1st Place – Podium Presentation

Early Adventitial Activation and Proliferation in a Mouse Model of Arteriovenous Stenosis Begoña Campos, PhD, Yang Wang, MD, Meenakshi J Mistry, Benjamin K Woodle, Virgilius Cornea, Timmy C. Lee, MD, FASN, and Prabir Roy-Chaudhury, MD, PhD, FASN*, Dialysis Vascular Access Research Group, Division of Nephrology and Hypertension, University of Cincinnati, Cincinnati, OH, United States.

Background: Early arteriovenous fistula (AVF) failure remains an important cause of hemodialysis vascular access dysfunction and a major impediment to the Fistula First initiative. Despite the magnitude of the clinical problem, there are currently no effective therapeutic interventions for early AVF failure. In order to better understand the cellular and molecular mechanisms involved in early AVF failure we have previously developed a mouse model which is characterized by significant stenosis at the AV anastomosis 14d post surgery. The aim of this study was to describe the pattern of cellular proliferation and macrophage infiltration at different time points in this model.

Methods: AVFs were created using an end to side anastomosis between the jugular vein and carotid artery in 13 mice. Animals were sacrificed at 2d (n=4), 7d (n=5) and 14d (n=4). A standard immunohistochemical analysis was performed to assess cellular proliferation (Ki-67) and macrophage infiltration (Mac-2), using a semiquantitative scoring scale (0=<10% of total cells positive; 1+=11-25%; 2+=26-50%; 3+=51-75%; 4+=>75%).

Results: Our results (Table shows Adventitial data only) demonstrate an early proliferation within the adventitia (ADV) which peaks at 7d and which is followed by a later endothelial (ENDO) proliferation which peaks at 14d (p<0.05 for ADV proliferation vs ENDO and intimal [INT] proliferation at 2d). This is accompanied by an early macrophage infiltration which peaks at 7d (p<0.05 for ADV macrophage infiltration vs INT and ENDO macrophage infiltration).

Conclusions: Our results suggest that the adventitia could be a key player in the pathogenesis of early AVF failure. In addition it is possible that early peri-adventitial therapies targeting cellular proliferation and macrophage infiltration might be effective in reducing early AVF failure.

| Cellular Proliferation and Macrophage Infiltration in the Adventitia |
|-------------------------|-----------------|-----------------|-----------------|
|                         | 2 Days | 7 Days | 14 Days |
| Cellular Proliferation  | 1.75 +/- 1.03 | 2.8 +/- 0.44 | 2.125 +/- 0.64 |
| Macrophage Infiltration | 0.75 +/- 0.88  | 1.6 +/- 0.69   | 0.875 +/- 0.64  |
2nd Place – Podium Presentation

RNA Interference and inhibition of Stem Cell Factor (SCF)/c-Kit Signaling Control Neointimal Hyperplasia in Experimental Fistulae
Nikolaos Skartsis, MD†, Brigham and Women’s Hospital; Si Pham, MD, Marwan Tabbara, MD, Yuntao Wei, MD, Loay Salman, MD, Arif Asif, MD, and Roberto Vazquez, MD, University of Miami

**Background:** Neointimal hyperplasia (NIH) is the most common cause of vein graft and arteriovenous fistula (AVF) failure. This study demonstrates the essential role of Stem Cell Factor (SCF)/c-Kit signaling in neointimal cell mobilization and venous stenosis. **Methods and Results:** Discarded human AVFs with neointimal hyperplasia ranging from minimal to severe were immunostained for SCF and c-Kit. SCF and c-Kit+ cells were abundant in proliferating neointimas but rare in veins with minimal or advanced NIH. This biphasic pattern of expression was also observed in a rat experimental fistula created by anastomosing the left renal vein to the abdominal aorta after unilateral nephrectomy. In this model, c-Kit+ cells were detectable at day 3 (125 ± 23 cells/mm²) reaching its maximum at day 14 (435±72 cells/mm²) and then, decreased to a non-significant level at day 30 (35±15 cells/mm²). c-Kit+ cells turned positive for SMA, a smooth muscle cell/myofibroblast marker, only in the media and neointima. The venous wall of sham operated rats didn’t show staining for SCF or c-Kit. In agreement with a previous work, c-Kit+ cells were also found incorporated in the adventitial neovasculature. The up-regulation of SCF signaling molecules was further confirmed by qRT-PCR and by placing fistulae in a transgenic c-Kit GFP reporter mouse. Interestingly, adventitial c-Kit+ cells did not derive from bone marrow (BM) as were mostly GFP negative in chimeric rats (GFP BM Lewis WT). Finally, we used Gleevec, a specific c-Kit inhibitor (5mg/Kg/d for 7d) and a lentiviral vector carrying a small hairpin RNA that decreases SCF gene expression in cultured smooth muscle cells in more than 95% to assess the therapeutic effect of SCF/c-Kit signaling inhibition on venous NIH. Gleevec produced a 3-folds reduction in neointimal thickness in treated versus control groups (0.093±0.006 vs. 0.030±0.0008, p=0.0026) while the SCF shRNA vector abolish the development of NIH in experimental fistulae (0.067±0.003 vs. 0.0180±0.0008, p=0.036).

**Conclusion:** Our results demonstrate the SCF deficiency protects veins from developing NIH.
3rd Place – Podium Presentation

Vascular Access Stenosis: From Biomarkers to Histology. Could be the Intima Media Thickness Surveillance with Ultrasound a new predictor?


As important as fistula prevalence is survival. The main pathology related with thrombosis is postanastomotic stenosis. It’s demonstrated its association with the intimal hyperplasia (IH) and although pathogenetic mechanisms have been suggested, it is not completely documented its development and predictive capacity in survival. Hypothesis: if some of main predisposing factors as inflammation could have translation in IH and if this could be monitored by ultrasound (US) with a prognostic aim.

Objectives Study: Relationship between inflammation and IH progression from fistula creation to stenosis development. Relationship between inflammation and stenosis; and influence of catheter antecedent. Capacity of IH surveillance with US compared with histology Material and Methods Prospective study of cohorts, observational. Cases: 100 fistulas. 2 years follow up Method: Variables: demography, anthropometry, hemodialysis, vascular access (VA), surgery, surgeon, vascular patholgy, Charlson index Inflammation: IL6, TNFa, hPCR; Initial and every 3 months US for follow up: image, hemodynamics, flow and Intima Media Thickness (IMT) in artery and vein. Initial and every 3 months Initial histology of artery and vein (fistula creation) and when stenosis tributary of surgical treatment Results Present a first interim analysis: 65 patients; 153 measurements of IL6; Histology: of 21 samples taken, 3 are presented as representative: without stenosis, with moderate and severe stenosis. Inflammation: no relationship with age, sex neither time in dialysis No difference in comorbidity for VA type Higher the stenosis, higher inflammation (p <0.0001) In case of catheter, higher inflammation Vs fistula (IL6: 8.9 Vs 1.0 pg/L, p <0.0001), with change in inflammation level when changed VA type In severe stenosis, relationship with catheter antecedent (p <0.02) Histological analysis, inflammation and US follow up of 3 pattern patients: No stenosis. “Initial”: US IMT = art: 0.272 mm, vein: 0.212 mm; Histology: art 0.161 mm, vein: 0.215 mm; IL6: 0.31 pg/L. “Surveillance” US: 1 month 600 ml/min, no pathology Moderate stenosis. “Initial”: US IMT = Art 0.472 mm, vein not measurable; Histology: art 0.465 mm, vein 0.1 mm. “Surveillance” US 10 weeks: 50% stenosis, flow 510 ml/min. US IMT = vein 0.498 mm; IL6: 2.5 pg/L Severe stenosis. “Initial”: US IMT = Art 0.553 mm, vein 0.284 mm; Histology: calcified artery, vein 0.318 mm. “Surveillance” 10 weeks: 70% stenosis with hemodynamic repercussion, flow < 200 ml/min. US IMT = vein 1.031 mm. Surgery is performed (reanastomosis). Histology: vein 1.2 mm; IL6: 21.8 pg/L Conclusions There is a relationship between inflammation level and stenosis progression associated to the IH The higher inflammation can lead to severe fistula stenosis and could be influenced by catheter antecedent Surveillance of the IMT progression by US could be a predictor This interim analysis must be confirmed with the integer study.
ABSTRACT
Background and objectives: Given the high rate of vascular access failure, its associated complications, and timing implications in placing a fistula versus a graft in the elderly, we wanted to re-evaluate the 'fistula first' strategy in the recent elderly hemodialysis population by studying the mortality outcomes in relation to the first pre-dialysis access placed rather than first used. We hypothesized that in the octogenarian hemodialysis population 'fistula first' may not be the superior strategy for pre-dialysis access placement.

