

High-Dose Single-Bolus Short-Infusion I Ib/IIIa Inhibition With Tirofiban In Peripheral Interventions

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Background: Glycoprotein (GP) I Ib/IIIa and direct thrombin inhibition (DTI) have shown outcomes benefits during percutaneous coronary (PCI) and peripheral vascular interventions (PVI). Recent reports suggest benefit with high-dose single bolus (HDSB) GP I Ib/IIIa inhibition with limited infusions. HDSB GP I Ib/IIIa and DTI is an attractive treatment strategy for PVI in critical limb ischemia (CLI) which has high incidences of diabetes, small vessel disease, hypercoagulability, platelet dysfunction, thrombus and complications.

Methods: Between October 2005 and January 2007, a CLI treatment group of 98 patients underwent PVI utilizing tirofiban (Aggrastat, Medicure, Inc., Winnipeg, Manitoba) (25 mcq/kg/min) bolus with 6-hr infusion (0.1 mcq/kg/min) and bivalirudin (Angiomax, The Medicines Company, Parsippany, NJ) (0.75 mg/kg/min) bolus with 1.75 mg/kg/min periprocedural infusion (group A). A matched control group B used unfractionated heparin (UFH) without GP I Ib/IIIa inhibition.

Results: Table.

Conclusion: A HDSB I Ib/IIIa and DTI combination is safe and feasible during PVI in CLI with potential outcomes benefits vs. UFH.

Variables	Group A (N= 98)	Group B (N=98)	P-Value
Procedural Success	96 (97.9%)	95 (96.9%)	N/A
VAC (Major)*	0 (0.0%)	2 (2.0%)	0.196
VAC (Minor)**	6 (6.1%)	12 (12.2%)	0.133
Acute Thrombosis (<48 hours)	1 (1.0%)	3 (3.1%)	0.367
Subacute Thrombosis (30 day)	2 (2.0%)	5 (5.1%)	0.283
Secondary re-intervention (6-mo)	9 (9.18%)	16 (16.3%)	0.140
Limb salvage (6-mo)	97 (98.9%)	95 (96.9%)	0.622
VAC = vascular access complications			
*Any surgery, intracranial bleed, stroke, > 5 cm hematoma, pseudoaneurysm, retroperitoneal hematoma, or ≥ 2u procedural related transfusion			
**Any other bleeding or hematoma < 5 cm			

Critical Issues Related to Clopidogrel and Short Door to Balloon Time, Primary PCI

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Purpose: Widespread use of Drug Eluting Stents (DES) and their added expense have squeezed hospital and payer budgets. Newer recommendations for prolonged duration of Clopidogrel use to avoid late stent thrombosis have significantly increased the financial burden on the individual patient too. Are we placing too many DES too hastily in some of these patients? Will they be able to afford a longer duration of expensive (\$4.10/75 mg tablet, Costco Pharmacy) anti-platelet agents? Are there quick questions that may lead to a more appropriate use of DES and of long-term Clopidogrel?

Methods: The financial payer mix from the early Door to Balloon Time, Primary PCI SINCERE (Single INDividual Community Experience REGistry) database is reported. This data was collected from the individual charts and verified separately by interviewing the patient. These procedures were performed at 5 community hospitals in South Florida.

Results: The payer mix of 189 patients who underwent Short Door to Balloon Time, Primary Stenting in SINCERE was: HMO (Managed Care) 37%, Medicare 28%, No Insurance 21%, PPO/Commercial 7%, Medicaid 6%. Ninety-five percent of the procedures were successful. DES was used in 82% of the procedures. A total of 202 DES were used (84 SES, 118 PES). Twenty-six of the 32 (81%) financially vulnerable "no insurance" patients received a DES. It could not be clearly established from the data whether or how many of the patients were inquired about their ability to purchase Clopidogrel for 12-month duration, for the following reasons: 1) As patients are sped through to the cardiovascular laboratory, insurance information is often not available; 2) Patient interaction is often too brief; 3) Ethical reasons of denying care; 4) Hemodynamically or clinically unstable patient; 5) Unavailability of family members.

Based upon these critical observations, we are now practicing a strategy of using DES/long-term Clopidogrel only if the answers to the following five quick questions are a definite "NO": a) Is there any bleeding disorder? b) Any vaginal bleeding or prostate problems? c) Any planned surgery? c) Any major dental procedure planned? d) Lack of insurance? As a result of this strategy, use of DES for the last 50 consecutive Short Door to Balloon Time, Primary Stenting is down to 72%.

Conclusions: In rushed Primary PCI procedures, a well-defined pathway for early recognition of patients who may not be able to afford expensive anti-platelet agents is important. Recent shifts towards using Bare Metal Stents for Primary PCI may offer pragmatic solutions but firmer mandates may be required to adopt this strategy.

The Boomerang Wire Decreases Complications during Peripheral Interventions: A Safety and Efficacy Study

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Background: Vascular access complications (VAC) remain problematic with a reported incidence of 0.4-27% in coronary and 3.5 – 32.7% in peripheral vascular interventions (PVI). Vascular closure devices (VCD) have not decreased VACs. Current VCD limitations include: small vessel size, PVD, non-femoral artery “sticks”, catastrophic failure modes (infection, thrombosis and embolization), impaired reaccess and groin scarring due to VCD debris (metal, sutures, anchors, and collagen wads). A recent report has sited 9 cases of claudication after VCD. The Boomerang Wire (Cardiva Medical, Mountain View, CA) is a novel vascular access management (VAM) system that addresses VCD limitations by converting the existing procedural sheath (6-10 Fr) to an 18-gauge needle size arteriotomy utilizing the natural vessel wall recoil (“Boomerang effect”), facilitating VAM while “leaving nothing behind”.

Methods: From January 1 – June 1, 2006, 53 PVI were performed with VAM using the 610 Boomerang system (6 Fr = 15, 7-Fr = 20, 8-Fr = 18). Each PVI received direct thrombin inhibition and 34/53 (64.1%) GP IIb/IIIa inhibition. VAM outcomes were compared to a matched manual compression (MC) group.

Results: There were no major surgical complications (MSC) with the Boomerang and one MSC in the MC group 1/53 (1.8%). Other variables included: device removal time (DRT) < 2 hrs, time to ambulation (TA) < 4 hrs and length of stay (LOS) < 24 hrs.

<u>Variables</u>	<u>Boomerang</u> N= 53 (%)	<u>MC</u> N= 53 (%)	<u>p-value</u>
Device Success	50/53 (94.3%)* *persistent ooze converted to MC (no complications)	N/A	N/A
Hematoma > 6 cm / Hematoma < 6 cm	1 (1.90%) / 2 (3.70%)	5 (9.4%) / 7 (13.2%)	0.2052 / 0.1607
Retroperitoneal Hematoma	0	2 (3.7%)	0.01270
Infection / A-V Fistula /Pseudoaneurysm	0 / 0 / 0	0 / 0 / 1 (1.8%)	N/A
Average Dwell Time (min)	123.3	298.8	< 0.0001
Average MC (hold) time (min)	12.3	34.5	< 0.0001
DRT < 2 hrs	46 (86.7%)	0	< 0.0001
TA < 4 hrs	33 (62.2%)	4 (7.5%)	< 0.0001
LOS < 24 hrs	29 (54.7%)	9 (16.9%)	< 0.0001

Conclusion: The Boomerang Wire is a safe and efficacious VAM system for PVIs and may decrease VAC while facilitating overall VAM allowing earlier ambulation and discharge.

Safety and Effectiveness of the Power-Pulse Spray in Treating Patients with Recent Onset of Claudication and Limb Ischemia

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Background: Data from the intravascular ultrasound (IVUS) substudy of the Dethrombosis protocol revealed the presence of definite thrombus in 94% of patients with infrainguinal recent arterial occlusions (<6 months). We present data from the Dethrombosis Registry on the effectiveness and safety of the Power-Pulse Spray (P-PS) and rheolytic thrombectomy (RT) in treating thrombus within these lesions.

Methods: The Dethrombosis Registry is a 2-center, prospective, open-label registry testing the effectiveness and safety of the power-pulse spray (P-PS) technique in treating patients presenting with recent (< 6 months) onset claudication or ischemia using t-PA or TNK. Patients are included if they are > 18 years of age and able to provide written informed consent. The study is approved by the Institutional Review Board. Patients are excluded if angiography reveals a less than occluded or subtotally occluded vessel, bleeding disorder or the inability to take an ADP receptor antagonist. All patients are pretreated with Plavix 600 mg and aspirin. Data on thrombus resolution using IVUS and angiographic assessment from the first 17 treated patients in this registry are presented. The primary angiographic endpoint of the study was acute procedural success (<30% residual with TIMI-III flow). The primary clinical endpoint was the 30-day combined rate of procedure-related death, stroke, unplanned amputation, and unplanned urgent revascularization. Safety endpoints included 30-day major bleeding, distal embolization requiring pharmacologic or mechanical therapy, vascular complications, renal failure and minor bleeding.

Results: IVUS data was present post P-PS and RT on 16 patients. In 10/16 (62.5%) patients the thrombus was partially resolved. In 5/16 (31.25%) there was no change in the thrombus appearance by IVUS. In 1 patient (6.25%) the thrombus appeared to have completely resolved. Angiographically and post P-PS and RT 14 patients showed intraluminal haziness consistent with thrombus versus 7 patients pre treatment. This apparent increase in angiographic thrombus inversely correlated to the IVUS findings indicating it mostly represents contrast dye around partly resolved or loosened thrombus. Embolization occurred in 3 (17.6%) patients with no clinical adverse events. One (5.9%) patient returned 15 days post procedure with an unplanned urgent revascularization. The latter had a clotting disorder and was non compliant with his Coumadin. One (5.9%) patient had transient renal insufficiency requiring delayed hospitalization. The primary clinical endpoint was met in 1 /17 (5.9%) patients. After final definitive treatment of the vessel with stenting acute procedural success was 100% with no angiographic filling defects seen.

Conclusion: The application of the P-PS and RT in subacute (>24 hours, <1 month) and chronic (> 24 hours, <6 months) thrombotic lesions leads to partial thrombus resolution in approximately 2/3 of patients treated. Embolization occurred in 3/17 cases with no subsequent adverse clinical events. Treatment was completed in a single-session without the need for subsequent catheter-directed thrombolysis. The overall outcome of patients was favorable with excellent acute procedural results and favorable 30-day outcomes.

Patterns Of Alcohol Use And Alcohol Knowledge Between Students Entering And Exiting A Nursing Program

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Introduction: The drinking patterns of college students in the United States have been documented and characterized over the past twenty years. Engs and Hansen (1994) reported that about 80% of all college students consume alcohol and about 20% have a pattern of heavy drinking. Nursing students are members of the college community as well as their community of origin. They are subject to the pressures, traditions, and life styles of these environments. In Southern Louisiana, the Cajun culture fosters the liberal use of alcohol as part of its celebrations and life style. Alcohol abuse by student nurses poses risks to themselves and others, including patients and nursing faculty, and the university. It is essential for nursing faculty to learn of the pattern of alcohol use and knowledge of alcohol among nursing students because alcohol can lead to impaired functioning and jeopardize the public safety.

Design: A comparative descriptive survey design was used to compare the knowledge about alcohol and pattern of alcohol used between student nurses as they enter and exit a professional nursing program.

Sample: A convenience sample of 124 entering baccalaureate nursing students and 49 exiting nursing students, who agreed to participate, were included in the study which was conducted in Fall 2001 in a university.

Methods: A quantitative design using a cross-sectional 70-item questionnaire developed by Eng & Hanson (1994) was used.

Findings: The findings revealed that the patterns of drinking alcohol were different between freshmen and seniors. Over 27% of freshman drank three or four cans of beer at any one time as compared to 12% of seniors. Freshmen (20%) and seniors (10%) drank spirits, such as whiskey, every day. Freshmen (10%) reported consuming 5 or 6 drinks of liquor at any one time; only one senior acknowledged this amount of liquor consumption. There was not a statistical difference between the knowledge about alcohol between the entering freshman and exiting seniors.

Conclusions: The drinking patterns of college students enrolled in nursing are compatible with national findings about alcohol use on campuses. There was a higher use of alcohol among freshman than senior nursing students. Knowledge about alcohol was the essentially the same for both groups of students.

Implications: Students that are at risk for alcohol abuse have the potential to harm the profession of nursing, its mission, and the public trust. This study reinforces the need for nursing faculties to recognize the potential for alcohol abuse among their students and the rationale for developing early screening and treatment programs for students with an alcohol problem.

Vascular Access Management in Peripheral Vascular Disease: Results of a Multiple Site Boomerang 610 Safety and Feasibility Registry in 232 Peripheral Vascular Interventions

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Background: The incidence of vascular access complications (VAC) after percutaneous peripheral interventions (PPI) has been reported between 3.5 – 32.7%. Peripheral vascular disease has been considered a relative contraindication for use with our current vascular closure devices (VCD) due to the high incidence of vascular calcifications, small femoral artery size and the risk of retained endoluminal and extraluminal VCD debris including sutures, staples, anchors and collagen. Few data exists regarding the safety and feasibility of VCD use in the > 6-8 Fr PPI. The Boomerang 610 Wire (Cardiva Medical, Mountain View, CA) is a novel vascular access management (VAM) system that addresses VCD limitations by converting the existing procedural sheath (6-10 Fr) to an 18-gauge needle size utilizing natural vessel wall recoil (“Boomerang effect”) and facilitating VAM while “leaving nothing behind”.

Methods: 232 PPIs were analyzed from a multiple site Boomerang 610 Registry for safety and feasibility variables. Sheath sizes used included 5 Fr (12), 6 Fr (95), 7 Fr (81) and > 8 Fr (34), ≥ 9 Fr (10). GP IIb/IIIa inhibition occurred in 40/232 (17.2%) and direct thrombin inhibition in 77/232 (33.1%).

Results: See table.

Safety and Feasibility Variables	<i>Boomerang</i> N= 232 (%)
Device Success	221/232 (95.2%)* * persistent ooze converted to MC (no complications)
Major Surgical Complications	1 (0.43%)
Hematoma > 6 cm	5 (2.15%)
Hematoma < 6 cm	9 (3.87%)
Retroperitoneal Hematoma	0
Infection	0
A-V Fistula	0
Pseudoaneurysm	0
Procedural Related Blood Transfusion	2 (0.86%)
Average Dwell Time (min)	120.5
Average MC (hold) time (min)	12.1

Conclusion: The Boomerang 610 Wire was found to be a safe and feasible vascular access management system in this multiple site study evaluating peripheral vascular interventions. The incidence of VAC in this cohort of 232 PPI patients was significantly less than other PPI published data.

Aspiration Catheters Appear more Suitable than Bulkier Atherectomy Devices for Short Balloon Times - Mandated Primary Stenting

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Purpose: Thrombus is often present in lesions associated with STEMI that are treated with Primary Stenting. Although mechanical atherectomy devices are effective in debulking the thrombus, their preparation and use is time-consuming and it constrains in achieving low door to balloon reperfusion times. Several newer, low-profiles, aspiration catheters may provide more efficient debulking.

Methods: The Short Door to Balloon Time, Primary PCI SINCERE (Single Individual Community Experience Registry) was explored for use of debulking devices. This database comprises of 189 patients expediently treated with Short Door to Balloon Times with Primary Stenting at 5 community hospitals in South Florida. All procedures were performed by a single, experienced individual and consisted of 164 procedures performed within the last 12 months.

Results: Debulking of thrombus was performed either with a mechanical atherectomy device (11 procedures, 7%) or with 3 available aspiration catheters (68 procedures, 36%). In 5 procedures with aspiration catheters, additional mechanical devices were used because of either failure to debulk (2 procedures) or because of insufficient debulking (3 procedures). Stenting was successful performed for these 5 patients. Based upon this experience, in the last consecutive 100 procedures, aspiration catheters have been used as first line strategy (38% of the last 100 procedures and 56% of the last 50 procedures). This transition coincided with lowered door to balloon time guidelines from 120 to 90 minutes. The present strategy includes: 1) debulking all STEMI lesions with TIMI flow 0 or 1 with aspiration catheters; 2) substituting a different aspiration catheter if this catheter fails; 3) using mechanical devices if both catheters fail or if bulky thrombus is visible. If there is a doubt about the guidewire to be in the true lumen, a quick, low-pressure inflation is performed with a small balloon catheter prior to using an aspiration catheter. Using this strategy, procedure success (relief of chest pain, ST segment resolution, TIMI 3 flow, myocardial blush grade 3) was achieved in 95% of these 189 STEMI procedures. Seven patients expired - all these patients had cardiogenic shock; the remaining 182 patients were discharged from the hospital. Door to Balloon Time of <120 minutes were achieved in the majority of patients and <90 minutes in 62%. Procedure time (groin stick to reperfusion) of <20 minutes was achieved in the overwhelming majority of procedures. Primary stenting was performed in 182 of 189 procedures (96%), and DES in 154 procedures (82%).

Conclusions: Aspiration catheters provide excellent debulking of thrombus for lesions treated with Primary Stenting. Their use is efficient and should be considered prior to the use of mechanical atherectomy devices for treating this cohort.

Targeted Renal Therapy and Contrast-Induced Nephropathy in Peripheral Vascular and Coronary Interventions and Beyond! A Safety and Feasibility Report

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Introduction: Chronic renal insufficiency (RI) associated with and without contrast-induced nephropathy (CIN) significantly increases the risks during cardiovascular interventions. The incidence of CIN after percutaneous coronary intervention (PCI) is 14-37% with in-hospital mortalities of 7.1-35.7% with dialysis with an increased 1-yr mortality. No data exists implicating the role of CIN during percutaneous peripheral interventions (PPI) despite a higher incidence of diabetes and pre-existing RI in the PPI population. Preprocedural RI and diabetes are known to increase the risk of CIN during PCI by 50%. Targeted renal therapy (TRT) is an emerging therapy for CIN prevention where direct high-dose intrarenal artery infusions of fenoldopam (FEN) (Corlopam, Abbott Labs, Abbott Park, IL), a short-acting selective dopamine-1 agonist and vasodilator is delivered by the FDA-approved 5-Fr Benephit PV Infusion System (Flowmedica, Inc. Fremont, CA). TRT has been shown to increase the glomerular filtration rate by 25% versus IV FEN and is being investigated in PCI, PPI, CABG and EVAR.

Methods: From October 1, 2005 - June 1, 2006, TRT with FEN 0.2-0.4 mcg/kg/min was used to treat a variety of high-risk RI and CIN patients during PPI (N = 48) and PCI (N = 12). TRT durations ranged from 1- 12 hrs delivered via femoral (N = 50) and brachial (N = 10) approach. The serum creatinine (Cr) ranged from 1.4-3.2 mg/dL (mean = 1.9) and Cr clearance (CrCl) from 12-56 mL/min (mean = 34). Safety and feasibility variables were analyzed including serial Cr and CrCl.

Results: There were no major vascular access or device complications. The time to TRT catheter placement ranged from 0.5-8 min (mean = 2.5). 57/60 (95%) patients did not develop CIN or > 25% increase in serum Cr despite a predicted rate of > 50% by the Mehran score. CIN occurred in 3 cases, which 2 resolved in 1 wk, and 1 required 72 hrs dialysis for volume overload. In that case, TRT was restarted during dialysis facilitating recovery.

