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Superficial femoral artery balloon angioplasty stent implantation-outcome stratified by type of follow-up evaluation: Arterial duplex imaging versus ankle-brachial index only

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Results: Clinical case 2 describes a 48-year-old woman with a history of Takayasus arteritis, prior proximal descending thoracic aorta to infrarenal abdominal aortic bypass and bypass to the left renal artery for mid-aortic syndrome, and atrophic right kidney presented with severe hypertension, fluid overload, and hyperkalemia, and a creatinine of 5.8 mg/dL requiring urgent dialysis. She was anuric and dialysis dependent. Magnetic resonance angiography revealed occlusion of the left renal artery bypass which originated from the aortic bypass graft and collateral filling of the left kidney with differential areas of perfusion (Fig 2). She underwent redo aortic graft to left renal artery bypass 18 days after her initial presentation. Upon discharge, she was no longer dialysis dependent and her creatinine has normalized.

Conclusions: Two patients presenting with dialysis dependent acute renal failure underwent delayed renal artery revascularization, greater than 14 days from their presentation. Complete renal recovery with return to baseline renal function was observed in these patients. In select patients, delayed renal artery revascularization (>48 hours of warm ischemic time) is controversial, but can be associated with complete renal recovery and freedom from dialysis.

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PC178.

Derivation and Validation of Thoracic Sarcopenia Assessment in Patients Undergoing Thoracic Endovascular Aortic Repair

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Objectives: Sarcopenia, as assessed by computed tomographic (CT) based measurements of muscle mass, is an objective and patient-specific indicator of frailty, which is an important predictor of operative morbidity and mortality. However, studies to date have primarily focused on psoas-defined sarcopenia, which may not be available or valid among patients with thoracic aortic disease. Using psoas sarcopenia as the reference for sarcopenia, the purpose of this study was to validate thoracic level measurements of sarcopenia as a novel method to assess frailty among patients undergoing thoracic endovascular aortic repair (TEVAR).

Methods: This was a post hoc analysis prospective data of patients undergoing TEVAR for thoracic aortic dissection, aneurysm, or injury using the conformable GORE TAG device (W. L. Gore & Associates, Inc., Newark, Del). Patients with core-lab preoperative abdominal and thoracic CT imaging were included. Thoracic muscle mass was measured at the T12 level (rectus abdominis, latissimus dorsi, intercostal, erector spinae, and external and internal obliques) using an automated sequence. Psoas sarcopenia was measured at the L3 level using standard methods. All measurements were expressed as muscle cm^2/height m^2. A subset of scans were reviewed in duplicate by two trained observers, intraoperative and interobserver reliability tested by intraclass correlation coefficient (scale 0-1). Sex specific cutoffs for thoracic sarcopenia were determined by receiver operator characteristic (ROC) plots, and agreement between T12 and L3 sarcopenia tested by Cohens kappa (scale 0-1).

Results: One hundred fifty patients were included for analysis, including 44 dissection, 45 injury, and 61 aneurysm patients. Intraobserver and inter-observer reliabilities for T12 muscle mass measurements were >0.95, indicating very high precision. T12 measurements had strong correlation with L3 values (Fig 1). Based on receiver operating characteristic (ROC) analysis, overall accuracy of T12 measurements was high (area under ROC 0.92 for males, 0.83 for females), and T12 sarcopenia was defined as <18 for females and <27.5 for males (Fig 2). Based on the defined T12 sarcopenia threshold, agreement with L3 sarcopenia was substantial (accuracy 83%; 95% CI, 0.76 0.88; kappa 0.58).

Conclusions: Thoracic sarcopenia can be readily and reproducibly assessed from CT-derived measurement of T12 level muscle mass. This approach may be used as an alternative method to objectively define sarcopenia in patients without abdominal CT imaging. Although this novel method accurately defines sarcopenia among patients undergoing TEVAR, further research is required to determine if either method is a superior predictor of clinical outcomes among patients with thoracic aortic disease.

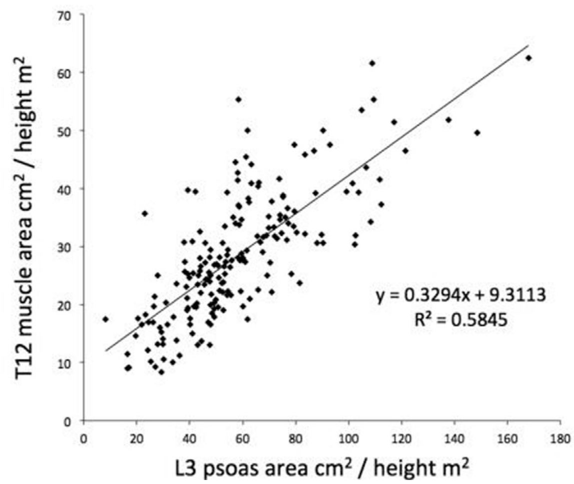

Fig 1. T12 muscle area cm^2/height m^2.