Methods: The study cohort of ≥ 67 years old incident hemodialysis patients (from 1/1/2005 through 12/31/2008) with identified initial vascular access placed was derived from the United States Renal Data System linked with Medicare claims. These claims provided pre-dialysis vascular access placement information. Primary variable of interest was the type of vascular access (i.e., fistula, graft, or central catheter) first placed prior to outpatient hemodialysis initiation. Primary outcome of interest was all-cause mortality (time to death measured from the first out-patient hemodialysis date). Proportional hazard models were used to evaluate mortality outcomes and fistula cohort was considered as the reference group to test stated hypothesis.

Results: Total study population included 115,425 incident hemodialysis patients, of which 21,436 were identified with fistula as the first pre-dialysis access placed; 3,472 with graft; and 90,517 with catheter. In the entire study population, those with catheter as the first pre-dialysis access placed demonstrated clear inferior survival compared to the fistula [HR 1.77 (p<0.001)]. However, those who had a graft as the first access placed did not show significant mortality difference compared to the fistula in the entire study population [HR 1.05 (p=0.057)]. To further test our hypothesis, we stratified the study population into three age groups (67 to <80, 81 to <90, and >90). In the '67 to <80' age group, those who had a graft as the first pre-dialysis access placed had inferior mortality outcomes compared to a fistula [HR 1.10 (p=0.007)], but in the '81 to <90' and '>90' age groups, those who had a graft as the first pre-dialysis access placed showed statistically similar mortality outcomes compared to a fistula [HR 0.98 (p=0.76) and HR 1.09 (p=0.67) respectively].

Conclusion: 'Fistula first' does not appear to be the clear superior strategy in the elderly. In particular, octogenarians have similar mortality outcomes with a graft compared to a fistula as the first vascular access placed prior to hemodialysis initiation.
Podium Presentation

Fibrin Sheath and its Relation to Subsequent Events after Tunneled Dialysis Catheter Exchange—a Single Center Experience  Amy Dwyer, MD, Almothana Shanaah, MD*, and Michael Brier, PhD, University of Louisville

Background: The use of cuffed, tunneled hemodialysis catheters for chronic hemodialysis access is frequent and is often complicated by failure due to dysfunction and catheter-related infection. Access dysfunction occurring more than 2 weeks after placement is likely to result from progressive occlusion of the catheter tip by fibrin or thrombus. In these conditions, it is recommended to exchange the catheter with sheath disruption. We hypothesized that the presence of fibrin sheath in cuffed, tunneled hemodialysis catheters is associated with an increased risk for subsequent catheter malfunction and infection, compared to patients without a fibrin sheath or with de-novo catheter placement.

Methods: Over a 7 year period, we retrospectively reviewed all tunneled catheter exchanges and de novo placements in our vascular access center. We collected patient demographic data, information about the catheter procedure (indication, insertion site, subsequent events after the index procedure) and radiological data regarding the presence of fibrin sheath. Outcomes were compared using Pearson chi-square and t-test.

Results: 833 catheter procedures were done at our access center over the study period. Data was available for 217 catheter procedures in 121 patients; 133 (61%) procedures were catheter exchange. Final outcome analysis included 168 procedure events. Three groups of catheter procedures were identified: catheter exchange without a fibrin sheath (CE), catheter exchange with a fibrin sheath that was treated (CEFS) and de novo catheter placements (DCP). The average age in the three groups was 55, 60 and 53 years; 63%, 64% and 69% patients were black; and 53%, 50% and 44% were female, respectively. We found that if the catheter was evaluated by angiography at the time of tunneled catheter exchange, the incidence of fibrin sheath was 47%, regardless of the indication for the procedure. There was no difference in age between the three groups (p=0.8). Further, there was no difference in incidence between left and right sided internal jugular vein access (p=0.4) although right sided access was predominate at 70%. In the CEFS group, there was no statistical difference in the incidence of subsequent infections or dysfunctions (7% and 60%, respectively), when compared to the CE group (9% and 43%, respectively), (p=0.3). After tunneled hemodialysis catheter exchange, the mean time to subsequent dysfunction or infection was similar if fibrin sheath was present or not (135 vs. 136 days, p value, 0.98). The mean time to first event in the de novo group was 60 days (p=0.077).

Conclusions: The presence of fibrin sheath is common and it should be evaluated when performing tunneled hemodialysis catheter exchange. In addition, if the fibrin sheath is treated, there is no increased incidence in subsequent catheter dysfunction or infection compared to patients without a fibrin sheath.
Podium Presentation

Bone Morphogenetic Protein-7 Inhibits Interleukin-1beta-Induced Monocyte Chemoattractant Protein-1 Expression in Human Vascular Smooth Muscle Cells

Hoon Suk Park, MD and Yongsoo Kim, MD, PhD, Section of Interventional Nephrology, Division of Nephrology, The Catholic University of Korea College of Medicine, Seoul, Korea

Background: Developing strategies that may interrupt neointimal hyperplasia are essential to improve fistula or graft survival. Neointimal thickening of arteriovenous fistula (AVF) or graft represents a local inflammatory process. Monocyte chemoattractant protein-1 (MCP-1) is known to be expressed in the venous segment in animal models of fistula and contributes to neointimal hyperplasia, subsequently to AVF failure. We studied the effect of bone morphogenetic protein-7 (BMP-7), which belongs to the TGF-β superfamily, on the IL-1β-induced MCP-1 expression in human vascular smooth muscle cells (VSMC).

Methods: Human umbilical vein smooth muscle cells were grown in medium supplemented with 2% FBS and growth factors. MCP-1 protein in the conditioned medium was measured by ELISA. Phosphorylated MAPks (JNK, P38, ERK) were detected in the cell lysate by Western blot analysis.

Results: IL-1β (250 pg/ml) significantly stimulated MCP-1 production and JNK, P38 expression in serum-starved VSMC. When the cells were preincubated with SP600125 (JNK inhibitor) or SB202190 (P38 inhibitor) or curcumin (transcription factor AP-1 inhibitor), IL-1β-induced MCP-1 production was significantly inhibited. However, preincubation of cells with PD 98059 (ERK inhibitor) or PDTC (transcription factor NFκB inhibitor) didn't inhibit IL-1β-induced MCP-1 production. When the cells were preincubated with BMP-7 (50 ng/ml and 100 ng/ml), IL-1β-induced MCP-1 expression was significantly inhibited. BMP-7 did not elevate LDH release above the control values by LDH release assay, indicating that BMP-7 was not cytotoxic to cells.

