PARAPLEGIA: HOW TO AVOID THE PROBLEM THAT WON'T DISAPPEAR?

Geert Willem Schurink
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Maastricht University Medical Center,
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European Vascular Center Aachen-Maastricht,
Germany and the Netherlands

23RD INTERNATIONAL EXPERTS SYMPOSIUM
CRITICAL ISSUES
in aortic endografting 2019
May 23 & 24 - LIVERPOOL - UNITED KINGDOM

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Disclosures

- **Consultant for COOK Medical**

Strategies to prevent SCI

Open repair

- CSF drainage
- Preserv
- Spinal c
- BP mana
- Staged r

Endovasc. repair

- CSF drainage
- usion
- toring

Preserve original inflow and stimulate alternative inflow to the collateral network around the spinal cord

Eur J Vasc Endovasc Surg (2018) 55, 829–841

REVIEW

Editor's Choice — Spinal Cord Ischaemia in Endovascular Thoracic and Thoraco-abdominal Aortic Repair: Review of Preventive Strategies

Martijn L. Dijkstra [a], Tryfon Vainas [b], Clark J. Zeebregts [a], Lotty Hooft [c], Maarten J. van der Laan [a,*]

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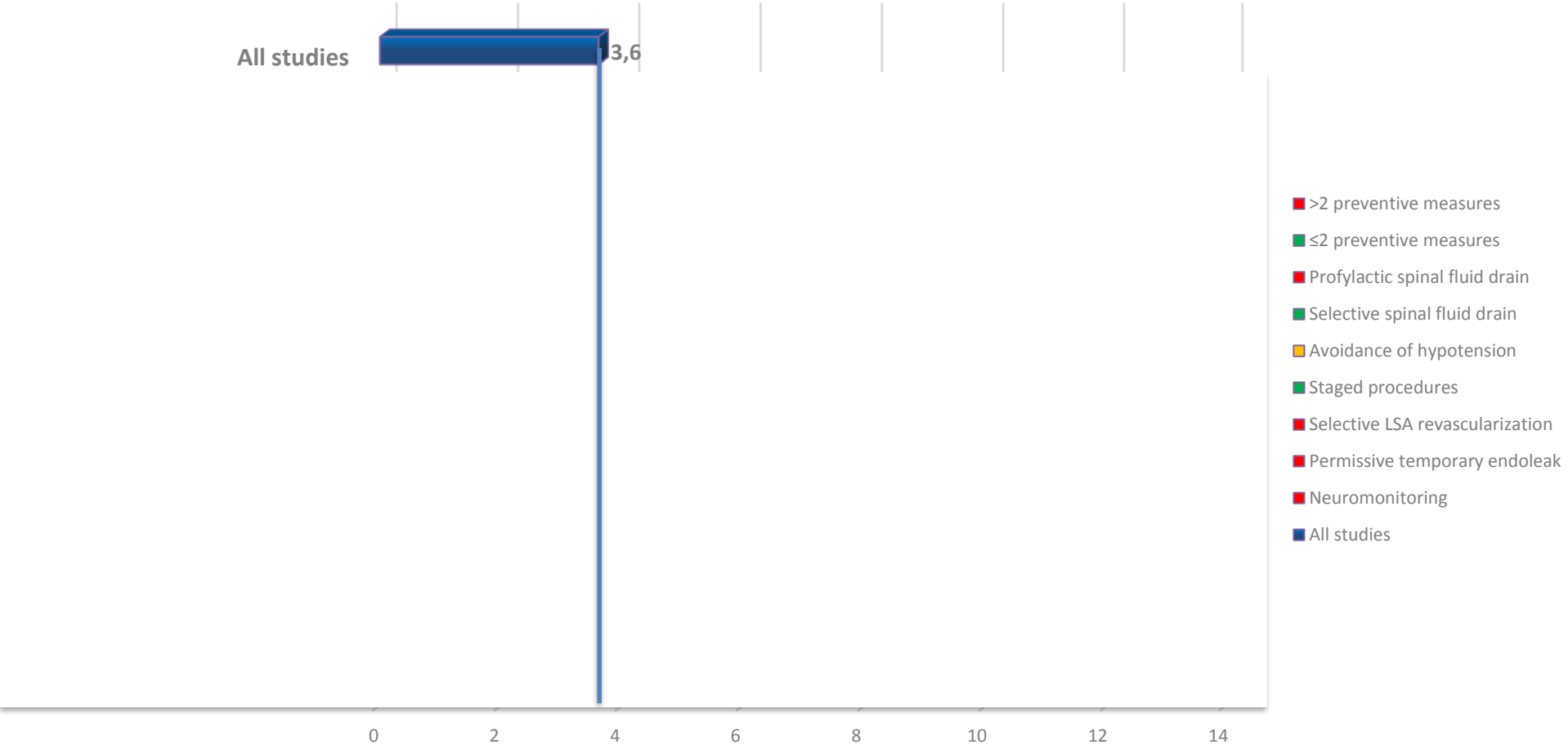
Only endovascular repair of TAAA:

