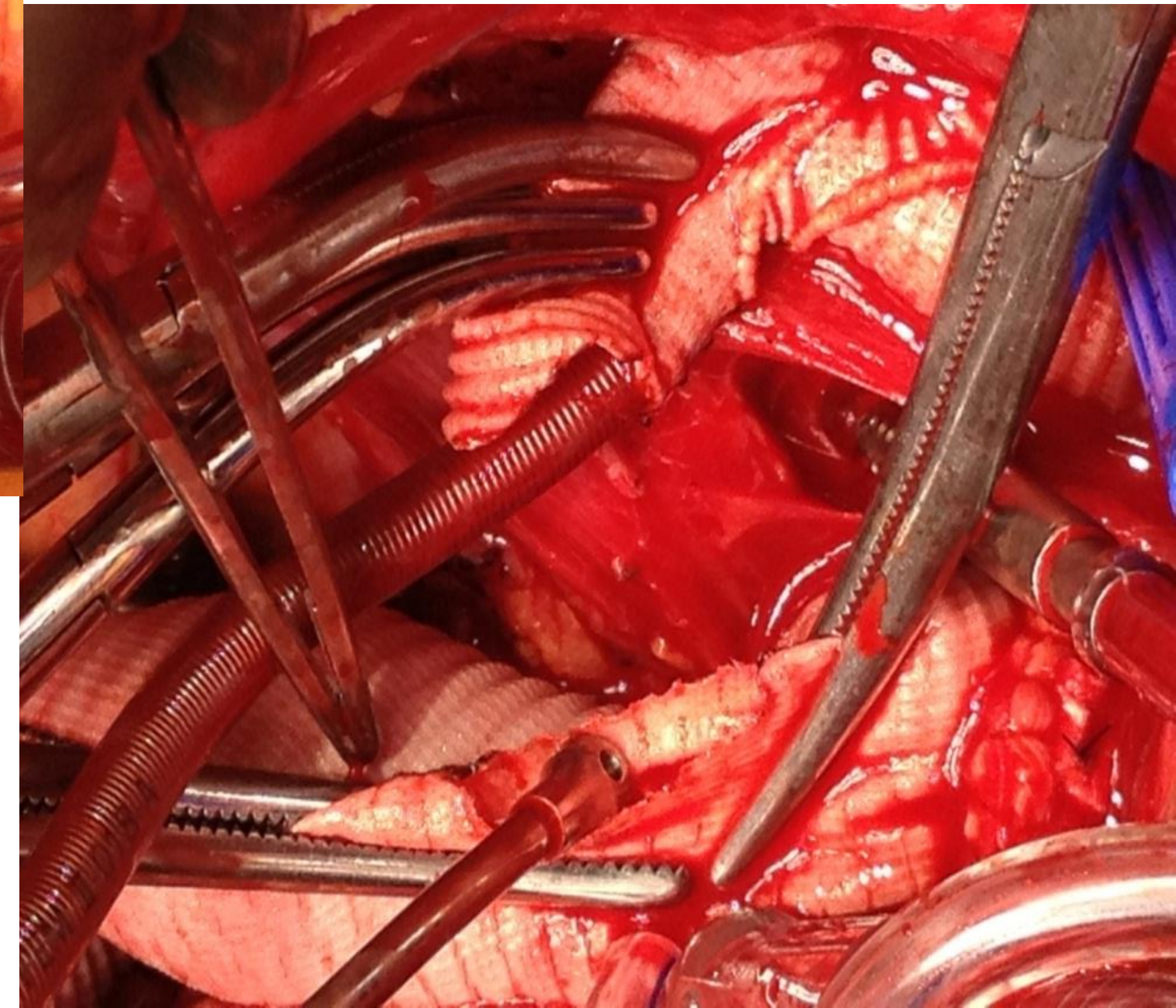
Aneurysmal Arch

Uninterrupted Central ACP Technique



Custom 3-branched brachiocephalic
graft separately perfused

Innominate, RCC or
LCC grafting during
cooling
2° arterial inflow
No interruption of ACP



Neurocerebral Protection/ Perfusion Protocol

1. 100% use EEG/SSEP monitoring
Steroids, lidocaine, MgSO_4 , mannitol use
DHCA initiation 4 min after electrocerebral silence (ECS)
2. Standardized cannulation:
aortic arch tear status and carotid malperfusion
3. Central aortic cannulation is default
4. RSCA/axillary cannulation for bad intra-arch tears
5. RCP for Hemiarch reconstruction (DHCA <30 min)
6. ACP for Total Arch reconstruction (DHCA >30 min)
7. Common carotid replacement when dissected

