

Fenestrated EVAR: Techniques and Outcomes

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Objectives

- To become familiar with the commercially available fenestrated EVAR graft
- Discuss techniques to increase success
- Review available data to determine role of Fenestrated EVAR in caring for patient's with AAA

Disclosures

- I am a Proctor for COOK Medical for Fenestrated Graft training.

COOK Z-Fen

- Only commercially available endovascular graft approved for treatment of juxtarenal AAAs
- IFU is for infrarenal neck length of 4-10 mm
- Customized graft that is built to the patient's specific anatomy based off of CT scan reconstruction.

Z-Fen Configurations

- Three types of openings can be created to accommodate the anatomy.
- Large Fenestration, Small Fenestration and a Scallop
- Each has specific manufacturing limitations that need to be considered
- Three opening maximum and max of two of same type

Large fenestration

Diameters of 8, 10, or 12 mm

Distance from edge to center of fenestration must be ≥ 10 mm

May be used for SMA or large renal

Struts may cross opening therefore cannot place a stent through the large fenestration



Small Fenestration

6 mm width and either 6 or 8 mm height

Distance from proximal edge to center of fenestration must be ≥ 15 mm

Most common configuration for renal arteries

Stent should be placed through the fenestration to secure alignment



Scallop

Starts at top edge of graft

10 mm Width and Height
range of 6-12 mm

Most common SMA
configuration

Can be stented



Planning

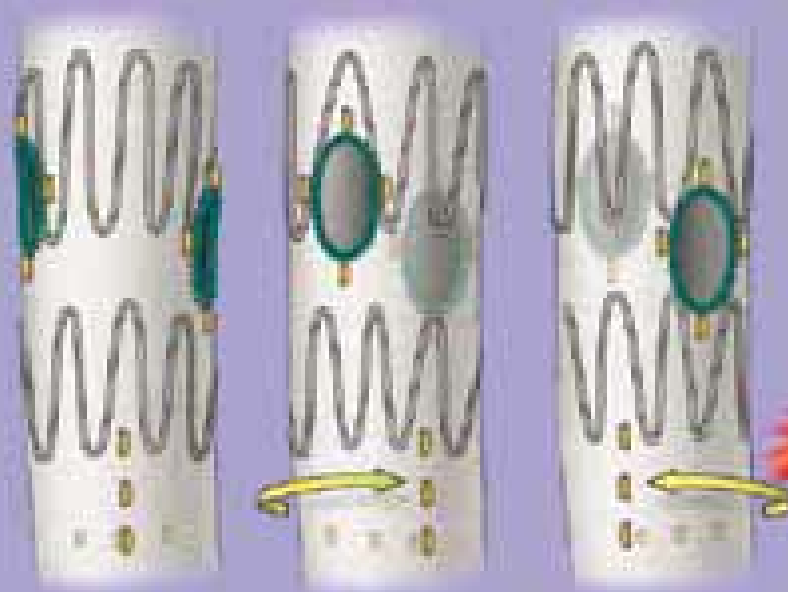
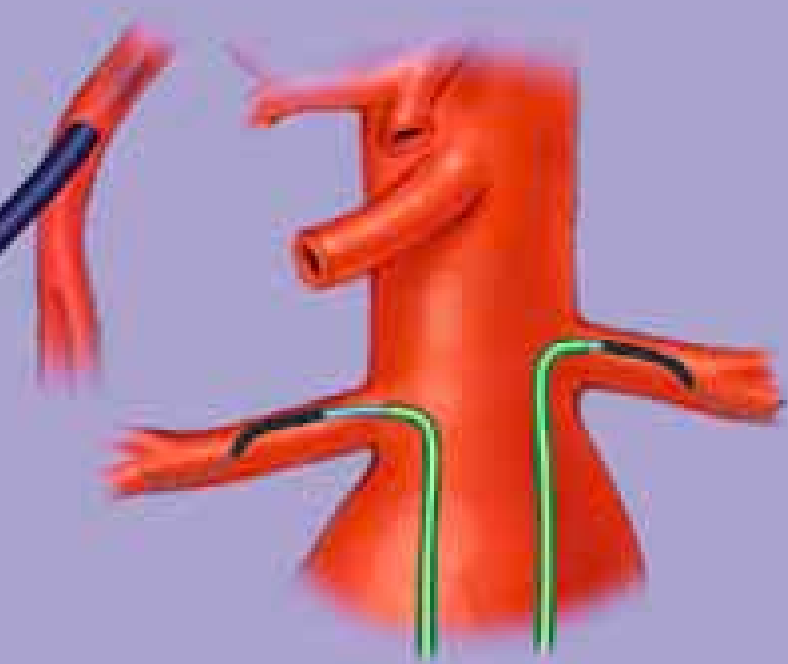
- Preoperative planning is the key to success for performing Fenestrated EVAR
- Patient selection is most important factor in avoiding complications and obtaining good outcomes
 - Pitfalls
 - Angulated necks, renal artery stenosis, small access vessels or calcified stenosis of iliacs or aorta