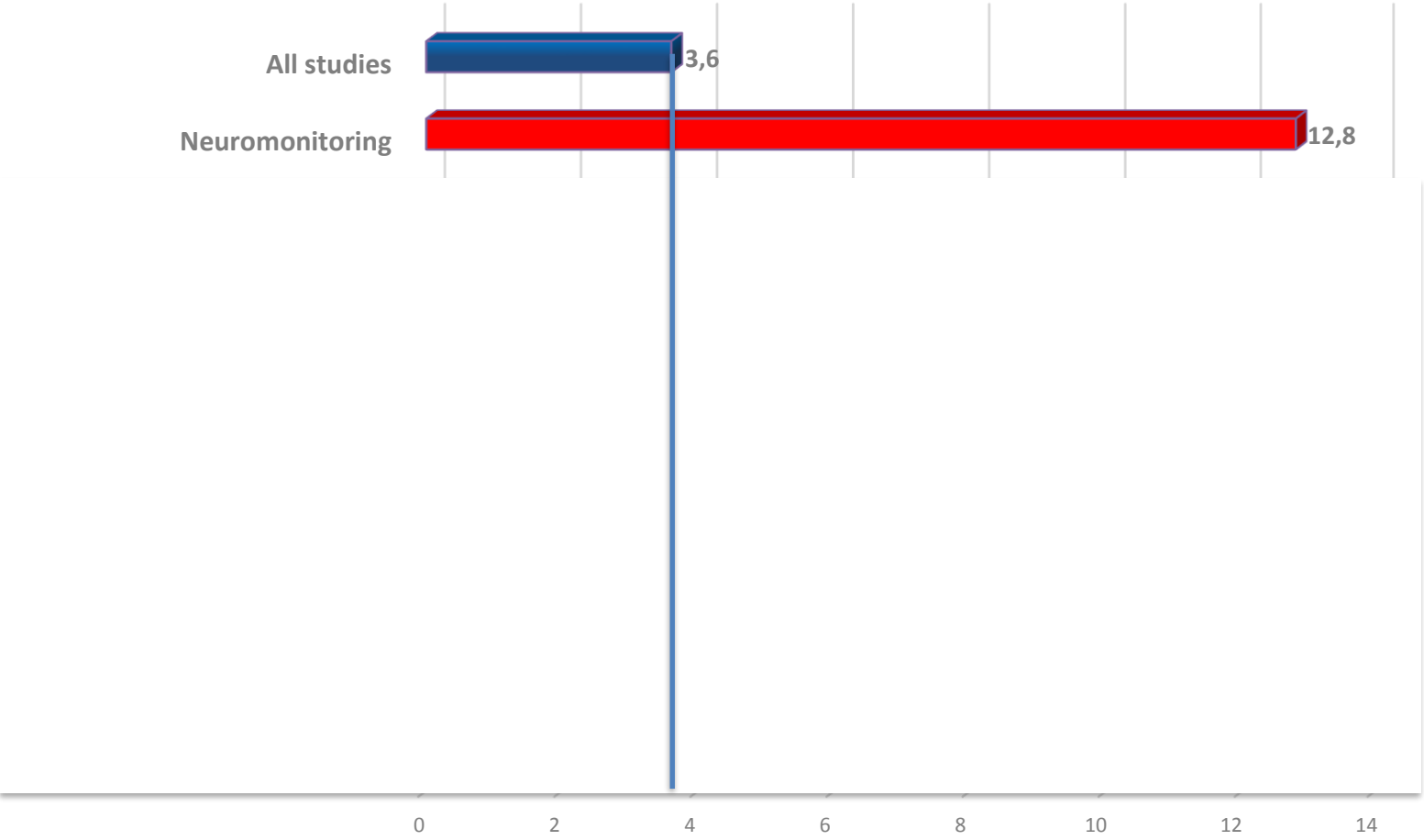
- 11 publications
- 873 patients
- Permanent SCI: 3,6%

Bisdas T et al. (2015)
Dias NV et al. (2015)
Guillou M et al. (2012)
Harrison C et al. (2012)
Jayia P et al. (2015)
Kasprzak PM et al. (2014)
Kato M et al.(2015)
Kitagawa A et al. (2013)
Maurel B et al. (2015)
Rossi SH et al. (2015)
Sobel JD et al. (2015)