Study Population

- 1/2007 to 4/2014
- 264 consecutive acute Type A dissection repairs
- 58% males
- Mean age of 61.5 (± 3 , range 24-86 yrs)
- Diagnosis confirmed with CTA and TEE in OR
- Prospectively collected data
- Follow up is complete and current
 - 91% (241) of patients have complete 1-yr follow up

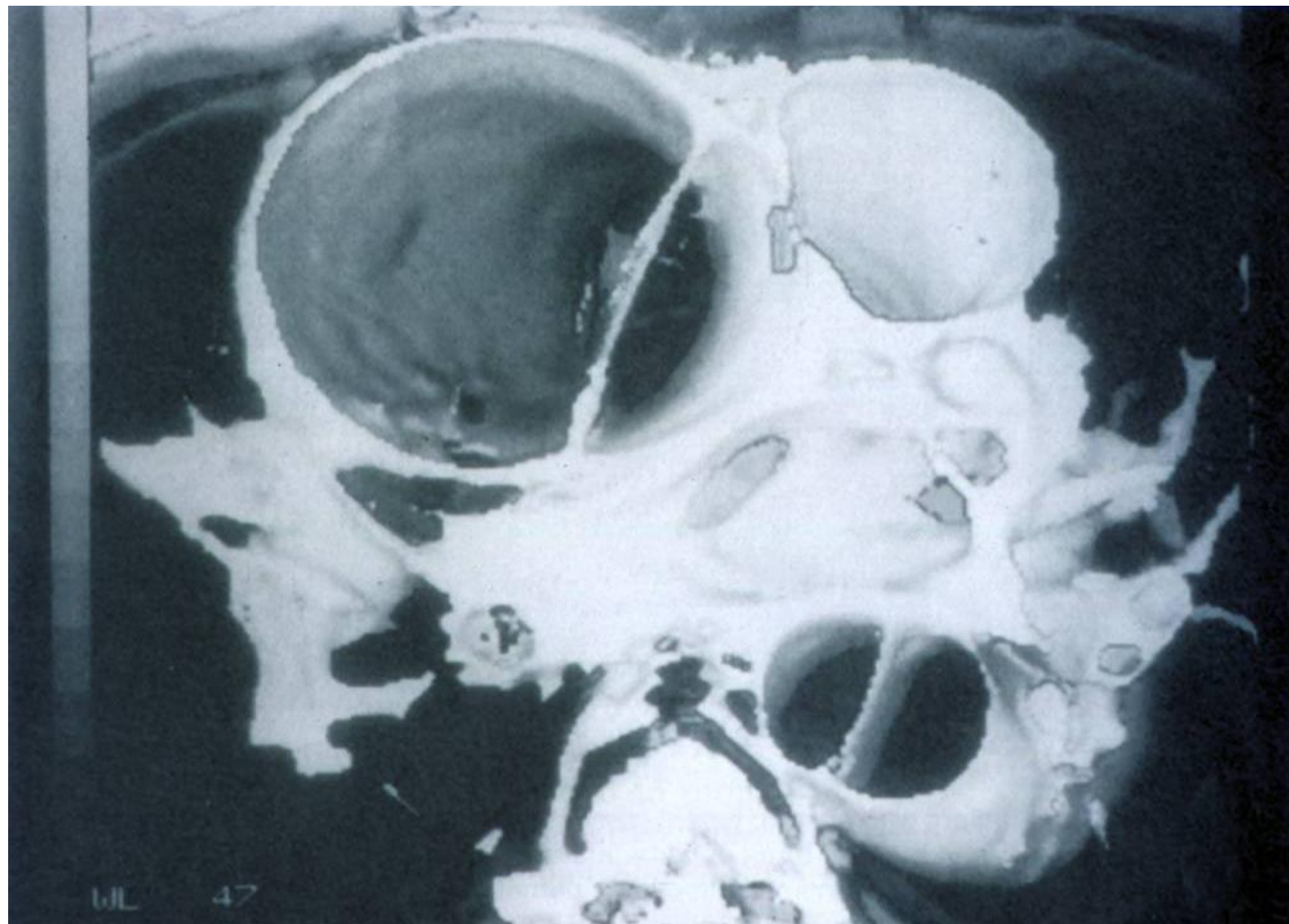
Dissection Characteristics

	N (%)
Previous Aneurysm Dissection	73 (28%) 22 (8%)
Frank Dissection IMH	239 (91%) 23 (9%)
Primary Tear Site STJ NCC LCC/RCC Ascending Aorta Arch	50 (19%) 65 (25%) 29 (11%) 104 (39%) 16 (6%)
Secondary Arch Tear	55 (21%)

	N(%)
Extent Debakey Type I Debakey Type II	200(76%) 64 (24%)
Malperfusion Neuro Coronary GI Renal Lower Ext.	100 (38%) 52 20%) 22 (8%) 13 (5%) 17 (6%) 42 (16%)
Pre-op Aortic Insufficiency (mod-severe)	126 (48%)

Outcomes with standardized protocol

Consecutive Acute Type A Dissection Repairs n=264/ 7 yrs



Hospital mortality 9.1%

Postop stroke 3.4%

Ann Thorac Surg. 2016 Mar;101(3):896-903; Discussion 903-5.

