

Safety of Cerebrospinal Fluid Drainage for Spinal Cord Ischemia Prevention in Thoracic Aortic Endovascular Repair

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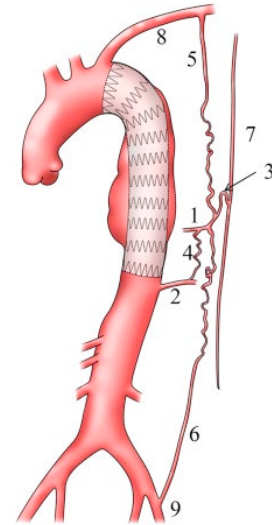


Disclosures

- None

Introduction

- Spinal cord ischemia (SCI) after TEVAR associated with risk of permanent neurologic deficit and decreased long-term survival
 - Endograft deployment may obstruct segmental spinal cord blood supply
- Cerebrospinal fluid drainage (CSFD) associated with lower rates of SCI in open thoracoabdominal repair
 - CSFD lowers CSF pressure, increasing spinal cord perfusion pressure
- CSFD usage for SCI prevention in TEVAR controversial due to absence of clear supporting evidence and perceived risk of CSFD-related complications



Desart K J Vasc Surg 58 (2013) 635

Coselli JS J Vasc Surg 35 (2002) 631

Aims of Current Study

- Examine long-term institutional trends in CSFD usage in TEVAR and rate of CSFD-specific complications
- Identify predictors of post-TEVAR CSFD complications
- Determine if implementation of bundled SCI prevention protocol relying on prophylactic CSFD usage caused increase in CSFD complications

Methods

- UF TEVAR database reviewed to determine frequency of CSFD usage and rate of associated complications
- Mild: Post-dural puncture headache (PDPH)/ CSF leak managed medically, urinary retention, etc.
- Moderate: PDPH/ CSF leak requiring intervention without neuraxial hemorrhage, any need for CSFD replacement or premature removal
- Severe: any suspected/ confirmed NAH or CSFD-related neurologic deficit
- CSFD placement timing
 - Pre-Implant
 - Post-Implant Prophylactic
 - Post-Implant Therapeutic

Results

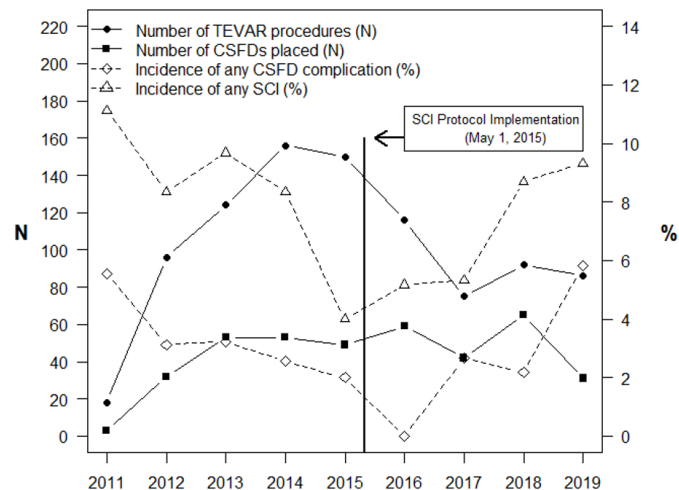
- 936 TEVARs and F/BEVARs performed in 869 patients (Oct 2011-Mar 2020)
- 390 CSFDs placed in 373 TEVAR patients (41.7% of all TEVAR patients)
- TEVAR indications
 - Overall: TAAA (32.2%), TAA (23.3%)
 - Receiving CSFD: Chronic dissection (64.7%), TAA (50.2%), acute dissection (45.4%)
 - CSFD by procedure urgency: 43.3% elective vs. 39.6% non-elective
 - CSFD by procedure type: TEVAR 44.7% vs. B/FEVAR 33.8%
- Most (89.5%) CSFDs placed pre-implant
 - Post-implant drains placed for new neurologic deficits (5.6%) or SCI prophylaxis (4.9%)

