Role of Contrast Enhanced Ultrasound in the follow-up of EVAR with branched and fenestrated endografts.

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Endovascular repair has emerged as an alternative for patients with abdominal aortic aneurysm who are considered to be at high risk for conventional open repair. Although the method's safety and efficacy have been established, challenging anatomy and especially inadequate landing zones create limitations to its application. Stent grafts, fenestrated and branched, were developed to overpass these anatomic restrictions.
Fenestrated endovascular aortic aneurysm repair (EVAR) involves insertion of a custom-made device with fenestrations and branches to accommodate the visceral branches of the aorta. Each additional stent graft placed increases the number of overlapping components and therefore the risk of a junctional leak. The presence of a junctional leak, known as a type III endoleak, confers a continued risk of aortic rupture due to exposure of the aneurysm sac to systemic arterial pressure. Computed tomographic angiography (CTA) has shown high sensitivity and specificity in the detection of endoleaks and is routinely used to follow up patients who have undergone conventional stent graft placement. Despite high rates of endoleak detection, limited data exist regarding use in the characterization of endoleak as a specific type.Contrast-enhanced Ultrasound (CEUS) is investigated as a novel, noninvasive technique that can be employed to characterize endoleak type and consequently prescribe appropriate treatment.
We conducted a prospective comparative study for the evaluation of diagnostic accuracy between Color- Duplex Ultrasound (DUS), Contrast-enhanced Ultrasound (CEUS) and Contrast-enhanced Computed Tomography (CTA) in detecting changes in the abdominal aortic aneurysm (AAA) size and endoleaks during follow-up after EVAR. 67 patients were enrolled in the study of which 24 had fenestrated or branched endografts. Mean follow-up period was 18 months with DUS, CEUS and CTA imaging at 1, 6, 12 months and yearly after EVAR. 3 type II, 1 type I and 1 type III endoleaks were diagnosed in the case of fenestrated/branched endografts. CTA failed to determine the type of endoleak in 1 case, describing it as a possible type II endoleak. CEUS diagnosed this endoleak as a low flow type I endoleak.
In conclusion CEUS is effective in the identification of the type of endoleak, the delineation of the vessel involved, and the hemodynamic information not available with any other testing method.

Keywords: EVAR, branched, fenestrated endograft, CEUS

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