Outcomes by Cannulation Strategy (n=264)

Hospital mortality

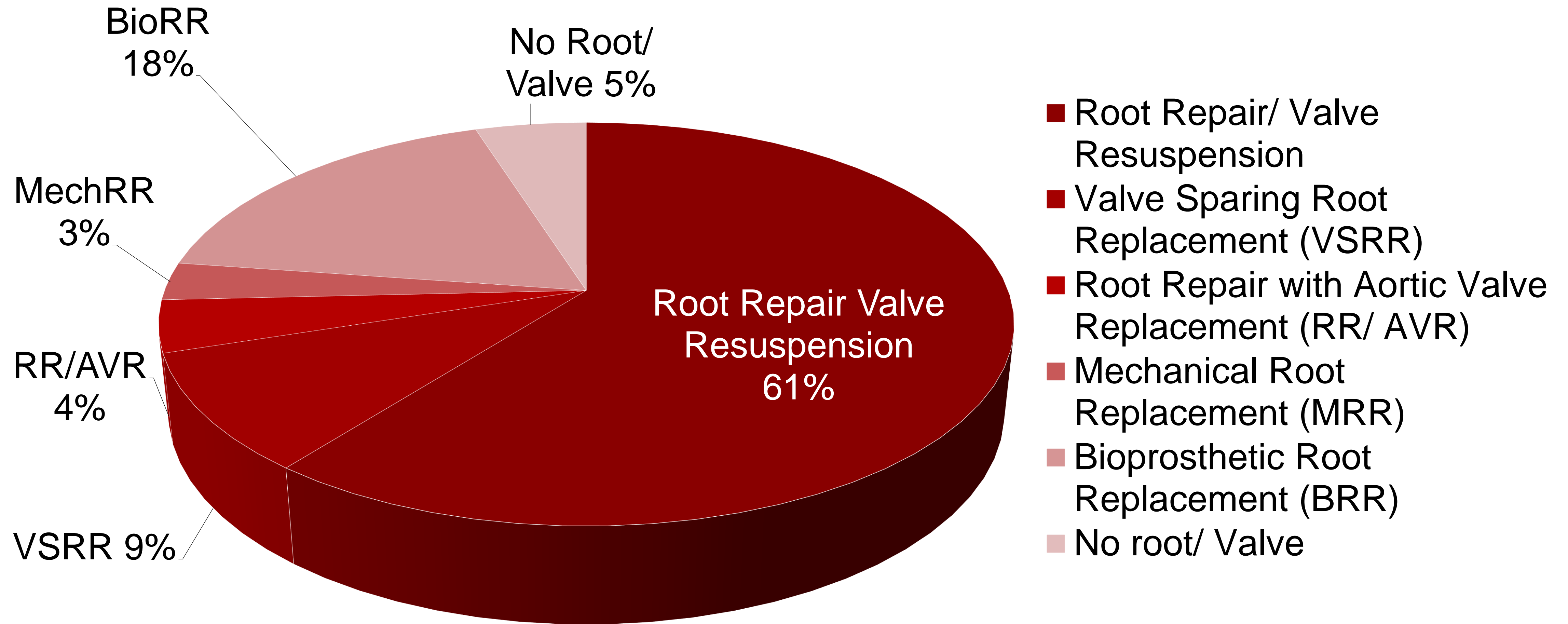
Central	7%	p=0.022
Subclavian	13%	
Femoral	29%	