Planning

- Use Terarecon or other 3-D program to obtain measurements on the centerline for planning
- Most critical part procedure- if planned correctly, case should not require much more time, contrast or radiation than infrarenal EVAR.

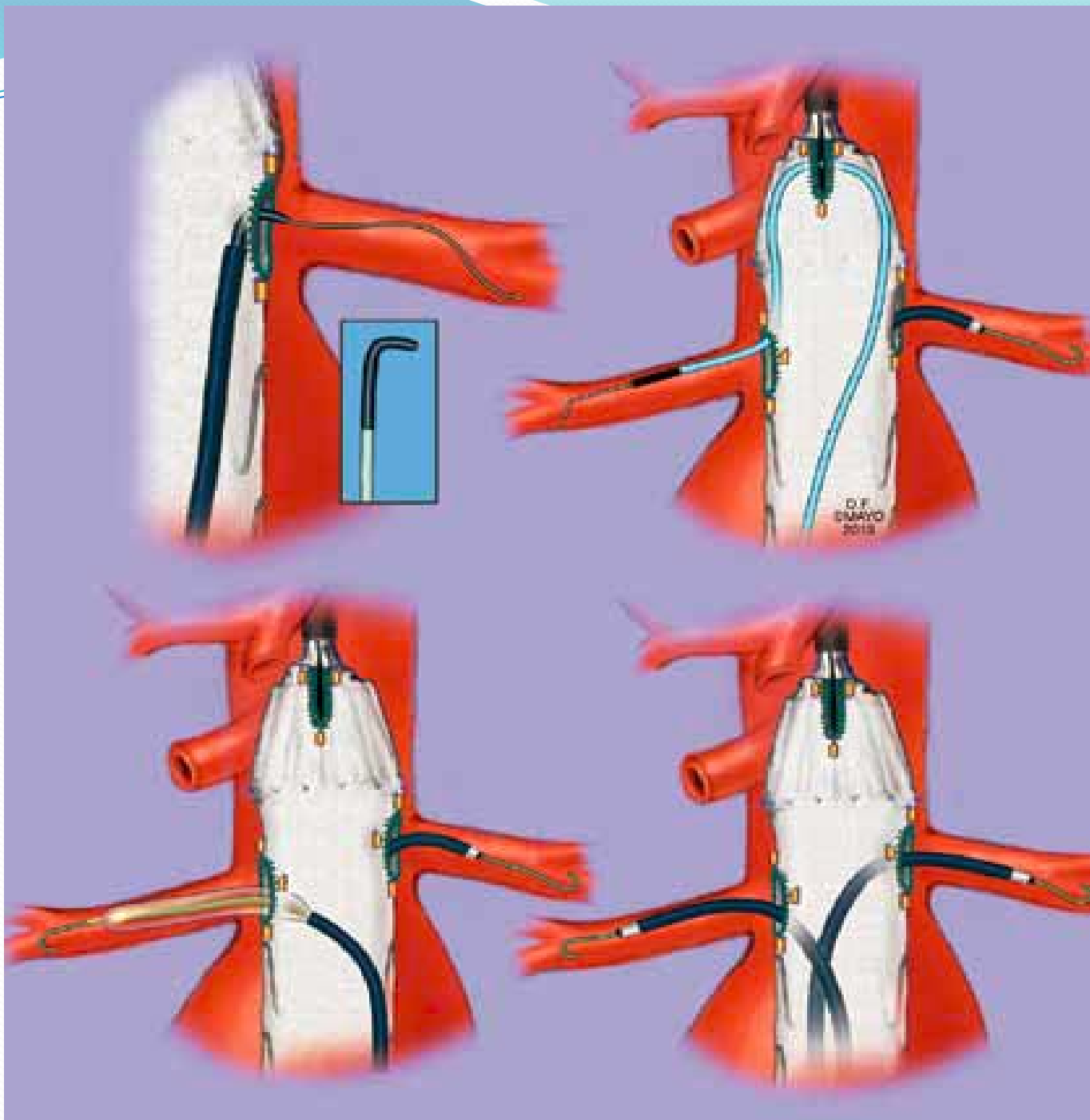
Technique

- Initial angiogram obtained to mark renals or precannulation of renals may be performed
- Proximal body (fenestrated portion) is advanced via one iliofemoral access and Deployed to open distal portion
- The proximal body is still attached to the cannula at top and bottom and has 20% reduction wire still in place. This allows rotation and proximal/distal movement of fenestrated graft for aligning target vessels.
- 20-22 Fr working sheath will be advanced via contralateral access into the proximal body if possible.



