

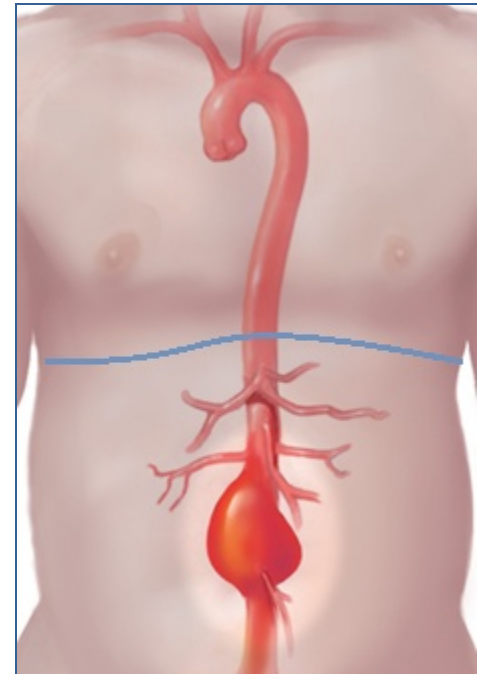
Branched and Fenestrated Endograft Repair Of Aortic Aneurysms

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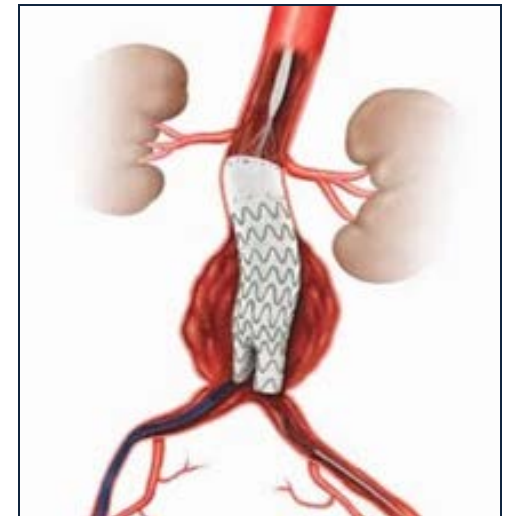
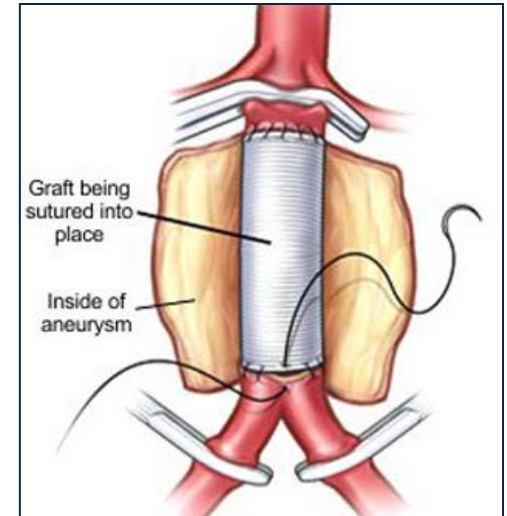
Abdominal Aortic Aneurysms

- Abdominal aortic aneurysm is dilation of the abdominal aorta greater than 1.5 times its normal diameter.
- Ruptured aortic aneurysms (mostly abdominal) are estimated to cause 15,000 deaths each year in the US.
- While some AAAs are small and stable, others present a higher risk of rupture.
- Surgical intervention is performed to avoid the risk of spontaneous rupture and death.



