

**Presentation Number:** KC35

**Publishing Title:** Is Percutaneous Coil Embolization Effective for Occluding Accessory Veins associated with Maturing Arteriovenous Fistulas

**Author Block:** **Homer H. Keadle, III, MD,** Anna Royer, MD, Richard Sprouse, MD, Chris Lesar, MD, Charles Joels, MD, Dan Fisher, MD, Michael Greer, MD, Mark Fugate, MD, Sachin Phade, MD, Jeff Horn, MD.  
UT Chattanooga, Chattanooga, TN

**Objectives:** To determine if percutaneous coil embolization is effective for occluding accessory veins and associated with maturing arteriovenous fistulas

**Methods:** This study is a 3-year retrospective review of 33 patients

**Results:** Twenty of the fistulas were brachiocephalic and 13 were radiocephalic AVF(s). Coil embolization was performed in 55 accessory veins. In 19 (34%) of these accessory veins 2 coils were used. The diameter of the coils ranged for 3 to 7 mm. Follow-up fistulagram confirmed successful occlusion in 46/55 (83%) of the accessory veins. Persistent flow was demonstrated in 5/55 (9%), and in 4/55 (7%) flow within the accessory veins could not be determined. Twenty-nine (87%) of the AVF (s) matured after undergoing percutaneous embolization.

**Conclusions:** Percutaneous coil embolization of accessory veins in AVF(s) provides an acceptable alternative to open ligation and is associated with successful AVF maturation.

**Abstract Body:**

**Presentation  
Number:** KC36

**Publishing  
Title:** Prophylactic Distal Revascularization with Interval Ligation (DRIL) with Simultaneous Arteriovenous Fistula Creation in Patients with Previous Steal Syndrome

**Author Block:** **Andrew E. Leake, MD<sup>1</sup>**, Steven A. Leers, MD<sup>1</sup>, Thomas Reifsnnyder, MD<sup>2</sup>, Ellen D. Dillavou, MD<sup>1</sup>.

<sup>1</sup>University of Pittsburgh Medical Center, Pittsburgh, PA, <sup>2</sup>John Hopkins University, Baltimore, MD

**Objectives-** Dialysis access-related ischemic steal syndrome is a common dialysis access complication. When severe, manifestations include rest pain, hand dysfunction and tissue loss. The affected extremity is usually abandoned after a diagnosis of steal syndrome and patients are often left catheter-dependent. The pre-emptive distal revascularization with interval ligation (DRIL) has been described in patients with previous steal syndrome who are deemed high-risk for recurrence. We present our experience with the prophylactic DRIL performed simultaneously with arteriovenous fistula (AVF) creation to prevent the recurrence of access-related steal syndrome.

**Methods-** After IRB approval, a retrospective review was performed at two major academic medical institutions, identifying patients who underwent prophylactic DRIL procedures with simultaneous AVF creation from July 2010 to July 2013. Demographics, technical details and patient outcomes were obtained.

**Abstract  
Body:** **Results-** Five patients underwent simultaneous DRIL/AVF placement. All patients previously experienced steal, and subsequent access ligation. Three patients were female, with a mean age of 64 (range 39-80) years. All patients had peripheral vascular disease, diabetes mellitus and end stage renal disease on dialysis. Mean number of previous access procedures was 2.6 per patient. All new AVF were brachial based and placed on the same side as the patient's previous episode of steal. Fistula types included three basilic vein transpositions, one brachial vein transposition and one brachial artery to axillary vein graft utilizing translocated femoral vein. DRIL bypass conduits included saphenous vein (3) and basilic vein (2). There were no 30-day complications or development of steal syndrome. At the time of last follow up (Mean 244 days), all AVF were functional and DRILs remained patent. One patient died >30 days after procedure, unrelated to access placement.

**Conclusions-** In patients with previous ischemic steal, a prophylactic DRIL with simultaneous AVF creation can allow use of the same extremity without recurrent symptoms. Larger studies are needed to better define patients that are at high-risk of developing access-related steal syndrome and would therefore benefit from a prophylactic DRIL at the time of AVF creation.