CSFD Complications

- CSFD complications present in 25/390 TEVAR procedures (6.4%)
 - 17 (64.3%) mild (15 PDPH ± CSF leak)
 - 3 (12%) moderate (drain fracture requiring replacement, drain occlusion requiring removal, persistent CSF leak requiring skin-level suture closure)
- Severe complications occurred in 5 patients
 - 3 confirmed/ suspected neuraxial hemorrhage → no permanent deficits
 - One CSFD occlusion resulting in SCI symptoms → no permanent deficits following CSFD replacement
 - 1 large ICH POD1 with death during same hospitalization
- Only significant clinical predictor of CSFD complications was post-implant therapeutic placement (OR 6.9, 95% CI 2.42-19.6, P=0.0003)
- Pre-implant: OR 0.26, 95% CI 0.10-0.68, P=0.006

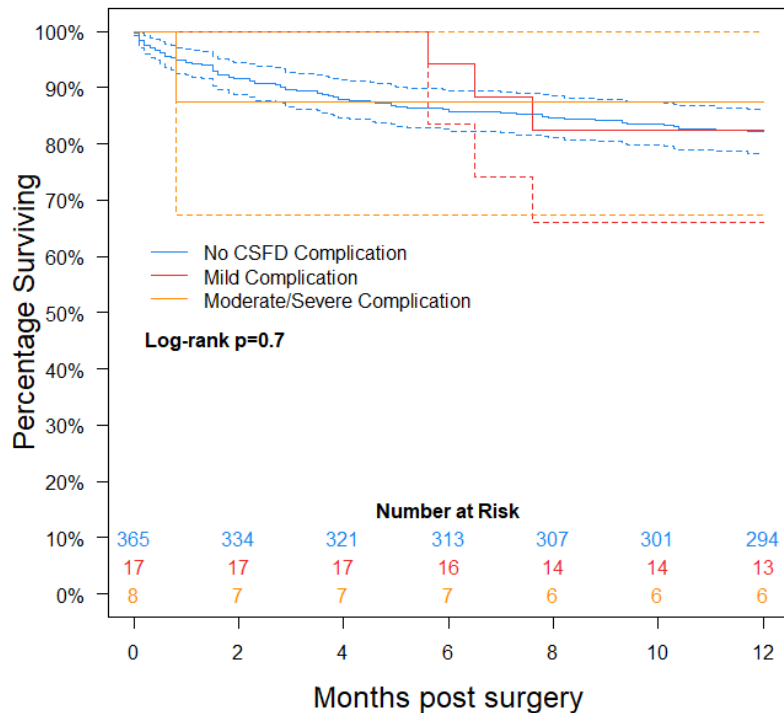
SCI Protocol and CSFD Usage

- Bundled SCI prevention protocol implemented May 2015
 - >150 mm planned aortic coverage
 - Zone 5 coverage within 5 cm of celiac
 - Prior aortic surgery
 - Unrepaired infrarenal aneurysm
- CSFD use increased (50.6% vs. 36.9%)
 - Greater proportion of TEVAR (vs. F/BEVAR) post-protocol
- No change in rates of CSFD complications (6.7% vs. 6.1%)



CSFD Complications and Survival

Survival by CSFD-Related Complication Status



Conclusions

- Low rate of complications with routine use of CSFD placement in TEVAR
- Routine use of prophylactic CSFD in context of bundled SCI prevention protocol did not increase rate of CSFD complications
- Post-implant therapeutic (“rescue”) CSFD placement for new SCI associated with **~7x increase in CSFD complication risk**
- Avoidance of emergent post-TEVAR CSFD placement is key to avoidance of CSFD complications, favoring prophylactic CSFD usage in patients at high risk for post-TEVAR SCI



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