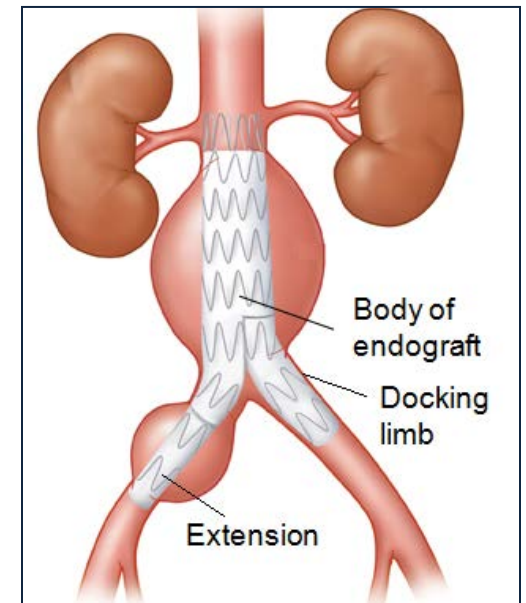
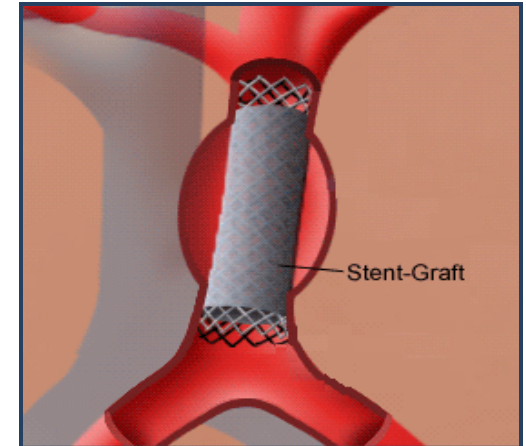
AAA Aneurysm Repair

- Open Repair
- Open repair of abdominal aortic aneurysms has been the historic gold standard.
- The aneurysmal segment is excised and replaced by a graft.
- Endovascular Repair
- An endograft (stent-graft) is inserted via the femoral artery, advanced into the aorta, and deployed under fluoroscopy.
- The endograft lines the diseased segment, excluding the aneurysm from blood flow.
- “Endovascular aneurysm repair” is often abbreviated EVAR.



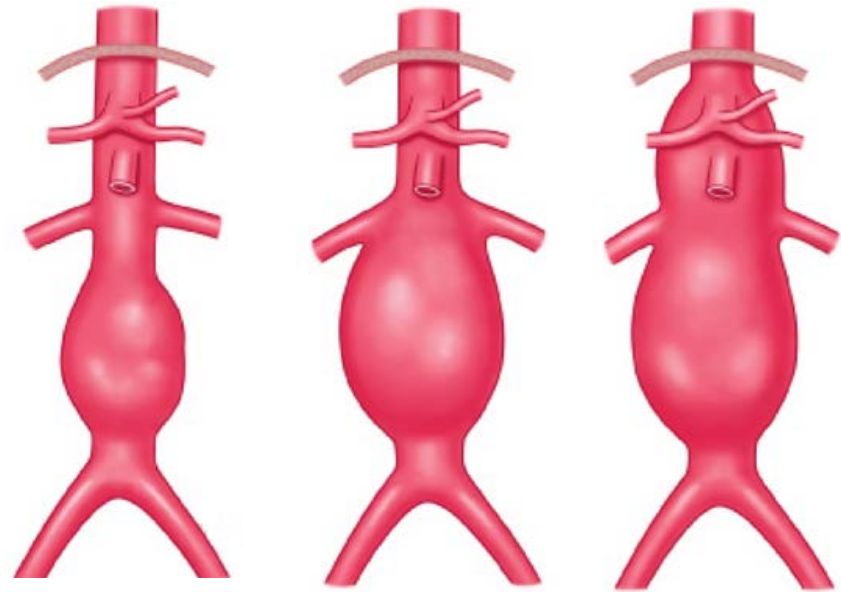
Types of Endografts - 1

- Tube Endografts
- The simplest type of endograft is a straight tube, used to repair an isolated abdominal aortic aneurysm.
- Bifurcated Endografts
- Most EVAR involves adjacent vessels, particularly below the aortic bifurcation.
- Many endografts are bifurcated with distal (“docking”) limbs or extensions that reach into the left and right common iliac arteries.
- Additional distal extensions can also be placed.



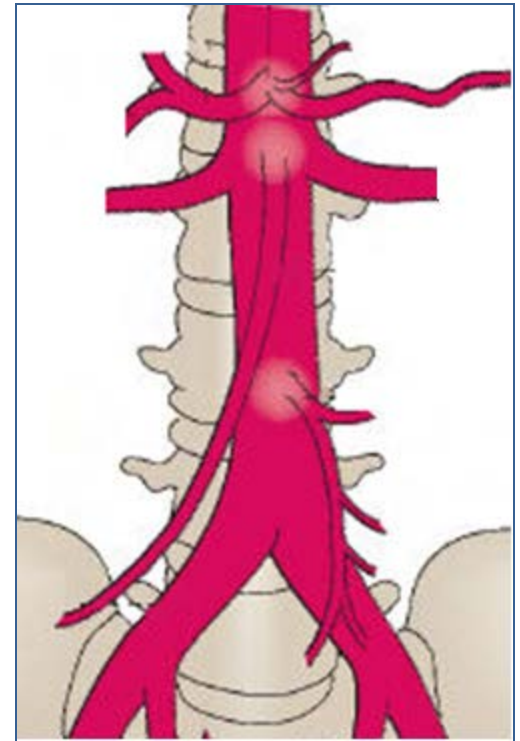
Infrarenal, Juxtarenal, and Suprarenal Aneurysms