**Presentation  
Number:** KC37

**Publishing  
Title:** Accuracy of Duplex Ultrasonography in Identifying Transplant Renal Artery Stenosis

**Author  
Block:** **Mandy R. Maness, MD**, Rachel L. Williams, MD, Jill N. Zink, MD, Daniel Torrent, MD, Charles S. Powell, MD, William M. Bogey, MD, Frank M. Parker, DO, Michael C. Stoner, MD  
East Carolina Heart Institute, Greenville, NC

**Objectives:** The purpose of this study is to identify ultrasound criteria indicative of a flow limiting transplant renal artery stenosis (TRAS), using catheter-based arteriography as a gold standard.

**Methods:** Over a 12-year period, ultrasound and arteriographic images were reviewed and pertinent sonographic variables collected. Univariate analysis and receiver-operator curve techniques were utilized to evaluate these parameters, with a  $P > 0.05$  indicating significance.

**Results:** Nineteen renal transplant patients were identified for inclusion, of these 9 were found to have flow limiting stenosis defined as a  $>70\%$  luminal narrowing by arteriography (Table). All patients with TRAS underwent catheter-based intervention. Correlates of TRAS were renal artery peak systolic velocity (PSV) and renal:iliac PSV ratio. A PSV  $> 4$  m/s was found to correlate positively with stenosis (sensitivity 70%, specificity of 80%,  $P=0.01$ ). A renal:iliac PSV ratio  $> 1.5$  yielded, sensitivity of 66.7% and specificity of 80%,  $P=0.04$ . When either variable was positive (composite PSV), the likelihood of a stenosis was increased (sensitivity 89%, specificity 70%,  $P=0.01$ ).

**Conclusions:** Duplex ultrasound is a reliable method for identifying TRAS, making this modality useful as a screening exam. PSV and the renal:iliac PSV were found to be accurate for the determination of TRAS in our laboratory. Acceleration time was not a reliable indicator of stenosis. The divergence of these data from commonly cited thresholds attests to the importance of individualized laboratory standards and quality control to optimize the care of renal transplant patients.

**Abstract  
Body:**

Summary of Ultrasound Parameters			
	TRAS + (n=9)	TRAS - (n=10)	p value
Iliac PSV (m/s)	3.07+/-0.66	2.99+/-0.30	0.90
Renal PSV (m/s)	4.99+/-0.48	3.38+/-0.44	0.03
Renal PSV $> 4$ m/s (%)	77.8	20	0.01
Iliac:Renal PSV	2.57+/-0.89	1.15+/-0.17	0.16
Iliac:Renal PSV $>1.5$ (%)	66.7	20	0.04
Acceleration Time	126.7+/-16.3	111.3+/-13.7	0.49
Resistive Index	0.80+/-0.04	0.84+/-0.02	0.48
Composite PSV (%)	88.9	30	0.01

**Presentation  
Number:** KC38

**Publishing  
Title:** The use of renal transplant duplex ultrasound as a predictor for return to dialysis in renal transplant patients

**Author Block:** Alison O. Flentje, BS, Stephen Gayle, Sadaf S. Ahanchi, MD, Reynold Lopez-Soler, MD PhD, Dave J. Dexter, MD, John Colonna, MD, Jean M. Panneton, MD.  
Eastern Virginia Medical School, Norfolk, VA

**Objectives:** Renal transplants are frequently monitored using duplex ultrasound (DUS) to assess for vascular complications, which includes transplant renal artery stenosis. While the DUS criteria of peak systolic velocity (PSV) and resistive index (RI) have been proven to have a predictive value for renal stenosis and renal failure in native renal arteries, the clinical implications of these DUS values have not been investigated in transplanted renal arteries.

**Methods:** A retrospective chart review was conducted on patients who underwent renal transplant at a single institution from 2008 to 2012. The primary endpoint was return to dialysis. Secondary endpoint was survival. Area under the receiver operating characteristic curve (AUROC) was used to determine the predictive value of PSV, RI, renal iliac ratio (RIR), and systolic rise time (SRT) on the endpoints. A student t-test was also performed on the DUS values.

