Short Necks, Juxtarenal and Pararenal Aneurysms: Open Repair is the Gold Standard

Disclosures

• NONE

Continued Evolution of EVAR

• Suprarenal fixation
• Improved flexibility
• Larger diameter grafts for larger necks
• Smaller caliber delivery systems/PEVAR
• Fenestrations, “snorkels”, “chimneys”
• Hybrid procedures- “De-branching”
• Branched grafts
  
  *Technical feasibility may not equal clinical success*
Definitions

- **Juxtarenal** - extends up to renal arteries and may include inferior border
- **Pararenal** - involves the renal arteries; some authors include JRAA with these
- **Suprarenal** - aneurysm extends above renals
- **Paravisceral** - involves SMA ± celiac
- **Type IV TAAA** - involvement extends to diaphragm level as high as pulmonary ligament

Relative Indications for Open Repair

- Juxtarenal or Suprarenal extent
- Unfavorable Neck
- Symptomatic Visceral Occlusive Disease
- Major renal artery arising from AAA
- Severe Aortoiliac Occlusive Disease
- Known or suspected infection
- Connective tissue disease e.g. Marfan
- Inadequate caliber access vessels
- Bilateral hypogastric exclusion in younger pt
- Young, good-risk patient

Paravisceral Aneurysm

Paravisceral AAA: Treatment Choices

- Open repair using bevelled anastomosis, Crawford patch and/or individual branch reconstructions
- Branched graft repair
- Hybrid approach combining debranching and EVAR
Paravisceral/Type IV TAAA: Operative Approach

Pararenal AAA

Challenging Neck
Para- and Juxta-renal AAA: Treatment Choices

- Open repair using suprarenal or supraceliac clamp
- Retroperitoneal or transperitoneal approaches
- With or without renal artery reconstruction
- Fenestrated EVAR
- EVAR with “snorkel” grafts for one or both renals
- Branched graft repair
- Hybrid approach combining debranching and EVAR

Suprarenal Repair: Contemporary Results

Suprarenal aortic cross-clamp position: A reappraisal of its effects on outcomes for open abdominal aortic aneurysm repair

- BWH Series N=171 (1990-2006) elective SRAAA
- 30-day mortality: SR 1.8% IR (N=849) 1.2%
- Postoperative renal impairment
  - SR 17% IR 9.5% (p=.003)
  - New onset dialysis rare (0.6% SR, 0.8% IR)
  - Postop decline linked to preop RF, renal revasc
- Five year survival: SR 67% IR 69%

Meta analysis of 21 studies, N=1,256 pts, 1986-2008
- Perioperative mortality 2.9% (95% CI 1.8-4.6)
- Postoperative renal dysfunction in 0-39% (median 18%) of patients
- New onset dialysis 3.3%
- Wide range of techniques and definitions precludes specific assessment of optimal strategies such as clamp location, adjuncts

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Comparing mortality with open repair of complex and infrarenal aortic aneurysm

Virendra I. Patel, MD, Robert T. Lancaster, MD, Mark F. Conrad, MD, Glenn M. LaMuraglia, MD, Christopher J. Kwok, MD, David C. Brewster, MD, and Richard P. Cambria, MD, Boston, Mass

Table V. Multivariate predictors of operative mortality

Table VI. Summary of outcomes for complex aneurysm repair


Fenestrated EVAR for JRAA

• Early studies have shown favorable technical success and 30-day mortality (2-3%)
• F/u has been generally limited 1-2 years
• Proximal migration rates as high as 14% at one year have been reported
• Branch vessel patency >90%; renal impairment in up to 22%
• Approximately 20% reintervention rate within two years
• First FDA approved device (Cook) on US Market

Durability of open repair of juxtarenal abdominal aortic aneurysms

Shirling Tui, MD, Mark F. Conrad, MD, Virendra I. Patel, MD, Christopher J. Kwok, MD, Glenn M. LaMuraglia, MD, David C. Brewster, MD, and Richard P. Cambria, MD, Boston, Mass

• Single center (MGH) experience 2001-2007, N=199
• Left flank retroperitoneal approach in >90%
• Mean f/u 41 ± 28 months
• 30-day mortality 2.5%
• Perioperative renal insufficiency 8.5%, 2% dialysis
• Postop renal artery occlusion 3% of imaged arteries
• Five year survival 74%
• Graft-related complications 2% at 40 months
• Increased age, steroid use, preop renal insufficiency negative predictors of long term survival

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Fenestrated EVAR for JRAA

2.1% mortality
16%-30% renal impairment
13.5%-22.6% reinterventions
“Chimneys” and “Snorkels” for JRAA

- Modest sized single center series with limited follow-up (generally 1 year or less)
- 30 day mortality 0-12%
- Type I endoleak up to 12%
- Long term renal artery patency, sac behavior, endoleak rates unclear
- Should likely be reserved for unique anatomic subset of high-risk patients

Conclusions

- Contemporary results of open repair for juxta- and para-renal AAA from referral centers show mortality is comparable to infrarenal AAA, and durability of repair is excellent. However postoperative morbidity > open infrarenal repair.
- Increased age and baseline renal impairment are important risk factors for postoperative mortality
- Early results of fenestrated and snorkel EVAR suggest low mortality but substantial rates of endoleak and reintervention; learning curve appears significant and durability is unknown
- Younger (<75), average risk patients with PRAA should be offered open repair at experienced aortic centers as the current “gold standard” treatment option

Early experience with the snorkel technique for juxtarenal aneurysms

Objectives: The lack of readily available literature created an opportunity for creative deployment of early experience with “snorkels” or “snorkel” type cuffs in 2009 to August 2011. Our standardized protocol and monthly prospective analysis revealed results. Fifty-eight snorkel grafts were used for juxtarenal aneurysms. Mean aneurysm size was 64.8 mm. Grafts were deployed from an ipsilateral infrarenal neck or standard ENTEGRA (Gore, Flagstaff, AZ) and size from 33.5 to 60.0 mm. Thirty day mortality was 7.1%; one patient was reoperated 1 week postoperatively with pneumonia and died of sepsis; one patient died at 1 week of a right hemispheric stroke. Other major complications included pleural effusion, 7.4%; permanent hemodialysis, 3.6%; IIL or ILE injury requiring endovascular graft placement, 3.9%; and brachial plexus injury, 3.9%. Cardiovascular complications included self-limited arteriopathy (14.3%) and one non-Q wave myocardial infarction (3.0%), with all occurring without necessity of rescue intervention. Mean follow-up was 14.7 months (range, 3-23 months). One patient died of non-disease-related causes at 3 months (93.5% survival). Postoperative imaging revealed one renal endograft occlusion occurring at 3 months (98.3% overall primary patency). Seven (25%) early endoleaks were noted on the first follow-up computed tomography angiography: two type I, two type II, and two type III (25%), leading to one secondary intervention (3.5%) with bridging stent placement (type III). The small type I endoleaks and other type III endoleak resolved at the 6-month scan. Mean sac regression at the latest follow-up was 7.3 mm. No aneurysm has enlarged on postoperative imaging.

Conclusions: Early success with the snorkel technique for juxtarenal aneurysms has made it one procedure of choice for complex short-neck to no-neck EVAR. Although long-term follow-up is needed, the flexibility of the snorkel technique and lack of requirement for custom built devices may make this approach more attractive than branched or fenestrated grafts.

7.7% 30-d mortality
25% early endoleaks
No postop AAA enlargement