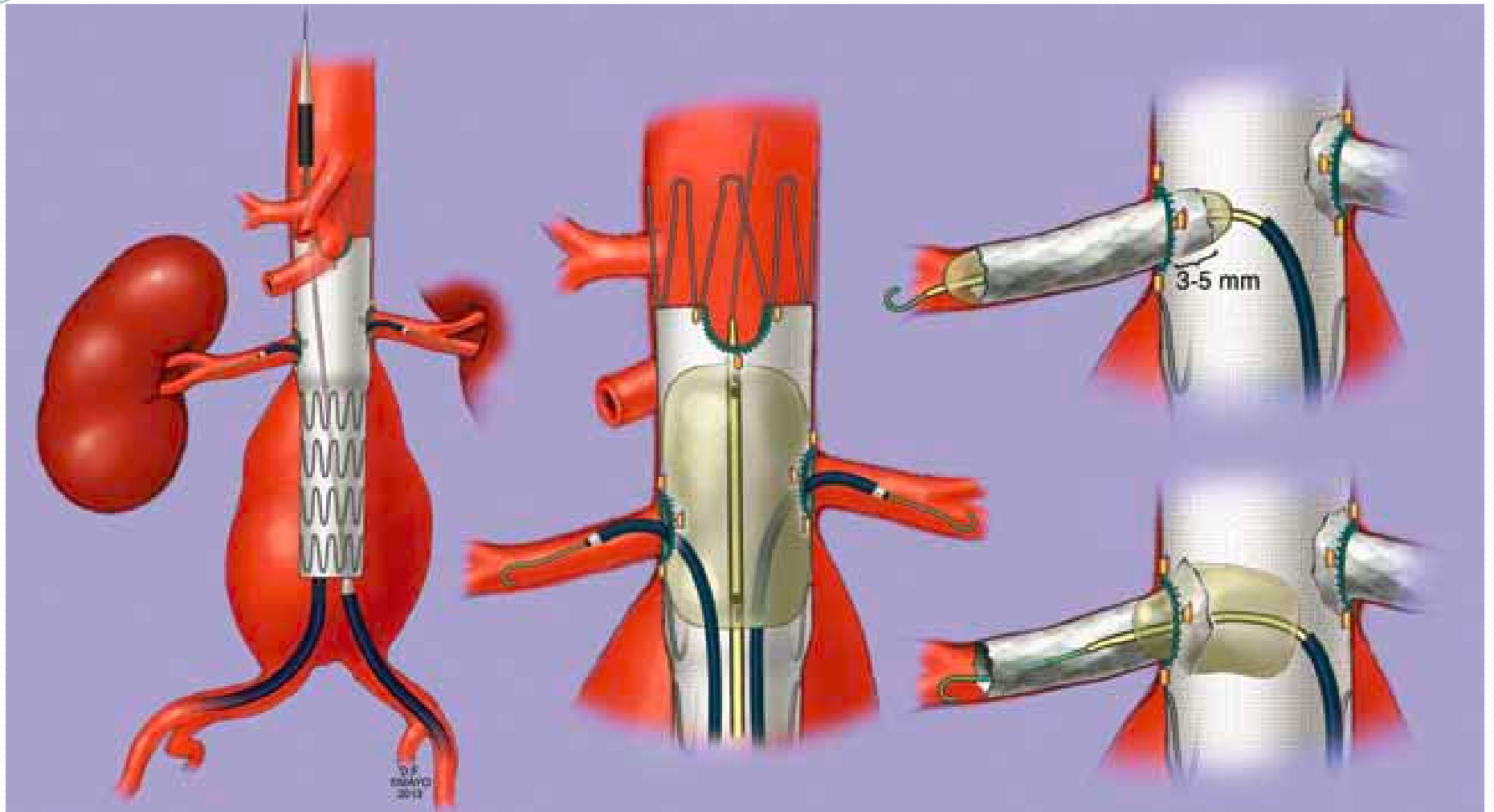
Technique

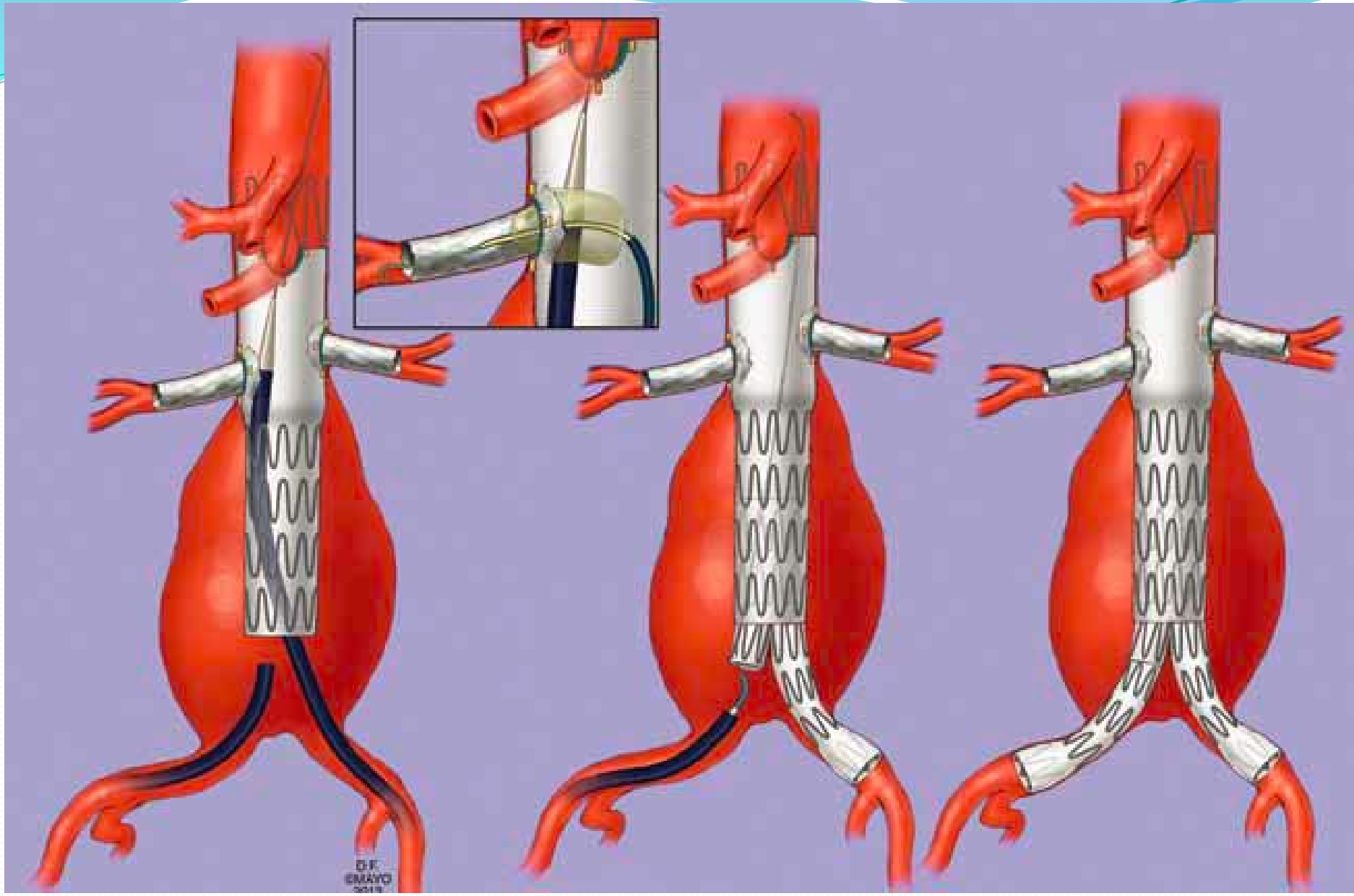
- The valve of the working sheath is punctured in opposite quadrants for introduction of 6 Fr renal sheaths.
- Target vessels are cannulated if stenting is planned and sheaths advanced through fenestration into target vessels.
- Stents are positioned and proximal body deployment is completed



