Intra-aneurysm Sac Pressure in Patients with Unchanged AAA Diameter after EVAR


Objective: To study intra-aneurysm sac pressure and subsequent abdominal aortic aneurysm (AAA) diameter changes in patients without endoleaks that remain unchanged in AAA diameter more than 1 year after endovascular aneurysm repair (EVAR).

Methods: A total of 23 patients underwent direct intra-aneurysm sac pressure (DSP) measurements 16 months (IQR: 14–35 months) after EVAR. Tip-pressure sensors were used through translumbar AAA puncture. Mean pressure index (MPI) was calculated as the percentage of mean intra-aneurysm pressure relative to the simultaneous mean intra-aortic pressure.

Results: In 18 patients, no fluid was obtained upon AAA puncture (group A). In five patients, fluid was obtained (group B). In group A, follow-up continued for 29 months (IQR: 15–35 months) after DSP; five AAA shrank, 10 remained unchanged and three expanded (MPIs of 26% (IQR: 18–42%), 28% (IQR: 20–48%) and 63% (IQR: 47–83%) and intra-sac pulse pressures of 3 mmHg (IQR: 0–5 mmHg), 4 mmHg (IQR: 2–8 mmHg) and 12 mmHg (IQR: 6–20 mmHg), respectively, for the three subgroups). MPI and intra-sac pulse pressures were higher in AAs that subsequently expanded (P = 0.073 and 0.017, respectively). MPI and pulse pressure correlated with total diameter change (r = 0.49, P = 0.039 and r = 0.39, P = 0.109, respectively). Pulse pressure had a greater influence than MPI on diameter change (R² = 0.346, P = 0.041, beta standardised coefficient of 0.121 for MPI and 0.502 for pulse pressure). Similar results were obtained when relative diameter changes were used (r = 0.55, P < 0.001).

Conclusions: AAA without endoleak and unchanged diameter more than 1 year after EVAR will often continue unchanged. Expansion can eventually occur in the absence of intra-sac fluid accumulation and is associated with higher and more pulsatile intrasac pressure. However, in patients with intra-sac fluid, expansion can occur with low intra-sac pressures.