INVITED COMMENTARY

Simplifying Post-EVAR Surveillance

J.A. van der Vliet a,*, L.J. Schultze Kool b, F. van Hoek a

a Department of Vascular Surgery, Radboud University Nijmegen Medical Center, POB 9101, 6500 HB Nijmegen, The Netherlands
b Department of Interventional Radiology, Radboud University Nijmegen Medical Center, POB 9101, 6500 HB Nijmegen, The Netherlands

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Surveillance after endovascular aneurysm repair (EVAR) is costly and a burden for the patient. Imaging is performed to detect stent-graft failure from endoleak or haemodynamic obstruction. Presently, computed tomographic angiography (CTA) is considered the gold standard for post-EVAR surveillance, as it has the potential to visualise most threats to stent-graft durability, such as migration, kinking, structural disintegration, endoleaks and aneurysm growth. Serious drawbacks of serial CTA, apart from its costs, are the risks of contrast-induced nephropathy and carcinogenesis from cumulative radiation exposure. Therefore, less invasive surveillance imaging techniques have been introduced, although none of these individually offers the ability to visualise all of the above signs of stent-graft failure.

In the present observational study, Harrison and co-workers retrospectively investigated the results of a change in EVAR follow-up, replacing their original extensive protocol of serial, single-arterial-phase CTA, duplex ultrasound (DUS) and plain abdominal radiography (AXR) by the combination of DUS and AXR, with CTA performed only when problems were identified or DUS was not diagnostic.1 After a 4-year-period with 412 annual imaging sets in a series of 194 patients, the cumulative freedom of CTA was 65%. Eighteen out of 30 abnormalities found with the DUS–AXR combination were reconfirmed by CTA, resulting in a positive predictive value of 60%. In absence of a control group, sensitivity of the new regimen could not be determined and, even more important, the negative predictive value remains obscure. There was one aneurysm-related death from late rupture in a patient awaiting conversion to open repair. The authors calculated a substantial mean reduction in radiation exposure of 45 mSV at 3 years and a mean annual cost reduction of €223,-. However, should the comparison have been made with a more common protocol of only CTA and AXR, 90% of the savings would have exhausted.

Others have also compared DUS with CTA in EVAR surveillance with similar results. With the findings at the time of secondary intervention as a reference, Schmieder et al. found in their retrospective study similar outcomes as the present study and concluded that DUS was better in identifying the type of endoleak.2 The use of contrast-enhanced DUS may very well increase its sensitivity over that of CTA, but the usefulness in clinical practice of this more invasive approach has yet to be established.3,4

Magnetic resonance angiography (MRA) shares numerous attributes with CTA for stent-graft surveillance, including assessment of luminal patency, device positioning and endoleak detection.5 It has significant limitations with potential magnet-induced metallic heating or motion (cardiac pacemakers) and imaging artefacts within ferromagnetic metallic (stainless steel) stents. In addition, the gadolinium-based contrast media are associated with development of nephrogenic systemic fibrosis in patients with renal insufficiency. Wireless pressure sensors implanted during EVAR provide the ability to serially measure aneurysm sac pressure or pulsatility and may detect stent-graft failure from endoleak, although sufficient clinical data are lacking.6
In the quest for a cost-effective post-EVAR surveillance protocol with reduced radiation exposure, other options remain as well. Considering the fact that late, secondary interventions for endoleak are only performed in the presence of aneurysm sac enlargement, screening for aneurysm growth may be sufficient. This is possible with serial, plain, thick-sliced (5-mm), non-contrast CT scanning alone. Alternatively, only DUS would suffice, which also provides the possibility to detect haemodynamic obstructions.

References