Technique

- Proximal fixation site is molded with a balloon prior to stent deployment
- Stents are flared with 10 mm balloon
- Distal bifurcated body is deployed, contralateral gate is cannulated and contralateral limb deployed in same manner as a standard infrarenal EVAR





Technical Considerations

- Length of proximal body
 - Plan length so that contralateral gate of the distal body extends outside of proximal body to make cannulation easier
- “Universal main body” vs customized ipsilateral iliac limb
 - 3 vs 4 piece graft
 - More flexibility in delivering device if complicated anatomy
- Pre-cannulation vs angiogram
 - Initial run of 8-10 cc contrast is usually adequate to see renals
- Placement of working sheath into proximal body
 - Provides stability and do not have to cannulate separately with individual 6 Fr sheaths.

Technical Considerations

- Proximal seal zone
 - Balloon prior to deployment of covered stents for renals
 - Less likely to damage stents
- Covered Stent vs bare metal stent
 - Most cases use balloon expandable covered stents
 - If early renal branch consider bare metal stent

Our Experience

- Between September 2012 and December 2014 we performed 23 Z-Fen Grafts
- 19 males and 4 females
- Most common configuration was 1 scallop and 2 small fenestrations
- Average contrast was 108 cc/ case (range 42- 229 cc/case)
- Average flouro time: 61 minutes

Results

- All procedures were completed as planned
- One patient developed left leg ischemia in recovery room requiring thrombectomy, iliac stent and CFA endarterectomy
- Three deaths (13%)
 - 10 weeks post implant from COPD/CHF exacerbation
 - 6 weeks post implant from sepsis and rupture of GDA pseudoaneurysm
 - 30 months post implant from cardiac event

Results

- Three Endoleaks (13%)
 - All type 2 and no change in AAA size
 - No re-interventions to date
- Three renal artery occlusions (13%)
 - All occurred between 6 months and 1 year after implant
 - One month CT scans were unremarkable

Postoperative Protocol

- All patients started on Clopidogrel 75 mg daily if no contraindication
- Follow-up CTA in 1 month
- Renal duplex ultrasound at 6 months
- FEVAR duplex ultrasound at 1 year and each year thereafter

FEVAR vs Open Repair

- Recent published reports comparing FEVAR and open repairs suggest that FEVAR and open repair have similar short-term results but FEVAR was associated with higher rates of secondary intervention, renal impairment during follow-up and lower long term survival.
- May reflect some degree of selection bias as FEVAR patients may have been denied open surgery

Conclusion

- Currently available Fenestrated grafts can be successfully used to treat juxtarenal AAAs but should be reserved for high-risk operative patients.
- Renal artery stent patency must be followed closely