- The location of the AAA in relation to the renal arteries creates issues for use of EVAR, because it signifies whether other arteries branching off the aorta are involved with the aneurysm.
- *Impinging on or covering the origins of the renal arteries, or other arteries off the aorta, prevents blood flow to critical organs.*



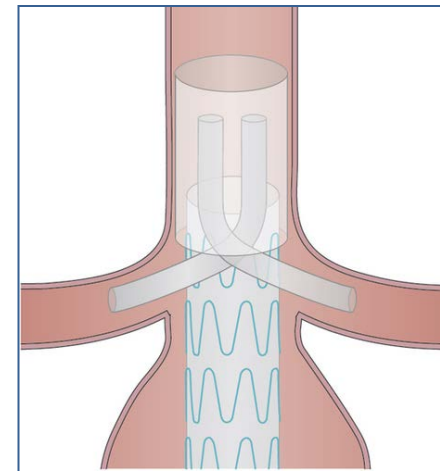
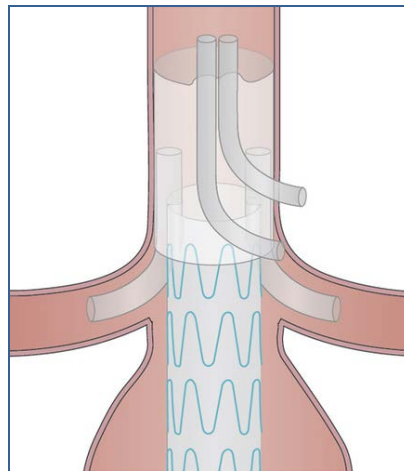
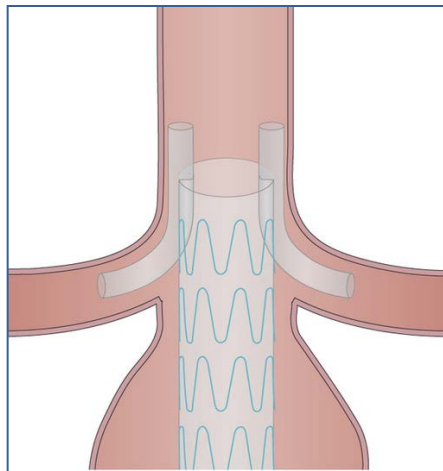
Key Aortic Branch Arteries

- There are four key branch arteries where blood flow must be preserved.
- Right renal artery
- Left renal artery
- Superior mesenteric artery
- Celiac trunk
 - (giving rise to the common hepatic, left gastric, and splenic arteries)
- The inferior mesenteric artery also branches off the abdominal aorta, but it has been established that this vessel can be covered.



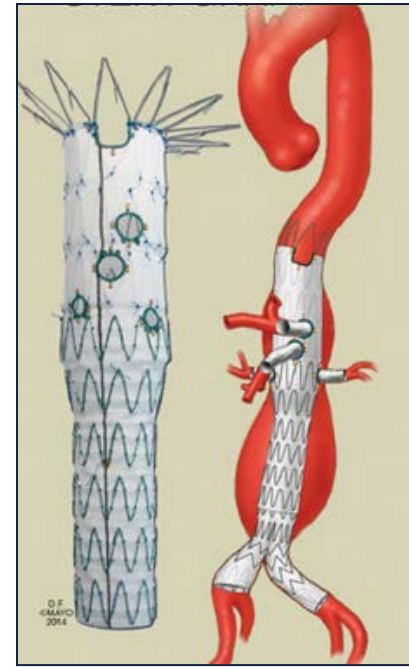
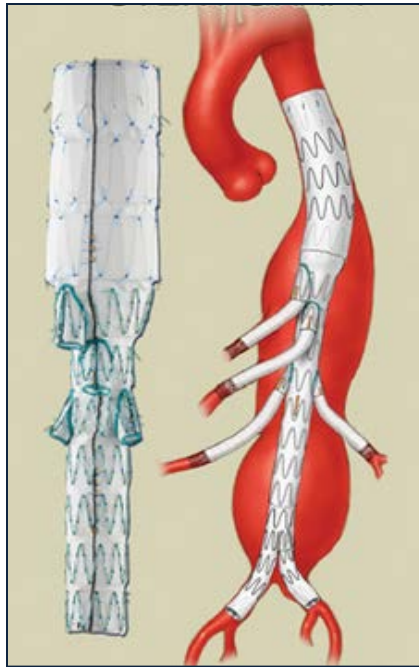
Physician-Modified Endografts

