VALUE OF DUPLEX ULTRASONOGRAPHY IN SURVEILLANCE OF RENAL ARTERY BRANCHES AFTER BRANCHED / FENESTRATED EVAR FOR JUXTA- / PARARENAL AAAs

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Disclosures
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Background — What is the Challenge?

- Complex device interactions occurring with endovascular pararenal AAA repair with need to maintain visceral branch patency & establish secure durable proximal fixation
- Added morbidity of renal or mesenteric branch loss after EVAR — need to detect and correct occlusive lesions prior to vessel thrombosis
- 5-10% renal target loss, 10-20% reintervention rate for visceral branch stenosis, proximal fixation loss (type 1A or 3 endoleaks) during mid term F/U (> 1 yr) in large series (PERICLES for chimney EVAR, Cleveland Clinic and meta-analyses post branched- / fenestrated- EVAR)
- Renal functional decline 18 – 24 % — what is relationship to branch vessel patency?
- Static anatomic imaging provided by CTA – added surveillance role dynamic / functional information provided by visceral duplex ultrasonography?

Deep Visceral / Aortic Imaging

- Fasting study (> 8 hrs)
- Supine position, reverse Trendelenberg
- 3 MHz curved or 5 MHz linear transducer
- 5 % technically suboptimal / incomplete imaging (obesity, excessive bowel gas)
- Midline transverse imaging to identify aorta, IVC and branches
- Use flank imaging if midline view obscured
- Celiac and SMA best viewed in sagittal view
- Renals best viewed in transverse view
- Can follow kidneys back to aorta for obscured proximal renals
- Use small sample volumes < 2 mm for vessel insonation
- Short breath hold during vessel insonation for spectral waveform recording
- Spectral waveforms at multiple locations along each main artery into parenchymal branches
- Kidney lengths, cortical thickness, overall color flow, RI, acceleration times

Surveillance Algorithm

- Complementary imaging modality with CTA — becomes primary aortic / mesenteric / renal imaging modality with noncontrast CT in patients with chronic renal insufficiency
- Serial serum Cr — GFR calculations
- Baseline aorto-visceral duplex within 3 mo postop
- Duplex at 6 mo intervals in first 2 years then annual thereafter if no renal functional loss or stenosis development / secondary intervention
- Threshold for secondary intervention ➔ aortic / renal arteriography
  - Increased Cr, accelerated HTN, loss kidney length > 1 cm, new proximal endoleak (type 1A or 3), renal artery PSV > 250-300 cm/s, RAR unreliable, hilar / parenchymal waveform changes

Accuracy of DU after renal artery stenting

Natural history of native RAS
Aortic duplex ultrasound with inclusion visceral branch imaging can be performed in nearly all patients post endovascular pararenal AAA repair and can serve a complementary role to CTA surveillance.

DU can detect lesions that threaten visceral branch patency and/or proximal endograft fixation & pararenal AAA exclusion.

DU can serve as the primary surveillance imaging modality in patients with significant renal insufficiency (Cr > 1.5 – 2.0)

Future needs include refinement of renal endoprosthetic velocity thresholds and prognostic renal parameters for identifying threatening occlusive lesions to better determine the relationship between renal branch occlusive lesions and late post-operative renal functional decline.