

Best Practice: Thoraco-Abdominal Aneurysms

The Problem

The operative treatment for Thoraco-abdominal aneurysm requires meticulous application of best practices to decrease risk of complications such as myocardial infarction, respiratory events, excessive blood loss, or visceral and spinal cord ischemia. This team reviewed current evidence and designed a process to ensure consistent implementation of state-of-the-art best practices.

Aim/Goal

The goal of this team was to identify best practices in the approach to elective thoraco-abdominal aneurysm repairs and construct systems that ensured these practices were consistently applied.

The Team

- Feroze Mahmood, MBBS, Co-Leader (Anesthesia)
- Marc L. Schermerhorn, MD, Co-Leader (Vascular Surgery)
- John Whitlock, RN, MS, Co-leader (CVICU Clinical Nurse Specialist)
- Matthew Alef, MD (Vascular Surgery Fellow)
- Mary Cedorchuk, RN (Cardiac, Vascular & Endovascular ORs)
- Mark Courtney, NP (CVICU)
- Senthil Nathan, MD (Cardiac Surgery)
- Shahzad (Shaz) Shaefi, MD (Anesthesia)
- Kamal Khabbaz, MD, Advisor (Cardiac Surgery)
- Marjorie (Margie) Serrano, RN, MS, Advisor (CVICU Nurse Manager)
- Richard Whyte, MD, MBA, Advisor (Surgery)
- John Tumolo, MBA, Facilitator (Surgery)

The Interventions

The following interventions were identified through literature review and best practices of high-volume centers across the country:

- Consistent scheduling communication to appropriate departments two weeks prior to surgery and use of distribution list
- Multidiscipline joint “huddle” prior to case start
- Consistent line and drain placement in the OR holding area
- Implementation of intraoperative neuro-monitoring for all cases
- Development of Cerebral Spinal Fluid (CSF) drainage protocol with “rescue” protocol for patients with altered neurological exam
- Development of standardized postoperative order set
- Implementation of hands-on training program as part of annual ICU nursing competencies
- Commitment to daily multidisciplinary rounding

The Results/Progress to Date

The following Thoraco-abdominal CSF drainage protocol was established and is used by multidisciplinary team members:

ICP	Drainage (per hour)
< 10	No Drainage
10-15	10cc
15-20	15cc
>20	Call HO

Call HO for:

- New onset ICP > 15 mmHg that does not respond to drainage
- Change in neurological exam

All documented protocols were used to design a Post-Op Order Set in POE to standardize practice for each Thoraco-abdominal aneurysm:

Tubes and Drains

click to Order Chest tube to suction 20 cm
Record chest tube output hourly

click to Order DGI

click to Order To low continuous suction
Remove when extubated

click to Order Foley To Gravity
Reason for Foley: Urine output monitoring
D/G Foley catheter on _____ at _____

Standard post TAA Lumbar Drain Management
Record Hourly
TAA Lumbar drain to pressure monitor when not open to drainage; CSF Pressure Goal ≤15 mmHg; CPP Goal > 60 mmHg

click to Order Drain hourly per protocol
CSF Pressure < 10mmHg No drainage
CSF Pressure 10-15 mmHg Drain 10cc
CSF Pressure 15-20 mmHg Drain 15cc
CSF Pressure > 20 mmHg Call HO
Lumbar drain Closed to drainage
Goal CSF Pressure _____
Goal CPP _____

click to Order Drain _____ cc every hour for CSF Pressure _____
Call HO for CSF Pressure > _____

Lessons Learned

- Joint Rounds are difficult to coordinate with multiple services
- Measuring goals with such a small cohort presents unique challenges; Ongoing measureable goals were difficult to establish in evaluating success given low numbers of cases done each year
- Staff are able to articulate a perceived consistency in their approach to patient management and a clearer understanding of what is expected of them
- The body of evidence is relatively small for TAA management; the team learned from shared experience of other major academic medical centers

Next Steps/What Should Happen Next

It is unclear if these efforts have had a measureable impact on patient outcomes. The following next steps will need to be implemented to measure a consistent, coordinated approach to managing thoraco-abdominal repair patients:

- Measure utilization of standardized order set
- Measure compliance/appropriateness of CSF Drainage Protocol
- Measure patient outcomes and complications: Review on
- Education & Reinforcement: Service level review of protocols

