**British Medical Ultrasound Society**

**Title:** The use of SMI in surveillance of endovascular aneurysm repair (EVAR)

**Abstract**

**Background and Purpose**

EVAR surveillance is recommended for the detection of endoleaks or aneurysm growth, usually using a combination of colour Doppler ultrasound (CDUS) and computed tomography angiography (CTA). Questions have been raised regarding the sensitivity of CDUS and contrast-enhanced ultrasound (CEUS) has been proposed as an alternative. CEUS is more sensitive than CDUS, but more invasive, costly and carries the potential risks of adverse reactions. SMI (Superb Microvascular Imaging) is a novel imaging technique developed by Toshiba Medical Corporation which demonstrates improved spatial resolution and low flow capabilities. In this audit, the applicability of SMI in an EVAR surveillance programme was tested.

**Methods**

A retrospective analysis was conducted on 136 patients comparing the success rate in diagnosing endoleaks with CTA, CDUS and SMI. The maximum diameter of the aneurysm sac was measured and the presence of endoleaks on CDUS, SMI and contemporaneous CTA scans was analysed.

**Results**

Of the 136 patients, 36 also had CTA. 18 and 17 patients respectively showed no endoleak on ultrasound (CDUS & SMI) and CTA. Ultrasound failed to demonstrate 1 endoleak compared with CTA. 18 patients were found to have an endoleak on ultrasound (13%). Further analysis showed CDUS alone failed to demonstrate 8 of these endoleaks. Of the 18 patients displaying an endoleak on SMI, 12 proceeded to CTA with only 8 demonstrating an endoleak. Therefore, SMI detected 4 more endoleaks than CTA. In addition, 2 of these 4 patients with SMI endoleaks had an expanding sac size.

**Conclusions**

SMI outperformed CDUS and was comparable to CTA for the detection of endoleaks. SMI is a non-invasive technique, with additional cost and safety benefits. The sample size was limited but agrees with trends found with CEUS and CTA in the literature.