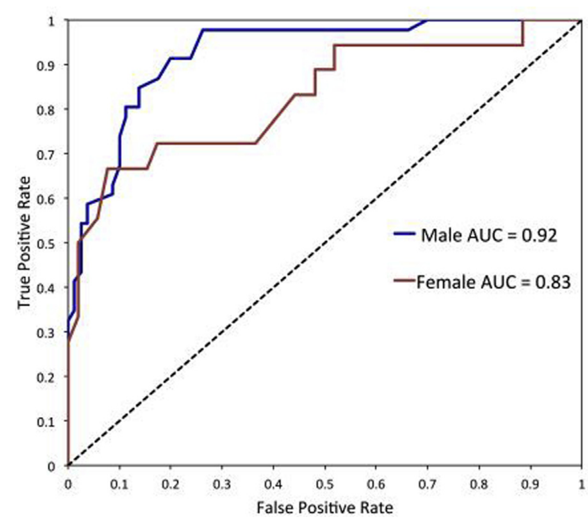

Fig 2. L^3 psoas area, cm^2/height m^2.

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PC180.

Superficial Femoral Artery Balloon Angioplasty Stent Implantation-Outcome Stratified by Type of Follow-up Evaluation: Arterial Duplex Imaging versus Ankle-Brachial Index Only

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Objectives: Endovascular therapy with transluminal angioplasty with stent deployment has become a commonly performed intervention in the management of superficial femoral artery (SFA) occlusive disease. In-stent stenosis occurs in approximately 16% to 32% of patients at one-year follow-up and can lead to stent occlusion and symptom recurrence. Arterial duplex stent imaging (ADSI) of the stented segment can be diagnostic for recurrent stenosis, however, its uniform application and benefit is controversial. With this study we aim to determine whether follow-up with ADSI yielded a better outcome than those with Doppler and ankle-brachial index (ABI) follow-up alone.

Methods: We performed a retrospective analysis collecting data of patients undergoing SFA stent implantation for occlusive disease at a tertiary care referral center between 2009 and 2016. Patients with PTA only, those with an in-stent restenosis, and those with no follow-up were excluded. The remaining patients were divided into those with at least one ADSI (ADSI group) and those with clinical/ABI follow-up only (ABI group). Variables analyzed included patients demographics, comorbidities, indication and procedural details. The two groups were compared via univariate analysis with respect to the following variables: patency, proximal/distal (relative to stent) progression and intervention, major adverse limb event, limb loss and mortality.

Results: There were 238 patients with SFA stent implantation included in the study, 152 into ADSI and 86 into ABI. There was no difference in demographics and comorbidities between the groups. ADSI and ABI were homogenous regarding clinical presentation (claudication/critical limb ischemia ADSI 39.1%/60.9% vs ABI 37.6%/62.4%; $P = .982$) and Trans-Atlantic Inter-Society Consensus classification ($P = .546$). The 1-year outcome showed a similar primary patency rates for ADSI (63.8%) versus ABI (65.1%; $P = .841$). Both groups had improvement in assisted patency, however, ADSI had a higher assisted patency compared with ABI (81.6% vs 69.8%; $P = .037$). Secondary patency was also higher for ADSI (88.1%) vs ABI (72.9%; $P = .003$). Despite similar clinical presentations, ABI patients were more likely to undergo a major amputation (ABI 14.7% vs ADSI 3.4%; $P = .002$) at the 1-year follow-up.

Conclusions: In SFA stent implantation, ADSI follow-up shows an advantage in assisted patency and secondary patency, which may contribute to a decreased rate of major amputation. Within the first year of follow-up evaluation of SFA stent implantation, ADSI would seem to be advantageous and consideration should be given to more uniform application of surveillance ADSI.

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PC182.

Development of Duplex Ultrasound Criteria for External Carotid Artery Stenosis: Importance of Assessing Both Peak Systolic Velocity and Presence of Color Aliasing

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Objectives: The external carotid artery (ECA) is routinely examined during carotid duplex ultrasound (DUS) despite no established criteria for ECA stenosis. Therefore, criteria for ECA stenosis is often extrapolated from that for internal carotid artery (ICA) stenosis despite obvious ICA and ECA anatomic/physiologic differences. We sought to systematically describe ECA DUS findings and to propose ECA stenosis criteria that will optimize overall carotid DUS accuracy.