Conclusions: These preliminary data suggest that BMP-7 inhibits IL-1β-induced MCP-1 expression in human VSMC and provide new insight into the therapeutic potential of BMP-7 in the neointimal hyperplasia of AVF and graft. The mechanism involved in the anti-inflammatory effect of BMP-7 needs to be explored.
A retrospective analysis of ESRD patients hospitalized with catheter related bacteremia demonstrates that patients are more likely to receive transesophogeal echocardiograms if an Infectious Disease consult is obtained during admission. Dawn Caster, MD, University of Louisville; Rosemary Ouseph, MD, MSPH; Alfred Jacobs, MD; Michael Brier, MD; Amy Dwyer, MD, University of Louisville. Presented by Amy Dwyer

**Background:** Despite efforts to increase the use of arteriovenous fistulas (AVFs) and arteriovenous grafts (AVGs), tunneled cuffed catheters (TCC) continue to be used frequently for dialysis access. It is well known that TCCs are associated with higher rates of morbidity and mortality than AVFs and AVGs. Catheter related bacteremia (CRB) continues to be a source of mortality and morbidity among hemodialysis patients. The management of CRB is variable. The duration of antibiotic treatment, preferred mode of catheter removal, and use of echocardiogram to screen for endocarditis has been debated. Infective endocarditis remains a significant cause of mortality and morbidity among HD patients and is frequently associated with CRB, especially when CRB is caused from Staphylococcus Aureus. Guidelines from the Infectious Disease Society of America (IDSA) suggest that transesophageal echocardiogram (TEE) be performed in the setting of CRB from Staphylococcus Aureus bacteremia unless the treatment duration is at least 4-6 weeks. However, KDOQI guidelines have not addressed the use of echocardiogram with CRB. In order to gain understanding of the characteristics CRB in our community and the rate of endocarditis in patients with catheter related bacteremia, we chose to conduct a retrospective chart review of patients hospitalized with CRB. We also looked into practice patterns of ordering echocardiograms on patients with CRB.

**Methods:** We conducted a retrospective chart review of ESRD patients from a single dialysis center who were hospitalized over a three year period. The data collected included demographic information, infection characteristics, whether the patient had an Infectious Disease consultation, echocardiogram data, and mode of catheter removal (exchange, delayed removal, salvage). Data was interpreted using SPSS version 19.

**Results:** We found 59 cases of catheter related bacteremia in 34 patients. 52.9% of patients were male, 47.1% were female. 64.7% of patients were African American and 35.3% were Caucasian. 50% of patients were diabetic. 50% of patients were seen in the emergency department or were hospitalized prior in the 30 days prior to developing CRB. There were 8 cases of infective endocarditis or endovascular infections. 50% of infective endocarditis cases were associated with Staphylococcus Aureus. TEE was performed in 27% of all CRB cases. Infectious disease consult was associated with a higher likelihood of a patient with CRB undergoing TEE (P value=.05). Conclusions: The association of Infectious Disease consultation with a higher TEE rate may reflect a deficiency in current KDOQI guidelines with regard to the use of echocardiogram in CRB.
The Hemaclear tourniquet is a self-contained non-pneumatic tourniquet system that utilizes a silicone ring and stockinette to provide surgical exsanguination, arterial control, and stockinette application. We utilized the Hemaclear tourniquet in 27 dialysis access operations. This is the first report of the use of the Hemaclear tourniquet for dialysis access surgery. Hemostasis and surgical exposure was excellent. The Hemaclear tourniquet enabled exposure, dissection, and manipulation of upper arm blood vessels under tourniquet control. In all but one case, blood loss was less than 20 ml. No patient required transfusion. The traditional pneumatic tourniquet has been shown to be effective in minimizing blood loss for forearm procedures. However, it is of very limited effectiveness in upper arm arteriovenous access surgery. The Hemaclear tourniquet is much narrower than the pneumatic tourniquet and has enabled surgery to be done on upper arm AV fistulas and grafts. One excellent use of the roll-on non-pneumatic tourniquet is the creation of the transposed brachiobasilic fistula. The basilic vein of the upper arm can be readily harvested through either long incisions or small incisions with long skin bridges. When harvesting the basilic vein through long incisions, the hemaclear tourniquet limits blood loss. When harvesting the basilic vein through small incisions with long skin bridges, absolute hemostasis is essential for adequate exposure. Similarly, the Hemaclear tourniquet has enabled extensive harvests and transpositions of the cephalic vein of the upper arm to be done almost bloodlessly. One of the bloodiest procedures in dialysis access surgery is the removal of the infected upper arm arteriovenous graft. With the surgical exsanguination tourniquet rolled up the junction of the axilla and the upper arm, the infected upper arm graft can be removed with very little blood loss. Some of the pitfalls of using the Hemaclear tourniquet in dialysis access surgery are also discussed in the paper.
3rd Place – Poster Presentation

Dilator-assisted Banding for managing complications associated with excessive hemodialysis access flow
Shouwen Wang, AKDHC; Ammar Almehmi, University Vascular Access Center, University of Tennessee College of Medicine; Jeffrey Packer, Ambulatory Surgery Center, Arizona Kidney Disease and Hypertension Center, Phoenix, AZ. Presented by Shouwen Wang

BACKGROUND: Excessive hemodialysis access flow can be associated with various complications, such as steal syndrome and heart failure. The reported techniques for managing these complications are diverse and each has its merits and limitations. The optimal management would achieve dual goals of minimizing clinical symptoms by reducing access flow while preserving adequate blood flow for hemodialysis. Although endoluminal balloon-guided banding has gained acceptance among interventionalists, its wider application is hindered by required fluoroscopic guidance. In search for a simpler flow-reduction technique, we developed Dilator-assisted Banding (DAB), in which vascular dilators are used as endoluminal-guides to achieve precision banding with or without fluoroscopic guidance.

METHODS: The cohort included 7 patients with steal syndrome due to excessive hemodialysis access flow. All procedures were performed in an outpatient setting using conscious sedation. The Dilator-assisted Banding procedure consisted of ligature banding of an arteriovenous fistula or graft around an over-the-wire vascular dilator of known size inserted into the post arterial anastomosis segment. The dilators used were 10, 12, and 14 French, corresponding to 3.3, 4.0, and 4.7 mm in diameter respectively.

RESULTS: Of the 7 patients, 3 were males, mean age was 67.7±16.3 years, 5 were diabetics, all were hypertensive, 5 had fistulas and 2 had grafts. Mean age of accesses was 17.2±18.4 months. Three patients had banding without fluoroscopic guidance (including two performed during fistula vein superficialization and basilic vein transposition). With a mean follow up of 5.9±3.7 months, all accesses were functional. Six patients had complete resolution and one reported markedly improvement of steal symptoms.

CONCLUSION: Dilator-assisted Banding is a simple, effective, and economical flow-reduction approach for managing steal syndrome and potentially other complications associated with excessive hemodialysis access flows. Additionally, it can be safely performed without fluoroscopic guidance.
Background: The type of hemodialysis vascular access used at the initiation of hemodialysis (HD) is known to affect the patient survival. However, its role in the subsequent kidney transplant outcome is unclear.

Methods: Study population was derived from the United States Renal Data System (USRDS), and included adult (>18 years) ESRD patients who were initiated on HD from January 1, 2005 through September 1, 2009, and who subsequently received at least one kidney transplant. Primary outcome variables were graft loss and all-cause mortality, measured from the time of the first kidney transplantation. The time of graft failure was defined as the date of either return to dialysis, re-transplantation or death. Data analyzed using Cox regression model adjusted for age at the time of transplantation, sex, race, comorbidity index, body mass index post transplant, primary cause of ESRD, vascular access type, donor type, HLA mismatch, most recent PRA level, pre-transplant dialysis time, and duration of pre-ESRD nephrology care.

Results: Among the study population (n=17,157), 12,428 (72.4 %) patients were initiated on HD with a catheter, 4,090 (23.8%) patients with an arterio-venous fistula (AVF), and 639 (13.7%) patients with an arterio-venous graft (AVG). The rate of kidney allograft loss in AVF and AVG groups was not significantly different from the catheter group (HR 0.82, p = 0.07, and HR 0.68, p = 0.13 respectively). All-cause mortality of patients initiated on HD with AVG (HR 0.761, p = 0.21) was not significantly different compared to patients initiated on HD with catheters. But the all-cause mortality in the AVF group was lower compared to patients initiated on HD with catheters (HR 0.65, p = 0.001).

Conclusion: AVF used at the initiation of HD was associated with lower rate of all-cause mortality after kidney transplantation compared to catheter and AVG. The type of initial vascular access for hemodialysis was not associated with graft survival after the kidney transplantation. If AVF is not feasible, there is no advantage in placing AVG over catheters in prospective transplant candidates.
Poster Presentation
Role of PTA in conjunction with accessory vein obliteration in fistula maturation and survival
Madhavilatha Vuppali, MD, Kenneth Abreo, MD, Sunanda J Ram, PhD
Department of Medicine/Nephrology. Louisiana State University Health Sciences Center, Shreveport, LA, USA

Background: Two major causes of arteriovenous fistula non-maturation are accessory veins, and stenosis. Obliteration of accessory veins is known to help the fistula maturation process, as is percutaneous transluminal angioplasty (PTA) of stenotic lesions. Studies have not examined the role of PTA in conjunction with obliteration on fistula maturation and survival. In this retrospective study we determined whether fistulae that undergo PTA together with obliteration have improved maturation and survival compared to those that undergo obliteration alone.