Conclusion: TRT is a safe and feasible therapy for CIN prevention during PCI and PPI in patients at high-risk for worsening RI and CIN. Our larger 12-mo experience with updates on multicenter randomized PPI, PCI, CABG and EVAR trials will be presented.

“The “Soft Total Contact Cast”: A Novel Method for Functional Offloading”

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Abstract: To illustrate a novel method of offloading that is simple, effective and reproducible and that provides improved compliance in the treatment of lower extremity wounds.

Background: Effective offloading of plantar foot ulcers is a challenging and critical component of successful wound healing. For offloading to be optimal, it must be continuous, and well tolerated while reducing focal pressure at the ulcer site. Various factors must be considered when choosing the type of offloading method to be employed in each patient, including ambulatory status, stability of gait, functional independence and level of perceived compliance to name a few. The “Soft Total Contact Cast” is a method of offloading that has borrowed components of the traditional total contact cast.

Materials/Methods: The “Soft Total Contact Cast” is comprised of the following materials: lamb’s wool, cast padding, adhesive felt padding, ABD pad and 4x4 gauze, Una boot, and self -adherent compression bandage. It is not time intensive and does not require costly materials to apply. It has been utilized in more than one thousand applications, is well tolerated, and has been shown to be an effective method for offloading. It has also been used, in conjunction with a variety of primary dressings, bi-layered living skin substitute, and vacuum assisted closure.

Discussion/Conclusion: The “Soft Total Contact Cast” provides critical offloading for ulcers, including in the pre and post skin substitute setting. It is not intended to provide the same degree of offloading as a traditional total contact cast or any removable walkers or orthoses. It does provide a “real world solution” to offloading on patients who are at greater risk of falling. It has proven invaluable on patients who may not be candidates for total contact casting. It is well tolerated, comfortable and provides compliance and offloading from the time of application. There is a reduced chance of disuse atrophy or contralateral knee or hip pain, as gait is not significantly altered.

Patients ranging in ages from the 30’s through the 90’s have utilized the “Soft total Contact Cast” and it has been used in over 1,000 applications. It is not indicated where critical limb ischemia or other concern for significant peripheral arterial disease is present. It is not recommended where infection is present or in heavily exudating wounds. It is recommended that the Soft Total Contact Cast be changed at least once weekly, with a preference of the author towards twice-weekly changes.

Prevalence of Thrombus in Patients with a Recent History of Claudication or Rest Limb Pain: An Intravascular Ultrasound Assessment

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Background: Patients with peripheral arterial disease (PAD) consists of a high proportion of patients with cardiac diseases, heightened inflammatory state, diabetics, hyperlipidemics and smokers, all conditions associated with a hypercoagulable state. We present a preliminary analysis of the first 17 patients enrolled in the Dethrombosis Registry.

Methods: The Dethrombosis Registry is a 2-center, prospective, open-label registry testing the effectiveness and safety of the power-pulse spray (P-PS) technique in treating patients presenting with recent (< 6 months) onset claudication or ischemia. Patients are included if they are > 18 years of age and able to provide written informed consent. The study is approved by the Institutional Review Board. Patients are excluded if angiography reveals a less than occluded or subtotally occluded vessel, bleeding disorder or the inability to take an ADP receptor antagonist. The first 20 patients in this registry will be undergoing intravascular ultrasound at baseline and after treating with the P-PS to assess the presence of intraluminal thrombus by an experienced operator. An intraluminal thrombus is defined as a discrete intraluminal, typically heterogeneous density that is attached to an intact intima or that partially or completely resolves with the P-PS treatment. Thrombus presence was labeled as definitely present (intraluminal on an intact intima), likely to be present (intraluminal, mobile but not clearly attached to an intact intima), definitely not present (does not meet any of the above criteria). Furthermore, the following modified TIMI thrombus scale is used to determine the presence of thrombus angiographically: Grade 0, no thrombus; Grade 1, thrombus suspected but not definite; Grade 2, thrombus is definite with a hazy filling defect and with linear length less than or equal double the reference vessel diameter; Grade 3: thrombus is definite with a hazy filling defect and with linear length more than double the reference vessel diameter. The first 17 consecutive patients (subacute and chronic) that have consented to the study have been enrolled in this registry and form this preliminary report.

Results: At baseline 16 of 17 (94%) patients had a definite thrombus seen by IVUS. In 1/17 (6%) patient thrombus was likely to be present by IVUS. Angiographically, 2 patients (11.8%) had a definite Grade III thrombus and 5 patients (29.4%) had a Grade I thrombus.

Conclusion: Thrombus was present in all patients with recent (<6 months) onset claudication or ischemia (Definite in 94%, likely present in 6%) and is generally largely underestimated by angiography alone. Future research needs to focus on the significance of these thrombotic occlusions and therapeutic implications.

Contrast Echocardiography for Right-Sided Heart Conditions

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Contrast echocardiography (CE) is a safe, effective technique for evaluating the endocardial border and left ventricular function in patients with suboptimal noncontrast echocardiograms. However, its use for diagnosing right heart conditions is less well established. In this article, we report our experience with the use of CE for diagnosing 3 distinct right-sided heart conditions in patients with suboptimal echocardiograms. In these cases, contrast echocardiography was successfully used to diagnose right heart abnormalities in patients with poor quality echocardiograms. Further studies should be done to validate the use of contrast echocardiography for diagnosing right heart pathology.

Non-Invasive 64-Channel Multidetector Computed Tomography Angiography in Peripheral Arterial Disease: A Validation Study in the Treatment of Femoral, Popliteal, and Infrapopliteal Disease

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Background: Conventional diagnostic angiography (CDA) with digital subtraction angiography (DSA) remains the “gold standard” for superficial femoral (SFA), popliteal (PA), and infrapopliteal arterial imaging but with significant limitations. 16-channel multidetector computed tomography angiography (MDCTA) has multiple advantages versus CDA/DSA and has been validated in infrainguinal arterial imaging. Few validation data exists regarding the role of 64-slice MDCTA in the diagnosis and treatment of infrainguinal disease. Recent critical limb ischemia (CLI) data suggests there are an estimated 220-240,000 major and minor amputations yearly in the US/Europe and < 30% have CDA/DSA before amputation oftentimes due to the known CDA/DSA limitations. MDCTA may provide an accurate, non-invasive tool in the diagnosis and management of infrainguinal disease.

Methods: Between January 2006 and April 2007, an anatomic validation analysis (% stenosis correlation between preprocedural 64-slice MDCTA with periprocedural CDA/DSA) was performed in 124 patients (248 limbs) undergoing treatment for CLI. Arteries analyzed include: 248 each of the SFA, PA, and infrapopliteal including tibioperoneal trunk (TPT), anterior tibial (ATA), and posterior tibial (PTA). Protocols exist for limb vessel imaging for 16-slice MDCTA but may need revision for the enhanced speed of a 64-slice MDCTA unit. Revisions included an immediate second below-the-knee scan with an 8-10 second initiation scan delay and an ejection rate of 4 cc's/sec for a total of 100 cc contrast with a 40 cc saline chase.

Results: 64-slice MDCTA revealed very strong correlations with CDA/DSA in SFA ($r^2 = 0.926$), PA ($r^2 = 0.919$), TPA ($r^2 = 0.907$), ATA ($r^2 = 0.920$), and PTA ($r^2 = 0.894$). MDCTA facilitated the diagnosis, planning and overall treatment in CLI.

Conclusion: MDCTA is accurate in imaging diseased SFA, PA, and infrapopliteal arteries with minor protocol revisions therefore the advantages of 64-channel high-resolution output are applicable to non-cardiac infrainguinal peripheral vascular disease. MDCTA plays a significant role of the overall management of patients with infrainguinal arterial disease.

Main Branch and Side Branch Stenting versus Provisional One Branch Stenting for Bifurcating Coronary Lesions using the Paclitaxel Drug-Eluting Stent: a single Center Experience with Intermediate term follow-up

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Background: Multiple strategies have been proposed to treat bifurcating coronary artery disease including both main branch (MB) stenting and side branch (SB) stenting (MBSB) or one branch stenting with Provisional Stenting of the Other Branch (PSOB). We present our own experience with MBSB stenting versus PSOB using the TAXUS paclitaxel-drug eluting stent (DES) (Boston Scientific). The study was approved by the Institutional Review Board at our center.

Methods: Five hundred and eighteen consecutive patients with de novo lesions underwent bifurcating stenting in 2005 at our institution using the Taxus stent (86 PSOB, 432 MBSB). Follow-up data on 312 (60.2%) patients was achieved using phone interviews and review of medical records (52 PSOB, 260 MBSB). Mean follow-up was 6.7 months. Plavix and aspirin were ordered for at least 6 months post procedure. The primary endpoint of the study was the combined endpoints of cardiac death, non-fatal myocardial infarction (ST elevation MI and non ST elevation MI) and target lesion revascularization (TLR). Secondary outcomes included the individual endpoints of death, cardiac death, AST, TVR, TLR, ST elevation MI (STEMI) and non-ST elevation MI (NSTEMI).

Results: Demographic, clinical and angiographic variables were not statistically different between the 2 groups. Procedural success (< 30% residual) was 98% and 94% in the MB and SB in the MBSB group and 100% and 94.4% in the MB or SB respectively in the PSOB group. Kissing balloon was performed in 76 % of lesions treated. Long term outcomes between MBSB and PSOB were statistically similar and are shown in the table below:

	N	MBSB	N	PSOB
TLR	260	7.3	52	3.8
TVR	260	13.5	52	5.8
AST	260	1.2	52	1.9
Death	260	6.3	52	3.8
Cardiac Death	255	3.1	52	1.9
Acute NSTEMI	253	0.4	52	1.9
Acute STEMI	254	2.4	52	0.00
Combined Primary Endpoint	260	10.8	52	5.8

Conclusion: Both MBSB and PSOB with the Taxus DES offer good Intermediate term outcomes compared to historic controls with bare metal stenting. A strategy of PSOB provides similar intermediate term outcomes to MBSB stenting.

Chronic Mesenteric Ischemia: Experience with PTA/Stenting in Celiac and SMA Disease in 99 Patients

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Background: Surgical revascularization for chronic mesenteric ischemia (CMI) is effective but carries high mortality (3-14.7%) and morbidity (8-44.7%). Recent natural history reports suggest CMI to be poorly understood, rarely diagnosed, have variable symptoms and approximately 30% progress to acute mesenteric ischemia with mortalities > 50% within 18-24 months if untreated. Percutaneous balloon angioplasty (PTA) alone carries a high recurrence rate (12-60%; mean = 26%). Sparse data exists regarding PTA/stenting in CMI therefore we report our immediate, intermediate and long-term experience.

Methods: Between January 1998 and April 2007, 99 visceral artery stenosis [60 superior mesenteric (SMA) and 39 celiac artery (CA)] in 65 patients underwent PTA/stenting. Abdominal pain and weight loss were present in 91/99 (92%) and 86/99 (87%) respectively. A transfemoral approach was successful in 54/60 (90%) SMA and 34/39 (87%) CA with 11/99 (11%) requiring transbrachial vascular access. 60/99 (61%) vessels had 6-month duplex ultrasound (DU) and 44/99 (44%) angiography at a mean follow-up (FU) of 28 months (range 7-69).

Results: Immediate procedural success 95/99 (96%) with > 90% clinical success; pain relief 87/91 (96%) and weight gain 78/86 (91%). There were no 30-day periprocedural deaths or major complications with 5/99 (5%) minor (< 2 cm) vascular access hematomas. 17/85 (20%) vessels available for objective FU developed > 50% restenosis by DU and angiography. 13/17 (76%) underwent successful repeat percutaneous revascularization [4/17 (24%) were treated conservatively]. The 1, 2, and 3-year symptom free survival rates were 70/75 (93%), 49/56 (88%), and 31/38 (82%) respectively.

Conclusion: Superior mesenteric artery and celiac artery PTA/stenting is a safe and effective treatment for CMI offering excellent procedural success and acceptable intermediate term clinical success. Restenosis rates of 15-20% do occur, potentially requiring secondary reinterventions.

DES Use for Short Door to Balloon Time, Primary Stenting and Risk of Stent Thrombosis: Results from the SINCERE Database

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Purpose: To examine the use patterns of Drug Eluting Stents (DES) for performing Short Door to Balloon Time, Primary PCI and to explore the incidence of stent thrombosis in this cohort.

Methods: 189 Short Door to Balloon Time, Primary Stenting procedures are recorded in the Primary PCI SINCERE (Single INdividual Community Experience REgistry) database. Of these, 164 procedures were performed in the last 12 months. These procedures were performed at 5 community, non-teaching hospitals in the defined geographic population of South Florida.

Results: Of these 189 procedures, 180 (95%) were successful (relief of chest pain, ST segment resolution, TIMI 3 flow, myocardial blush grade 3). In 181 procedures, PCI was performed of a sole "culprit" lesion; in the remaining 8 procedures, an additional lesion was treated to avoid imminent closure. Seven patients expired; all these patients presented with cardiogenic shock. One patient had an abrupt occlusion of his stent and was successfully treated with PCI. Primary stenting was performed in 180 of 189 procedures (96%). Of the 180 Primary Stenting procedures, 34 procedures were performed with the use of Bare Metal Stents (BMS). Six additional procedures were performed using both a combination of a DES and a BMS. A total of 155 of 189 patients (82%) were treated with DES; however, there appears a trend towards decrease of DES - for the last consecutive 50 procedures, the use of DES is 72%. In 40 procedures (21%), multiple DES stents were used; in 4 patients a combination of a Sirolimus DES (SES) and a Paclitaxel DES (PES) was employed. There were a total of 202 DES used: 84 SES and 118 PES. Although there was no significant operator bias for using either a PES or SES, at two of the five institutions, only a PES was available for use. Bivalirudin was chosen as an anticoagulant for all procedures. Seventy percent of the procedures employed a Platelet Glycoprotein IIb/III a Receptor Antagonist: Abciximab 61%; Integrilin 9%. All patients received a bolus of at least 300 mg of Clopidogrel and they were discharged on a regimen of 325 mg Aspirin and 75 mg Clopidogrel for a strictly recommended duration of 12 months. There was no subacute stent thrombosis in the entire cohort. Preliminary results demonstrate no late thrombosis either. Final results for this critical determinant are in progress.

Conclusions: DES are commonly used to perform Short Door to Balloon Times, Primary Stenting and their use does not appear to be associated with stent thrombosis.

Intermediate Term Outcomes with Bifurcating Coronary Lesions Stenting using the Paclitaxel Drug-Eluting Stent: a Single Center Experience

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Background: Percutaneous treatment of bifurcating coronary artery disease is complex and, in the era of bare metal stents (BMS) was reported to have a high rate of repeat target lesion revascularization (TLR). Drug eluting stents (DES) have been used in the treatment of bifurcating coronary lesions with overall better outcomes than BMS. Short and long term acute stent thrombosis (AST) ranging from 1.7 to 4.3% has been reported with bifurcating DES and remains a concern in treating these patients. In this report, we present intermediate term outcomes with bifurcating coronary artery stenting using the TAXUS paclitaxel-DES from our own center. The study was approved by the Institutional Review Board.

Methods: Five hundred and eighteen consecutive de-novo bifurcating stenting procedures were performed in 2005 at our institution using the Taxus DES. Follow-up data on 312 (60.2%) patients was achieved using phone interviews and review of medical records at a mean of 6.7 months. Patients were treated with aspirin and clopidogrel for at least 6 months. The primary endpoint of the study was the combined endpoints of cardiac death, non-fatal myocardial infarction (ST elevation MI and non ST elevation MI) and target lesion revascularization (TLR). Secondary outcomes included the individual endpoints of death, cardiac death, AST, TVR, TLR, ST elevation MI (STEMI) and non-ST elevation MI (NSTEMI) on intermediate term follow-up.

Results: The following bifurcating stenting techniques were utilized: T-stenting 43.9%, v-stenting 30.1%, crush 0.4%, culotte 0.2%, Y stenting 3.9% and one branch stenting 16.7%. Kissing balloon was performed in 76% of patients. The mean age of the patients was 66 ± 12 years. The procedure was elective, urgent and emergent in 65.4%, 24.9% and 9.7% respectively. Acute procedural success was 95% (main branch 99%, side branch 95.9%). The bifurcation lesions were located in the LAD/D 50.7%, LCX/OM 26.7%, LAD/LCX 13.5%, PL/PDA 6.6%, Others 2.5%. Intermediate term outcomes with bifurcating DES are shown in the table below:

	Percentage
TLR	6.7
TVR	12.2
AST	1.3
Death	6.1
Cardiac Death	2.9
Acute NSTEMI	0.7
Acute STEMI	2.0
Combined Primary endpoint	9.9

Conclusion: The Taxus DES carry good intermediate term outcomes in the treatment of bifurcating coronary lesions compared to historic controls with BMS with low TLR, TVR and overall primary combined endpoint. Stenting of bifurcating lesions using the Taxus DES appears to be a feasible strategy to treat this complex coronary anatomy.

Contrast-Induced Nephropathy & Targeted Renal Therapy in Peripheral Vascular Disease: A 24-Month Experience

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Background: Chronic renal insufficiency associated with and without contrast-induced nephropathy (CIN) significantly impacts outcomes during cardiovascular interventions. The incidence of CIN after percutaneous coronary intervention (PCI) is 14-37% with in-hospital mortalities of 7.1-35.7% with dialysis. Preprocedural renal insufficiency and diabetes are known to increase the risk of CIN during PCI by 50% and negatively impact outcomes during endovascular abdominal aneurysm repair (EVAR). No data exists implicating the role of CIN during peripheral vascular interventions (PVI) despite a higher incidence of diabetes and pre-existing renal insufficiency. Targeted renal therapy (TRT) is an emerging therapy for CIN prevention where direct intrarenal artery infusions of fenoldopam (FEN) (Corlopam, Abbott Labs, Abbott Park, IL), a short-acting selective dopamine-1 agonist and vasodilator is delivered by the FDA-approved 5-Fr Benephit PV Infusion System (Flowmedica, Inc. Fremont, CA). TRT has been shown to increase the glomerular filtration rate by 25% versus IV FEN and is being investigated in PCI, PVI, and EVAR.

Methods: From October 2005 - April 2007, TRT with FEN 0.2-0.4 mcg/kg/min was used to treat a variety of high-risk patients during PVI (N = 74) and EVAR (N = 14). TRT durations ranged from 1- 18 hrs delivered via femoral (N = 55) and brachial (N = 19) approach. The serum creatinine (Cr) ranged from 1.3-3.4 mg/dL (mean = 1.9) and Cr clearance (CrCl) from 12-59 mL/min (mean = 35). Safety and feasibility variables were analyzed including serial Cr and CrCl.

Results: There were no major vascular access or device complications. The time to TRT catheter placement ranged from 0.5-8 min (mean = 2.5). CIN or > 25% increase in serum Cr did not develop in 80/89 (89.8%) despite a predicted CIN rate of > 50% by the Mehran score. CIN occurred in 9 cases, which 7 resolved within 2 wks, and 1 required 72 hrs dialysis for volume overload.

Conclusion: In our experience, TRT was found to be safe, feasible and an effective therapy for CIN prevention during PVI and EVAR in patients at high-risk for CIN and worsening renal insufficiency. Our 24-mo experience with updates on multicenter PVI, PCI, and EVAR trials will be presented.

