Examination of Abdominal Exploration and Return to OR in Ruptured Abdominal Aortic Aneurysm Repair

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Emily Spangler
EVAR for ruptured AAA has increased in adoption over the past 10 years.

On an institutional basis following creation of EVAR protocols for rupture:
- Similar rates of abdominal compartment syndrome
- Decreased mortality
No recent broad assessment of abdominal exploration in the repair of ruptured AAA has been made

- VQI does not have a specific abdominal compartment syndrome variable
  - Examination of abdominal evacuation as a surrogate for ACS
  - Further examination of other returns to the OR
Hypothesis

- We suspected:
  - Increased utilization of EVAR for ruptures over time
  - Regional variation in use of EVAR for rupture
  - Declining use of abdominal evacuation over time
Methods

- EVAR and open AAA national VQI datasets from 2003-2016

  - Total cases: 40,450
  - Indication Rupture: 3,424
    - Open: 1605
    - EVAR: 1819
      - Without abdominal evacuation: 1597
      - With abdominal evacuation: 222
Ruptured Repair Modality Over Time

- Percent Utilization of open repair vs EVAR over 2003-2016
- We see increasing use of EVAR for ruptures over time
% rEVAR Utilization Over Time by Region
rEVAR Case Volume Over Time by Region
No significant trends in regional utilization of EVAR for rupture over time.

- Time of rise of absolute case numbers largely correspond to volume of VQI centers by region

- Time of earliest adoption (possible biggest learning curve) only captured in Eastern Region
Abdominal Evacuation Cases Over Time by Region
Abdominal evacuation rates are low overall

Did not appear to have a distinct time or regional trend to use of abdominal evacuation
Survival by Mode of Repair

Kaplan-Meier survival estimates

- Open AAA repair
- EVAR without abdominal evacuation
- EVAR with abdominal evacuation
Survival by Mode of Repair

Kaplan-Meier survival estimates

- Open AAA repair
- EVAR with abdominal evacuation
- EVAR without abdominal evacuation

Survival vs. analysis time (days)
30-day Survival by Mode of Repair

Kaplan-Meier survival estimates

- Open AAA repair
- EVAR without abdominal evacuation
- EVAR with abdominal evacuation

analysis time (days)
Survival worse among rEVARs with abdominal evacuation compared to both rEVAR without abdominal evacuation and open ruptured AAA repair

- Likely a proxy for abdominal compartment syndrome
Conclusions

- EVAR use has increased in treatment of rupture over time.
- Proportion undergoing abdominal evacuation has remained relatively stable.
- No significant regional variation noted, however analysis limited by small number of cases.
- Patients requiring abdominal evacuation after EVAR fared worse than those undergoing EVAR without abdominal exploration or open AAA repair, likely as a surrogate for abdominal compartment syndrome.