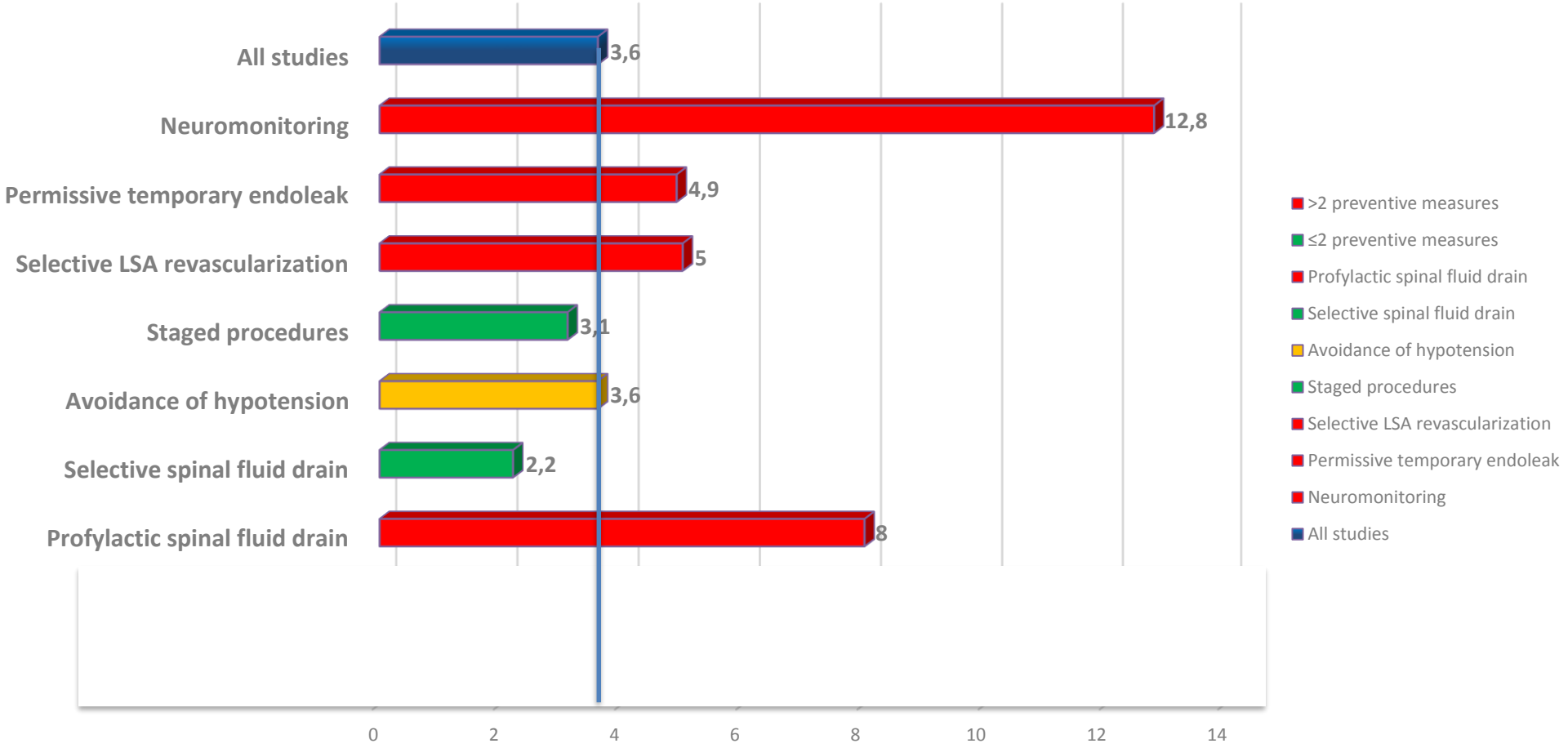
Permanent paraplegia in endoTAAA



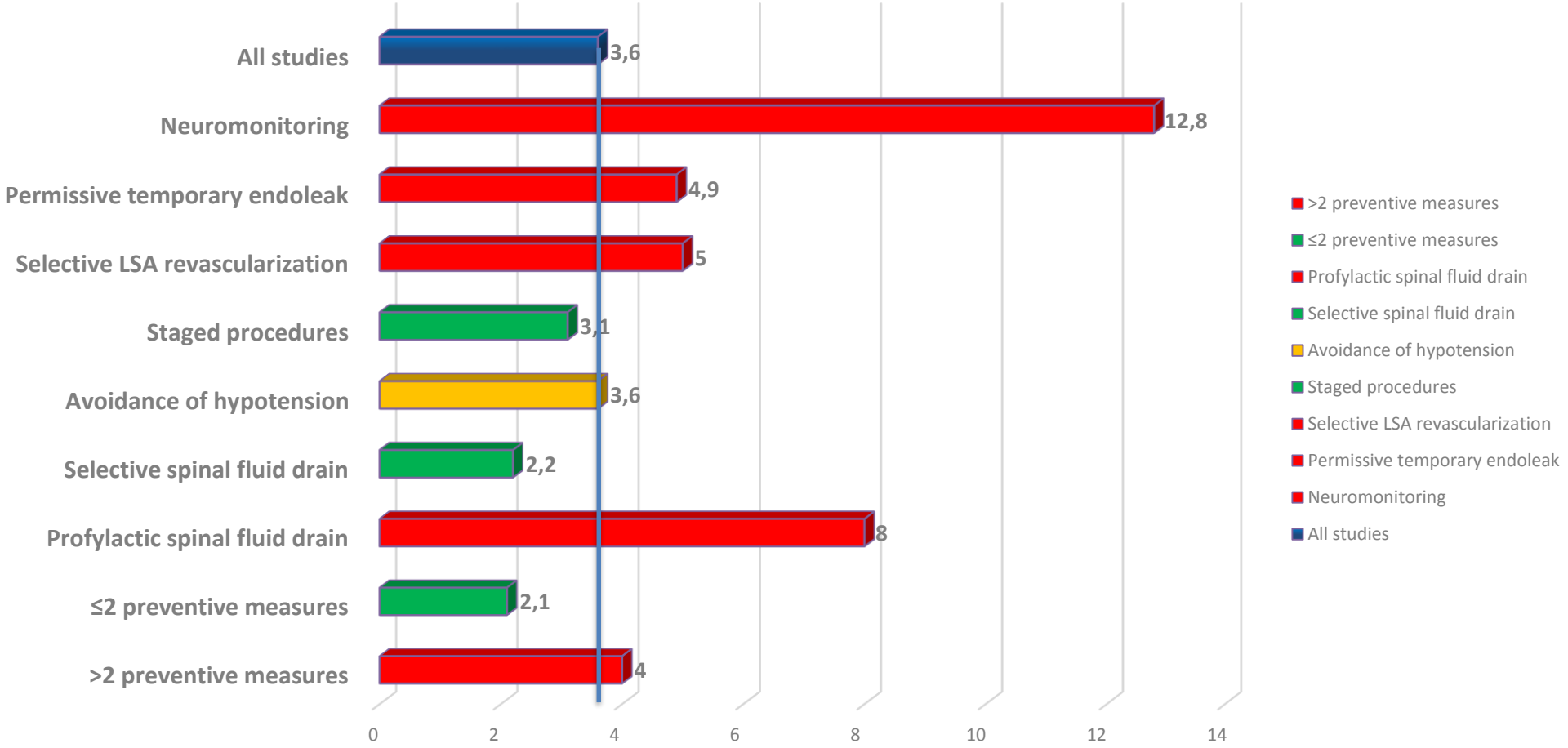
Permanent paraplegia in endoTAAA



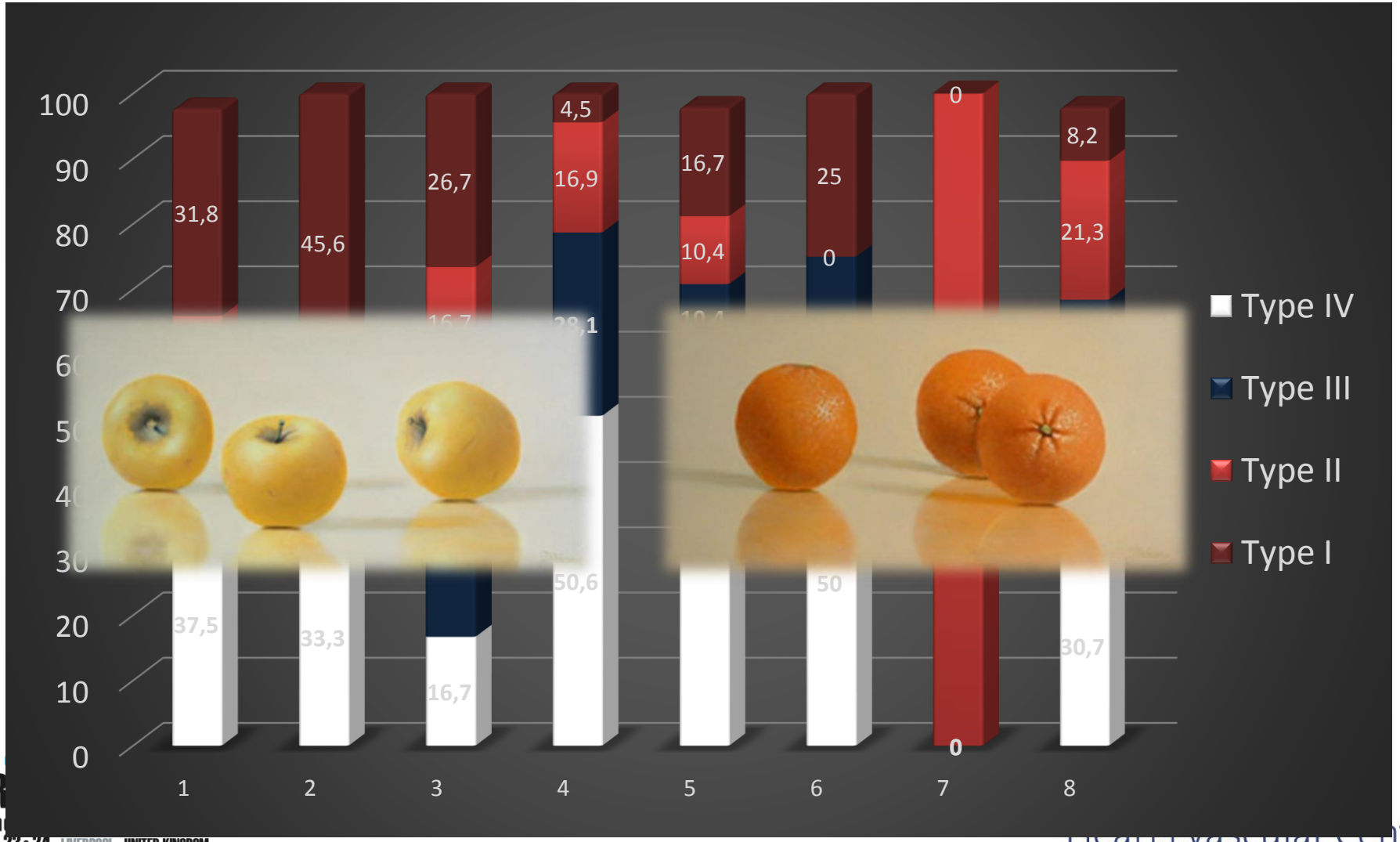
Permanent paraplegia in endoTAAA



Permanent paraplegia in endoTAAA



Distribution of types of TAAA in published series



Strategies to prevent SCI

Introduction of:

- **TEVAR staging**
- **LSA & HA preservation**
- **CSF drainage in type 1-3**
- **Early pelvic reperfusion**
- **Aggressive blood, plasma and platelet Tx**
- **MAP 85-90 mmHg**

Eur J Vasc Endovas

Editor's Ch
and Attent
Ischemia D

B. Maurel [a], N. De
M. Tyrrell [b], S. Ha

	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

endovascular thoracoabdominal aneurysm repair performed in a high volume center

Staging TAAA

Bo

- F aging)
- M AR)
- S (

Takes longer to exclude the TAAA Patient @ risk?

Only Endo repair

- "Open branch" staging

Results EndoTAAA (n=112)

- Historical staging: 28%
  - 35% abdominal aorta
  - 58% thoracic aorta
  - 7% both thoracic &abd aorta
- TEVAR staging: 9 %
  - TAAA type 2 with carotid-subclavian bypass
- Open branch staging: 20%
  - Using MEPs during last branch occlusion
  - Reason for open branch:
    - 86% MEP.↓ (> 50%)
    - 14% Endoleak during branch occlusion