Methods: From December 2016 to July 2017, ECAs with PSV <125 cm/s and 125 cm/s were prospectively identified from carotid DUS studies performed in our university hospital IAC accredited vascular laboratory and categorized with respect to prevalence and distribution of ECA PSVs, and color aliasing, an indication of turbulent flow or flow acceleration. Aliasing was assessed by two individual reviewers and validated by Cohens Kappa coefficient. Differences between groups were assessed using a χ^2 test. ECA stenosis was calculated using the North American Symptomatic Carotid Endarterectomy Trial (NASCET) method in patients with CTAs performed within 3 months of carotid DUS. Receiver operator characteristic (ROC) analysis was performed to identify ideal criteria for determining >50% ECA stenosis.

Results: There were 1324 ECAs from 662 subjects analyzed: 174 subjects (20%) had 266 ECAs with PSVs 125cm/s and 488 (80%) had 976 ECA with PSVs <125cm/s. Of ECAs with PSVs 125cm/s, 31.3% were between 125 and 149 cm/s; 23.4% between 150 and 174 cm/s; 12.1% between 175 and 199 cm/s; and 33.3% at >200cm/s. Color aliasing was assessed in patients with at least one ECA with a PSV >125 cm/s (341 ECAs evaluated). Color aliasing correlation with PSVs is demonstrated in Fig 1. Dividing ECAs into those with PSV 200 cm/s vs <200 cm/s there were 89 ECAs with PSV 200 cm/s, 64% with color aliasing and 259 ECAs with PSV <200 cm/s, 26.3% with color aliasing ($P \leq .0001$). Receiver operating characteristic analysis was used to correlate PSV with >50% luminal stenosis by CTA. A PSVs 125 cm/s had a sensitivity of 19.5% (8.8%-34.9%) with specificity of 100% (97.3%-100%). When combined with presence of color aliasing, sensitivity was 50.0% (23.0%-77.0%) and specificity 100% (97.3%-100%). A PSVs 200cm/s had a sensitivity of 47.1% (23.0%-72.2%) and a specificity of 100% (93.0%-100%). When combined with presence of color aliasing, sensitivity was 83.3% (51.6%-97.9%) and specificity 100% (93.0%-100%). The ROC curve is demonstrated in Fig 2.

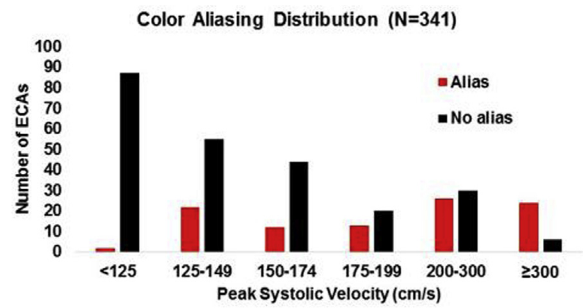
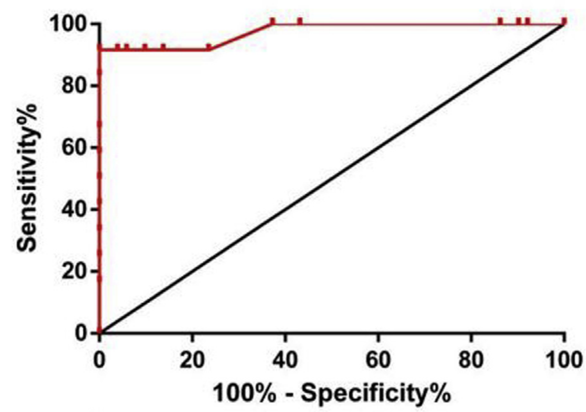


Fig 1. Color alias distribution among peak systolic velocity (psv) grouping. Increasing color alias is seen as psv increases. *ECA,* External carotid artery.



Area under the ROC curve	
Area	0.9747
Std. Error	0.02552
95% confidence interval	0.9247 to 1.025
P value	< 0.0001

Fig 2. Receiver operating characteristic curve for >200 cm/s peak systolic velocity in addition to the presence of color aliasing using duplex ultrasound.

Conclusions: A PSV >125 cm/s alone overestimates ECA stenosis. A PSV >200 cm/s combined with color aliasing is highly predictive of >50% ECA stenosis. Combining ECA color aliasing with higher PSV cutoffs will improve DUS determination of ECA stenosis and improve overall accuracy of carotid DUS.

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