Effective Strategies to Decrease Door to Balloon Times for Primary Stenting: Results from Primary PCI SINCERE Database

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Purpose: Achieving ultra short Door to Balloon Time (DBT) for Primary PCI is the new mantra for Primary PCI. We present our experience of combining a variety of traditional and non-traditional techniques that have been successfully employed for achieving short DTB (and high success rates) for these procedures.

Methods: The Short Door to Balloon Time, Primary PCI SINCERE (Single INdividual Community Experience REgistry) database comprises of 189 Primary Stenting procedures with DTB<90 min that were performed by a single individual. Of these 189 procedures that were performed at 5 community hospitals in South Florida; 164 were done within the last 12 months. A variety of blended traditional and non-traditional techniques that were employed in an attempt to achieve short DTB are reported.

Results: Of these 189 procedures, 179 (95%) were successful (relief of chest pain, ST segment resolution, TIMI 3 flow, myocardial blush grade 3). Seven patients expired; all these patients presented with cardiogenic shock. DTB<120 minutes were achieved in most patients and <90 minutes in 64%. Procedure times (groin stick to reperfusion) of <20 minutes were achieved in the overwhelming majority of procedures. Primary stenting was performed in 180 of 189 procedures (96%), and DES in 155 procedures (82%). The last 100 procedures have adopted several non-traditional techniques - these deliberate efforts were made to comply with shortened guidelines of DBT from 120 to 90 minutes. Precise contribution margin of these 6 non-traditional items is difficult to measure but is being attempted. However, use of hydrophilic wires (100%) and Aspiration Catheters (48%) contributes to reducing time to reperfusion. Use of Bivalirudin (97%) and Intracoronary Nitroprusside (44%) appears to enhance procedural success. Importantly, certain time-consuming maneuvers, such as Mechanical Thrombectomy Devices (13%) are being used less frequently. The respective use of these techniques was as follows:

Traditional techniques:

6F Based-system (100%); Groin Closure (78%); Abciximab Use (71%); Direct stenting (81%); Mechanical Thrombectomy devices (13%);

Non-traditional techniques:

Hydrophilic Guide wires (100%); Bivalirudin (97%); Drug Eluting Stents (82%); Aspiration Catheters (43%); Intracoronary Nitroprusside (44%); 600 mg bolus Clopidogrel (43%)

Conclusions: Innovative strategies to work speedily and achieve high success rates are critical factors in achieving low DBT. As standardized techniques for primary stenting evolve, the adoption of some non-traditional techniques may be beneficial.

Creative Vascular Access Tricks in Pediatric Electrophysiology

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Background: Vascular access in the pediatric population can be difficult due to small vessel size or repeated vessel use. Reported here are cases wherein the use of an established venous access site was used for fluoroscopy and guidewire assisted cannulation of additional vessels.

Methods: Access is obtained in the left femoral vein (LFV). A 0.035 hydrophilic guidewire is advanced through the LFV to the IVC, and then directed downward toward the right femoral vein (RFV) with the use of a 4F multipurpose catheter. Alternatively, a 0.035 tip-deflecting wire and 4F glidecatheter could be utilized. The guidewire is then used under fluoroscopy as a target for RFV access. In the presence of distal vein obstruction, venography can guide proximal RFV cannulation.

Venous access is obtained in the RFV and desired in the right internal jugular (IJ). Neck landmarks are less prominent in small children, and can be obscured under anesthesia, making IJ access challenging. A 0.018 straight wire is advanced from the RFV up the IVC and into the SVC. A balloon occlusion angiogram in the SVC, with a 5F endhole catheter, demonstrates vessel patency and gently inflates the distal jugular vein facilitating access. Balloon inflation with carbon dioxide eliminates the risk of air embolism should balloon puncture occur. This method can be reversed if IJ access is obtained in a child with difficult femoral venous access.

Results: Electrophysiologic mapping of the coronary sinus (CS) or cardiac veins in a small child can be achieved using a 1.5F quadrapolar Cardima Pathfinder® mini catheter within a 7F steerable decapolar Inquiry Luma-Cath™. A 0.018 guidewire inserted into the lumen of the Luma-Cath™ enhances maneuverability of the catheter, eases passage through the valve of coronary sinus, guides access to distal coronary sinus structures, and allows for angiography. The guidewire can serve as a fluoroscopic marker for the mitral valve annulus and the microcatheter can be independently manipulated for distal CS mapping.

Conclusion: The challenges of multiple site pediatric vascular access and small vessel cannulation can be met, without undo trauma, via creative use of the tools available to the electrophysiologist.

The Use of a Bilayer Matrix Wound Dressing on a Large Necrotizing Soft Tissue Foot and Ankle Wound: A Case Study

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Necrotizing soft tissue infection is characterized by rapid progression of infection with extensive necrosis of subcutaneous tissues and overlying skin. It must be recognized early and treated promptly. Diagnosis is not difficult when skin necrosis or bullae are present. This usually results in surgical debridement of all necrotic tissue and can leave a large tissue defect and extensive wound. An option for treating these large tissue defects is Integra BMWD (Bilayer Matrix Wound Dressing). Integra is a tissue-engineered matrix. It is ideal for partial and full-thickness traumatic soft tissue wounds, chronic wounds and deep wounds needing coverage and protection.

Integra Bilayer Matrix Wound Dressing is an advanced wound care product comprised of a porous matrix of cross-linked bovine tendon collagen and glycosaminoglycan and a semi-permeable silicone layer. The silicone layer provides protection from infection, improves fluid management and reduces heat loss. It also provides a flexible adherent covering for the wound surface and adds increased tear strength to the tissue. The matrix also provides a scaffold for cellular invasion and capillary growth.

Multi-disciplinary Limb Salvage Using Endovascular Intervention And Bi-layered Skin Substitute In Patient With Critical Limb Ischemia

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Background: An 81-year-old man with a history of a recurrent left foot ulcer was treated successfully through the combined efforts of a Nurse Practitioner, Interventional Cardiologist, and Podiatrist. A home health nurse consulted the Nurse Practitioner as the patient was about to be discharged for failing to show progress in the healing of his wound. Patient was found with maggot-infested ulcer, irregular with raised edges, tendon exposed, foul smelling drainage and exquisite pain upon elevation of lower extremity.

Methods/Procedures: Patient was hospitalized for wound management and suspicion of underlying critical limb ischemia, osteomyelitis, and concern of possible carcinoma within the foot. Interventional Cardiologist was consulted for possible endovascular procedure to be performed on left leg. Biopsy of foot ulcer initially revealed concern of angiosarcoma. Osteomyelitis was ruled out on x-ray and MRI. Daily pulse lavage, along with daily dressing changes, was performed, while second opinion obtained from additional Pathologist ruled out angiosarcoma in favor of hypergranulation tissue. Bi-layered living skin substitute was applied to ulcer by Podiatrist after significant improvement of ulcer, status post endovascular intervention in the form of atherectomy, angioplasty and stenting, as well as diligent wound care.

Conclusions: This illustrates the importance of team approach, and use of multiple technologies in a complicated limb salvage case. Critical Limb Ischemia is a severe form of Peripheral Arterial Disease that significantly increases the risk of lower extremity amputations. Early recognition of PAD or CLI can result in limb salvage. Wound management at its best, often requires a team approach to achieve the desired outcomes of efficient healing and prevention of amputation. Wounds that appear suspicious or that have been present for one year or greater should be biopsied to rule out underlying carcinoma.

Preventing Lower Extremity Distal Embolization Using Embolic Filter Protection: Preliminary Results of a Pilot Registry

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Background: Atheroembolization has been frequently noted during endovascular interventions of the coronaries, vein grafts, carotids, renals and lower extremity vessels. In this prospective registry we evaluate the safety and effectiveness of embolic filter protection (EFP) in reducing distal embolization (DE) during lower extremity (LE) peripheral percutaneous intervention (PPI). This study was approved by the Institutional Review Board at our center.

Methods: In this single center prospective registry patients were included if they are able to provide informed consent and have an infrainguinal lesion that meet one or more of the following angiographic criteria: a. moderate or higher calcification of any length, b. total occlusions of any length, c. presence of a filling defect, d. irregular appearing lesions at least 30 mm in length, e. smooth lesion at least 50 mm in length. The primary angiographic outcome is to evaluate the EFP ability in capturing macro debris in the lower extremities and prevent visible embolization, slow flow and loss of a distal tibial runoff.

Results: Sixteen patients have been enrolled in this ongoing registry (planned 40 patients). The total number of vessels treated with EFP is 22 (denovo lesions 15, restenotic 7). The Spider Filter (EV3) (n=18) and the EmboShield (Abbott) (n=4) were utilized. Sixteen vessels (group A) were treated with percutaneous angioplasty with (n=4) and without stenting (n=12) and the remainder 6 vessels (Group B) were treated with the SilverHawk (FoxHollow) atherectomy and adjunctive balloon angioplasty. Macroembolization was caught in the EFP device in 38% of patients in group A and in 100% of patients in group B. There was no distal embolization, slow flow or loss of tibial vessels. All filters were retrieved successfully with no complications.

Conclusion: Macroembolization is very frequent in patients undergoing PPI of the LE particularly with the use of the SilverHawk atherectomy device. EFP appears to be very effective in capturing macrodebris and its use is associated with good acute angiographic outcome with no distal tibial embolization or slow flow.

Using Chronic Care Model to Improve Diabetes Outcomes

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Background: The chronic care model was designed as a reaction to the current health system, which is oriented toward acute care. Ideally, we should have the right tools to proactively create and track treatment plans using the six elements of the chronic care model. The primary objective of our project is to improve diabetes care and outcomes through implementation of the chronic care model in an academic setting. Our main areas of emphasis are enhanced patient self management skills and the creation of a clinical information system to track quality indicators across our pilot population

Methods: This project was done at Southern Illinois University, as part of our participation in the Academic Chronic Care Collaborative. For the database we used CDEMS (Chronic Disease Electronic Management System), which is a registry program for management of chronic health conditions. We developed a data collection form and compiled baseline information on 385 patients in our pilot population with Type 2 diabetes. We developed a process to update the registry and educated faculty, residents and nursing staff on self-management strategies and motivational interviewing. We use the registry to identify patients with HgbA1c more than 8 and patients not seen in the last six months and then schedule them for planned visits.

Results: The variables measured were: the documentation of self-management goal setting, retinal exam, the percentage of patients having HbA1c less than 7, blood pressure less than 130/80, LDL less than 100. Also we looked into the number of patients having comprehensive foot exam and pneumococcal vaccination, number of patients taking an ACEI or ARB, statin and aspirin. The results over a 14 month period showed an increase from 2.4% to 46.7% for self-management goal, from 56% to 77.9% for foot exam, from 27.5% to 50.3% for retinal exam, from 25% to 40.7 % for influenza vaccination, from 11.3% to 57% for pneumococcal vaccination, from 55.1% to 60.8% for statin prescription, from 43.8% to 57.9% for aspirin prescription. Individual resident results showed improvement in HbA1c less than 7 from 28.6% to 44.4%, BP less than 130/80 from 28.6% to 50% and LDL less than 100 from 42.9% to 50%.

Conclusion: Using the concepts of the chronic care model, we can already show improved performance on process measures. Outcome measures, such as HbA1c, will naturally take more time to show change and will continue to be tracked, but individual residents result suggests that a more intensive approach leads to better outcomes. Having an involved, proactive patient leads to overall better disease management. The registry reports make patient follow-up proactive and facilitate recapturing lost patients.

Vascular Access Site Management in Peripheral Vascular Patients with Limited Vascular Access: Results Using the Boomerang Wire in Brachial, Axillary and Popliteal Artery “Sticks”

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Background: The incidence of vascular access complications after peripheral vascular interventions (PVI) has been reported between 3.5 – 32.7%. Peripheral vascular disease (PVD) has been considered a relative contraindication for use with current vascular closure devices (VCD) due to the high incidence of vascular calcifications, small femoral artery size and the risk of retained endoluminal and extraluminal VCD debris including sutures, staples, anchors and collagen. PVD patients often have limited femoral artery access due to absent pulses, bypass grafts, severe disease, previous complications or prior stents therefore may require non-femoral artery access including brachial, popliteal or axillary artery “sticks” which are associated with higher bleeding and thrombotic complications. Few data exists regarding vascular access management (VAM) in non-femoral access. The Boomerang 610 Wire (Cardiva Medical, Mountain View, CA) is a VAM system that converts the existing procedural sheath (6-10 Fr) to an 18-gauge needle size arteriotomy using natural vessel wall recoil therefore allowing retrograde flow and facilitating VAM while “leaving nothing behind”.

Methods: Between January 2006 and May 2007, 52 patients had PVI using non-femoral artery vascular access with VAM using the Boomerang 610 system (brachial = 30, popliteal = 12, and axillary = 10). Sheath sizes included: 5-Fr 8/52 (15.3%), 6-Fr 29/52 (55.7%) and 7-Fr 15/52 (28.8%). Heparin was used in all cases (mean 4,900 ± 2,400 units). The Boomerang was deployed under fluoroscopic guidance in all cases.

Results: The device success was 50/52 (96.1%). The two device failures were persistent oozing where the sheath was easily reinserted and manual compression applied. There were no device-related or major surgical complications. There were 2 minor < 5 cm hematomas [axillary = 1/10 (0%), brachial = 1/29 (3.4%) and popliteal = 1/12 (8.3%)] and no other complications. The average dwell time = 105.5 minutes and average hold time = 11.5 minutes.

Conclusion: The Boomerang 610 Wire was found to be safe, feasible and effective in VAM in this cohort of 52 PVD patients with poor femoral artery access utilizing brachial, axillary and popliteal “sticks”.

Is Combined Reconstruction Worthwhile In Aortic Surgery?

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Background: Multi segment involvement of Aorta, Iliac and Femoral arteries is responsible for critical leg ischemia and management of such patients presents formidable problems. The aim of our study is to assess the feasibility of combined reconstruction in Aortic surgery.

Material & Methods: Between Jan. 2000 to June 2006, we performed 14 cases of combined reconstruction i.e. Aortofemoral & Femoro popliteal bypass operations and Iliac stenting and Femoropopliteal bypass simultaneously from a total of 68 Aortic surgeries. All patients were male and of young age (mean age 59 years). All patients presented with rest pain, non-healing ulcer or pregangrene. 5 patients underwent Aorto Bifemoral and Unilateral Femoropopliteal bypass, 4 patients underwent Aorto Unifemoral and Unilateral Femoropopliteal bypass, 4 patients underwent Unilateral Iliac stenting and Unilateral Femoropopliteal bypass and 1 patient underwent Aorto Bifemoral and Bilateral Femoropopliteal sequential bypass. Most of the patients were hypertensive. Four patients were diabetic. Pre operative Cardiac non-invasive evaluation showed good LV function. Average operating time (by a single operator) was 6 hours. All patients were followed up by clinical examination and Color Doppler study at 3, 6, 12, 24 months.

Results: Average follow up was 3 years (6 months to 6 years). The primary & secondary patency rate at 3 years were 85 % & 78% respectively. Limb salvage rate was >90%. There was one post operative death due to intestinal ischemia & septicemia.

Conclusions: There is no infallible method to decide the necessity of combined reconstruction. Due to associated co-morbidities leading to high morbidity & mortality, prolonged operating time, increased blood transfusion requirement, combined reconstruction is not favored by many. We conclude that in Young patients (<60 years) with advanced ischemia combined reconstruction in Aortic surgery is worthwhile and safe.

Distal Origin Grafts: Is It Appropriate For Limb Salvage?

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Background: The Great Saphenous vein remains the conduit of choice in Infrainguinal revascularization for critical leg ischemia. When limited length of vein is available, either Distal Origin Graft or Composite reconstructions are used. The aim of our study is to confirm the validity of Distal Origin Graft.

Materials & Methods: Between Jan.1999 to June 2006, we performed 43 distal origin grafts (i.e. Lower femoral at adductor canal - 34 cases and Popliteal - 9 cases) bypass operations from a total of 140 infrainguinal reconstruction (30.7%). Majority of patients were male (M: F: 38:5) of various age group 24 years to 82 years (Mean age: 57.4 years). Non- diabetics (71%) outscore diabetics. The indications of DOG were Rest pain &/or ulcer 23 cases, Gangrene 6 cases and Disabling Claudication pain 14 cases. Reversed saphenous vein was used as a conduit in 30 cases and Non-reversed saphenous vein was used in 13 cases. The proximal anastomoses were performed at Lower femoral artery at adductor canal in 34 cases and popliteal artery in 9 cases. The distal anastomoses were performed on the Posterior Tibial artery in 25 cases, peroneal artery in 2 cases and Anterior Tibial artery in 16 cases. All patients were followed up with clinical examination and Color Doppler study at 3, 6, 12, 24 months.

Results: Average follow-up was 2 years (range 5 months to 5 years). The primary and secondary patency rate at 2 years was 61% and 69% respectively. Limb salvage was achieved in 70% of patients. The mortality rate was 3%.

Conclusion: The use of Distal Origin Graft is the most appropriate for limb salvage when saphenous vein available is limited in length. The quality of saphenous vein harvested from thigh is an excellent conduit.

New Treatment Strategies for Venous Stasis Ulcers

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Background: The treatment of patients with advanced stages of venous disease is quite challenging. Patients with CEAP Class 4 through 6 disease have traditionally been managed with compression and topical wound care. New minimally invasive procedures for the treatment of venous reflux disease and bioengineered cell based tissue substitutes are new therapies for treatment of venous ulcers. Endovenous ablation has emerged as the treatment of choice for saphenous reflux. Although literature exists to support the use of endovenous ablation for saphenous reflux, little is known about the effectiveness of endovenous ablation of incompetent perforating veins. In addition, there are no reports in the literature about its use in patients with CEAP Class 6 disease (active ulceration).

Methods: After complete evaluation in our wound care center, all patients with venous disease undergo complete venous duplex scanning in our vascular laboratory to identify saphenous, deep system, and/or perforator reflux, and areas of obstruction. If incompetent perforating veins are identified, the location and number of incompetent perforating veins are recorded. From January 2004 through December 2006, 40 incompetent perforating veins were identified in 35 patients. All patients underwent percutaneous radiofrequency endovenous ablation of their incompetent perforating veins with an RF Plus catheter (VNUS Medical Technologies) as an outpatient under local anesthesia. Of these 40, 3 patients had active ulcerations at the time of their procedure. All 3 patients had a history of multiple recurrent ulcerations, and all initially healed with compression and topical care alone, but then recurred within 1 month.

Results: All patients had percutaneous endovenous radiofrequency ablation of incompetent perforating veins performed as an outpatient. After confirmation of success with post-operative duplex scanning, all 3 patients then had ulcer treatment with a cell based tissue engineered skin substitute (Apligraf®). All patients achieved 100% wound closure within 3 weeks. All remain without recurrent ulceration at 9 months follow-up. There were no complications.

Conclusion: Perforator incompetence in patients with advanced venous disease contributes greatly to the degree of venous hypertension and recalcitrant ulceration. Aggressive surgical management of venous hypertension with minimally invasive endovenous radiofrequency ablation of incompetent perforating veins is safe and effective in patients with active venous stasis ulceration. An aggressive surgical approach combined with cell-based therapy (Apligraf®) will optimize results in the treatment of patients with venous stasis ulceration.