Clinical Investigation

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

JOURNAL OF ENDOVASCULAR THERAPY

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2016, Vol. 23(1) 139–149

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www.jevt.org
SAGE

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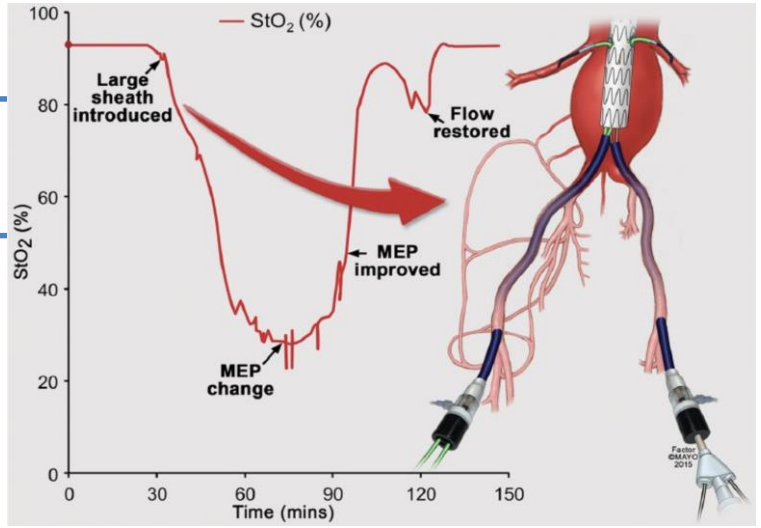
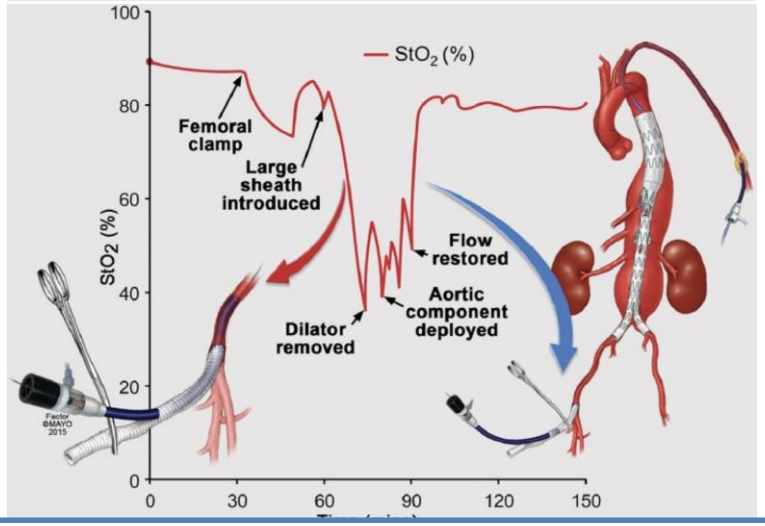
Abstract

Purpose: To review outcomes of continuous motor/somatosensory-evoked potential (MEP/SSEP) monitoring, cerebrospinal fluid drainage, and selective use of iliofemoral conduits in patients undergoing endovascular repair of descending thoracic aneurysm (DTA) and thoracoabdominal aortic aneurysms (TAAAs). **Methods:** The clinical data of 49 patients (mean age 75±8 years; 38 men) who underwent endovascular repair of DTA and TAAAs (2011–2014) were reviewed. All patients had cerebrospinal fluid drainage, permissive hypertension (mean arterial pressure ≥80 mm Hg), and MEP/SSEP monitoring. There were 44 (90%) patients with TAAAs and 5 (10%) with DTA. Types I and II TAAAs were repaired in staged procedures. Iliofemoral conduits were used for small iliac arteries and to minimize time of lower extremity ischemia in patients with difficult anatomy. In patients with changes in MEP/SSEPs, a standardized protocol was employed to optimize spinal cord perfusion and restore lower extremity blood flow. Endpoints were mortality, spinal cord



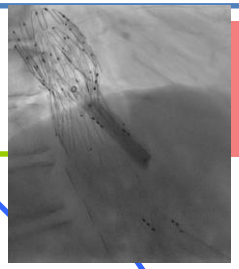


conduits were used in 16 limbs/14 patients. A stable MEP/SSEP was achieved in all patients. Thirty-one (63%) patients had a ≥75% decrease in MEP/SSEP amplitude in 50 limbs starting on average 75±28 minutes after obtaining vascular access. MEP/SSEP amplitude improved with maneuvers in 12 (39%) patients and returned to baseline with restoration of lower extremity flow in all except 1 patient who developed immediate SCI. Thirty-day mortality was 4%. Three (6%) patients

perfusion during complex [illegible]
neuromonitoring to prevent SCI.