Materials and Methods: Data was collected from LSU Shreveport interventional nephrology computerized system. Institutional review board approval was obtained. All immature fistulae with first intervention for accessory vein from May ’04 through March ’11 were included in the study. Accessory veins were obliterated either by ligation or coil embolization. Fistulae with significant stenosis (≥50%) were treated with PTA. Dates of fistula procedures, maturation (determined by ultrasound, first use of fistula or catheter removal), and fistula loss or abandonment were noted. Data was analyzed using t-test and Kaplan-Meier survival plots.

Results: A total of 38 patients with immature fistulae underwent accessory vein obliteration during the study. Most patients were black, 47% were female, 66% had diabetes mellitus. Accessory veins were either ligated or coiled at the discretion of the intervention nephrologist. Of the 38 patients, 12 (32%) had significant stenosis requiring PTA (Obliteration and PTA group), 26 (68%) patients had no stenosis, therefore underwent obliteration alone (Obliteration alone group). All obliteration and PTA procedures were 100% successful. Stenosis was 74% before, and 25% after PTA. Over 94% fistulas matured, only 2 fistulas (1 from each group) failed to mature. There was no difference in maturation success between the 2 groups. Fistula maturation time was shorter for the Obliteration and PTA group compared to the Obliteration alone group, but this was not significant (34±16 vs. 71±34 days, P=0.5). Two-year fistula survival in the Obliteration alone group was 89% and Obliteration and PTA group was 100% (NS). Fistulae that had stenosis with accessory veins required multiple PTAs before successful maturation (Maturation procedure rate 0.400 vs. 1.029 PTAs/patient yr). Total PTA rates (0.861 vs. 1.519 PTAs/patient yr, NS).

Conclusion: Stenosis occurred along with accessory veins in 32% immature fistulae in our study. Contrary to our expectations, fistulae with PTA and accessory vein obliteration had maturation and survival similar to fistulae with obliteration alone. As expected, fistulae that underwent initial PTA were more likely to restenose and require additional maturation PTAs compared to fistulae that did not have stenosis to begin with. It is therefore important to address both stenosis and accessory veins in order to maximize fistula maturation.
Background: NKF-KDOQI guidelines recommend that grafts and fistulae undergo routine surveillance for stenosis with preemptive correction of the stenosis. In access flow (Qa) surveillance, the guidelines recommend an intervention referral when graft Qa is <600 ml/min or when Qa has decreased by >25% and falls below 1,000 ml/min, and when fistula Qa is <400–500 ml/min. We performed elective angiography to investigate the rate of significant stenosis according to the monthly surveillance of Qa, when Qa has decreased by >25% in fistulae and grafts.

Methods: In this prospective observational study, the Qa was measured monthly by ultrasound dilution technique (Transonic HD03 hemodialysis monitor; Transonic Systems, Inc., Ithaca, NY). An elective angiography was done when Qa has decreased (ΔQa) by >25%, regardless of absolute Qa value. A significant stenosis was defined as decrease in vessel diameter by > 50%, together with functional improvement of Qa with a successful percutaneous transluminal angioplasty (PTA).

Results: Out of total 68 cases, 51 patients (75%) were male, mean age 62 years old, mean vintage of access 39 months, 37 (54.4%) diabetics, 47 (69.1%) fistulae, and 42 (61.7%) accesses were on the forearm. At the time of angiography, the Qa has decreased from 874±361 ml/min to 536±300 ml/min (-39.1%) in the fistulae, and from 989±330 ml/min to 639±268 ml/min (-37.5%) in the grafts. Elective angiography revealed a significant stenosis in 43 out of 47 cases (91.5%) in the fistulae and in 21 out of 21 cases (100%) in the grafts. In the fistulae, a significant stenosis was found in all cases with Qa < 400ml/min + ΔQa > -25% or with Qa > 400ml/min + ΔQa > -30%. In addition, in the 19 cases out of 43 fistulae with a significant stenosis, the Qa at the time of PTA was >500 ml/min. The ΔQa in 4 cases of fistulae without a significant stenosis was between -25% and -30%. In the grafts, a significant stenosis was found in all cases with ΔQa > -25%, even when the Qa was > 600 ml/min (11/21 cases) or > 1,000 ml/min (2/21 cases). The serial change of Qa in all cases was 910±408 ml/min (previous month of PTA), 567±292 ml/min (at the time of PTA), and 960±374 ml/min (after PTA). The location of stenosis was outflow (84.1%), inflow (2.3%), and mixed (13.6%) in the fistulae, and outflow (100%) in the grafts.

Conclusions: Although it remains unclear that preemptive angioplasty improves fistula or graft survival, our study suggests that the patients need to be referred for elective angiography, when Qa has decreased by >30% in fistulae and grafts, regardless of absolute value of Qa, to prevent future thrombosis.
Thrombectomy is a common procedure performed to declot thrombosed dialysis arteriovenous fistula (AVF) or arteriovenous graft (AVG). Complications associated with access thrombectomy like pulmonary embolism (PE) have been reported but paradoxical embolism is extremely rare. We report a case of stroke secondary to paradoxical embolism following thrombectomy of a clotted AVG. A 74 year old man with history of hypertension, atrial fibrillation on coumadin, and end stage renal disease (ESRD) maintained on hemodialysis was referred to an outpatient vascular access center for declotting of his right forearm loop AVG. Thrombectomy was attempted with 4 mg of Alteplase and 8000 units of heparin which were injected into the clotted graft. This was followed by mechanical thromboaspiration of the clot and balloon angioplasty. After completion of the procedure, the patient became lethargic and aphasic with right sided hemiplegia. He was transferred to the emergency room of our hospital where a CT of the brain revealed a hypodensity within the left posterior parietal lobe (Fig 1). Echocardiogram showed a normal sized left atrium without any thrombus with a bubble study confirming the presence of right to left shunting. Atrial Fibrillation was ruled out as a cause of this embolic stroke due to therapeutic INR at time of admission, Echo findings, and the time relationship of stroke with thrombectomy.

Figure 1

Paradoxical cerebral embolism is very rare but can occur after thrombectomy of clotted vascular access in ESRD patients. Clinicians should be alert of this serious and potentially fatal complication of vascular access procedure.
Poster Presentation
Predictors of Arteriovenous Fistula Success in Patients with Advanced Kidney Disease- Nephrologist Perspective
Bhanu K. Patibandla, M.D., Akshita Narra, M.D., Ranil DeSilva, M.D., Varun Chawla, M.D., Yael Vin, M.D., M.P.H., Alexander Goldfarb-Rumyantzev, M.D., PhD.

Background: Following the introduction of the First Fistula Initiative, nephrologists are faced with the challenge of ensuring their patients initiate hemodialysis with a functional fistula. To help guide the complex decision-making regarding access placement in patients with advanced chronic renal failure, this study examined certain factors that are associated with primary fistula success.

Methods: United States Renal Data System from 1/1/2005 through 12/31/2008 linked to Medicare Claims from 1/1/2005 through 12/31/2008 was used to identify the study cohort consisting of patients ≥ 67 years of age, who had an arteriovenous fistula (AVF) as a first access placed prior to hemodialysis initiation (n=21,436). Patients were excluded if they received a renal transplant prior to hemodialysis initiation and also if there was another AVF placed prior to hemodialysis initiation. After these exclusions, the study cohort consisted of 20,360 patients. We defined fistula as successful if the initially placed fistula was used at hemodialysis (n=9,794) and as failure when an arteriovenous graft or catheter was used at the time of hemodialysis initiation (n=10,566). Multivariable logistic regression analysis was used to estimate the independent contribution of specific patient characteristics in predicting the success of the AVF.