“Code Heart”

Jennifer Suito and Viola Cedillo

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Las Palmas and Del Sol Medical Centers are two acute care hospitals, owned by HCA, located approximately 12 miles apart in El Paso, Texas. We operate in an underserved medical community with approximately 20 Cardiologists to serve a population of greater than 750,000 people.

In January 2006, Code Heart was implemented as part of the facilities' ongoing initiatives to decrease mortality and improve functional outcomes in patients presenting with STEMI. While the demographics of the two facilities are very different, the challenges of meeting the 90 minute door to balloon time for our STEMI patients are very similar.

The implementation of Code Heart ensures our community our facilities achieve the ACC clinical standard, door to balloon time of 90 minutes or less, in all patients presenting with STEMI. In one year, our Code Heart Response Plan has reduced our door to balloon times almost in half.

The clock begins ticking the minute a patient presents with STEMI via ambulance or walk-in. Immediately upon diagnosis or suspicion of STEMI, the patient's primary nurse, ED physician or EMS activate the Code Heart response team.

Activation of Code Heart

1. One phone call to the hospital operator #5555.
2. Hospital operator will immediately call Code Heart overhead throughout the entire hospital, notify the on-call Cardiac Cath Lab team. The ED physician will immediately notify the on-call cardiologist.
3. Code Heart Team Members include; ED Physician, Nursing Supervisor, Patients Primary Nurse, CVICU Nurse, Phlebotomist, Radiology Technician, Respiratory Technician and Cath Lab Nurse.
4. The Code Heart Team implements our STEMI protocol, prepares and transports the patient to the Cath Lab.

Our success with Code Heart is due to the collaborative efforts of our hospital staff, medical staff and EMS and their dedication to deliver the best care as expeditiously as possible. Our Code Heart initiative has drastically reduced wait times for patients needing primary PCI and is subsequently becoming a community initiative for other hospitals.

The Relationship of Nurse Job Satisfaction with Patient and Physician Satisfaction

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Purpose: We examined the relationship of nurse job satisfaction with patient and physician satisfaction on a cardiovascular unit.

Design: A descriptive, correlational design was used.

Background: Over a two-year period many changes were implemented on the unit. The hospital was engaged in a consolidation project, which required the unit to drop from a 44 bed to a 24 bed unit. The primary nursing model replaced a team nursing approach. Shared governance councils were initiated. Staff members became actively involved in a congestive heart failure performance improvement project.

Methods: Nurse overall job satisfaction was examined by using the Gallup Survey. In 2005 nurse (n=54) overall job satisfaction was calculated at 3.20 on a five point Likert-type scale, and in 2006 (n=34) was 3.32 (The Gallup Organization, Princeton, NJ). Patient satisfaction scores were measured using the Gallup Inpatient Survey and physician satisfaction was measured by using the Quality Check Physician Satisfaction Survey (Data Management and Research, Inc., Franklin, TN). Patient and physician satisfaction scores both increased from 2005 to 2006.

Results: Pearson correlations showed that nurse satisfaction scores were significantly related to patient and physician satisfaction scores.

Conclusion: Nurse job satisfaction contributed to both patient and physician satisfaction on this particular nursing unit. Longitudinal research is recommended to determine if nurse satisfaction trends continue to effect patient and physician satisfaction results.

Vacuum Assisted Closure (VAC) Devices for the Treatment of Mediastinitis Following Congenital Heart Surgery

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Introduction: We attempt to avoid the use of soft tissue flaps for mediastinitis in patients with congenital heart disease. Pectoralis flaps complicate re-entry and are disfiguring in children. Omentum is not substantial enough for use in pediatric patients.

Methods: We used VACs in 4 consecutive patients with post-operative mediastinitis. Each was treated with debridement, +/- sub-sternal drain placement, replacement of sternal sutures with wires or tightening of existing wires, and VAC placement.

Results:

Patient 1: 6-month-old with sternal dehiscence and purulent mediastinitis following a bidirectional Glenn. Sub-sternal drains and a VAC were placed. Sternal sutures were replaced with wires.

Patient 2: 14 y.o. with sternal dehiscence following aortic valve replacement for severe insufficiency. Sternal sutures were replaced with wires and a VAC placed.

Patient 3: 12 y.o. male with sub-sternal abscesses following RVOT reconstruction. He had placement of sub-sternal drains and a VAC. Sternal sutures were replaced with wires.

Patient 4: 24 y.o. male with purulent mediastinitis following aortic arch replacement for recurrent coarctation. He was treated with sub-sternal drains, sternal wire tightening, and VAC placement. Wet-dry dressings were required for 3 days during the Hurricane Katrina evacuation followed by resumption of his VAC.

Three patients had primary closure of their wounds and one healed by secondary intention. No patient required further surgical intervention.

Conclusion: Alternatives to flap reconstruction are desirable in patients with congenital heart disease. A combination of sub-sternal drains, placement or tightening of sternal wires, and VAC use is a successful alternative to flap closure.

Peripheral Vascular Disease in Saudi Arabia: Prevalence in Nomads and Urban Dwellers

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Objective: To estimate the prevalence of peripheral vascular disease (PVD) in Saudi Arabians and to determine the effect of lifestyle and associated risk factors.

Design of Study: Cross sectional prospective study.

Setting: Two groups are compared: Nomads were selected from a desert dwelling population and urban dwellers were selected from a nearby town.

Subjects: Blood was drawn from 857 individuals aged 40 to 80. 503 nomadic Bedouins (NB) and 354 urban dwellers (UD).

Results: Twenty-five subjects showed evidence of PVD according to previously established criteria, 9 of whom were symptomatic. Overall prevalence was 2.9%; seventeen UD and 8 NB. The PVD prevalence among the NB (1.6%) was one of the lowest ever reported while the UD prevalence (4.8%) was comparable to that found in Western literature. The proportion of the over 70 year old male UD having PVD was dramatically higher (19%) compared to the NB (3%). The ratio of asymptomatic PVD to symptomatic PVD was 2:1.

Conclusions: The prevalence of PVD among nomads of the Arabian Peninsula (1.6%) is the lowest reported in the literature. Urban dwellers have a prevalence similar to that reported in the West suggesting that the nomadic lifestyle with its intensive, lifelong exercise and simple diet may be protective against some chronic diseases such as PVD.

Ergonomics Revisited 2007 -Repetitive Stress Injuries in the CCL

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Background: Working in the world of interventional cardiology and radiology is wonderful. Let me preface this article with that thought. This article and teaching tool was developed to help educate and inform the staff working in those medical fields of some of the risks associated with our jobs. It goes without saying that all jobs must be evaluated, first, is it a job that you could be happy doing, second, does it pay the bills, and then - what are the risks involved doing the day to day tasks associated with the job itself?

Our roles in the invasive lab are monitoring, scrubbing, and circulating. That is our job, I love it as you do, and so this article will help identify the risks associated with the completion of the job. The onus is upon us to find the best and safest way to complete the tasks we need to do to take care of our patients. I was told years ago, a nurse that hurts herself at work is a loss to her patients, and a loss to herself. Anyone can get hurt at work, but it should not hurt to do the work, that's ergonomics.

Methods: *Discuss Anatomy Carpal Tunnel to Cervical Disc Compression:*

With those thoughts in our mind, let us examine the anatomy and physiology of the upper arm and neck, because those areas of our bodies are at risk of repetitive use injury from completing the tasks we do daily. These tasks and equipment we use daily are documented as potential sources of work-related musculoskeletal injury syndromes. This article will focus on the main ones, carpal tunnel syndrome, thoracic outlet syndrome, and cervical neck compression. We will use the powerpoint presentation and time will be allotted for question and answers from the participants.

We have also has an opportunity to compile preliminary results and the impact of repetitive stress injuries in the lab will be discussed. I am a member of the Occupational Health Committee with the SCAI looking at the data from both physicians and staff in our fields. This is a work in progress.

Conclusions: The data identifying specific staff and physician injury patterns from repetitive stress injury is scanty at best and there needs to be a coordinated multidisciplinary effort to look into this serious health risk to our practitioners. This process was started in 2005, and will hopefully identify work related musculoskeletal injuries. As the data is compiled, we will look for trends, look for ways to reduce any risks we identify at these labs, and hopefully become proactive in protecting our healthcare workers.

Bioterrorism: Signs and Symptoms

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Background: In post 9/11 world car bombings and suspicious white powder in envelopes are the norm. If one works in a Federal facility it is assumed that a large bull's-eye target floats over your building.

Methods: Following a short survey of shift mates it was determined that there was a definite lack of awareness of bioterrorism agents among the nurses that would form the first line of defense in identification and treatment should any of these agents be used. A limited pilot study was created with the possibility of taking the study facility wide using the Center for Disease Control's designated "Class A" bioterrorism agents. The study consisted of a pretest to determine general knowledge; it was broadcast to the study participants, the nurses of the Medical Intensive Care Unit, that a low score on this pretest was anticipated.

Results: The study participants lived up to that expectation with an average test score of 54%. This was followed by an in-service and post test to determine what was learned. The post test showed a marked improvement with the average test score being 94%.

Carotid Artery Stenting – VA Experience

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Background: Carotid Artery Stenting (CAS) with embolic protection has been shown to be an acceptable less invasive alternative to Carotid Endarterectomy (CEA) in patients with carotid stenosis and may be even superior in high risk symptomatic patients with carotid stenosis. There is limited literature on the long term outcomes in patients felt high risk for CEA who underwent CAS.

Objective: To evaluate the 6 month outcomes in veterans felt high risk for CEA who underwent CAS for symptomatic and asymptomatic carotid stenosis $\geq 80\%$.

Methods: Retrospective review of 26 consecutive patients with symptomatic and asymptomatic carotid stenosis $\geq 80\%$ felt high risk for CEA who underwent CAS between August 2004 and April 2007 at our center. These patients were categorized as high-risk based on carotid anatomy (including subtotal occlusions), prior h/o ipsilateral CEA, contralateral carotid occlusion and comorbidities. The 30-day and 6 month occurrence of ipsilateral transient ischemic attack (TIA) / stroke, restenosis, stent thrombosis, myocardial infarction (MI) and death were recorded.

Results: The mean age was 69 ± 10 and all patients were male veterans. Ninety six percent (25/26) of patients were hypertensives, 50% (13/26) were diabetics, 81% had dyslipidemia (21/26), and 73% (19/26) had history of smoking. The mean serum creatinine was 1.48 mg/dl. Sixty two percent (16/26) were symptomatic with previous history of transient ischemic attack (TIA) / stroke, 54% had concomitant coronary artery disease (CAD) and 42% had concomitant peripheral vascular disease (PVD). Mean left ventricular ejection fraction was $53 \pm 18\%$. Fifty eight percent (15/26) had bilateral carotid disease. The CAS procedures were performed using baremetal stents with distal embolic protection and heparin or bivaluridin. All patients received antiplatelet therapy with clopidogrel (for at least 1 month) and statins. Follow up was 96% (25/26). Only two patients had episodes of TIA (within 30 days) of which one was immediately post procedure felt to be due to hypotension, which recovered immediately and the other did not correspond to the carotid territory intervened, hence felt to be unrelated. All patients followed up at 6 months were asymptomatic and there were no instances of TIA / stroke / restenosis / stent thrombosis / MI / death in these patients.

Conclusion: CAS has favorable long term outcomes in the veteran patients felt high-risk for CEA.

Results From the Multi-Center Registry of the Novel AngioSculpt Scoring Balloon Catheter for the Treatment of Infra-Popliteal Disease

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Background: The novel AngioSculpt (ASC) device incorporates a flexible nitinol scoring element containing 3 rectangular spiral struts which encircle a minimally compliant balloon to create focal concentration of the dilating force. The ASC was designed to treat complex diffuse fibro-calcific lesions and to avoid slippage/geographic miss during device deployment.

Methods: Pts scheduled for percutaneous intervention of infra-popliteal arteries or planned amputation and with a reference vessel diameter of 1.5-3.5 mm were included in the study.

Results: A total of 63 pts (age 73.3±9.2 yrs, males 63.5%) and 86 lesions were treated at 13 sites. Of these, 52 pts (82.5%) presented with critical limb ischemia (Rutherford Class ≥4). The ASC was successfully deployed in 98.8% (85/86) of lesions attempted and was used without adjunctive stenting in 84.9% (73/86) of lesions. Lesion morphology was complex, including moderate/severe calcification in 67.4%, lesion length 29.5±35.7 mm, bifurcation in 25.6% and ostial in 15.1%. There was no significant device slippage and no perforations. Post-ASC dissections occurred in only eleven (12.8%) lesions and were minor or resolved with stenting. In 17 pts initially referred for amputation, treatment with the ASC resulted in limb salvage. Angiographic results are shown in the table.

	Pre-ASC Treatment n=86	Post-ASC Treatment n=85	Post-Stent Treatment n=13
RVD (mm)	2.97±0.68	--	--
DS (%)	85.6±11.83	13.5±19.51	3.85±6.50
MLD (mm)	0.55±0.50	2.73±0.66	3.26±0.91

Conclusions: The AngioSculpt is highly effective in a broad range of complex lesion morphologies, in most cases as sole therapy, is associated with a very low complication rate and avoids device slippage during deployment. Follow-up studies are underway to assess the long term efficacy of this promising new technology.

Early Use of Vacuum Assisted Closure in Long-Term Acute Care Patients is Associated with Reduced Length of Stay Enter

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Introduction: Data from a Long Term Acute Care Hospital (LTAC) setting was used to evaluate the impact of early placement of Vacuum Assisted Closure (VAC) on reducing the overall length of stay (LOS) and total wound care treatment costs.

Methods: This is a retrospective study of LTAC patients treated from November 2001 to November 2006. Wounds/patients with complete therapy information, a single wound and treatment with VAC were eligible for inclusion. Early treatment was defined as initiation of VAC within 14 days of admission. Two-sample t-tests and linear regression models were used to compare outcomes between patients based on early vs. late (15 or more days after admission) therapy initiation.

Results: Two-hundred forty-one patients (165 surgical, 52 pressure ulcer and 24 classified as other) met study criteria; 201 patients initiated VAC early and 40 patients initiated VAC late. Patients initiating treatment early had a 38% reduction in mean LOS (35 vs. 56 days, $p < 0.0001$). Initiating VAC early was also associated with a 35% reduction in the mean time to 50% closure of the wound (22 vs. 34 days, $p = 0.0154$). Regression analysis results indicated that each day VAC use was delayed, almost three quarters of a day is added to the total LOS ($\beta = 0.73$, $p < 0.0001$). The total cumulative treatment costs were less among the patients who began VAC early vs. late (\$3,194.36 vs. \$4,182.13, $p = 0.0898$).

Conclusion: This retrospective study of LTAC patients indicates that early treatment with an aggressive proven wound care strategy can lead to significant reduction in overall LOS and improved wound progression. The significant reduction in LOS with early initiation of VAC upon LTAC admission is associated with a reduction in total wound care treatment costs. Thus, VAC appears to be a cost-effective intervention due to its positive impact on patient outcomes and overall costs.

Diabetic Foot Neuropathy and Tarsal Tunnel Syndrome: Ultrasound Diagnosis and Correlation

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Purpose: (1) Evaluate the tarsal tunnel and the tibial nerves of nondiabetic with tarsal tunnel syndrome and diabetics with neuropathy of the foot using high frequency ultrasound; (2) Elucidate the ultrasound anatomic features of abnormal tibial nerve and the tarsal tunnel; (3) Establish an association and causality between tarsal tunnel syndrome and diabetic foot neuropathy

Materials and Methods: The tarsal tunnel and tibial nerve of diabetic patients with symptoms of foot neuropathy were compared to a control group of nondiabetic patients with symptoms of tarsal tunnel syndrome. Both groups were evaluated by a single, experience operator using high frequency ultrasound with a linear array transducer (10 - 14 MHz). For the control group, 85 patients (M=41, age 32-63; F=44, age 34-71) were evaluated. For the disease group, 187 patients (M=94, age 48-71; F=93, age 41-75) were evaluated. The tibial nerve cross-sectional area was calculated by multiple measurements of the short and long axes through the tarsal tunnel. Other features and abnormalities of the tibial nerve and the tarsal tunnel were documented. The mean area and other features such as focal compressions, local masses, and nerve contour abnormalities were also noted. From the data, the mean, standard deviation and variance values were calculated for each group as well as ANOVA to establish association.

Results: For the nondiabetic control group, the mean area of the tibial nerve was 25.6 mm² (SD = 1.8). For the diabetic group, all (100%) patients demonstrated abnormalities of the tibial nerve, with the mean area of 27.7 mm² (SD = 2.3). ANOVA analysis revealed $p < 0.05$ in comparison to the control group. Predominant features included diffuse enlargement of the tibial nerve (87%), focal compression of the distal tibial nerve (64%), local vascular encroachment (45%) and tenosynovitis of the flexor hallucis longus tendon sheath (26%) were also encountered.

Conclusion: Ultrasound is an accurate and useful modality for the evaluation of the tarsal tunnel and its contents in both diabetic and nondiabetic patients. This study demonstrates the high degree of correlation in the abnormalities of the tibial nerve between nondiabetic tarsal tunnel syndrome and diabetic foot neuropathy. They are essentially the same disease, opening the possibility of treatment and relief of symptoms for patients suffering from diabetic foot neuropathy.

Combined Aortic Debranching and Thoracoabdominal Aortic Endovascular Repair (TEVAR) Is Effective, but at a Cost

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Background: Combined aortic de-branching and TEVAR (“hybrid repair”) has recently been reported as an effective method of management of complex aortic pathology in high-risk patients. The purpose of this study is to compare our experience with hybrid and conventional open thoracoabdominal aortic repairs and perform a cost analysis of these procedures within our institution.

Methods: A chart review was performed of 27 patients with aortic pathology involving branch vessels managed at our institution between November 2005 and December 2006. Patients underwent hybrid (HR) (15) or conventional open repair (OR) (12). Location of pathology was as follows: thoracic (HR-4, OR-2), thoracoabdominal (HR-9, OR-8), and abdominal aorta (HR-2, OR-2). Aortic de-branching was performed with artificial conduit (6) or femoral-popliteal vein (FPV) (9), followed by TEVAR with Gore-TAG (11), Cook-Zenith/Cook extension (3) or Dacron grafts (1). Dacron grafts were used for open reconstruction, and branch vessels were reimplemented or bypassed with artificial conduit (7) or FPV (1). Hospital costs and reimbursement data were obtained from the finance department.

Results: Mean age was HR 73.1 \pm 8.8 years, and OR 58 \pm 17.4 years ($p=0.013$). Technical success was achieved in all patients. When compared to OR, HR patients had significantly less blood loss (HR 2.0 \pm 2.4 vs. OR 4.8 \pm 3.1 L, $p=0.016$), transfusion requirements (HR 6.14 \pm 7.85 vs. OR 14.67 \pm 6 units, $p=0.004$), incidence of postoperative renal failure (HR 0% vs. OR 42%, $p=0.018$), pulmonary morbidity (HR 21.4% vs. OR 67% $p=0.019$), days of mechanical ventilation (2.9 \pm 4.6 vs. 10.0 \pm 10.6 $p=0.03$), and ICU stay (7.23 \pm 7.21 vs. 16.4 \pm 12.9 $p=0.047$). There were no differences in mortality, hospital days, incidence of spinal cord ischemia, cardiac morbidity or wound complications. Mean direct hospital cost was HR 59,435.7 (\pm 20,535.6) vs. OR 45,295.8 (\pm 31,505.3) US dollars ($p=0.21$). The mean cost margin per case was -34% for HR and +6.2% for OR ($p<0.035$).