- To preserve blood flow to arteries branching off the aorta, some physicians have employed endografts with stent configurations of their own creation.
- In chimney and snorkel configurations, stents to the branches are placed *outside* the aortic endograft.
- In sandwich configurations, stents to the branches are “sandwiched” between two aortic endografts.



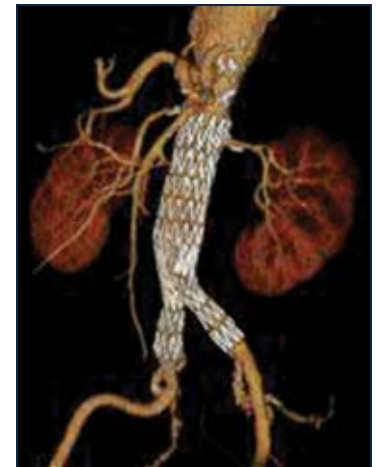
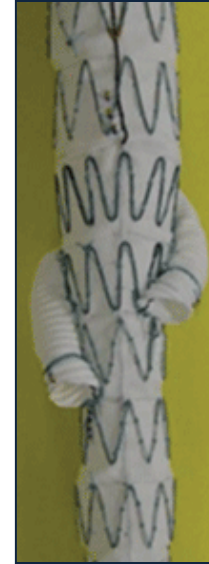
Types of Endografts - 2

- Branched and fenestrated endografts were developed to allow for preservation of blood flow to the renal arteries and other arteries branching off the aorta.



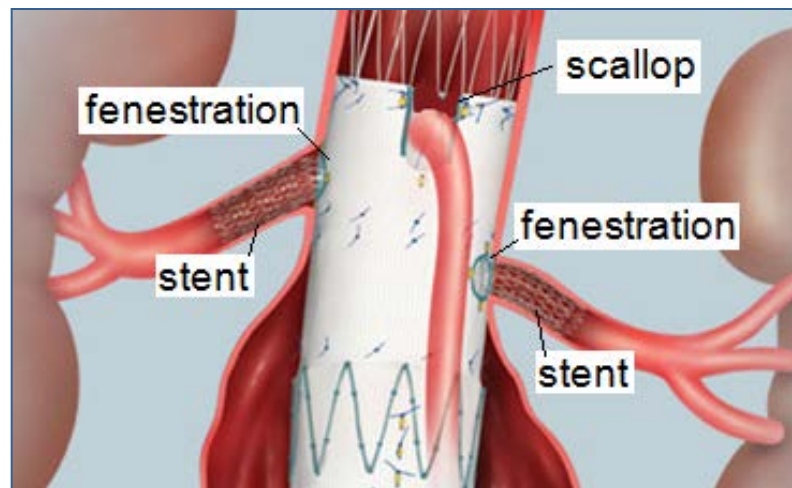
Branched Endografts

- Branched endografts have “nubs” or branches that extend toward the arteries branching off the aorta.
- Covered stents are then placed within the nubs and into the branch arteries.
- Use of a branched endograft with covered stents allows blood flow from the aorta into the branch vessels to be preserved.
- Branched endografts which preserve blood flow to side arteries of the aorta can also be bifurcated at the aortic bifurcation.



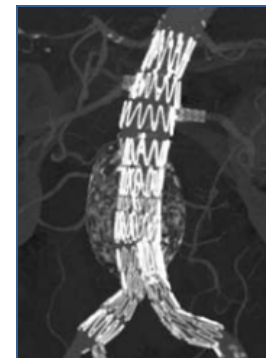
Fenestrated Endografts

- Fenestrated endografts have openings or windows in their coverings.
- Covered stents are placed from the aorta through the fenestrations and into the branch arteries to preserve blood flow.
- Scallops, a variation on fenestration, are U-shaped cutouts in the proximal end of the endograft which prevent the endograft from impinging on a branch vessel.
- Fenestrated endografts can also be bifurcated.