Results: Primary AVF success is associated with early fistula placement i.e. more time between the fistula placement and the HD initiation (OR 1.07 per month, p<0.001). Duration of pre-ESRD nephrology care was strongly correlated to the timing of fistula placement and thus a strong independent predictor of AVF success (OR for <6 months, 6-12 months and >12 months compared to no care were 3.22, 3.33, and 4.12 respectively). Glomerulonephritis as the primary cause of ESRD is associated with increased fistula success compared to ESRD due to diabetes (OR 1.22 p=0.01). Following factors are associated with reduced success of AVF: age (OR 0.99 per year, P=0.009), female gender (OR 0.64, P<0.001), black race (OR 0.75, P< 0.001, compared to White), body mass index (≥30kg/m2 compared to <18.5 kg/m2 OR 0.86, P=0.001), history of diabetes (OR 0.84, P<0.001), cerebrovascular disease (OR 0.88, P=0.008), and congestive heart failure (OR 0.77, P<0.001).

Conclusion: We identified multiple factors that are associated with a higher risk of fistula failure in the advanced chronic renal failure population. Specifically, these factors include elderly age, diabetes as a cause of ESRD, female gender, black race, higher BMI and comorbidity level. Better ability in the future to model and predict the success or failure of an AVF based on these results will help to guide the nephrologist caring for this patient population.
Poster Presentation

Management of hypertensive urgency by successful angioplasty and stenting of a chronic total occlusion of the renal artery secondary to Takayasu’s arteritis

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Introduction- Takayasu’s disease is characterized by large vessel arteritis leading to narrowing or occlusion of the involved vessels. It is seen most commonly in people of Asian descent. Case- We present a 17 y/o Caucasian female with Takayasu’s arteritis diagnosed after significant difference in systolic blood pressure (SBP) in her arms was found during a regular school physical. She was treated with steroids and methotrexate along with diltiazem for hypertension. Four months after the initial diagnosis, she presented to the ED with seizures and hypertensive crisis (SBP 200-260 mm) and required intravenous nicardipine, labetolol and hydralazine for control. MRI of head showed posterior reversible encephalopathy syndrome (PRES). Renal ultrasonography showed a small difference in kidney size (left kidney 10.7 cm, right kidney 11.7 cm). MRA showed a long stenotic segment in the left renal artery with superimposed focal ostial stenosis. Her clinical presentation was consistent with malignant hypertension from renal artery stenosis secondary to her primary disease Takayasu’s arteritis. Intervention- An aortogram and renal artery angiogram revealed two renal arteries on the right side. The main right renal artery was free of significant disease. The right inferior pole artery had 60-70% ostial stenosis. On the left, no renal artery could be visualized. The renal artery was completely occluded as opposed to what was demonstrated on MRI. However, a small stump, presumably to the left renal artery was seen. Through the stump a successful recanalization of the left renal artery was done. Following angioplasty, a 3.0 x 28 mm drug-eluting stent was placed across the stenotic segment with resulting good reperfusion of the kidney. Results- There was a dramatic improvement in blood pressure control following the renal artery intervention. Patient was discharged home on only nifedipine and carvedilol for hypertension along with aspirin and plavix with SBP in the 130-140 mm range. Serum creatinine improved from 0.9 on admission to 0.6 mg/dL over four weeks. MRA done 8 weeks after the procedure showed a patent stent in left renal artery. Conclusion- Conventional wisdom suggests that 100% chronic total occlusions (CTO) in the renal arteries are not amenable to intervention. We report the first case of a successful angioplasty and stenting of a renal artery CTO to treat malignant hypertension in the setting of Takayasu’s arteritis.
Novel Approach to Hemodialysis Reliable Outflow Device Placement

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Introduction  Obtaining vascular access in end stage renal disease patients can become complicated after multiple access failures. Through a multidisciplinary approach, new and improved ways to achieve access have been discovered. Patients with severe central vein stenosis or occlusion typically require balloon angioplasty or stent placement. In patients with occluded central veins in whom venous outflow is unattainable, a hemodialysis reliable outflow device, which is a hybrid graft/catheter device, can be placed. Typically, this device is inserted through any large vein to access superior or inferior vena cava and right atrium. At our institution, we were presented with a complex access case that required a unique approach to obtaining an arteriovenous access. Case Presentation  A 26-year old morbidly obese female with end stage renal disease presented with peritonitis and malfunctioning peritoneal dialysis catheter and a small bowel perforation. Peritoneal catheter was removed. She had numerous failed accesses in the past, including AV grafts and tunneled hemodialysis catheters in her upper and lower extremities. She had central vein stenosis including both superior and inferior vena cava stenoses. An attempted hemodialysis reliable outflow device placement using traditional approach had failed in past due to the severe stenosis and the tortuosity of our particular patient’s venous anatomy. She was started on peritoneal dialysis and continued this for approximately one year. She had residual renal function and had satisfactory clearance. Given her difficult access history, discussions were initiated for hospice and end of life care. Fortunately, the patient was able to survive 3 weeks in the hospital on severe dietary restrictions. After further multidisciplinary discussion, an innovative plan for hemodialysis reliable outflow device placement was made. Cardiothoracic surgery along with transplant surgery worked in tandem to do median sternotomy and inserted the device catheter through the infraclavicular space. Pericardium was opened, the atrial appendage was removed and the catheter was placed in the right atrium. Transplant surgery anastomosed a Gore-Tex graft to the brachial artery, and connected this to the catheter component of the device. After 14 days of maturation, the device was accessed successfully. The patient has been dialyzing without problem after a month. Conclusion Central vein stenosis can jeopardize ipsilateral vascular access, but this can be overcome via creative approaches. Multidisciplinary approach, like in our patient, can innovatively create new access. Consideration of all options is essential to enable these patients to receive a life-saving access. Of course, prevention of central vein stenosis with early referral for vascular access placement prior to the initiation of dialysis is the best approach.
Poster Presentation
Timing of Arteriovenous Fistula Placement and its Association with Arteriovenous Fistula Success
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Background: Arteriovenous fistula creation is the standard of care in a patient requiring hemodialysis. However, once the decision to place an arteriovenous fistula is made, there is an uncertainty about the optimal time for its creation in predialysis patients. In this study we aimed to evaluate the association of the timing of an arteriovenous fistula placement prior to hemodialysis with its success.

Methods: We used the United States Renal Data System data from January 2005 through December 2008 and linked it with Medicare Claims from January 2003 through December 2008 and identified 21,436 patients, ≥67 years of age who had a fistula created as the first access prior to hemodialysis initiation. Patients were excluded if they received a renal transplant prior to the initiation of hemodialysis and also if there was another fistula placed prior to hemodialysis. After these exclusions, the study cohort consisted of 20,360 patients. We defined fistula as successful if the initially placed fistula was used at hemodialysis (n=9,794) and as failure when an arteriovenous graft or catheter was used at the time of hemodialysis (n=10,566). Logistic regression model was used with the primary variable of interest being the time between the placement of fistula as the first access and initiation of hemodialysis and the dependent variable being success of the fistula first placed. The model was adjusted for age, sex, race, body mass index, primary cause of ESRD, comorbidities, duration of pre ESRD nephrology care, employment status and substance abuse.

Results: The earlier the fistula is placed prior to hemodialysis the higher is the likelihood of fistula being used at the time of hemodialysis. The odds ratios of a successful fistula when placed 91-180 days, 181-360 days, 361-540 days, and >540 days prior to hemodialysis compared to ≤ 90days, were OR 3.61, p<0.001; OR 3.96, P<0.001; OR 4.39, p<0.001; and OR 4.08, p<0.001 respectively.

Conclusion: Early placement of an arteriovenous fistula even when done approximately 1.5 years prior to initiation of dialysis may be associated with greater primary success rate.
Background: Previous studies have shown that arterio-venous fistulae (AVF) were associated with better survival compared to catheters based on the study designs evaluating mortality in relation to the access type used at the time of hemodialysis (HD) and the access type initially placed prior to HD. In this study, we were aiming to evaluate the mortality outcomes associated with different dialysis access placement strategies to better understand the effect of the access on patient mortality versus the patient selection.