Conclusions: Hybrid aortic repair is a less invasive method of managing complex disease in high-risk patients with improved outcomes even when compared to open repair in younger patients. However, this new technology is expensive, and ultimately comes at a significant cost to the hospital, with a 34% loss in revenue per case and a greater than 40% cost margin per case when compared to open repair.

Drug Resistant and Drug Responsive Atrial Fibrillation Correspond to Focal and Macroreentrant Mechanisms, Respectively

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Introduction: Previously we developed a model of focal atrial fibrillation (AF) by application of acetylcholine (ACh) to the atrial appendages (AA) on the dog heart. We hypothesized that the focal form of AF would be resistant to a standard anti-arrhythmic drug whereas macroreentrant forms of AF would be readily terminated by the same agent.

Methods: Ten dogs were anesthetized with Na-pentobarbital and subjected to a left then right thoracotomy. Multi-electrode catheters were attached to the left and right atrial free walls, appendages and superior pulmonary veins (PVs). A plastic barrier was attached across the AA and a gauze pad soaked in ACh, 100mM, was placed on the AA inside the barrier.

Results: Electrical stimulation of the atrium consistently induced sustained AF (≥ 10 minutes) with focal firing arising at the AA (cycle length, CL 37 ± 9 ms). All other atrial sites averaged 2-3X longer CLs. After a variable period of sustained AF, propafenone, 2mg/kg (bolus IV), slowed the focal firing (CL 66 ± 23 ms) but did not terminate AF in 8/10 dogs. The duration of AF after propafenone administration was 351 ± 233 seconds. Electrical re-induction in the two cases, which terminated, maintained AF for an average of 32 minutes. After GP ablation at the left posterior atrium and at the right PVs, ACh (100mM) was applied to the RAA and AF was electrically induced. Although similar focal activity was seen at the RAA now there was synchronization of electrogram intervals and pacing induced entrainment between the left and right atria. Propafenone, 2mg/kg, terminated this form of AF within 151 ± 49 seconds, $p < 0.05$. Attempts to re-induce resulted in only short intervals of AF, < 1 minute.

Conclusions: Before ganglionated plexi (GP) ablation, propafenone failed to terminate focal AF in 8/10 cases; whereas, after GP ablation at several left atrial sites, macroreentrant circuits were now identified by synchronization of left and right atrial electrogram intervals. In addition, pacing from one atrium could capture and entrain local sites as well as electrograms on the contralateral atrium. Propafenone consistently terminated AF under these circumstances.

Successful Angioplasty And Stenting Of An Unusual Case Of Bilateral Renal Artery Stenosis

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Introduction: Bilateral Renal Artery Stenosis (RAS) can present with renal dysfunction, and typically uncontrolled or poorly controlled blood pressure despite the use of multiple antihypertensive agents. Improvement in non-invasive diagnostic modalities has led to increased recognition of RAS as a cause of uncontrolled hypertension. We describe an unusual case of severe bilateral RAS presenting with acute renal failure and well controlled blood pressure that was successfully treated with PTA/S

Case Report: A 72 year-old Caucasian male presented to the emergency department with a three day history of anuria and anorexia. On physical exam, jugular venous distension, crackles at the lung bases, and bilateral pitting pedal edema were evident. Blood pressure on presentation was 120/72 mm Hg with a range of 124±10/72±12 mmHg in the last 2-3 years. An abdominal bruit was not appreciated. Laboratory evaluation was consistent with acute renal failure. A duplex ultrasound suggested bilateral proximal renal artery stenosis prompting bilateral angioplasty and stent placement with the use of gadolinium based contrast media and distal embolic protection device. Renal function and urine output following stent placement improved dramatically, and returned to normal in four days with sustained normal function at a ten month follow up.

Discussion: Well controlled blood pressure and acute renal failure can be an unusual presentation of bilateral RAS. Doppler ultrasound evaluation of the renal arteries, using the indirect method, is helpful as an initial screening test in these patients. Percutaneous Transluminal Angioplasty (PTA) and stenting of a select group of patients may lead to an improvement in blood pressure control and also renal functions (as demonstrated in our case). Randomized controlled trials have proved the superiority of stents over conventional balloon angioplasty alone in treatment of stenotic lesions. The ASPIRE-2 study (which evaluated renal artery stenting following suboptimal/failed renal artery angioplasty) group also demonstrated the safety and durability of revascularization using balloon expandable stents. The ongoing CORAL study will better comment on the benefits of PTA plus medical therapy versus medical therapy alone. This case demonstrates that well-controlled BP and anuria can be an unusual presentation of bilateral RAS. PTA/S of a select group of patients may lead to an improvement in BP control and renal functions. In patients with pre-existing renal dysfunction the use of digital subtraction angiography (DSA) with low volume gadolinium based contrast media coupled with use of distal embolic protection devices (EPD) is emphasized.

“One Heart, Two Rhythms”

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Introduction: The presence of two left atrial appendages in two different rhythms in one patient has not been described so far. We describe here a case of stroke secondary to concealed atrial fibrillation arising out of one of the appendages.

Case Report: A 70 yr old male with a history of orthotopic heart transplant (OHT) presented with expressive aphasia for more than 24 hrs duration, slurred speech and transient hemiparesis of right upper and lower extremities for less than 2 hrs duration. Heart rate was normal and regular in rhythm. Neurological examination was only remarkable for altered mental status with confusion and a slurred speech. EKG revealed a normal sinus rhythm. CT scan and MRI of the brain showed acute left temporal lobe infarction. Carotid arterial Doppler was unremarkable. Trans thoracic echocardiogram (TTE) showed normal bi-ventricular function and the left atrial appendage (LAA) was not visualized. Subsequently, trans-esophageal echocardiogram (TEE) revealed the presence of two left atrial appendages (LAA). The one that was inferior in location appeared normal sized with no spontaneous echo-contrast (SEC) and was in normal sinus rhythm by pulse wave (PW) Doppler. The superior one was dilated with SEC and revealed the presence of atrial fibrillation by PW Doppler.

Discussion: In the standard operative technique of OHT, the recipient LAA is excised. Our patient had anastomoses of the donor and recipient atria resulting in a larger atria and dual left atrial appendages, as the recipient appendage was not excised. Interestingly, these two LAA were found to be in separate rhythms on TEE. The presence of concealed atrial fibrillation in one LAA was an important diagnosis in this patient and was likely the etiological factor for his embolic stroke. It is important to remember that the surface EKG showed sinus rhythm and at no point, in the past or during this hospitalization, the patient was found to be in atrial fibrillation by electrocardiography. Based on TEE findings, the patient was started on anti-coagulation with warfarin in addition to aspirin. Had atrial fibrillation not been found, dipyridamole would have been prescribed in place of warfarin, as is recommended in neurological literature.

Studies have underlined the importance of TEE in evaluating left atrial thrombus and SEC in patients with OHT. Left atrial thrombi and SEC are much better visualized with TEE. In our patient, TEE revealed the presence of two left atrial appendages in two different rhythms, which is usually not seen on TTE.

Successful Angioplasty And Stenting Of Dunbar Syndrome

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Introduction: Dunbar Syndrome (Celiac Artery Compression Syndrome or Median Arcuate Ligament Syndrome) is an unusual and rare cause of abdominal pain, nausea and weight loss caused by compression of the celiac artery by the median arcuate ligament. Traditionally this syndrome was treated with laparoscopic division of the median arcuate ligament. We report here a patient who underwent successful angioplasty and stenting of the celiac artery leading to complete resolution of symptoms.

Case Report: A 44 yr old female with past medical history of Pernicious Anemia, Endometriosis, status post total abdominal hysterectomy and bilateral salpingo oophorectomy, and migraines was admitted with complaints of chronic abdominal pain(for 6 months) and intractable nausea and vomiting for 2 days. The initial evaluation for abdominal pain including an esophago gastro duodenoscopy, colonoscopy and CT scan of abdomen/pelvis was normal. Duplex scan of the mesenteric arteries revealed a celiac artery stenosis based on the Peak Systolic Velocities (PSV) and End Diastolic Velocities (EDV). Conventional Angiography revealed a 95% stenosis in a very tortuous and angulated proximal segment of the celiac trunk, a centimeter away from the ostium which was unusual for an atherosclerotic lesion. The superior and inferior mesenteric arteries were free of atherosclerotic lesions. During angiography it was found that celiac artery stenosis was more prominent during expiration which lead to the diagnosis of Dunbar syndrome. Percutaneous transluminal angioplasty (PTA) followed by a placement of EXPRESS™ (7 x 17mm) stent was done which lead to immediate resolution of symptoms, and so far has a one year symptom free follow up.

Discussion: Dunbar syndrome is a rare and unusual cause of mesenteric ischemia. It is caused by the compression of the celiac artery trunk by the median arcuate ligament, which connects the two crura of the diaphragm. Abdominal pain, nausea and weight loss are the most common presenting symptoms. Conventional angiography and more recently CT angiography have emerged as the preferred tools for diagnosis of this condition. Laparoscopic release of the median arcuate ligament is the current approach to the management of celiac artery compression syndrome. Angioplasty and stenting has not been reported as a means of treatment for this condition owing to the fact that this is an external compression. Our case demonstrates the success of PTA and stenting, reflected in the fact that our patient had immediate clinical resolution of symptoms and continues to be symptom free at a one year follow up.

A Case Report of Squamous Cell Carcinoma In a Chronic Non-Healing Wound of the Foot

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Introduction: Although the prevalence of squamous cell carcinoma (SCC) in chronic wounds is low, the condition is well documented in the literature. It is not only imperative to recognize when, where and how to biopsy a wound but also to understand the various treatment options to excise and eradicate SCC. This case report is presented to raise awareness within the medical community and demonstrate that squamous cell carcinoma may present innocuously as a simple wound without visible malignant transformation, dysplastic changes, and the classic signs of malignancy. A 53-year-old female sought treatment for a chronic ulcer of the right foot, and consequently, was diagnosed with ulcerative invasive carcinoma with focal squamous differentiation.

Methods: Case report of a single patient (n=1) and literature review.

Results: A 53-year-old female complained of a right foot ulcer that began 3 months prior to the initial consultation. Thirty years ago, she had a partial first ray amputation and split-thickness skin graft of the right foot secondary to gangrene that healed without complication. However, over the past ten years her ulcer reoccurred, alternating between an open wound to a healed state. After the patient failed to respond to conservative treatment, a biopsy was performed that resulted in the diagnosis of SCC. A concurrent MR study revealed diffuse, abnormal soft tissue that extended along the dorsum, plantar, and medial aspects of the forefoot and between the third and fourth toes, representing a possible neoplasm.

Conclusion: Wide surgical excision of the lesion was performed. Intraoperative biopsy revealed margins negative for any further invasive squamous cell activity, and a sentinel node biopsy was negative for metastasis. Because malignant change potential is directly related to the duration of the wound, regular biopsies will be performed to avoid missing a potentially life threatening condition. Magnetic resonance imaging is noted to be an important diagnostic tool to assess the margins and extent of bony destruction.

Increased Healing of Chronic Foot Ulcers with the WarmFeet® Intervention (Biofeedback Assisted Relaxation)

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Background: Limited micro vascular circulation contributes to chronic foot ulcers and is responsible for the progression to the majority of complications and amputations in the lower extremities. Current clinical research has suggested using multi-disciplinary means in treating patients. This study investigated the clinical efficacy of using an integrative, biofeedback assisted relaxation technique, designed to improve peripheral blood flow to increase healing.

Methods: A randomized controlled study included patients (N=32) diagnosed with diabetes and/or peripheral arterial disease. They presented with chronic foot ulcers (average duration 21 weeks). All patients received standard medical foot and wound care. Ulcers were observed/measured/photographed monthly for 3 months. Intervention consisted of teaching patients a standardized relaxation technique asking them to visualize the feet feeling comfortably warm. Assisted thermal biofeedback was used to monitor their progress of increasing great toe skin temperature each time of practice. Homework included 16 minutes of daily relaxation following a prepared audio recording to guide them, 5-7 days a week. Homework for the Control group patients was to relax using a self-selected method of relaxation 15 minutes daily.

Results An independent t-test showed statistically significant differences in ulcer healing rates between Intervention participants (2.84 mm²/day, SD = 3.45) and Control participants (0.56 mm²/day, SD = 1.35), (t=3.536, p < 0.002). After 12 weeks the Intervention group presented 14 healed ulcers (87.5%) and the Control group presented 7 healed ulcers (43.7%) Results were statistically significant (χ2 = 6.79, df = 1, p < 0.009). Allowing a cross over of 5 patients with unhealed ulcers from the Control group to learn the relaxation yielded 100% complete healing of all five ulcers in the subsequent 12 weeks. Additionally, patients experienced significant pain relief, increased ambulation, sensory function and coping skills.

Conclusion: The study demonstrates that this relaxation technique, now called the WarmFeet intervention, a patient directed self-care intervention, increases the rate of wound healing when used in addition to standard medical therapies for wound care. Since this therapy is non-invasive and non-pharmaceutical it serves well as a first stage intervention for peripheral limitations. Ramifications for improved outcomes in rehabilitation and cost saving for patients are significant. Third party payers can also enjoy significant cost savings thereby reducing health care costs.

Estimation And Comparative Study Of Insulin Levels In Human Subjects

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Insulin resistance (IR) is an impaired metabolic response to our body's own insulin so that active muscle cells cannot take up glucose as easily as they should. In that situation, the blood insulin levels are chronically higher which inhibits our fat cells from giving up their energy stores to let us lose weight.

IR is the chief characteristic of adult-onset diabetes, which affects an estimated 15 million Americans. It also sets the stage for obesity and coronary heart disease - even if one is not diabetic. Several studies have shown that high level of circulating insulin is linked to devastating epidemic of heart disease. Up to 50% of patients with Hypertension are estimated to have insulin resistance. The main problem is that this condition can exist unrecognized and metabolic damage can occur before a full-blown type 2 DM is fully diagnosed. Insulin resistance diabetics are 2.5 times more likely to die of heart attack or stroke than are non-diabetics. In the light of above facts the present study was undertaken with a view to study the concept of hyperinsulinemia in human subjects.

In order to study the concept of hyperinsulinemia serum insulin estimation was done in selected groups consisting of Normotensive nondiabetic normal subjects (standard weight and over weight), hypertensive, diabetics and hypertensive diabetics. Serum insulin levels were estimated by coat A count Insulin, a solid phase ¹²⁵I Radioimmunoassay designed for the quantitative measurement of insulin in serum. Coat - A - Count Insulin kit was procured from Diagnostic Products Corporation (DPC) Los Angeles, USA. p value < 0.05 was considered as statistically significant.

In present study statistically significant difference was observed in PG2 serum insulin level of obese subjects ($99.7 \pm 50.13 \mu\text{u/ml}$) $p < 0.05$ and that of hypertensive patients ($113.2 \pm 75.94 \mu\text{u/ml}$) $p < 0.05$ when compared with PG2 serum insulin level found in normal weight normotensive non-diabetic subjects. Elevated PG2 serum insulin level was observed in hypertensive diabetic patients. ($63.1 \pm 39.83 \mu\text{u/ml}$) and diabetic patients ($62.6 \pm 50.77 \mu\text{u/ml}$) as compared to that of normal weight normotensive non-diabetic subjects ($48.9 \pm 31.72 \mu\text{u/ml}$) High level of fasting serum insulin was observed in normotensive non-diabetic obese ($15.27 \pm 9.37 \mu\text{u/ml}$) and hypertensive patients ($13.14 \pm 11.48 \mu\text{u/ml}$) as compared to normal weight normotensive non-diabetic subjects.

In conclusion, the present work demonstrated that coat A count Insulin, a solid phase ¹²⁵I Radioimmunoassay is a useful tool for estimation of insulin and elevated serum insulin levels can be linked with conditions such as hypertension, obesity, and diabetes.

Patient Selection Decreases the Rate of Revision and Complications Associated with AneuRx™ Repair of Abdominal Aortic Aneurysms Enter

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Background: Within the vascular surgery community, endovascular stent-graft management (EVAR) is widely deemed an effective minimally-invasive treatment modality for abdominal aortic aneurysms (AAAs). (1) The AneuRx (Medtronic) stent graft system is among the options for endovascular repair. The aim of this study was to describe the incidence of complications at a single center tertiary care facility associated with the use of AneuRx stent-grafts and to determine which patient characteristics are independent variables for prediction of endoleaks, migration, and revision.

Methods: A retrospective review of a prospectively maintained database of 124 patients undergoing AneuRx stent-graft repair from 2001 to 2006. Pre, intra, and postoperative data in the form of imaging and patient charts was reviewed with special attention paid to aneurysm size and location, as well as occurrence of graft endoleaks and migration. Patients were followed at 1, 6, 12, and 18 months, as well as 2, 3, and 4 years as appropriate for the patient. Average patient follow-up time was 1-72 mos with a mean of 28mos.

Results:

	Time 0	1 Month	6 Month	1 Year	2 Years	3 Years
Persistent endoleak rate	21%	5.9%	7.5%	10.1%	8.5%	8.5%
New endoleak rate	5.9%	5.9%	4.3%	2.5%	2.8%	2.8%
Total endoleak rate	21%	11.8%	11.8%	12.6%	11.4%	11.4%
Migration rate	N/A	4%	1.0%	1.2%	1.4%	0%
Aortic size	5.4 cm	5.3 cm	5.1 cm	4.8 cm	4.5 cm	4.0 cm
Reintervention Rates	N/A	0.83%	2.0%	0%	2.8%	0%

Two of 124 aneurysms underwent open revision. The average aortic size of the aneurysms that had migration was 5.6 cm and endoleak 5.9 cm versus 5.4 cm for the entire cohort. The total reintervention rate was 5.6%. There were no ruptures. Average neck angulation was 15 degrees.

Conclusion: We believe this data to be important as it may add support for the repair of small aneurysms. The data from our center would support that by choosing smaller aneurysms to repair (avg size 5.4cm) we were able to show very low reintervention rates (5.6% at 3 years), with a total migration rate of 7.6% at 3 years. We believe that these exemplary rates are secondary to a slight permissiveness to allowing ongoing endoleaks and a cohort made up of small aneurysms. Our permissive approach to endoleaks (all Type II) is borne out by the our decreasing average aneurysm size and lack of delayed rupture. Comparing this cohort to others brings one to believe that higher re-intervention rates and more graft slippage is in part secondary to the larger aneurysm remodeling and therefore if identified and treated earlier may have fewer complications, unlike data from previous small aneurysm trials.

Management of Normal Caliber Heavily Calcified Aortas

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Objective: Without trauma, dissection, infection and steroid use, spontaneous rupture of normal caliber heavily calcified aortas (NHCAs) has been reported. The purpose of this study is to highlight the importance of promptly referring patients with NHCAs for proper evaluation and follow-up after they are diagnosed in the emergency room (ER) or elsewhere. Acute presentation may resolve without transmural rupture, but these patients have increased short and long-term risk of rupture.