MEPS @ Crawford extent 2 endo TAAA repair with multivessel BEVAR

Peripheral ischemia Right Leg

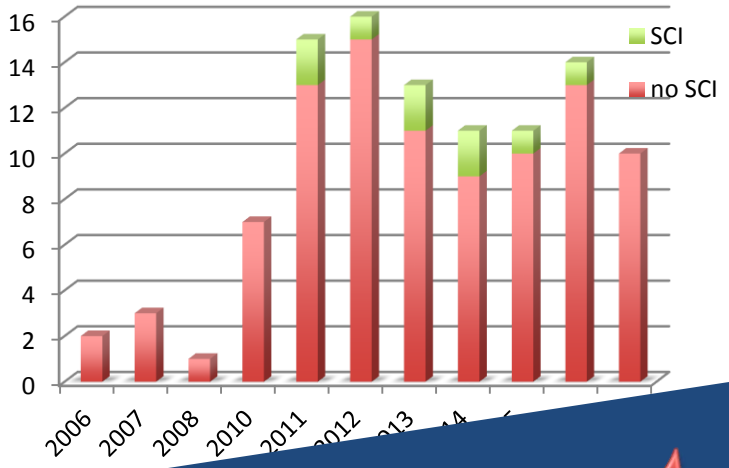


Spinal Cord Ischemia

Increase vs decrease upperleg MEPS

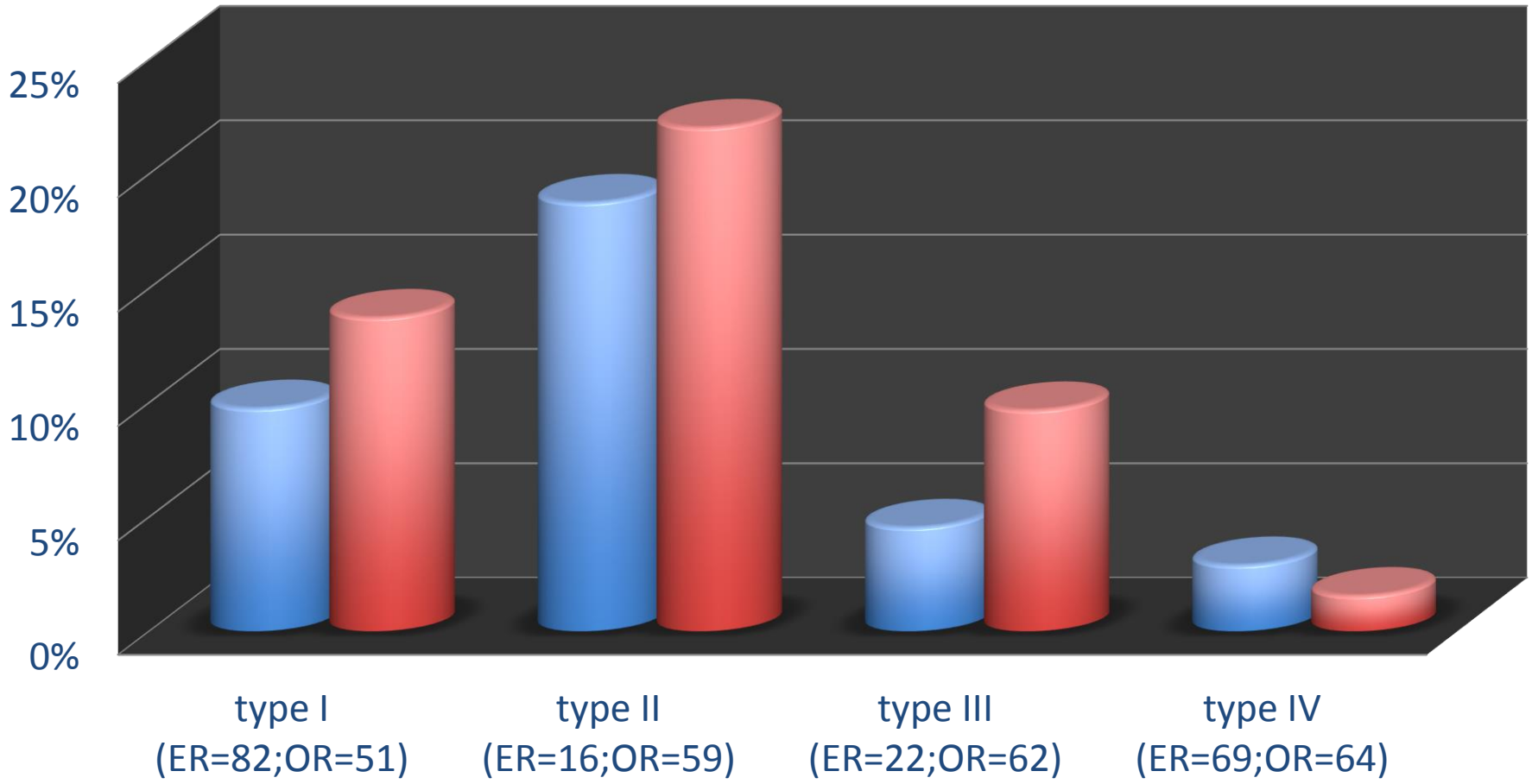
Results EndoTAAA (n=112)

- Spinal cord ischemia: 6%
  - 4/7 improved (all walking)
  - 1/7 cured
  - 2/7 no improvement