Postop Stroke

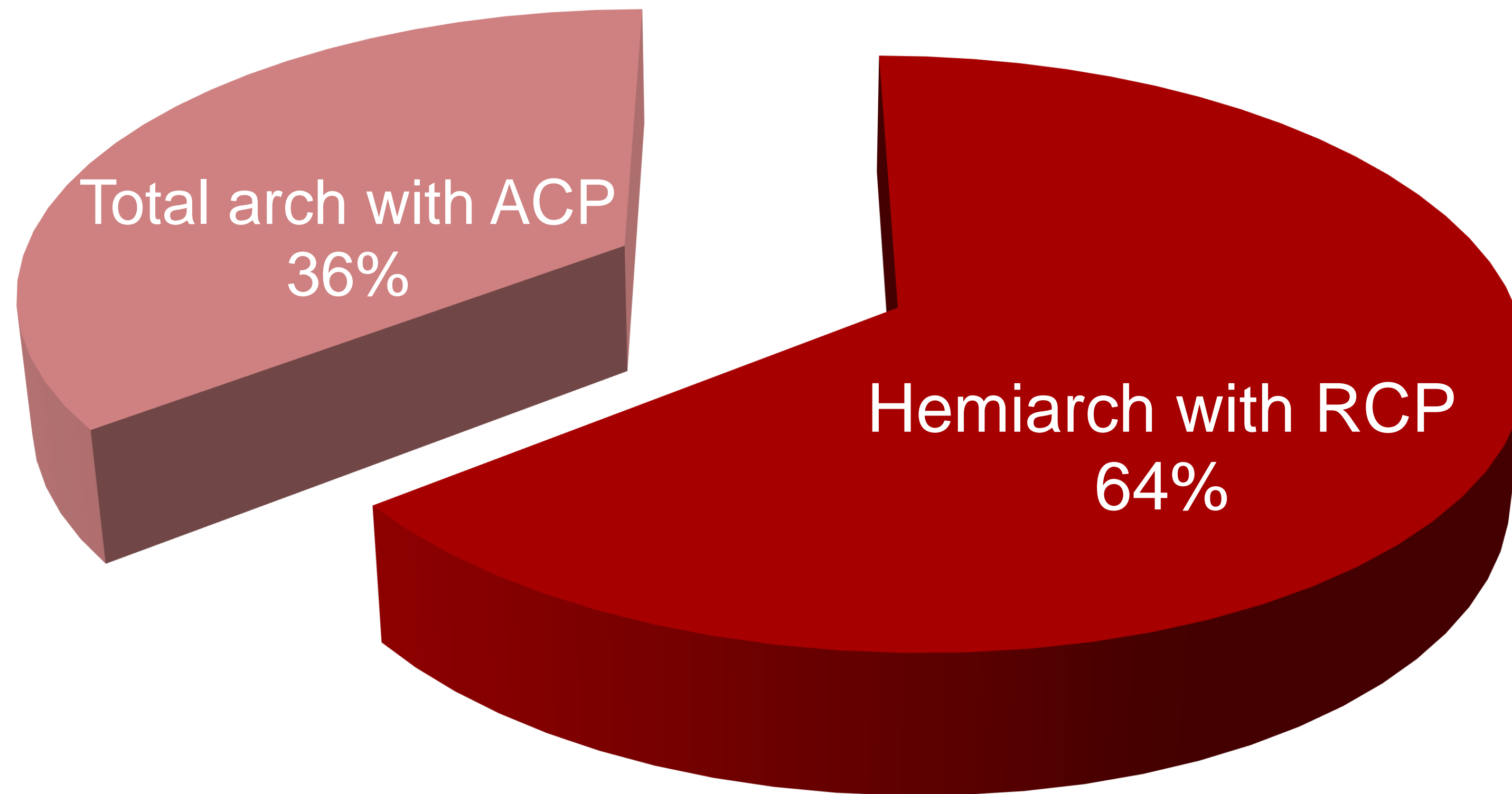
Central	2.97%	p=0.615
Subclavian	4.4%	
Femoral	7.7%	

Overall 1-yr mortality did not differ by cannulation strategy (p=0.222)

Management of the root (n= 264)



Arch Reconstruction



Complete Common Carotid Replacement in 33 patients using separate neck counter incisions

Multivariate Predictors of Hospital Mortality

	OR [95% CI]	
Pre-op CVA	21.3 [6.2-73]	p<0.001
Intra-op EEG Change	5.2 [1.6-16.5]	p=0.005
Frozen Trunk	14.5 [3.4-62.3]	p<0.001
Concomitant CABG	6.6 [1.7-24.8]	p=0.005

Multivariate Predictors of 1-yr Mortality

• 1 Year	OR [95% CI]	
Age ≥ 65	3.0 [1.3-7.2]	p=0.013
Pre-op CVA	12.3 [3.7-41.5]	p=0.000
RBC Transfusion ≥ 5 Units	5.9 [1.8-19.0]	p=0.001
Frozen Trunk	14.9 [4.3-52.1]	p=0.000
Concomitant CABG	2.8 [1.2-6.9]	p=0.023

Conclusion

1. Protocol driven management of Acute Type A dissection can reduce delay in time from diagnosis to restored perfusion
2. Central cannulation facilitates rapidly changing the stage from chaos to control.

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THANK YOU