Methods: A retrospective case series study included eight patients at a single center, tertiary care facility with a diagnosis of NCHCA. Data was collected between 2000 and 2006.

Table I: NCHCA Patient Diagnosis and Management Information

Patient	Time of Complaint	Time-1st Study	Modality-1st Study	AAA Diameter @ 1st Study	Time - Definitive Study	Modality-Definitive Study	AAA Diameter - Definitive Study	Time of Repair
1	12/30/00	12/13/00	CT	3.5 cm	12/18/00	CT	4.0	01/18/01
2	10/07/99	10/16/00	CT	4.2 cm	11/18/00	CT	4.2 cm	1/25/01
3	3/01	3/01	CT	4.0 cm	7/6/01	CT	5.7 cm	7/19/01
4	7/6/88	7/6/88	CT	3.0 cm	2/8/02	USG	4.3 cm	4/25/02
5	4/7/04	4/7/04	CT	5.2 cm	4/29/04	Aortogram	5.2 cm	7/1/04
6	3/02	3/02	USG	3.8 cm	1/19/06	CT	5.9 cm	1/26/06
7	4/06	4/18/06	CT	3.0 cm	5/1/06	CT	3.7 cm	5/16/06
8	4/3/05	4/3/05	CT	3.2 cm	5/26/06	CT	3.8 cm	6/6/06

Results: Given the aforementioned potential clinical course, for optimal management we recommend routine imaging surveillance with CT scanning. The average aneurysm size at repair was 4.6cm, while the average change in aneurysm size from initial study to repair is 0.9cm. The time from definitive study completion to endovascular repair is 39 days.

Conclusion: NHCAs may progress faster and need repair earlier than standard fusiform infrarenal aneurysms. Their saccular nature may necessitate repair at smaller diameters. Our experience has been that early imaging studies were under appreciated by the interpreting physician. Therefore, we recommend early referral to a vascular specialist with early repeat imaging. If symptomatic but have no leak we recommend repeat imaging in 48 to 72 hours. Optimal management would also include serial imaging every six months to detect aneurysm enlargement or leaks.

Ulcers Infection Evaluation In A Portuguese Diabetic Foot Community Clinic

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Background: Foot infection is a common cause for hospitalization and subsequent lower limb amputation among diabetic foot ulcer patient. Infection by Methicillin-Resistant Staphylococcus aureus (MRSA) in diabetic foot clinics is a growing medical problem linked with adverse clinic prognosis.

Methods: A retrospective analysis of wound swabs taken from infected foot ulcers in diabetic patients, selected from an outpatient diabetic foot clinic. This analysis occurred between January 2002 and July 2007 in a universe of 159 patients with positive wound swabs.

Results: 159 patients (63% male) had one or more cultures taken during the observation period. Among these patients, 75% had Type 2 Diabetes and the average HbA1c was 8.2%. Mean age of the population analyzed was 68 years and the average duration of the disease was 24 years.

The University of Texas Classifications System For Diabetic Foot Wounds was used to classify the ulcers, between grades 2 and 3. Gram-Positive aerobic bacteria were the commonest isolated micro-organism (63%), followed by Gram-Negative bacteria (37%, respectively). Among the Gram-Positive aerobes, Staphylococcus Aureus was found most frequently. Fifteen cases were confirmed to be Methicillin-Resistant Staphylococcus aureus infection.

All patients were treated previously for Chronic Foot Ulcer Infections with broad-spectrum antibiotics over 1 month and all the Methicillin-Resistant Staphylococcus aureus positive patients had history of hospitalization.

Conclusions: This is the first study of Methicillin-Resistant Staphylococcus aureus in a Diabetic Foot Community Clinic in Portugal.

The prevalence of Methicillin-Resistant Staphylococcus aureus was less than the expected on previous studies. It shows the importance of a multidisciplinary ambulatory community care approach to diabetic foot clinic. Methicillin-Resistant Staphylococcus aureus infection is one of the major problems in Diabetic Foot Ulcers and our study confirmed the association with previous antibiotic treatment and hospitalization. Further studies are required to show the importance of the ambulatory community clinics, since most infections are probably acquired in hospitals.

A Hybrid Endovascular Approach to Ascending Aortic Pseudoaneurysm

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A 66 year old male presented to a regional E.R. with a chief complaint of chest pain. He was 6 months out from aortic valve replacement with a patch angioplasty and dacron wrapping of the ascending aorta secondary to a very friable aortic wall that "wouldn't hold a stitch". He had done well since his operation with the exception of this acute chest pain presentation. A CT scan ordered in the ER revealed a large, leaking aortic pseudoaneurysm with a large anterior mediastinal hematoma. He was transferred to our institution for emergent surgery. It was felt that fem-fem bypass with probable circulatory arrest would be necessary to repair this problem. An alternate strategy of ascending aortic cuff (Gortex Excluder 23 mm.) to seal this leak was considered. Since the available cuffs are on a 60 cm. shaft this was placed via a left subclavian approach.

Completion angiography in the OR showed resolution of the leak and the procedure was stopped. A review of the intra-operative TEE by cardiology well after the procedure had concluded suggested a persistent, but much smaller, leak.

Subsequent imaging confirmed a smaller pseudoaneurysm. The neck on this appeared small so an attempt at catheter based embolization. This was unsuccessful secondary to inability to access the neck. An alternative approach was employed by accessing the pseudoaneurysm via a left parasternal approach and multiple nester and tornado coils were placed with resolution of flow in the pseudoaneurysm. The patient is now several months out and doing well.

**A Control And Clinical Utility Evaluation Of Lower
Extremity Administration Of A Vasodilator
A Comparison Study Of The Effects Of L-Menthol
Foam And L-Menthol Cream On Skin Perfusion
Pressure (SPP) In The Wound Care Clinic**

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Foot ulcers occurring in patients with DM and PAD are challenging from a therapeutic point of view since the wounds require adequate perfusion to these most distal capillary beds in order to heal. Therefore, prevention of DFU in patients with DM is important. Easy to use topical agents that increase blood flow to the extremity may have a role in increasing blood flow to the feet of patients presenting with DM and PAD and thereby prevent complications secondary to diminished skin perfusion.

A Clinical Study Of The Ability Of BCT Gel To Increase Epidermal Perfusion In Peripheral Tissue

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Successful management of open wounds requires an effective occlusive barrier, adequate blood flow to the wound and effective debridement of necrotic tissue. All of these therapeutic benefits can be delivered by BCT (balsam peru, castor oil, trypsin) products. Previous work has shown that BCT Gel provides an effective occlusive barrier and delivers enhanced enzymatic activity. To date, no studies have examined the ability of BCT Gel to increase tissue perfusion. BCT ointment has been shown to increase capillary blood flow. However, no definitive correlation exists between either the velocity or quantity of capillary blood flow and wound healing. In contrast, SPP (Skin Perfusion Pressure) has been shown to correlate to wound healing outcomes with SPP values of ≥ 30 mm Hg having a positive correlation with wound healing. The degree of tissue perfusion as determined by measurement of SPP will be done by laser Doppler flowimetry using a SensiLase PAD3000 system (Vasamed, Eden Prarie MN). A ten (10) person clinical trial has been initiated to examine the ability of BCT Gel treatment to increase tissue perfusion in healthy volunteers. These results will be compared to results obtained by treatment with BCT ointment or a barrier ointment.

Five Case Studies from the *TOPICS* Program- Treatment of Various Wound Types in a Clinical Setting with a Novel BCT Gel formulation.

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Successful management of open wounds requires an effective occlusive barrier, adequate blood flow to the wound, effective debridement of necrotic tissue, infection control and pressure relief. Optimized BCT (balsam peru, castor oil, trypsin) formulations can improve wound visualization, provide an effective protective barrier and minimize trauma to the wound upon application, aiding healing while decreasing the workload for wound care specialists and caregivers. An uncontrolled, open label, multi-center program has been initiated to evaluate the efficacy of a novel BCT Gel wound treatment in a “real life” clinical setting. The program is designed to provide a framework for evaluating the efficacy of BCT Gel in treating a variety of wounds in both the clinic and home care settings. This poster will report on 5 selected case studies from patients with varying wound types and severity that were treated in this on-going study.

Study Design: Uncontrolled, open label, multi-center clinical evaluation program. After determining that the patient is a candidate for BCT treatment, patients are treated with BCT Gel applied according to the approved labeling instructions, twice daily or as directed for a maximum of 60 days or until healing has occurred. The treatment protocol allows additional supportive measures per standard of care guidelines. No other pharmacological wound treatments will be used. Weekly assessments with photographs and size measurements as well as qualitative assessments will be recorded. Endpoints include percentage and rate of healing, ease of use and overall clinical satisfaction.

A Comparison of the Trypsin Activity of Two Wound Treatments *In Vitro*.

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All trypsin based wound care products contain the same three active ingredients, trypsin, balsam peru and castor oil at identical concentrations. These products are differentiated by physical properties such as viscosity and the impact these properties have on therapeutic activity. The trypsin activity of a wound treatment is dictated in part by the ability of a formulation to release active enzyme to the wound site.

In order to assess the ability of different products to release active enzyme, an *in vitro* wound model was developed. The model replicates a wound environment by presenting a fully hydrated substrate matrix containing embedded protein. Enzyme must diffuse from the vehicle into the hydrated substrate, then diffuse through the substrate matrix to the embedded protein. The embedded protein is then degraded to form a zone of clearance allowing measurement of enzymatic activity as a function of time.

Using the assay described above, two different trypsin based products were examined. Product 1 was characterized by a zero shear viscosity greater than 1,500,000 cP. In contrast, product 2 had a zero shear viscosity of approximately 350,000 cP. Both treatments demonstrated trypsin activity under the conditions of the assay. Comparison of the magnitudes of trypsin activity showed that product 2 demonstrated greater trypsin activity at all time points ($p = 0.03$ to 0.003). Linear regression of the activity versus time data showed that product 2 had 1.84 times greater trypsin activity than product 1.

The results of this study indicate that the lower viscosity product 2 demonstrates greater trypsin activity in an *in vitro* wound model than product 1. While increased trypsin activity has not been clinically shown to improve wound healing to date, the results of this study suggest that differences in trypsin activity might be improve clinical outcome.

Complications Associated with Circular Ring Fixation in Patients with Diabetes versus Patients without Diabetes

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Objective: The purpose of this study is to identify and report the complications associated with the use of circular ring fixation in diabetic patients, and to compare the frequency of complications in patients without diabetes. Based on the clinical observations, we hypothesized that complications with circular ring fixation occurred more frequently in patients with diabetes than patients without diabetes.

Research Design and Methods: Institutional Review Board approval was obtained and patient charts were retrospectively reviewed between June 2004 and February 2007. There were 62 consecutive patients undergoing midfoot, hindfoot and/or ankle surgery with circular ring fixation. Patient demographics, the duration of treatment with the external fixator, and complications encountered were recorded.

Results: Males had a significantly greater number of complications compared to females ($p= 0.017$). The total number of complications was statistically greater in diabetic patients (study group) versus non-diabetic patients (control group) ($p=0.003$). Of the 44 complications in the study group, 61% were minor and 39% were major. Fourteen complications were encountered in the control, of which 71% were minor, and 29% were major.

Conclusions: Patients with diabetic neuropathy experience significantly more complications than patients without diabetes during treatment with the use of circular ring fixation. The vast majority of those complications can be managed without affecting the final result.

Transitioning Patients with Diabetes or Diabetes Wounds to Home Care

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Participants will: Understand the value of home care as a cost-effective, clinically efficient means to manage care for patients with diabetes and diabetes wounds 2. Demonstrate the value of home care services to stakeholders along the continuum of care 3. Verbalize the limitations of home care for persons with chronic illness.

Quality home health agencies provide an opportunity for innovative relationships with health care providers along the continuum of care. Transitioning a patient from the acute care setting to a more hospitable home environment improves patient satisfaction while providing evidence-based, quality care. Home health agencies are being called on to take an active role in addressing longterm patient health care needs. Post-acute care selection should be aligned with ability to provide evidence-based care, while exercising prudent fiscal responsibility. This involves quality-based purchasing, understanding formulary and the managed care requirements. Long-term financial implications of chronic illness care are driving payors to demand that self-care management be part of any home health initiative.

Both payors and regulatory agencies require longitudinal outcomes be collected, collated and reported for all home health agencies. By partnering with all the stakeholders along the continuum, home health agencies are taking a active role in defining quality-based parameters and preparing for the bonus structure in Pay For Performance, the payment model that is the future.

Home health agencies with the expertise of Wound, Ostomy, Continence nurses (WOCN) and Certified Diabetes Educators (CDE) can provide the leadership needed to research and deliver evidence-based practice while exercising fiscal responsibility. Utilizing outcome metrics for continuous quality improvement and regard for the long term financial implications aligns the home health agencies with the quality care trends that are influencing payment structure. Here lies the strength and the limitations of home health. Hospital-based treatments ordered "twice a day" for example, are not home-care appropriate. Insulin administration by the home care nurse on daily basis requires substantial documentation for justification unless it is to teach patient or caregiver. Home health agencies provide "short-term, intermittent care". It is in this transition where the stakeholders need clarity.

The strength of the home health relationship with the stakeholders is the ability to assess the patient in a unique setting, individualize the care plan and be the conduit to the health care team.

Comprehensive assessments, telephone triage, follow-ups improve outcomes, reduce all emergent events, can reduce length of stays, and result in patient satisfaction. This defines the goal of home health agencies.

SpacerTek™: A Novel Minimally Invasive Treatment For Mitral Valve Regurgitation

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Background: Mitral valve regurgitation is diagnosed in over 400,000 Americans annually. Etiologies can be primary (eg, myxomatous degeneration) or secondary (eg, dilated cardiomyopathy). Patients may be symptomatic or asymptomatic. Some can be managed medically but surgery is indicated when the ejection fraction is <60% or the left ventricular end-systolic dimension exceeds 45-mm. Mitral valve repair offers a lower operative mortality over valve replacement (2.6% vs 10.3%) and a higher 10-year survival rate (68% vs 52%). Existing repair techniques are nonetheless complex, requiring the skills of a highly specialized surgical team. If repair is to become widely applied, intervention techniques must be enhanced. This feasibility study assessed our ability to safely and effectively deploy in healthy sheep a novel intracardiac implant designed to ameliorate regurgitation by enhancing functional valve coaptation (valve-valve or valve-device) during systole.

Methods: Twenty mature, female sheep (65-75 kg) were maintained under isoflurane/oxygen inhalant anesthesia. Under fluoroscopic and intracardiac echocardiographic guidance, a dedicated trans-catheter (femoral vein) delivery system (Percu-Pro™, Cardiosolutions Inc, Stoughton, MA) provided a trans-septal approach to the left atrium and subsequently the left ventricle. Via the catheter the implant (MitraSpacer™, Cardiosolutions Inc, Stoughton, MA), consisting of a cylindrical (9 x 25-mm, expanded) collapsible Nitinol wire scaffold enveloped within a silicone polyurethane sheath, was deployed and suspended within the mitral annulus by a single Nitinol wire anchored to the ventricular wall. Sheep were then euthanatized and the heart and implant were grossly examined. The ability of the operators to achieve a series of successive objectives (trans-septal puncture, trans-mitral transit, and device deployment, fixation, and release), associated sheep morbidity and mortality, procedure duration, and necropsy findings were recorded.

Results: System design modifications and a progressive increase in operator experience through the course of the study culminated in successful, uncomplicated, and repeatable implantations of the device. Procedure duration declined from 240 minutes initially to 45 minutes. One sheep died intraoperatively (hemopericardium). Early complications included catheter malfunction and operator learning curve associated problems including malposition of trans-septal puncture, failure of trans-mitral catheter placement, trauma to chordae, and partial protrusion of the anchor wire into the pericardial space. Occasional cardiac fibrillations were successfully medically treated.

Conclusion: This study demonstrates the potential for using the SpacerTek™ (Cardiosolutions Inc, Stoughton, MA) system in some human populations afflicted with mitral regurgitation. Minimally invasive trans-thoracic implantation may offer an alternative to the percutaneous technique validated here. Survival studies in sheep are warranted.

Abdominal Aortic Aneurysm Screening in Louisiana

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Background: In the past decade, several studies have demonstrated the benefit of screening for abdominal aortic aneurysms (AAA) among high risk adults. Controversy still exists, however, regarding which population groups are "high risk" and whether certain geographic regions would not benefit from screening due to a low prevalence of AAA. The purpose of this study was to determine the efficacy of AAA screening in the Gulf Coast by reviewing a four year experience.

Methods: Between September 2003 and March 2007, 3672 eligible adults were screened at 29 locations throughout the Gulf Coast region. The sole eligibility requirement was age 60 years or older. Each screening consisted of an ultrasound guided abdominal aortic measurement. All positive findings were confirmed by a physician on premises. A participant was considered to have an AAA if their greatest aortic diameter was over 3 cm. Basic gender, race and age data were collected on all participants while 414 underwent a physician interview to record an additional nine risk factors. Among this group, logistic regression analysis was performed to determine independent predictors of AAA.

Results: Of the 3672 individuals screened, 1763 were male (48%) and 3084 (84%) were Caucasian. Overall, 113 (3.1%) participants were found to have an AAA, of whom 96 (84%) were male and 103 were Caucasian (91%). Among the 414 individuals who had additional data recorded, 16 (3.9%) AAAs were identified. In this subgroup, independent predictors of AAA were male gender (OR 1.73, $P < .01$), family history of AAA (OR 4.92, $P < .001$), coronary artery disease (OR 2.51, $P < .05$) and age greater than 65 (OR 1.12, $P < .05$).

Conclusion: These data suggest that widespread AAA screening of adults aged 60 or greater in the Gulf Coast will yield positive findings equivalent to those in most reported series throughout the country. Additionally, males and individuals with either coronary artery disease or a family history of AAA seem to be at highest risk and should be specifically encouraged to attend a screening.

The Prevalence of Occult Diabetes Mellitus in Patients with Symptomatic Tibial Vessel Disease: Findings in a High Risk Urban Setting

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Objective: While recent estimates indicate that over 20 million people in the United States have diabetes mellitus (DM), as many as one-third of these cases are undiagnosed. The purpose of this study was to review the authors' experience with routine testing for occult DM in patients found to have symptomatic stenoses in one or more of the tibial vessels.

Methods: Between September 1, 2004 and August 31, 2006, 407 lower extremity angiograms were performed for symptomatic peripheral vascular disease (PVD) in the greater New Orleans region. Fasting plasma glucose levels (FPG) were obtained in all patients with both a $\geq 50\%$ stenosis in one or more tibial vessels and no prior diagnosis of DM. Patients with positive results were classified as either diabetic or pre-diabetic according to the American Diabetes Association guidelines.

Results: Of the 407 angiograms performed, 215 demonstrated a $\geq 50\%$ stenosis of at least one tibial vessel. Of these 215 patients, 75 had been previously diagnosed with DM. The remaining 140 patients were screened and 67 (67/140, 48%) had an abnormal FPG. Secondary testing diagnosed 41 patients with DM (41/140, 29%) and 26 (26/140, 19%) with pre-diabetes. Logistic regression analysis determined that the presence of undiagnosed DM or pre-diabetes was predicted by a first degree relative with DM (OR=11.85, P=.0006, 95%CI 3.38-86.46), black race (OR=5.03, P=.025, 95%CI 1.19-15.04), multiple tibial vessel involvement (OR=23.19, P<.0001, 95%CI 6.19-75.77) and tissue loss at presentation (OR=16.94, P<.0001, 95%CI 3.41-77.83).