Methods: Study cohort is derived from the United States Renal Data System (1/1/2005-12/31/2008) linked to Medicare claims (1/1/2003-12/31/2008) and included incident ESRD patients ≥ 67 years of age (n=115,425). Initial dialysis access placed prior to HD initiation was identified from the Medicare claims based on appropriate CPT code. In the study cohort, 21,436 patients got AVF as the initial access (AVF cohort), 3,472 patients got AVG as the initial access (AVG cohort), and 90,517 patients got catheter as the initial access (catheter cohort) placed prior to HD. In the AVF cohort, 10,870 patients were initiated on HD with AVF (AVF_AVF), 1,260 patients were initiated on HD with AVG (AVF_AVG), and 9,306 patients were initiated on HD with catheter (AVF_Cath). Further the ‘AVF_Cath’ cohort was stratified based on the presence or absence of the associated maturing AVF or AVG - 6,934 patients had an associated maturing AVF or AVG and 2,372 patients had no associated maturing AVF or AVG. Cox proportional hazard models adjusted for age, sex, race, body mass index, comorbidity index, primary cause of ESRD, and duration of pre-ESRD nephrology care were used to evaluate the mortality outcomes between different study cohorts. In each Cox model, only the groups considered for the comparison were included in the analysis.

Results: ‘AVF_AVF’ has better mortality outcome (HR 0.73, P <0.001) compared to ‘AVF_Cath’. ‘AVF_Cath’ cohort with associated maturing AVF or AVG and ‘AVF_Cath’ cohort without associated maturing AVF or AVG were associated with better mortality outcomes (HR 0.64, P<.001 and HR 0.72, P<.001 respectively) compared to catheter cohort.

Conclusion: 1) While the effect of the selection bias is reduced or minimized by comparing ‘AVF_AVF’ to ‘AVF_Cath’, the differences observed in outcomes can be interpreted as an evidence for the beneficial effect of the access i.e. AVF used at the initiation of HD. 2) Clinical scenario of the patients in the ‘AVF_Cath’ cohort without maturing AVF or AVG is similar to the patients in the ‘catheter’ cohort; both initiate HD with a catheter and without a maturing AVF or AVG with only difference with the AVF_Cath group selected prior for an AVF placement. The difference in results here may suggest different patient characteristics of these subgroups. This quantitative expression of the selection bias may be important to the future design of clinical studies of access strategy and interpretation of past conclusions in the literature.
Poster Presentation
Middle-Pole Approach Ultrasound-Guided Percutaneous Native Renal Biopsy: A Less Penetrative with High-Yield Technique

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Introduction
Renal biopsy (RB) is an essential intervention for tissue diagnosis in various renal diseases. Although there are many methods of renal biopsy, such as percutaneous, open, transvenous, laparoscopic, and transurethral approaches, the most definite choice remains percutaneous renal biopsy (PRB). However, this conventional, lower-pole of native kidney, approach through a mechanical guiding device can get either small number of glomeruli or biopsy complication from too depth of needle tip passage into the kidney, especially in whom having reduced kidney size. We compared between our middle-pole approach, which less distance of penetrated needle tip from renal cortex, and the conventional approach to identify the adequacy of specimens, complications, and patients’ favor by pain scoring scale.

Materials and Methods
Patients were referred for biopsy after review of clinical indications by nephrologist. The only exclusion criterion was single kidney. Patients with high diastolic blood pressure (DBP >95 mmHg), high blood urea nitrogen (BUN >80 mg/dL), or coagulopathy (INR >1.2) were deferred until conditions were well controlled. Twenty nine were participated and randomized into two groups (group A: conventional lower-pole approach, n = 15 and group B: middle-pole approach, n = 14). Biopsies were performed by one nephrologist using free-hand real-time ultrasound guidance with a 16-gauge x 16 cm biopsy needle with a 1.9-cm length of sample notch (MC1616; Bard Peripheral Vascular, Inc., Tempe, AZ, USA). The plane angle between needle and skin were 45 and 30 degree angle for group A and B, respectively. (Fig.1)

Results
All of them were made only three passes at each procedure. All biopsies (100%) resulted adequate tissue for definite diagnosis. Both groups showed non-significant differences in baseline demographics. In group A (n = 15), the average number of glomeruli were 15.3+4.1 (range 7-22) compared with a mean of 22.8+7.2 (range 10-34) glomeruli were present in group B (n=14), p = 0.02, despite diabetic nephropathy and advanced glomerulopathy were diagnosed in 35.7% (5/14) of patients in group B. Three patients (20%) in group A developed frank pain due to perinephric hematoma with response to conservative treatment while one of patients (7%) in group B had minor hematoma, consisting of macroscopic hematuria with resolution within 48 hours without requirement of blood transfusion or intervention. The average distance of needle tip from renal capsule was measured 1.69+0.4 cm and 0.92+0.3 cm in group A and B, respectively (p = 0.03). Finally, the mean of pain scoring scale was 3.89 and 4.11 in group A and B, respectively (p = 0.26).

Conclusion
By combining free-hand real-time ultrasound with our middle-pole approach, we conclude that this technique retrieves more significant adequate tissue glomeruli than the lower-pole approach albeit provides less penetration, with comparable complications and patients’ favor by pain scores.
Successful Outcome of Tunneled Venous Catheters for Dialysis- Single Center Experience from Developing Country

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Background:
Though arteriovenous fistulas (AVF) is the optimal means of dialysis vascular access, most of patients of chronic kidney disease (CKD) in India need central venous catheters for hemodialysis initiation in view of late referral to nephrologists. Thus most of the patients of ESRD require urgent/immediate HD initiation necessitating CVC for emergency vascular access. Formation of AVF and initiation of HD through AVF depends not only upon availability of local vascular surgical expertise, but also on the time required for AVF maturation and associated with primary failure rate of AVF. Non-tunneled catheters are associated with significantly high rates of bacteremia compared to tunneled venous catheters. TVC placement is straightforward, can be performed by nephrologists and they can be used immediately once inserted. Tunneled venous catheters (TVC) have revolutionized issue of vascular access in such scenario.

Materials and Methods:
This prospective study was undertaken to evaluate outcome and complications of TVCs placed by nephrologists in 109 CKD patients (72 males and 32 females) with mean age of 47.5±14.1 years from June 2010 to May 2011. We used Kaplan–Meier survival analysis with log-rank test, to compare the effect of different parameters on catheter survival.

Results:
Most common basic diseases leading to CKD were chronic glomerulonephritis (46.78%) and diabetes mellitus (33%). Right internal jugular vein was preferred site (89.9%) for insertion. Over mean follow up of 8.7 months, complications observed were oozing from exit site (11.9%), bacteremia (8.2%) and mechanical complications (0.9%). Most common reasons for TVC removal were switch to AVF (n=30), renal transplantation (n=28) and death (n=5; not related to TVC). Factors like age, sex, site of insertion and diabetes had no influence on catheter survival. Kaplan-Meier survival analysis showed 95.3% & 62.1% survival rates at 3 and 6 months respectively.