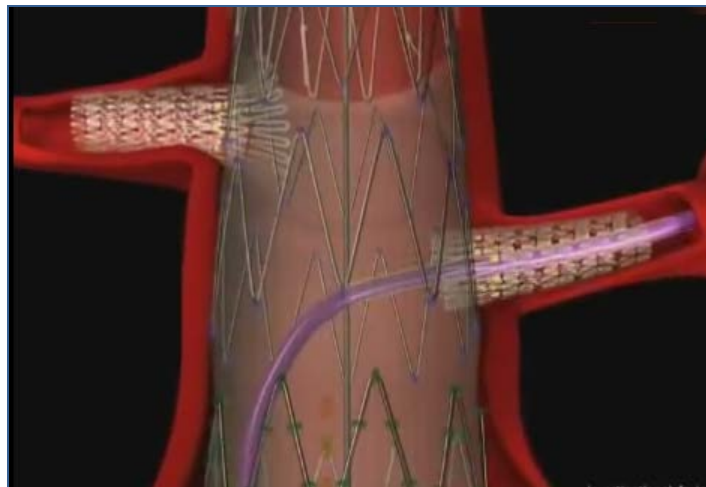
FEVAR Procedure

- While fenestrated EVAR (FEVAR) and standard EVAR share some procedural steps, FEVAR is more complex and takes substantially more time.
- The femoral artery is accessed bilaterally, followed by bilateral catheterization of the aorta.
- The main body of the FEVAR endograft is deployed in the diseased segment of the aorta, *requiring precise alignment of the fenestrations and scallops with the origins of the branch arteries.*
- *Branch vessels are catheterized and covered stents are placed in each.*
- Distal limbs and other components are deployed, and the endograft is sealed.



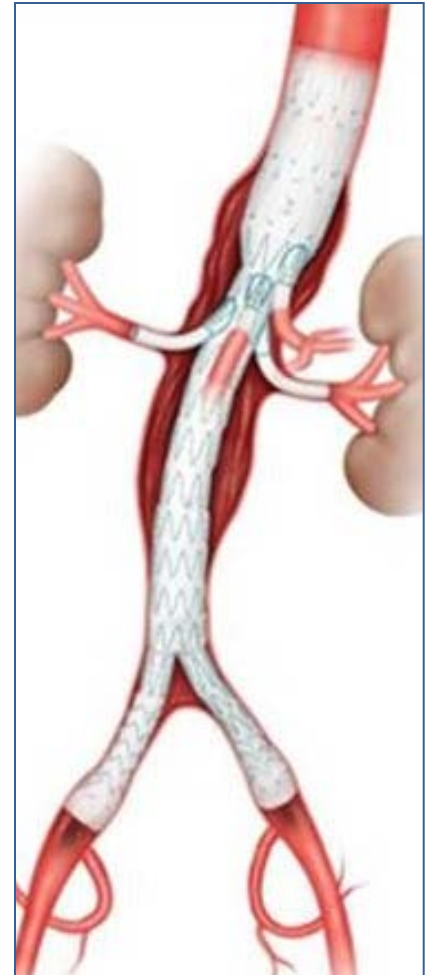
Use of Covered Stents

- Covered stents are used with both branched and fenestrated endografts to preserve blood flow to the arteries branching off the aorta.
- Clinically, placement of these stents does not equate to vessel dilation. In fact, it is the opposite of angioplasty.
- The objective of angioplasty is to *re-open* an occluded vessel.
- In EVAR, the objective of placing stents is to preserve blood flow by *preventing* vessels from becoming occluded.



