

Endovascular Aortic Sealing of Infrarenal Abdominal Aortic Aneurysms with a Sac-anchoring Endograft

Endovascular aortic sealing (EVAS) is an innovative method to exclude infrarenal abdominal aortic aneurysms. The concept of EVAS is based on sealing of the aneurysm by polymer filling of endobags that surround the EVAS stents, which provide flow lumens to both legs (cover image). Polymer cures in 3 to 5 minutes, thereby sac-anchoring the device in the aneurysm flow lumen, and by sealing the entire aneurysm flow lumen type I and II endoleaks are potentially avoided.

Filling of the endobags is pressure guided, aiming at an intended pressure of 180 mm Hg. A prefill with saline is performed to estimate fill volume of the endobags. If digital subtraction angiography (DSA) shows no endoleaks, the solution is aspirated and the endobags are filled with a similar volume of polymer, again until a pressure of 180 mm Hg is reached. Additionally, pre-procedural calculations of aneurysm flow lumen are performed to estimate the number of polymer cartridges needed, which have to be thawed prior to the procedure, requiring 15 minutes before ready to use.

Intraoperative DSA length measurements are performed to determine stent lengths. A calibration catheter is advanced over a stiff guide wire to compensate for eventual straightening of tortuous anatomy by the stents postprocedural. Additionally, preoperative length measurements of aortoiliac length are performed to estimate a range of device lengths that will be ordered prior to the procedure.

This thesis consists of three parts, including changes in aortoiliac anatomy post-EVAS, validation of preoperative calculations of aortic flow lumen volume to estimate prefill of the endobags and validation of preoperative aortoiliac length measurements to estimate stent lengths.

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