Conclusion:
In a resource limited setting where fistula first initiative is not feasible, we suggest that TVCs could be utilized as a best modality of primary vascular access with acceptable survival rates with lower incidence of bacteremia.
Poster Presentation

Association of maturation period blood pressure with dialysis access patency

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Background: Problematic dialysis vascular access is a major health issue. The purpose of this study is to evaluate for factors associated with access patency, particularly the association of early post-operative, or maturation period, blood pressure with patency. Methods: A retrospective review was performed of patients who had undergone placement of an arteriovenous fistula or graft. Demographic, operative, and post-operative factors were evaluated for possible association with access primary patency using univariate and multivariate Cox regression analyses. Results: Seventy-three patients over a three-year review period were identified for inclusion in the study (fistulas 66%, grafts 34%). Overall analysis for all patients showed significant association of absence of peripheral vascular disease (PVD) (P=0.047), use of aspirin (ASA) (P=0.023), and absence of previous permanent dialysis access (P=0.026) with higher primary patency rates. Fistula subgroup analysis showed that higher blood pressure during the maturation period relative to pre-operative blood pressure was associated with lower patency rates (P=0.019). For grafts, race was significantly associated with patency, with blacks having higher patency rates than whites (P=0.014). Conclusion: Absence of PVD, use of ASA, and absence of previous permanent dialysis access were significantly associated with higher primary patency rates for fistulas and grafts. For fistulas, higher maturation period blood pressure relative to pre-operative blood pressure was associated with lower patency rates. For grafts, black race was associated with higher patency rates, though the validity of this conclusion may be limited by low patient numbers. The finding of an association of maturation period blood pressure with fistula patency suggests that the maturation period environment, specifically hemodynamics during this time, may play an important role in the ultimate patency of a particular permanent dialysis access.
Introduction: The vascular access in children is one of the most difficult obstacles to cross in the coverage of the child in hemodialysis. The difficulties to make an arteriovenous fistula and the difficult access for veins of big diameter for the catheter installation are frequent. Patients and methods: We bring back two observations of children with small weights to whom we set up a tunneled separate catheter. These 02 children aged 6 years (HA) and 8 (SA) and weighing 15 and 16kg respectively. The failure of the peritoneal dialysis was a mechanical cause for the first one and hyperpermeable peritoneum for the second. These patients had multiples central venous stenosis without total obstruction and a 9 french double lumen catheter had a low delivering flow. The catheters used were a mono lumen catheter made by silicone of 9 French with distal connector. The technique consisted has to put two different catheters in two different veins, one in the right jugular vein and the other one in the left jugular vein, or one in right femoral vein and the other one in the left. The tunnelisation of both catheters in the skin was made either in the same exit point for the jugular vein pose or in the thighs or abdomen for the femoral pose. Results: This technique allowed us to put big diameters catheters in every vein without vascular trauma and to have an ideal blood flow delivering for a good purification. We have significant reduction of thrombosis catheters thanks to a big diameter of every catheter with much longer duration of use. Conclusion: The problem main of coverage the child in hemodialysis stays the vascular access, tunneled catheters is an alternative we allow to cross this course while waiting the preparation of an arteriovenous fistula.
Poster Presentation

Predicting Renal Biopsy Complications
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Background: Percutaneous renal biopsy in both native and transplanted kidneys is a valuable tool in the diagnosis of renal dysfunction. However, renal biopsy can result in serious bleeding complications such as hematoma formation, need for blood transfusions, additional surgical procedures including nephrectomy and even death. At our center, kidney biopsies are performed by an interventional nephrologist with standardized guidelines using real-time ultrasound. We hypothesized that patient factors could predict biopsy complications and that a follow up hemoglobin (Hb) 6 hrs and 24 hours post biopsy was predictive of a bleeding complication.

Methods: We retrospectively reviewed 100 patients from January 2005 through June 2011 who underwent renal biopsy by at our center. We collected patient demographics, type of biopsy (native or transplant kidney), administration of antihypertensives, and pre-biopsy blood pressure, creatinine, hemoglobin, platelets, and coagulation factors. Biopsy procedure information including kidney size, needle size, number of passes, number of glomeruli obtained and pathological diagnosis was also collected. A repeat hemoglobin was obtained 6 hours after the procedure and then at 24 hours and blood pressure at 6 and 12 hours post procedure was recorded. Complications and need for additional post-biopsy imaging were noted. A minor complication was defined as one that did not need intervention such as gross hematuria or presence of hematoma < 5 cm. A major complication was defined as any complication that needed intervention such as blood transfusion, transfer to intensive care, nephrectomy or death.

Results: The average age was 47 years, 41 were male, 51 were black, 30 had diabetes and 81 had hypertension. Demographic data were compared using chi – square analysis. 26 patients had a complication; 14 minor and 12 had a major complication including 1 nephrectomy. The only factor that was predictive of a complication was obesity (p =0.09). We then performed a logistic regression of the drop in Hb at 6 and 24 hours to predict any complication. We found that the risk of complication increased by 60% for every 1 g/dL fall in Hb at 6 and 24 hours to predict any complication. We found that the risk of complication increased by 60% for every 1 g/dL fall in Hb at 6 hours (p=0.043). At 24 hours the risk of a complication increased by 58% for every 1 g/dL drop in Hb (p<0.001). However the overall specificity and sensitivity of this measure is low with an ROC value of 0.6.

Conclusions: Obese patients have a higher risk of bleeding after renal biopsy. Serum creatinine, platelets, coagulation factors, blood pressure, administration of anti-hypertensives, needle size and number of passes were not predictive of bleeding complications in our population. A drop in hemoglobin predicts a bleeding complication although the specificity and sensitivity of this is low.
Implantable port catheter system for hemodialysis

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Introduction: The implantable port catheter system for hemodialysis are a new type of vascular access, they are made by a tunneled catheter connected has his distal part by two ports made by titanium with silicone membrane implanted under the skin. Patients and methods: We took care seven patients requiring a permanent vascular access after the impossibility to make an arteriovenous fistula in the two arms. The average age of the patients is 57ans (extreme 45-70). The average duration in hemodialysis is 15 years. The pose of the catheter was made with a fluoroscopy. The vascular access is constituted by double lumen polyurethane split catheter of 14.5 F which presents to its distal extremity two implantable ports made by titanium with silicone membrane (Pakumed) being able to prick until x1000 given to him 4 years of duration life. The prick is made through this membrane by special cannulas with lateral opening after disinfection of the skin. At the end of the session of hemodialysis, the ports are closed by 3.9 cc of an anticoagulant. Results: On these seven patients this implantable ports catheter system allowed us to reach an easy delivering flow between 300 ml/min and 400 ml/min. One patient presented a catheter infection treaty by antibiotics. The patients can take their shower without any constraint. One patient presented a catheter thrombosis after three months of the pose treaty by streptokinase with an excellent result. A single case of tunnel infection was observed requiring the ablation of the catheter. Conclusion: The implantable port catheter system with silicone membrane we we allowed to take in charge the patients where the vascular access had become vital with much fewer infections than tunneled catheters and a better quality of life.
Pre-Existing Venous Calcification Prior to Dialysis Vascular Access Surgery

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**Background:** Vascular calcification has been shown to be present in arterial vessels used for dialysis vascular access, prior to surgical creation of the access. Calcification in the veins used to create a new vascular access has not previously been documented. The objective of this study was to describe the prevalence of calcification in vein samples collected at the time of new vascular access creation.

**Methods:** 67 vein samples, collected at the time of new access creation, were studied. Routine immunohistochemistry, using a von Kossa stain, was performed to quantify calcification. A semi-quantitative scoring system from 0-4+ was used to quantify the percentage positive area (brown or black) as a fraction of total area (0 = 0-10% positive; 1+ = 11-25%; 2+ = 26-50%; 3+ = 51-75%; and 4+ = 76-100% positive) for each vascular layer (endothelium, intima, media, and adventitia).

**Results:** 22/67 (33%) samples showed evidence of calcification[figure1]. Histologic examination showed varying degrees of calcification within each cell layer. Among the subset of patients with calcification, 4/22 (18%), 19/22 (86%), 22/22 (100%), and 7/22 (32%) had calcification present within the endothelium, intima, media, and adventitia, respectively. The mean semiquantitative scores of the 22 samples with calcification for each cell layer were 0.18±0.39, 1.2±0.66, 1.6±0.59, and 0.36±0.58 for the endothelium, intima, media, and adventitia, respectively.

**Conclusions:** Our results are the first to demonstrate that vascular calcification is present within veins used to create new dialysis vascular access. In samples with vascular calcification, the calcification was present predominately within the intimal and medial layers. Important questions that remain to be answered include the pathogenetic role of uremia in the development of venous calcification and the future clinical impact of the magnitude of vascular calcification on vascular access stenosis and outcomes.
Background: The benefits of arteriovenous fistulae (AVF) as the first dialysis access have been demonstrated in the past. Still, large proportions of patients initiate hemodialysis with accesses other than AVF. In this study, we assessed the association of some demographic and clinical factors with the type of initial hemodialysis access placed. Identification of these factors is important so that the potential interventions can be suggested to increase the prevalence of AVF.