**Abstract  
Body:**

**Results:** Of the 327 patients reviewed, 63 were removed from the study (4 for lack of data, 1 for bilateral renal transplantation, 1 for immediate postoperative thrombosis of the graft, and 57 for immunologic rejection). The remaining 264 patients had a mean age of 51 with 58% males and an average BMI of 30. Comorbidities included hypertension (98%), hyperlipidemia (60%), diabetes (50%), and coronary artery disease (34%). At a mean follow up of 17 months the overall rate of return to dialysis was 9% and the overall survival was 91%. The best predictors for return to dialysis were RI (AUROC=0.634) and PSV (AUROC =0.531). ). A RI value of  $\geq 0.75$  gave a sensitivity (SN) of 61% and a specificity (SP) of 59% with a positive predictive value (PPV) of 10% and a negative predictive value (NPV) of 95%. A PSV of  $\geq 250$  gave a SN of 39% and SP of 75% with a PPV of 10% and NPV of 94%. The average RI of patients who returned to dialysis was 0.8, which was significantly higher than the patients who did not return to dialysis (RI=0.73,  $p=0.008$ ).

**Conclusions:** In conclusion, the resistive index (RI) and peak systolic velocity (PSV) values of a renal transplant DUS are the strongest predictors of return to dialysis.

**Presentation  
Number:** KC39

**Publishing  
Title:** Renal transplant vascular complications and their impact on transplant failure and dialysis

**Author Block:** Alison O. Flentje, BS, Sadaf S. Ahanchi, MD, Reynold Lopez-Soler, MD PhD, Dave J. Dexter, MD, John Colonna, MD, Jean M. Panneton, MD  
Eastern Virginia Medical School, Norfolk, VA

**Objectives:** Renal transplant related vascular complications (RTVC), include transplant renal artery stenosis (TRAS), native iliac artery stenosis (NIAS), native iliac artery dissection (NIAD), and transplant renal vein stenosis (TRVS). RTVC is uncommon, but can still result in transplant dysfunction leading to end stage renal disease (ESRD) and return to dialysis. Our aim was to investigate the impact of RTVC on transplant function and return to dialysis.

**Methods:** A retrospective chart review was conducted on 327 consecutive patients who underwent renal transplant at a single institution from 2008 to 2012. Primary endpoints were loss of transplant function and return to dialysis. Secondary endpoint was survival. Chi squared analysis was done to compare patients with RTVC to those without RTVC.

**Results:** Of the 327 patients reviewed 7 were excluded from the study (4 for lack of data, 1 for bilateral renal transplantation, 1 for hyperacute rejection, and 1 for immediate postoperative thrombosis of the graft). The overall patient cohort had a mean age of 50 with 55% males and an average BMI of 30. Comorbidities included smoking (30%), diabetes type 1 (6%), diabetes type 2 (46%), hypertension (98%), obesity (50%), hyperlipidemia (58%), coronary artery disease (33%), peripheral artery disease (11%), congestive heart failure (14%), and previous transplant (10%).

**Abstract  
Body:**

RTVC were diagnosed based on post transplant duplex ultrasounds. The RTVC of stenosis were defined as either a >50% luminal narrowing seen on 2D imaging, a peak systolic velocity (PSV) > 300 cm/sec, or a doubling of PSV between adjacent segments. Of the 320 patients, 37 were identified as having RTVC by duplex ultrasound: 16 with TRAS, 9 with NIAS, 2 with NIAD, and 10 with TRVS, while 283 had no evidence of RTVC. The rate of return to dialysis for the RTVC group was 22% in an average of 9 months, which was dramatically higher than the remaining patients without RTVC, which had a rate of return to dialysis of 12% in an average of 26 months,  $p=0.03$ . At a mean follow up of 2.5 years, the overall mortality rate was 9%, with no difference between groups.

**Conclusion:** Patients with renal transplant vascular complications (RTVC) have a higher rate of post transplant graft dysfunction causing ESRD and return to dialysis when compared to patients without RTVC.

**Presentation  
Number:** KC40

**Publishing  
Title:** Robotic IVC Surgery

**Author Block:** Mark E. O'Donnell, MMedSc MD FRCS, Scott M. Cheney, MD, Erik P. Castle, MD, Grant T. Fankhauser, MD, Richard J. Fowl, MD, William M. Stone, MD, Samuel R. Money, MD.  
Mayo Clinic, Phoenix, AZ

**OBJECTIVES:** Robotic surgery has been widely adopted in urological, gynecological and now colorectal surgery. However, providers still remain apprehensive when vascular structures are involved. The objective of this study was to describe our initial experience with robotic surgery of the inferior vena cava (IVC).

