Abdominal aortic aneurysm: basics of endovascular repair

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Aortic aneurysm

- Pathological dilatation of the normal aortic lumen involving one or several segments
- A permanent localized dilatation having a diameter at least 2 times the normal diameter of that given segment
Aneurysm classification

Fusiform

Saccular
Rupture risk of untreated aneurysms

- 5 - 5.9 cm: 25%
- 6 - 7 cm: 35%
- > 7 cm: 75%

5 Year Risk of Rupture of Untreated Aneurysm

Aneurysm Size
Mortality

Diameter AAA [cm]

- 4.0
- 4.5
- 5.0
- 5.5
- 6.0
- 6.5
- 7.0

Mortality

- 15%
- 10%
- 5%

Operative mortality

UK small aneurysm trial, NEJM 2002; 346:1445
Indications for treatment

- Diameter >5.5 cm (males), >5 cm (females)
- Diameter infrarenal aorta 2x suprarenal aorta
- Growth of >0.5 cm/ 6 months
- Symptomatic/ruptured aneurysms
Treatment options

• Open surgical repair
• Endovascular aneurysm repair
EVAR

• AAA diagnosis
  – Ultrasound
  – CT
  – MRI

• Evaluation feasibility EVAR
  – CT
  – MRI
  – (Calibrated angiography)
Stent graft

- Suprarenal fixation (‘free-flow’)
- Infrarenal fixation
- Bifurcated/tube/AUI
Advantages

• Procedure time ↓
• Blood loss ↓
• Length of stay ICU ↓
• Length of stay hospital ↓
• Quality of life ↑
• Operative mortality ↓

Prinssen et al, NEJM 2004;351:1607-1618
Greenhalgh et al, Lancet 2004;364:843-848
Advantages
Criteria for endovascular repair

• General patient profile
  – Cardiac function
  – Renal and pulmonary function
  – Hematological and biochemical profile
  – Medical history (previous surgery)

• Morphological criteria

• Planned and possible additional procedures
  – Additional angioplasty
  – Iliac vessel reconstruction
  – Distal procedures
  – Pre- or peroperative embolisation
Evaluation feasibility endovascular procedure

- CTA
- (calibrated angiography)
- MRA
Evaluation AAA

- Renal arteries
- Proximal and distal neck ("anastomoses")
- Hypogastric arteries
- Access vessels
- Tortuosity, thrombus, calcification etc.
Evaluation AAA

- Diameter and length anastomotic area (length proximal neck >10 mm, distal neck 15 mm)
- Total length of aorta and iliac arteries to be covered
- Position aortic and iliac bifurcation
- Choice of stentgraft (bifurcated, tube, AUI); 15-20% oversizing media-media diameter
Axial slices

- Not always perpendicular to vessel axis
- Due to tortuosity length underestimated
Diameter measurement
Diameter measurement
Diameter measurement
Length is underestimated in axial CT as well as with marker catheter.
Length measurement

“Centre Line”-calculation
Procedure

• Anesthesia
  – Local
  – Regional (epidural)
  – General
• Arteriotomy/puncture CFA
• Placement endograft
Material—the requisites

- 5F introducer (x2)
- Diagnostic catheters
  - Flush
  - MP
  - Cobra
  - Simmons
- Snare
- Angioplasty balloons
- Renal stents (bail-out)
Procedure
Procedure
Procedure
Procedure
Procedure

Insertion stiff guidewire
Procedure
Placement endograft
Locating renal arteries
Locating renal arteries
Optimizing angulation C-arm
Optimizing angulation C-arm

Lateral
Procedure
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