Methods: Study cohort (n=111,953) was derived from the United States Renal Data System (USRDS) from 1/1/2005 through 12/31/2008, linked with Medicare Claims from 1/1/2003 through 12/31/2008 and included patients ≥67 years of age. Information regarding the type of first access placed was obtained from the Medicare Claims using appropriate CPT codes. In the database we identified two cohorts: (1) the patients who had a fistula placed or attempted as a first access prior to hemodialysis (n=21,436) and (2) the patients who had a catheter placed as a first access (n=90,517). We used logistic regression model with outcome being AVF as a first access placement compared to a catheter.

Results: Longer duration of pre-ESRD nephrology care significantly increased the likelihood of AVF being the first access placed or attempted. There was an incremental increase in the probability of AVF being the first access placed or attempted associated with increase in duration of the nephrology care (OR for < 6 months, 6-12 months, > 12 months compared to no care were 9.35, 9.78, and 17.21 respectively). Age (OR 0.98 per year; P < 0.001), female sex (OR 0.80; P < 0.001), black race (OR 0.93; P=0.005), history of diabetes (OR 0.79; P < 0.001), history of malignancy (OR 0.91; P=0.003), history of peripheral vascular disease (OR 0.96 P = 0.04), history of cardiac failure (OR 0.62; P < 0.001), and history of cerebrovascular disease (OR 0.88; P < 0.001) are the factors associated with decreased likelihood of AVF as the initial access placement compared to a catheter. In addition, hypertension (OR 0.85; P = 0.007) or glomerulonephritis (OR 0.95; P < 0.001) as the primary cause of ESRD (compared to diabetes as the primary cause of ESRD) are associated with decreased likelihood of AVF as the first access placed. Living in an urban location (compared to rural) was also associated with reduced probability of AVF as the initial access placed (OR 0.81; P < 0.001).

Conclusion: In spite of the increasing efforts to start hemodialysis with an AVF, there still exist sub-populations of patients, with lower probability of AVF placement, namely: elderly age, black race, female gender, and those with greater comorbidities. Our results suggest that longer pre-ESRD nephrology care significantly increases the probability of AVF placement.
Poster Presentation

Surgical Placement of Peritoneal Dialysis Catheter: Nephrologist versus Surgeon

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Background: In terms of the PD catheter insertion, the ISPD guidelines recommend that local expertise at individual centers should govern the choice of method of PD catheter insertion and PD catheter insertion training should be available to all trainees. In addition, the guidelines recommend that surgical support should be available for surgical PD catheter insertion by dissection. In our university hospital (Seoul St. Mary’s Hospital), the surgical PD catheter insertion by dissection has been involved in the nephrology fellowship training program since 1991. The outcome of catheter insertion by a nephrologist trained during nephrology fellowship was compared to that by 4 surgeons in Daejeon St. Mary’s Hospital.

Methods: PD catheter was inserted to 31 patients from April 2010 to November 2011 by a nephrologist. Thirty four patients who received PD catheter insertion by four surgeons from 2007 March to 2010 March were served as control. All catheters were surgically inserted by dissection through the paramedian incision and standard swan neck CAPD catheters were used. We reviewed the early (≤2 weeks after insertion) and late (>2 weeks after insertion) catheter-related complications and catheter revision-free survival rate.

Results: The age, gender, body size and proportion of primary renal disease were not different between nephrologist and surgeon groups. The early catheter malfunction was observed in two (6.5%) patients in nephrologist group, which was significantly lower than surgeon group (29.4%; p < 0.05). The omental wrapping as a cause of early catheter malfunction occurred more frequently in surgeon group than in nephrologist group (0% vs. 17.6%; p = 0.025). The hospitalization day after catheter insertion was shorter in nephrologist group than surgeon group (15.9 ± 4.8 days vs. 22.9 ± 10.8 days; p = 0.001). The early catheter-related infection rate and late catheter malfunction rate were not different between two groups. However, the peritonitis rate in nephrologist group was significantly lower than in of surgeon group (0.11±0.25/person-year vs. 0.50±0.87/person-year; p = 0.016). The catheter revision-free survival rate was 91.1% at 1 year in nephrologist group and 76.2% at 1 year in surgeon group (p = 0.057).

Conclusion: This observational study demonstrates that surgical placement of PD catheter can be successfully done by nephrologist under the well-organized training program and the outcome of PD catheter insertion is dependent on the need, interest, and training rather than technical skill itself.
Introduction: The installation of tunneled hemodialysis catheter with fluoroscopy is a technique which allows the nephrologist to put catheters at patients having venous anatomical varieites, to see a stenosis or a thrombosis, to see the good positioning of the guide wire and finally to have a correct position of catheter hemodialysis. Patients and methods: Our experience concerns 6 patients having benefited a tunneled hemodialysis catheter with fluoroscopy, These 6 patients had all stenosis or venous narrowing not allowing the progression of guide wire. The patients were premedicated with steroids and antithistaminic. After installation the patient we introduce a 5 frech catheter through the which we inject a radiocontrast agent (3cc/sec) while locating on the fluoroscopy the site of the stenosis or if there is a total obstruction. After localisation the stenosis or venous narrowing we make pass the guide wire by several movements of go and come or of rotation, so we shall be on that the sheath dilator will not take a dangerous way. Results: For these patients the installation of tunneled hemodialysis catheter was not possible without fluoroscopy. On the 6 patients, 4 have benefited a tunneled catheter, and both last ones requiring a dilatation procedure. Conclusion: All nephrologists should put catheters with fluoroscopy while waiting to learn the procedure of revascularization and this to give in patients in end stage renal disease the best possible coverage.
Background
Almost 380,000 US patients require hemodialysis treatments to replace lost kidney functions with their access sites prone to reductions in flow and eventual failure over time. Angioplasty remains the standard treatment to prolong the access site. However, the patency of angioplasty is subpar, leading to multiple procedures over time. This need forces physicians to search for new methods to improve both access longevity and economic value.

Our facility has evaluated a new, multi-functional catheter, the GPSCath balloon (Hotspur Technologies, Mountain View, CA). The GPSCath incorporates a valve into the catheter to combine the functions of an angioplasty balloon and an angiographic catheter into one device. We discuss our early experience with the balloon and provide an retrospective analysis of the product’s initial commercial cases.

Methods
Over a 7-month period, 18 institutions performed 141 angioplasties of hemodialysis stenoses in 105 patients using the GPSCath. These cases were evaluated, including 12 GPSCaths used on 6 patients at our facility. All 105 patients were receiving regular hemodialysis treatments via an arm fistula or PTFE graft and were being treated for low flow rates, high venous pressures, or edema. These patients underwent outpatient interventional procedures using traditional techniques.

Upon completion of each PTA procedure, success was defined as <30% residual stenosis, and case notes regarding device performance were noted.

Results
In our facility, the GPSCath was successful in 100% of the 6 procedures with 12 balloons used. The balloons were inflated an average of 7 times per procedure with inflation pressures averaging 18 ATM. Our highest inflation pressure was 24 ATM with a maximum of 13 balloon inflations.

Nationally, success was seen in 97.8% of cases. The balloons were inflated an average of 7 times per procedure with inflation pressures averaging 19 ATM, while maximums reached 14 total inflations and 28 ATM.

Conclusions
During our initial experience, the GPSCath proved to be a potentially valuable tool in treating hemodialysis lesions. This balloon proved effective in reaching the high pressures needed to treat resistant venous stenoses. While currently limited in its size matrix, upon the introduction of additional sizes, the GPSCath can be viewed as a potential first-line option for such procedures.

I also look forward to evaluating the cost savings resulting from the GPSCath’s multi-functionality. During our experience, the injection capability of the GPSCath’s integrated valve allowed for effective contrast delivery. This delivery can potentially decrease catheter exchanges, guidewire adjustment, and the amount of contrast required.

Additional studies are required to quantify this savings, but, if the GPSCath can reduce usage of other items while eliminating procedural steps, it may prove to be a valuable first-line choice due to its combination of cost effectiveness and performance.