**METHODS:** All patients who underwent robotic surgery of the IVC between September 2011 and August 2013 were included. Patient data regarding clinical presentation, radiological imaging, operative intervention, treatment pathway and clinical outcome were recorded.

**RESULTS:** Four patients were identified (Male=3, mean age 51.5 years). Three patients with renal tumours (right=2) had tumour thrombus extending to the IVC. These three patients were commenced on therapeutic low-molecular weight heparin pre-operatively to minimise tumour thrombus propagation. A fourth female patient presented with a symptomatic IVC filter with associated migration and perforation. All patients proceeded to robotic surgery with careful patient positioning. After creation of the pneumoperitoneum, a 12mm camera port was inserted followed by insertion of the remaining robotic ports under direct vision (5mm x 1, 8mm x 3 and 12mm x 1). The operative procedure was performed in stages which included mobilization of the duodenum and right colon, IVC dissection, vascular control of the IVC with ligatures and Rummel tourniquets, creation of cavotomy, mobilization and removal of the tumour thrombus or IVC filter followed by closure of the cavotomy. Conventional additional dissection was performed for nephrectomy when indicated. Mean operative time was 192 minutes with an IVC clamp time of 78 minutes. Mean total peri-operative intravenous fluid administration was 4167mls with a corresponding urine output of 383mls. All four patients had uncomplicated post-operative courses with mean discharge on post-operative day three. Adjuvant chemotherapy was administered to all renal tumour patients. All patients remain well with mean follow-up of nine (range 1-24) months.

**CONCLUSIONS:** Our initial experience suggests that robotic IVC surgery is a valid and safe modality providing satisfactory access to the IVC leading to shorter recovery and improved patient quality of life.

**Abstract  
Body:**

**Presentation  
Number:** KC41

**Publishing  
Title:** The Utility of Lower Extremity Duplex to Diagnose DVT in Patients with Lower Extremity Swelling and Pain

**Author Block:** **Khanjan H. Nagarsheth, MD**, George Benson, MD, Phyllis Suen, Saqib Zia, MD, Jonathan Schor, MD, Kuldeep Singh, MD, Jonathan S. Deitch, MD

Staten Island University Hospital, Staten Island, NY

**Objective:** Lower extremity venous duplex ultrasound (LEVDU) is over-utilized to exclude deep vein thrombosis (DVT) in patients with leg pain and swelling. These findings alone are not enough to warrant DVT screening with lower extremity venous duplex ultrasound (LEVDU). We performed this study to evaluate the utility of LEVDU in identifying DVT in patients presenting with lower extremity pain and swelling.

**Methods:** We performed a retrospective review and chart analysis for all LEVDU performed at our institution from May 2013 until July 2013. We identified studies that were performed for an indication of lower extremity swelling, pitting edema or extremity pain (ICD-9: 729.81, 782.3 and 729.5, respectively). A comprehensive chart review was performed for each patient looking at variables including; gender, race, smoking history, history of prior DVT, newly diagnosed cancer, BMI, limb swelling, presence of pitting edema and localized extremity pain. Multivariate analysis was conducted using SPSS 20. Nonparametric data was analyzed using Chi square test and parametric data was compared using independent sample t-test. The level of significance was set to an alpha of 0.05.

**Abstract  
Body:**

**Results:** A total of 1,442 LEVDU were performed during this time period of these only 119 (8.3%) were positive for lower extremity DVT. There were 807 LEVDU ordered for ICD-9 codes 729.81, 782.3 and 729.5 (232, 275 and 300, respectively). Ninety-one of these patients (11.2%) were positive for DVT.

Patients positive for DVT were more likely to have a history of prior DVT ( $p<0.001$ ), recently diagnosed cancer ( $p<0.001$ ) and paralysis ( $p<0.001$ ) compared to those who were negative.

The negative group had a significantly higher incidence of whole limb swelling ( $p<0.001$ ), pitting edema ( $p<0.001$ ) and localized pain ( $p<0.001$ ) compared to the positive group. This group was also significantly older ( $p<0.001$ ) and had a higher BMI ( $p<0.001$ ) than the DVT group.

**Conclusions:** Based on this analysis, physical exam findings of lower extremity swelling, pain and pitting edema may not necessarily be indicative of DVT, and a thorough differential diagnosis should be explored before ordering a LEVDU. This may help to reduce hospital cost and labor.