1,9% complete persistent paraplegia

Cleveland Clinic Experience



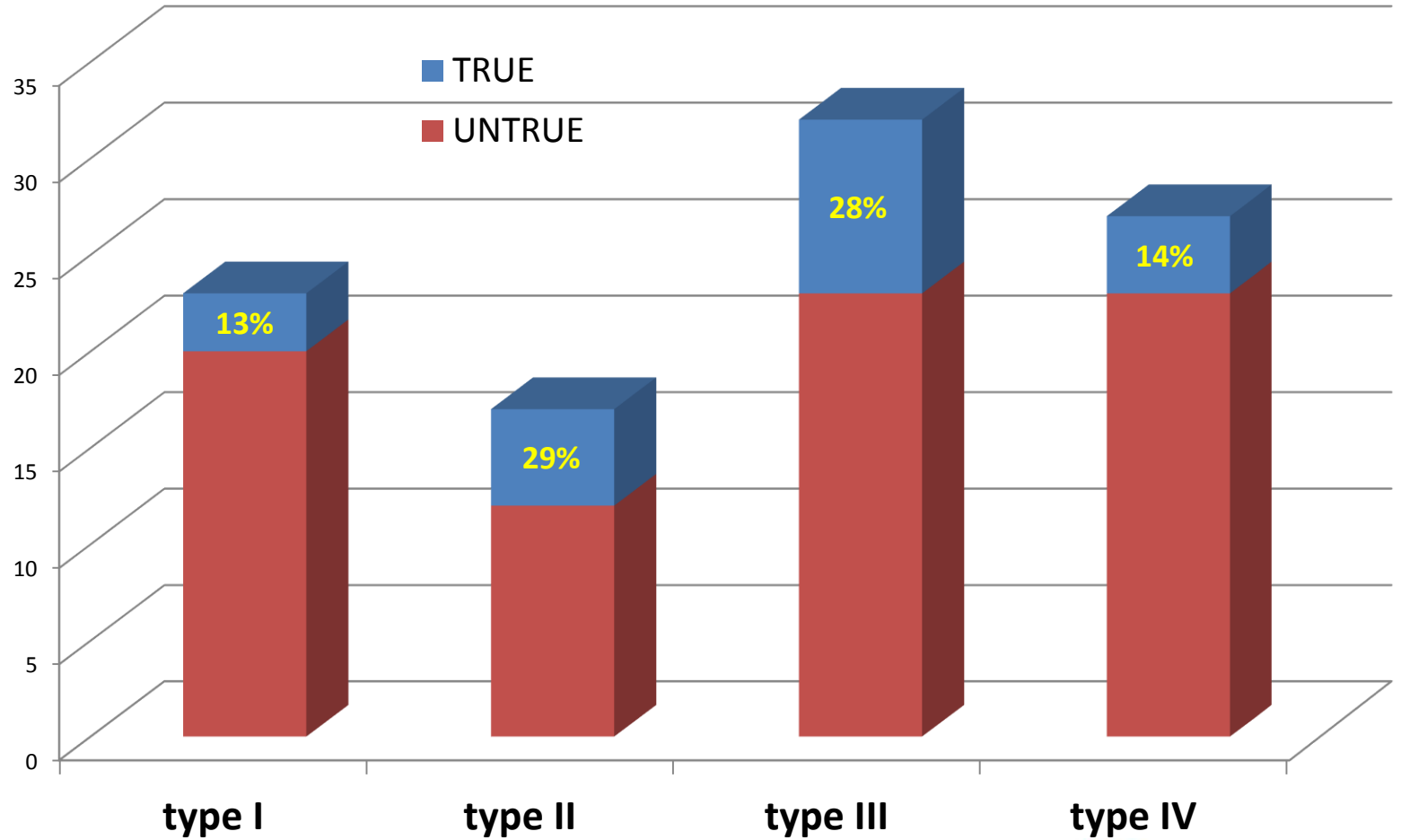
Greenberg, Circulation. 2008;118:808-817

SCI in endoTAAA (n=112)

- Preop. Crawford classification

		Spinal Cord Ischemia	
type	N=	complete	partial
I	23	0	0
II	18	1	2
III	34	1	1
IV	27	1	1

‘Open Branch’ staging in endoTAAA



Conclusions

- Spinal cord ischemia is still a serious problem in endovasc repair of TAAA.
- In endoTAAA SCI seem to decrease with current protocols.
- Current protocol is set of adjunctive measures
  - not clear which is essential/unimportant
- Staging is an effective way to reduce SCI
- Selective staging with MEP during branch test occlusion is associated
  - with low spinal cord ischemia rate in endoTAAA
  - more frequent staging in Crawford type 2 and 3
  - no need for staging in 80%