Conclusion: These data demonstrate a clinically significant prevalence of occult DM among individuals with symptomatic tibial vessel disease in an urban setting. Routine screening should be considered as part of the treatment process in these patients.

Evidence Based Wound Care Registry Focusing On Proactive Approach to Plan of Care and Documented Outcomes in a Podiatric Practice Setting

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Background: Wounds of the lower extremity are common and increasingly growing in the diabetic patient population. Patients present with not only a wound(s) but also with associated disease states/complications. These complications may be the underlying cause and/or contributing factors that inhibit the ability for the patient heal. The current nature of wound care has been one of reactive care. The primary goal in the creation of the Registry is to establish a proactive plan of care with treatment algorithms, imploring the highest level of evidence available.

Method: The Registry is designed to capture objective clinical data from the initial encounter and overtime provides a detailed accounting of the patient's wound progression and care provided, as well as data on the response to treatment modalities. Information regarding related factors affecting care and wound progression is also able to be captured in this method. An adjustable workflow is implemented at each encounter that assists in care plans with schedules for appropriate and necessary testing, medication, surgical interventions, wound dressing and patient instructions. Likewise the physician and staff are alerted to any abnormal diagnostic findings and test results, laboratory outcomes. Treatment details are able to be extracted from the data base as well. This in turn enables tracking, analysis and reporting on the entire care provided to a particular patient from the start until the wound resolves or otherwise. The reporting is tied to an E H R, which is also created at each encounter, documenting services provided; which is then tied to the billing software to allow the practice to submit claims to the patient's insurance plan.

Results: The best available evidence based medical guidelines are accessible through links within the Registry and can be searched by the practitioner at the point of contact, while the patient is with the practitioner. Thus allowing the practitioner to provide the most optimum outcome and care. Data can then be analyzed as to predefined successful outcome, healing rates, time to heal, as well as assessment of the dressings and treatment modalities implored. Tracking of patient compliance is also able to be followed in this method.

Endovascular AAA Repair and Subsequent Paraplegia: A Case Study

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Background: Endovascular abdominal aneurysm repair (EVAR) is favorable in patients with multiple co-morbidities and in patients who are at high risk of developing complications from open operations. A rare but devastating event following EVAR is paraplegia secondary to spinal cord ischemia.

Case Report: Our patient, a 79 year old man with multiple co-morbidities including renal failure and a 7 cm infrarenal abdominal aortic aneurysm, was treated endovascularly with a Bifurcated Cook Zenith Endograft (TFB-32-132mm) (Cook Medical Inc. Bloomington, IN) and also received a wireless pressure measurement sensor Endosure (CardioMems Inc. Atlanta, GA).

Immediately post-op the patient regained his baseline pedal pulses and movement in all extremities. Overnight, however, he lost mature function in his lower extremities and later developed paresthesia in the lower extremities bilaterally. Neurological examination showed acute flaccid, areflexic, paraplegia with spinothalamic loss at the level of T10 as well as weak sphincter tone with sparing of perianal sensations and proprioception.

Spinal ischemia was suspected and immediate attempts were made to improve spinal blood flow. By next morning he developed metabolic acidosis, leukocytosis, hyperglycemia and D-dimer of 14.14. Bowel ischemia was suspected and surgical exploration was performed twice within 48 hours but with negative results. His metabolic acidosis progressively worsened and he subsequently passed away.

Given our patient's initial onset of paralysis, he likely experienced ischemia in the anterior segment of the spinal cord. Several other factors including atherosclerotic showers and cholesterol crystal emboli (CCE) syndrome could have all contributed to our patient's spinal cord ischemia. Demographically, our patient fits the profile of individuals most at risk for CCE (white male smoker with diffuse atherosclerotic disease, plaques in his aorta, hypertension and an abdominal aortic aneurysm). CCE also explains our patient's spinal cord ischemia and rising lactic acid levels. Since our patient had a history of a previous cardiac catheterization he would be at a 25-30% risk of developing CCE. CCE also may have partially contributed to his baseline renal insufficiency. If this was the case, then any endovascular procedures would have been contraindicated in our patient.

Conclusion: After surveying the existing literature, we report that this is the seventh case of EVAR associated paraplegia. We hypothesize that this complication was possibly due to an embolic event and would suggest better preoperative imaging (even at the expense of worsening renal function and increased need for dialysis) in patients with perfuse PVD and multiple co-morbidities.

Prevalence of Aspirin Resistance in Patients with Coronary Artery Disease

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Background: Aspirin is widely used for primary and secondary prevention of CV events in patients with CV risk factors or established atherosclerotic disease. There has been concern about aspirin response variability, which may be linked to increased number of CV events. The role of various clinical variables that may affect response to aspirin therapy remains uncertain.

Aim: To determine the prevalence of aspirin response variability in patients referred for angiogram/ PCI and to evaluate whether CV risk factors affect aspirin resistance. We also studied the effect of statins and B-Blockers on aspirin response.

Methods: Platelet function was measured in 60 patients with stable CAD undergoing elective PCI by Platelet Works (Helena Laboratories ICHOR) using Arachidonic Acid as an agonist. Patients were on chronic aspirin therapy (81 to 325 mg/day) including the day of testing. Aspirin resistance was defined as an aggregation of more than 80%. Patient demographics, clinical information, and blood for aspirin function testing was obtained prior to the angiographic procedure.

Results: Aspirin resistance was found in 31% of patients. The Aspirin Resistance group had a significantly greater percentage of males, tobacco use, and 3 vessel CAD when compared with the aspirin responders group. No difference was noted in prevalence of diabetes or use of statins/beta blockers between the 2 groups. Higher dose of Aspirin was not associated with a lower aspirin resistance.

Conclusions: Patients with stable CAD on Aspirin therapy showing evidence of resistance are more likely to be males, to use tobacco, and to have 3 vessel CAD.

The Role of 64-Channel CTA in the Diagnosis and Overall Management of Chronic Mesenteric Artery Disease

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Background: Recent natural history reports suggest chronic mesenteric ischemia (CMI) to be poorly understood, rarely diagnosed, have variable symptoms and approximately 30% progress to acute mesenteric ischemia with mortalities > 50% within 18-24 months if untreated. Conventional diagnostic angiography (CDA) is the “gold standard” for the diagnosis and treatment but has significant limitations. Recent reports describe excellent immediate clinical results treating CMI with PTA/stenting but with a 12-24 month restenosis rate of 20%.

Methods: Between January 2005 and February 2007, an anatomic validation analysis (% stenosis correlation between preprocedural 64-slice MDCTA with periprocedural CDA) was performed in 48 patients (96 vessels) undergoing treatment PTA/stenting for CMI. Arteries analyzed include: 96 each of celiac artery (CA) and superior mesenteric artery (SMA). Abdominal pain and weight loss were present in 45/48 (93.7%) and 42/48 (87.5%) respectively. All patients underwent PTA/stenting [CA = 20/48 (41.6%), SMA = 39/48 (81.2%), and both CA/SMA = 18/48 (37.5%)].

Results: Initial diagnostic 64-slice MDCTA revealed strong correlations with CDA in CA ($r^2 = 0.968$) and SMA ($r^2 = 0.943$). Immediate procedural success was 47/48 (97.9%) with > 90% clinical success; pain relief 42/45 (93.3%) and weight gain 39/41 (95.1%). There were no 30-day periprocedural deaths or major complications. 80/96 (83.3%) vessels were available for objective 12-24 months MDCTA follow-up. 19/80 (23.7%) vessels (CA = 7, SMA = 12) developed > 50% restenosis by MDCTA and 16/19 (84.2%) were confirmed by CDA and underwent successful repeat percutaneous revascularization.

Conclusion: 64-slice MDCTA is an accurate non-invasive imaging modality for the diagnosis of mesenteric artery disease and facilitates the overall management and follow-up of CMI patients treated with PTA/stenting.

Clopidogrel Response Variability in Patients with Hyperlipedemia undergoing PCI

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Background: Hyperlipedemia is a well established risk factor for CV events. Clopidogrel is widely used along with statin therapy for secondary prevention of CV events. The interaction between statin therapy and clopidogrel is not fully understood. We evaluated the prevalence of clopidogrel response variability in patients on statin therapy.

Methods: Platelet function was measured in 120 patients with stable CAD undergoing elective PCI by Platelet Works (Helena Laboratories ICHOR) using ADP 20μmol as an agonist. Patients were on chronic clopidogrel therapy (75mg/day) including the day of testing. Clopidogrel resistance was defined as an aggregation of more than 65% compared to baseline. After informed consent, demographics, clinical information, and blood for clopidogrel function testing was obtained.

Results: In the total population Clopidogrel resistance was found in 21% of patients. All the patients with hyperlipidemia were on statin therapy. Patients were divided into two groups for study purposes: Group1: Statin therapy and Group 2: Statin naive. The patients on statin therapy had a significantly higher percentage clopidogrel non-responders compared to statin naïve patients. In patients with a normal lipid profile there was only one non-responsive to clopidogrel.

Conclusions: The overall prevalence of clopidogrel non-responders was similar to other studies. Patients with hyperlipidemia (on statins) had a higher percentage of non-responders to clopidogrel therapy.

Limb Loss Nurse Identified Need For Vascular Amputee Clinic

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Background: Duke University Health System has a large volume of patients requiring amputation each year. Seventy-five percent of this patient population was diabetic and PVD. The Limb Loss Nurse Clinician identified this population with the vascular surgery team as having increased wound healing issues, edema, mobility problems, decreased family knowledge, and many become lost to appropriate prosthetic evaluations. The Limb Loss Nurse Clinician was not illegible to charge for clinic visits, she worked with a Physician Assistant (PA) to create a multidiscipline postoperative clinic for the vascular surgery amputee patients.

Methods: The PA set up a weekly Wednesday afternoon clinic for return amputee patients. The Nurse identified a Physical Therapist (PT) and Certified Prosthetist (CP) to attend the clinic. A work sheet for recording visit findings from each discipline was developed and a continued plan of care was determined and returned to the Skilled Nursing Facility, Acute Rehab, or Home Health Nursing. The Limb Loss Nurse directed the family and patient education and follow-up care. She includes the clinic nurse in the wound care and identifies new wound treatments with the PA for each patient. These patients are routinely seen every two weeks, more often if needed, until the limb is healed and after the prosthesis is fitted. The team identifies patient's safe for a prosthetic evaluation. When a prosthesis is not an option, safe wheelchair mobility is determined with the patient and family. The team also evaluates and provides the patient and family with teaching and reminder of glucose monitoring, medical care follow up and diabetic foot care for the remaining foot. For the bilateral amputee, the patient and family were encouraged to continue the therapy needed to gain strength for possible prosthetic fitting.

Results: The clinic demonstrates a continued need for coordination of care for the amputee population. Aggressive wound care and follow-up has prevented hospital readmissions and promoted early prosthetic fitting for many patients. The clinic has also provided proper diabetic foot care and shoe wear when possible

Conclusions: The multidisciplinary team approach for care of diabetic and dysvascular patients following an amputation provides constant follow-up and wound care. Further analysis of this method compared to the previous care provided the diabetic/dysvascular patient should be studied. The Limb Loss Nurse desires to become wound care certified.

Distal Protection Devices in Infringuinal Interventions for Critical Limb Ischemia: A 12-Month experience in 58 Patients

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Background: Distal protection device (DPD) utilization has been well described during coronary bypass vein graft, carotid and renal percutaneous vascular interventions (PVI). Sparse data exists regarding DPD use during infringuinal interventions for critical limb ischemia (CLI) despite being at high risk for periprocedural distal embolization with potential catastrophic consequences.

Methods: Between July 2006 and June 2007, 58 CLI patients underwent PVI using a SPIDER™ Embolic Protection Device (eV3 Inc., Plymouth, MN). Multiple vessels were treated in 42/58 (72%). Arteries treated included common femoral (CFA) = 7, superficial femoral (SFA) = 49, profunda femorosa (PFA) = 8, popliteal (PA) = 39, and infrapopliteal (IPA) = 19. Chronic total occlusions (CTO) were treated in CFA = 2, SFA = 24, PA = 12 and IPA = 10. The DPD was deployed in SFA = 6, PFA = 8, PA = 28 and IPA = 16. PVI treatments included: sole laser = 4, sole plaque excision (PE) = 2, laser PTA = 16, PE PTA = 4, laser PTA/stent = 23, PE PTA/stent = 4, and PTA/stent = 5. The filter was analyzed for debris content, amount (none, minor or major) and 6 specimens for histopathology. Detailed final angiogram scrutinization with partial filter capture and removal under cine magnified imaging is now recommended.

Results: The DPD delivery success rate was 58/59 (98%). There were no major DPD complications but 3/16 (18.7%) IPA experienced vasospasm. Minor distal emboli occurred in 2/58 (3.4%). Histopathology consisted of platelets, erythrocytes, inflammatory cells, fibrin conglomerates, extracellular matrix and atherosclerotic plaque particle debris. Overall, particulate DPD debris was identified in 44/58 (76%) of cases. No DPD debris was found in 14/58 (24%) cases. Minor debris was identified in 37/58 (64%) and major debris in 7/58 (12%). Predictors of major debris included CTO's, PE, PTA, and PTA/stenting but minor debris occurred with all types of PVI including laser.

Conclusion: Major and minor embolic debris occur commonly during PVI and can occur with all treatments. The SPIDER™ DPD was found to be safe and feasible during infringuinal PVI and may have the potential to decrease distal emboli and improve PVI outcomes in CLI patients.

PROVANT Wound Therapy in Diabetic and Venous Stasis Ulcer Patients: A Prospective, Open-Label, Non-Comparative Multi-Center Case Series Across Various Sites of Care

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Background: In order to evaluate the effectiveness of PROVANT® Wound Therapy, (cell proliferation induction), (Regenesi Biomedical, Inc., Scottsdale AZ), a novel radio-frequency based wound treatment technology, in the healing of Diabetic Foot Ulcers and Venous Stasis Ulcers across various sites of care, a prospective, open-label, non-comparative, multi-center case series was collected and analyzed

Methods: Patients were recruited from 65 geographically distributed US centers over the period 2005-2007. Sites of care included wound clinics, long term care facilities, skilled nursing facilities, hospitals and nursing homes. Data collected included subject age, gender, wound type, location, duration, dimensions, exudates and tissue quality. All subjects were followed for 4 weeks and some for up to 8 weeks. All subjects received standard wound care following institutional treatment protocols in addition to PROVANT therapy. Data on subjects with Diabetic Ulcers and Venous Stasis Ulcers who received 4 weeks of PROVANT therapy was analyzed.

Results: From the database of 322 wounds, 39 wounds were identified as Diabetic Ulcers. Wounds were primarily foot ulcers, with mean initial wound area of 5.0 cm². Most were chronic, long-term ulcers, with mean wound age 21.1 months. Over 4 weeks of therapy with PROVANT, the percentage of Diabetic wounds that closed was 7.6%, and percentage that reduced in surface area by >90% was 23.1%. On average, Diabetic ulcers reduced 42.5% in surface area during treatment, with a healing rate of 8.3 mm²/day.

The Venous Stasis Ulcers were very large (mean surface area at entry 68.5 cm²) and chronic (mean wound age 25.3 months), but responded well to Provant Wound Therapy, reducing in area on average 54.4%. Among the 33 Venous Stasis Ulcers in the study population, 6.1% closed during 4 weeks of therapy and the percentage that reduced in surface area by >90% was 27.3%. The healing rate for Venous Stasis ulcers was 79.8 mm²/day.

Conclusions: In a real-world setting, PROVANT Wound Therapy is found to promote the healing of Diabetic Ulcers and Venous Stasis Ulcers, significantly reducing wound size in 4 weeks of treatment.

Novel Hand-Held Angiographic Injector: Bench & In-Vivo Results

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Background: Syringes provide ease-of-use, control, and feel for angiographic injections. But, syringes are limited in injection speed/pressure, especially if using small diameter catheters or imaging large organs. Power injectors increase injection speed during angiography and are associated with better images, less contrast usage, and a reduction in contrast induced nephropathy.

Methods: A new disposable hand-held angiographic syringe (PowrSyringe Injector, Pinyons Medical Technology, Inc., Park City, Utah USA) was used in a bench and in-vivo study to test injection speeds and imaging. The PowrSyringe Injector's integrated handles are connected to the plunger and barrel then cross for the user to hold and squeeze. When the handles are squeezed, a mechanical and ergonomic advantage advances the plunger into the barrel. The plunger withdraws from the barrel to aspirate when the handles are apart. Bench tests were performed with 12.5ml PowrSyringe Injectors and standard 12ml control syringes using selective 65cm 5F catheters and water powered by one-handed squeeze force from a 180# male and 110# female. In-vivo tests were performed to image 18-24mm inferior vena cava in ovine (n=4) with standard 10ml & 20ml syringes and 12.5ml & 25ml PowrSyringe Injectors using 5F 90cm pigtail catheters and 50-100% contrast/saline.

Results: The PowrSyringe Injector injected from 9-12ml/sec and the control syringe injected from 4-6ml/sec in bench testing. Users independently added the PowrSyringe Injector injections were easier with better ergonomic feel. In-vivo, 12.5 & 25ml PowrSyringe Injector was easy to use and associated with denser inferior vena cava images when compared to standard hand-held syringes.

Conclusion: The PowrSyringe Injector delivered faster hand-held injections in bench tests and was associated with dense vessel opacification in-vivo. The PowrSyringe Injector's may be useful in other applications including balloon inflation and discography. More research is needed to quantify the clinical and user benefits of the PowrSyringe Injector's design.

“At The Heart of New Orleans: Nurses And Community Health Workers Find Innovative Ways To Reduce The Prevalence of Cardiovascular Disease”

Cheryl Taylor, PhD, PI

REACH 2010: At The Heart of New Orleans, New Orleans, Louisiana, USA

Background: Cardiovascular Disease (CVD) is the leading cause of death for American women, and the number of women dying of CVD increases each year, with substantially higher morbidity and mortality rates among African-American women. CVD is the leading cause of death in Louisiana for both men and women. Community health nurses and volunteers bring light to these dismal statistics through a coalition known as REACH (Racial and Ethnic Approaches to Community Health) 2010 @ the Heart of New Orleans. REACH 2010 @ the Heart of New Orleans is a nurse-led, community-based research demonstration project with a focus to reduce CVD risk factors among African-American women.

Methods: Forty churches of ten denominations were randomly assigned to one of three categories: observation group, intervention group I, and intervention group II. A quasi-experimental research design was used. The theoretical framework for REACH included the American Heart Association guide for improving cardiovascular health at the community level, Prochaska’s stage of change, the Center for Disease Control logic model, and community based participatory research methodology. All churches had an annual health event which included a Community Health Assessment Program survey (CHAPS), the primary instrument for measuring the impact of the program interventions. Members of each church also received 6-session culturally specific Cardiovascular Health Education classes, and the National Black Women’s Health Imperative (NBWHI) Walking for Wellness Program™. Intervention groups I and II included a referral component to facilitate progress toward achieving personal goals in managing cardiovascular risk factors, hypertension, physical activity, nutrition, healthy weight, stress management and communication. Intervention II also included the NBWHI Church-Based Women Self-Help™ component.

