Contrast-Enhanced Ultrasound as a Novel Alternative in the Detection and Characterization of Endoleaks Post-EVAR: Final Results

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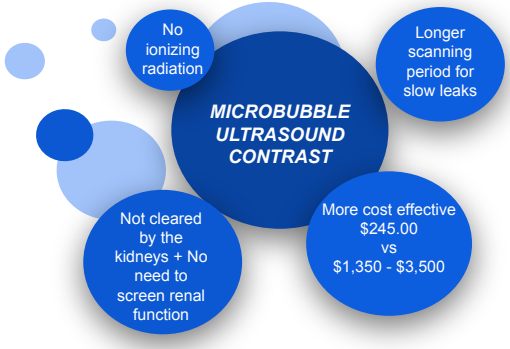
PURPOSE

- A large prevalence of cardiovascular disease (e.g. Abdominal Aortic Aneurysm) require Endovascular Aneurysm Repair (EVAR) in patients with chronic kidney disease and these patients would benefit from radiologic evaluation that would preclude the need for renally excreted contrast.
- Often, patients with underlying renal disease undergo monitoring with serial non-contrast Computed Tomography (CT) or non-contrast Ultrasound (US), which provides information on only the overall size of the aneurysm sac and does not demonstrate the presence of an endoleak, its type, or its location.
- Contrast-Enhanced Ultrasound (CEUS) could be used as a primary or complementary modality for endoleak detection or surveillance as CEUS is primarily excreted by the lungs, not the kidneys.
- The goal of this study is to provide objective data supporting the use of CEUS as an alternative to CT angiogram (CTA) and non-enhanced US.

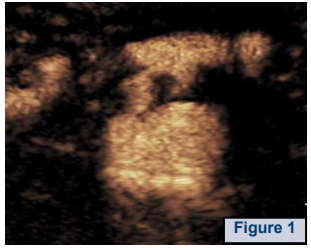
METHODS

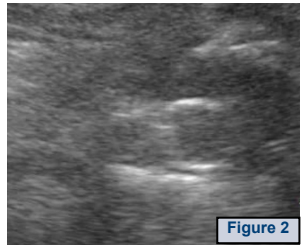
- Prospective study with final sample size of 20 patients.
- CEUS was performed, evaluating abdominal aorta post-EVAR with particular focus on endoleak characterization, as adjunct examination on same day as the current standard of diagnostic imaging after EVAR, (i.e. CTA & non-contrast US).



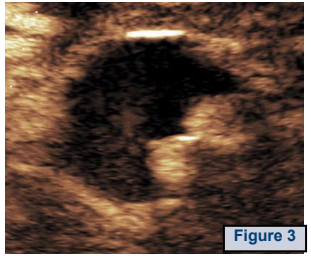
RESULTS

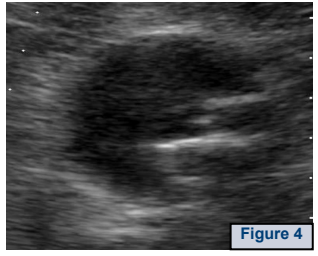
- There were a total of 20 patients included in this study.
- 2/20 patients had endoleaks visualized on both CTA and CEUS, however the type of endoleak was not able to be characterized on CTA, but was characterized on CEUS.
- 2/20 patients had comparison of CEUS to non-contrast US due to renal insufficiency precluding iodinated contrast for CTA. There were no endoleaks noted on either study.
- No cases were noted in which an endoleak was seen on CTA and not CEUS. Findings suggest equivalency of CEUS to CTA for endoleak detection.
- There is a slight benefit to characterizing endoleaks using CEUS in 2/20 patients, however given the sample size, it does not reach statistical significance.
- The overall cost of CEUS testing was approximately 16% of the cost of CTA.





Injection of microbubble contrast (**Figure 1**) demonstrates initial normal enhancement of the aorta and both iliac limbs. Subsequently, there was microbubble enhancement noted within the aneurysmal sac anterior to the left iliac limb of the graft, 11 seconds after contrast injection, suggestive of Type IIIa endoleak involving the left iliac limb. The ability to scan continuously over a period of time is a notable advantage of CEUS. Non-contrast grayscale image obtained simultaneously (**Figure 2**) shows no visible abnormality.





Injection of microbubble contrast demonstrates normal enhancement of the aorta and bilateral limbs without evidence of endoleak (**Figure 3**). Non-contrast grayscale image obtained simultaneously shows no visible abnormality (**Figure 4**).

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