Late Renal Salvage after Complex Endovascular Aneurysm Repair (EVAR) Complicated by Renal Thrombosis

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Endovascular Abdominal Aneurysm Repair

- Endovascular abdominal aneurysm repair (EVAR) changed abdominal aortic aneurysm (AAA) treatment
- Initially, limited to AAAs with necks below visceral & renal arteries
Complex EVARs

- Surgeons now treat peri- & supra-renal aorta with more complex endografts
  - Accepting Shorter Proximal Aortic Necks
  - Fenestrations, branches, snorkels, & sandwiches
  - Anchor technology and Balloon Expandable stents

- Increased risk for embolization & acute occlusion of visceral & renal stents
  - Incidence after fenestrated/branched EVAR (0.6-5%)\(^1\)

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\(^1\) Mastracci et al. Durability of branches in branched and fenestrated endografts. JVS.2013; 57 (4):926-32
Renal Ischemia

- Management of acute renal ischemia not standardized
- Loss of renal function with warm ischemia time ~ 1-2 hours\(^1\)
- Reports of renal salvage after variable duration of renal ischemia (hours to months)\(^2\)
- Salvage by endovascular or open techniques

\(^2\) Delayed Hepato-spleno-renal bypass for renal salvage following malposition of an infrarenal aortic stent graft. J Endovasc Ther. 2010;17:326-31
Objective

- Evaluate outcomes of five cases of renal graft/artery occlusion following complex EVAR
Methods

• 5 patients in last 24 months
• Subacute renal graft occlusion following EVAR
• Time from renal ischemic symptoms to intervention
  - 5 to 30 days
• Renal perfusion assessed by nuclear perfusion scan or kidney enhancement (CTA)
Patient 2: FM

- 63 yo M underwent suprarenal fenestrated aneurysm repair (10/2012) with p-branch to both renals, fenestration to SMA
Patient 2: FM

- Presents 2 weeks postop with 5 days of left flank pain
- CT scan with evidence of acute ischemia of left renal branch stent kinking
Patient 2: FM

- Left renal Angiojet thrombectomy, thrombolysis, angioplasty, stent placement
Renal catheterization with thrombus
After TPA administration
After TPA & Angiojet
S/p Angioplasty & Stent Placement
Patient 2: FM

- Doing well with resolution of pain, normal Cr
- Patent stents on follow-up duplex
Patient 3: EL

- 71 yo F s/p left nephrectomy (donor 1982) s/p EVAR (2008) for infrarenal aneurysm
- Developed type 1a endoleak, underwent aortic cuff placement (1/2014) with right renal artery coverage
- Developed acute renal failure requiring dialysis
Patient 3: EL

- Presented for renal artery revascularization
  - 30 days on dialysis
- Renal artery angioplasty & stent placement, left brachial access
Patient 3: EL

- 9 month f/u: off dialysis, Cr 1.0, doing well
Results

• 4 of 5 patients we were able to restore renal perfusion

• 2 of 2 patients on dialysis were able to discontinue dialysis

• 1 of 5 patients had no significant decrease in renal function or increase in BP so did not undergo reintervention
Conclusion

- Delayed revascularization of renal ischemia after EVAR feasible even after up to 6 weeks of renal ischemia
- Consider in patients with residual renal function despite occlusion
- Further studies needed to determine long-term return of renal function in small patient population
Thank You