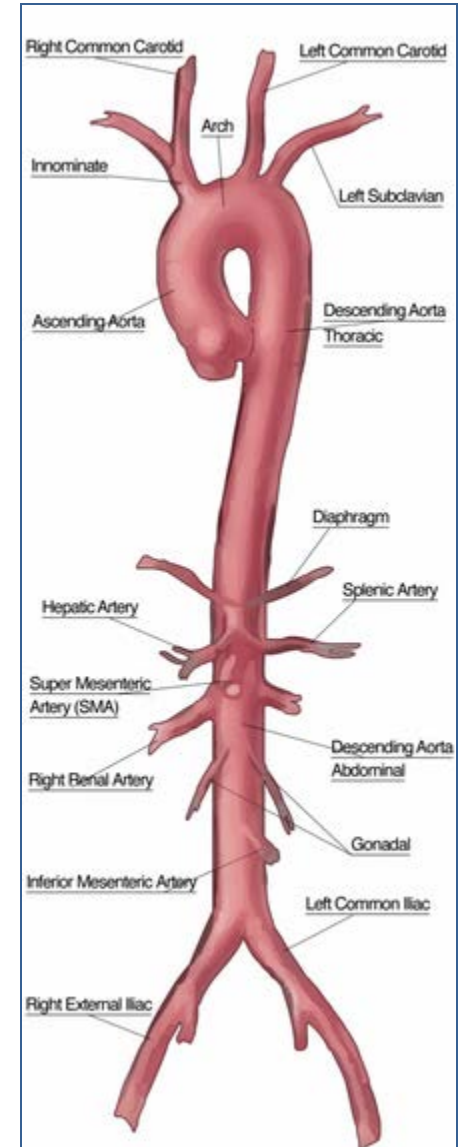
Crossing Anatomic Boundaries

- Some endografts cross anatomic boundaries into other segments of the aorta. This can be for two reasons, one therapeutic and the other procedural.
- Nature of Aneurysm
- The aneurysm may extend into an adjacent anatomic site, eg. aorto-iliac aneurysm, thoracoabdominal aneurysm.
- Landing Zone
- The “landing zone” is a segment of healthy tissue, without aneurysm, into which the endograft must extend to form a proper seal.



What's Next ...

- Fenestrated endografts are currently approved for use in the abdominal aorta.
- The use of branched or fenestrated endografts for other anatomic sites is under active development or in clinical trials.
- On successful completion of trials, it will be possible to perform EVAR of the entire aorta, from the aortic valve to the distal bifurcation, and on into the iliac arteries.



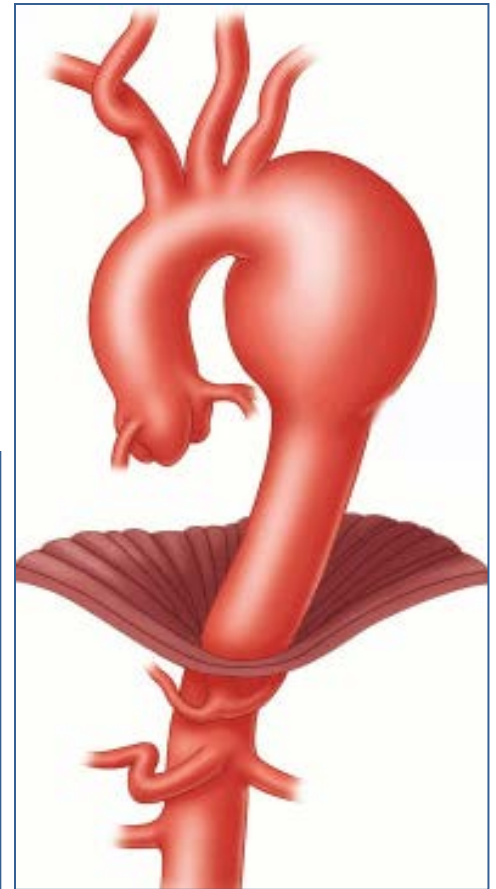
Branched Iliac Endografts

- Standard EVAR is currently performed in the iliac arteries for isolated aneurysms.
- The internal iliac (hypogastric) artery branches off the common iliac artery, which then transitions into the external iliac artery.
- As with the aorta, this creates issues in preserving blood flow to the internal iliac when performing EVAR.
- Branched endografts designed specifically for the iliac arteries are currently in clinical trials.
- Use of branched or fenestrated endografts is unlikely in lower vessels beyond the common iliac arteries, due to the nature of the vessels and the availability of other treatments.



Branched or Fenestrated Thoracic Aorta Endografts

- Standard EVAR is currently performed in the thoracic aorta, but only in the relatively straight descending thoracic aorta.
- In the aortic arch, the precerebral arteries branch off to supply the brain, making preservation of blood flow critical.
- Branched and fenestrated endografts designed specifically for thoracic aorta are under development.



Questions?