Results: Churches improved wellness by adapting healthy eating behavior. Participants increased rates in recognizing signs of stroke and heart attack, increased rates of taking medication for high blood pressure, and increased access to healthcare. Project evaluation data revealed that health screenings financed by community partners serve as a major incentive for churches’ involvement in health promotion and education activities.

Conclusion: In order to start making a difference in your community: 1. Become familiar with risk-reduction resources that work and routinely practice personal healthy lifestyle behavior. 2. Acknowledge and recognize local nurses and health professionals who are community volunteers. 3. Advocate environmental policies that promote physical activity and healthy eating habits. 4. Increase awareness about health resources and promote quality healthcare.

Combined Intraoperative Innominate and Common Carotid Intervention with Simultaneous Carotid Endarterectomy: A “True” Endovascular Hybrid Approach

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Background: Simultaneous brachiocephalic and internal carotid artery (ICA) disease is rarely reported with an incidence of 1.8%. It is likely more common. We report our short and mid-term results and technique of a hybrid endovascular surgical treatment in patients presenting with simultaneous severe innominate, ostial left common carotid (CCA), and ICA disease utilizing a combined intraoperative carotid endarterectomy (CEA) with retrograde balloon angioplasty and stenting of the brachiocephalic lesion.

Methods: Between January 1996 and January 2007, 36 patients required combined intraoperative CEA and left CCA (28/36) and innominate (8/36) intervention. All patients had preoperative arch and carotid angiography, preoperative duplex ultrasound (DU), and 6 weeks, 6 months, and yearly postoperative DU. Selective carotid angiography was considered high risk in 6 cases (ulcerative lesions) and CEA was recommended on carotid DU results. Intraoperative techniques used included general anesthesia, C-arm fluoroscopy, prosthetic patching, selective shunting (12/36 shunts), manual sizing of the CCA, balloon expandable stent placement after predilation, needle-guidewire-8 French sheath entry into native CCA (not arteriotomy), and intervention performed before CEA. Stent diameter ranges from 7 mm to 9mm and all lengths = 36 mm.

Results: Procedural success 35/36 (97.2%); in one case a CCA dissection resulted during guidewire introduction and the intervention was aborted with CEA and carotid-subclavian bypass performed without complication. There were no perioperative or follow-up CNS events. The mortality rates at 30-day, 12-month, 24-month and 36-month were 0%, 4.5%, 7.6% and 11.5% respectively. There were no CEA restenosis and 3/36 (8.3%) brachiocephalic restenosis > 70% all treated successfully with repeat PTA/stenting.

Conclusion: A combined intraoperative innominate or left CCA intervention with simultaneous carotid endarterectomy is safe, effective, and durable and offers an excellent less invasive alternative than the more traditional transthoracic surgical approach to those patients presenting with simultaneous brachiocephalic and ICA disease.

A Review Of Utilizing Living Bi-Layered Cell Therapy In Lower Extremity Ulcerations Following Arterial Vascular Intervention.*

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Among several commercially available bioengineered tissue grafts, there is only one bi-layered cell therapy* that is approved by the FDA for the use with standard therapeutic compression in the treatment of non-infected partial- and full- thickness venous stasis ulcers as well as full thickness neuropathic diabetic foot ulcers. The bi-layered cell therapy expresses multiple growth factors found in normal skin, and provides a biologically active matrix. This presentation looks at the possibility of this bi-layered cell therapy* being beneficial in the management of lower extremity ulcerations following arterial vascular intervention. The bi-layered cell therapy* was utilized in sixteen lower extremity ulcers from eight patients following arterial vascular intervention. The bi-layered cell therapy* was an extremely useful in healing this difficult lower extremity ulceration. The results suggest that bi-layered cell therapy* is beneficial in healing lower extremity ulcerations following arterial vascular intervention.

Reducing Time To Decision In Non St Segment Elevated Myocardial Infarction (NSTEMI) By Using Pre-Hospital Point Of Care Cardiac Biomarkers

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Purpose: Non-ST-Segment-Elevated-Myocardial-Infarction (NSTEMI) care relies upon rapid detection and intervention. Bedside point of care (POC) markers reduce time from test to result over standard hospital lab based results. This study looks at the feasibility, implementation, accuracy, and further time saving by performing these tasks by EMS personnel. Time saving analysis from ED presentation to resulted test between EMS and ED initiated cardiac biomarkers is a primary endpoint.

Study Design: Prospective Interventional Trial of Biosite, Inc product cardiac biomarker in the pre-hospital setting by EMS compared to standard ED testing. Pre-trial study was performed to verify reproducibility and correlation with hospital lab based results.

Setting: Sub-urban community hospital ED and county's 911 EMS provider.

Subjects: Adult patients with chest pain/chest pain equivalents requesting 911 and transport to ED or presenting as "walk in" patients to the ED.

Interventions: Standard ED and EMS protocols which include iv access and blood draw for patient presenting with above symptoms. Biosite, Inc biomarker card was inoculated within 15 minutes of EMS arrival to ED. Biomarker card was read on correlated Biosite instrument in ED. EMS times were corrected according to "official" hospital ED times. Times were recorded for EMS transport with card inoculation prior to arrival, EMS transport with blood drawn but card not inoculated, EMS transport only, and ED "walk-in" chest pain/chest pain equivalent patients.

Results: 293 patient met criteria for study. 112 patient were ED walk ins (38.2%), 112 patient arrived via EMS with biomarker inoculated pre-hospital (38.2%), 26 patients were transported with blood drawn only (8.9%), and 43 had transport only (14.7%). EMS biomarker group had an average result time of 15 minutes vs ED walk-in cohort of 69 minutes ($2.45E-20$, $p < 0.001$). EMS transport with blood draw only averaged 41 minutes to result ($p < 0.001$). EMS transport only was not significantly different from walk in results (68 minutes average).

Statistical analysis: T-test with a 2-tailed distribution and unequal sample variances.

Conclusions: EMS initiated POC biomarkers are feasible, accurate, and result in a significant reduction in time to results and decision making for this population.

Is This A Migraine Headache?

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Purpose: To describe a case of spontaneous, bilateral vertebral artery dissections in a patient with a history of migraines.

Methods: Case report and literature review.

Results: A 22-year-old woman with a history of migraines presented to the ER with acute onset of severe headache, neck pain, nausea, vomiting, and blurry vision in her right eye. On examination, she was noted to have nonspecific decreased visual acuity in her right eye. No focal neurologic deficits were noted and the remainder of the physical exam was unremarkable. MRA indicated bilateral vertebral artery dissections.

Conclusion: Vertebral artery dissections can present with symptoms similar to that of a migraine and warrants consideration in any patient who complains of a new onset headache.

Targeted Renal Therapy in High-Risk Cardiac Surgery: Early Safety and Feasibility With a Novel Catheter Treatment For Renal Function Preservation During High-Risk Coronary Artery Bypass Grafting

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Background: Renal insufficiency and low glomerular filtration rates (GFR) are associated with increased mortality and morbidity after CABG. Worsening renal insufficiency is reported at 2-30% post CABG with an increased perioperative and 1-2 year mortality. Contrast-induced nephropathy is associated with increased mortality and morbidity after coronary angiography and intervention. There are no consensus effective perioperative CABG renal protection strategies. Targeted renal therapy (TRT) is an emerging treatment where bilateral intrarenal artery infusions of fenoldopam (FEN) (Corlopam, Abbott Laboratories, Abbott Park, IL), a dopamine-1 agonist and vasodilator, is delivered percutaneously by the FDA-approved 5-Fr Benephit™ Infusion System (Flowmedica, Inc., Fremont, CA). Extracorporeal circulation results in renal vasoconstriction, decreased renal plasma flow, and reduction of glomerular filtration by 25-30%. TRT has been shown to increase the glomerular filtration by 25%. Contrast exposure < 72 hours preceding CABG has been associated with worsening perioperative renal function.

Methods: From October 1, 2005 to February 1, 2007, TRT with FEN 0.2-0.4 mcg/kg/min was utilized to treat 20 high-risk CABG patients with preoperative renal insufficiency and low creatinine clearance (CrCl). TRT durations ranged from 3 -24 hours (mean = 6 hrs) delivered via femoral (N = 18) and brachial (N = 2) approaches. Serum creatinine (Cr) ranged from 1.3-3.3 mg/dL (mean = 1.9) and CrCl from 15-58 mL/min (mean = 35).

Results: Time to TRT catheter placement was 0.5-8 minutes (mean = 2.5). There were no TRT related complications and no patient required dialysis. In 17/20 (85.1%) patients did not develop worsening renal function or a > 25% increase in Cr. The 3 worsening renal function cases resolved at 1-week. Our larger 18-month experience with updates on randomized CABG trials will be presented.

Conclusion: TRT is safe and feasible for CABG patients at high-risk for worsening perioperative renal function and poor outcomes. Cardiac surgeons need to be aware of this percutaneous therapy that has the potential to improve CABG outcomes and surgeons should consider acquiring catheter-based skills.

Novel Wound Dressing* Promotes Healing in Diabetic Foot Wounds

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Purpose: Wounds are a tragic problem afflicting nearly 20% of the 16 million diabetics in this country, and preceding 85% of the 87,000 limb amputations each year. Limb amputation is unfortunately more prevalent in the elderly at the end of life. A novel wound dressing* developed for palliative treatment was used to treat diabetic foot ulcers in end of life patients.

Methods: Retrospective case study review of 28 foot wounds in diabetic hospice patients treated over a 30 month period. Twenty-four (24) wounds were treated with the novel dressing, which required once daily dressing changes. Treatment endpoints were wound healing or patient death. Pain and infection were monitored.

Results: Median age of patients was 78. Average length of time that patients lived after treatment started was less than 90 days, with a majority of patients living less than 30 days. No new wound infections were reported. Pain relief was achieved, based on caregiver and patient reports. Despite short treatment times, nearly 50% of wounds in the novel treatment group were healed or healing. There were no amputations.

Conclusion: Using a novel dressing designed for palliation resulted in significant healing of foot wounds in a fragile end of life diabetic population, with prevention of amputation in all cases.

Proprietary mixture containing liquid hydrogel, lidocaine, and antibiotic on gauze.

A Case Of Cervical Carcinoma Metastasizing To The Heart And Embolizing To The Lungs

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The presence of cardiac metastasis from a cervical cancer has very poor prognosis. We describe a patient who presented with pulmonary embolism from a cardiac mass and was subsequently found to have cervical cancer on autopsy. A 42 years old caucasian female with past medical history of hepatitis C, chronic vaginal bleeding and intravenous drugs use presented to the hospital with shortness of breath and chest pain. Patient reported worsening dyspnea on minimal exertion. On the day of presentation patient also reported an episode of near syncope. A CT scan of the chest with IV contrast was performed which showed bilateral lung septic emboli. An echocardiogram showed a right atrial and right ventricular mass extending into right ventricular outflow tract. Patient was started on anticoagulation. Due to concern for repeated pulmonary embolization patient was referred for open heart surgery. Open heart surgery was performed under cardiopulmonary bypass and aortic cannulation. Intraoperatively patient was found to have an enlarged heart. Majority of the mass was removed via a right arteriotomy. Due to extension of the mass into right ventricular trabeculae the part of the mass could not be removed. Histopathological analysis of the mass showed non differentiated adenocarcinoma. Workup to find the primary tumor revealed a mass in the vagina but examination under anesthesia could not be performed since the patient desaturated during anesthesia. Due to worsening hypoxia and cardiac instability patient eventually died. An autopsy was performed which showed extensive pelvic and abdominal lymphadenopathy with adhesions along with a mass in cervix and uterus.

Histopathological analysis showed poorly differentiated carcinoma. It is very rare to have a cervical carcinoma metastasizing to the heart. When it happens, prognosis is extremely poor. In our patient an aggressive treatment was attempted including cardiac surgery but tumor could not be completely removed from the heart due to extension into trabeculae. There are some case reports of cervical cancer metastasizing to the heart in the literature but diagnosis is most often made on autopsy.

Paradoxical Embolization Of A Pulmonary Artery Embolus During Surgical Embolectomy

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Surgical embolectomy has been described as one of the treatment options for massive pulmonary embolism. We describe a young patient who developed paradoxical lower extremity embolism during surgical embolectomy. A 27 years old African American male with no significant past medical history presented with shortness of breath and cough productive of blood tinged sputum for one week which became severe one day prior to admission. Patient also complained of left sided chest pain. Pain was moderate, non-radiating, sharp and increased by exertion and taking a deep breath. Patient denied any palpitations or diaphoresis during these episodes. Initial labs showed high D-dimers. Arterial blood gas showed mild respiratory alkalosis. EKG showed S1Q3T3 and evidence of subepicardial ischemia manifested by deep T wave inversions in V1-V3. An echocardiogram showed right ventricular volume overload along with massively dilated right ventricle and right atrium (giving left ventricle a D-shaped appearance on short-axis view). A CT angiogram showed massive pulmonary embolism involving bilateral main pulmonary arteries. Lower extremity Doppler showed deep venous thrombosis of right lower extremity. Patient was started on unfractionated heparin. On second day patient became hypotensive. At this time cardiothoracic surgery was consulted for possible surgical embolectomy. A pre-operative Tran-esophageal echocardiogram in the operating room confirmed pulmonary arterial embolus but did not show any thrombus or vegetation on the left side of the heart. Embolus was removed. A post-operative Tran-esophageal echocardiogram showed patent foramen ovale and evidence of a clot vs. vegetation on aortic valve. Same evening nurse reported absent pulses in right lower extremity. Patient was taken to the operating room for emergency surgery and a clot removed from right lower extremity arterial circulation. Our patient presented with massive pulmonary embolism and evidence of right ventricular failure with systemic hypotension. Major cause of mortality in pulmonary embolism is right ventricular failure. A search should be done to look for patent foramen ovale before surgical embolectomies because a massive embolus may fragmentize and embolize to the systemic circulation during manipulation of embolectomy. Also our case shows that surgical embolectomy is a feasible choice in case of massive pulmonary embolism and right ventricular systolic dysfunction.

Optimizing Platelet Inhibition And Anticoagulation In Treating Critical Limb Ischemia: High-Dose Single-Bolus Short-Infusion Iib/IIIa Inhibition With Tirofiban And Direct Thrombin Inhibition During Peripheral Interventions

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Background: Glycoprotein (GP) Iib/IIIa and direct thrombin inhibition (DTI) have shown ischemic and vascular access hemostasis outcomes benefits during percutaneous coronary (PCI) and safety and feasibility during peripheral vascular interventions (PVI). Recent PCI reports suggest benefit with high-dose single bolus (HDSB) GP Iib/IIIa inhibition with limited infusions. HDSB GP Iib/IIIa with short infusions and DTI is an attractive treatment strategy for PVI in treating critical limb ischemia (CLI). CLI patients have a high incidence of diabetes, small vessel disease, hypercoagulability, platelet dysfunction, thrombus, distal macro-/microembolization and overall complications.

Methods: Between October 2005 and January 2007, a CLI treatment group of 98 patients underwent PVI utilizing a single high dose tirofiban (Aggrastat, Medicure, Inc., Winnipeg, Manitoba) (25 mcq/kg/min) bolus with a limited 6-hr infusion (0.1 mcq/kg/min) and bivalirudin (Angiomax, The Medicines Company, Parsippany, NJ) (0.75 mg/kg/min) bolus with 1.75 mg/kg/min periprocedural infusion (group A). A matched CLI control group B used unfractionated heparin (UFH) without GP Iib/IIIa inhibition.

Results: Table.

Conclusion: A high dose single GP Iib/IIIa bolus of tirofiban with a limited 6-hour infusion and DTI combination is safe and feasible during PVI in CLI with potential outcomes benefit versus UFH. Randomized multicenter data to validate efficacy is warranted.

Variables	Group A (N= 98)	Group B (N=98)	P-Value
Procedural Success	96 (97.9%)	95 (96.9%)	N/A
VAC (Major)*	0 (0.0%)	2 (2.0%)	0.196
VAC (Minor)**	6 (6.1%)	12 (12.2%)	0.133
Clinical Distal Embolization	0 (0.0%)	2 (2.0%)	0.196
Acute Thrombosis (<48 hours)	1 (1.0%)	3 (3.1%)	0.367
Subacute Thrombosis (30 day)	2 (2.0%)	5 (5.1%)	0.283
Secondary re-intervention (6-mo)	9 (9.18%)	16 (16.3%)	0.140
Limb salvage (6-mo)	97 (98.9%)	95 (96.9%)	0.622
VAC = vascular access complications			
*Any surgery, intracranial bleed, stroke, > 5 cm hematoma, pseudoaneurysm, retroperitoneal hematoma, or ≥ 2u procedural related transfusion			
**Any other bleeding or hematoma < 5 cm			

The Power-Pulse Spray Technique for Deep Venous Thrombosis (DVT)

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Objective: To evaluate the clinical outcomes of percutaneous rheolytic thrombectomy using the Angiojet (Possis Medical, Minneapolis, MN), with added lytic agent, known as the “power-pulse spray” technique, in selected patients with acute and/or chronic DVT.

Methods: 24 patients with 28 deep venous thrombotic events who were treated with the power-pulse spray technique using urokinase and tissue plasminogen activator (tPA) between January 2003 and July 2006 at the Cardiovascular and Interventional Radiology Division of the GWU Medical Center were identified. Data was collected by review of medical records and procedural venograms.

Results: Procedural success was achieved in all 28 power pulse spray procedures without complications, resulting in complete or partial thrombolysis, with immediate symptomatic relief. Post interventional venograms demonstrated 100% of thrombus removal in 4 cases, 75%-95% of thrombus removal in 13 cases, 50%-75% of thrombus removal in 8 cases, 25%-50% of thrombus removal in 2 cases, and 0-25% of thrombus removal in the remaining case. 21 patients received balloon angioplasty and 5 out of the 21 also received venous stent placement.

Conclusion: The power-pulse spray technique offers a safe and effective approach for treating DVT. It allows for rapid recanalization of vessels, with minimal bleeding risk, a reduced systemic thrombolytic effect, and a shorter hospital stay. Use of power-pulse spray for treatment of acute DVT in a single session is feasible. Power-pulse spray performed in a single setting is less costly as the charge for an intensive care unit admission and laboratory monitoring is eliminated.

Cutaneous Calciphylaxis – A Case Report in Wound Care

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Cutaneous Calciphylaxis is a rare disorder whose pathogenesis remains unclear. It is most often seen in patients with End Stage Renal Disease and is characterized as a calcific uremic arteriopathy, causing small and medium sized vessel vasculopathy, that eventually lead to cutaneous necrosis. Patients commonly present with painful, lower extremity ulcerations which unfortunately may go unrecognized or misdiagnosed as more common, venous or arterial insufficiency ulceration.

Purpose: We report on a case of a 72-year old African American Female with Diabetes Mellitus and ESRD on hemodialysis who presented with a painful right leg ulcer.

Method: The etiology of the ulcer was determined following biopsy. Pt had mild hypercalcemia and significant hyperparathyroidism and was treated with Pamidronate IV, which incidentally dramatically relieved the patient's pain as well. Patient was also treated with IV antibiotics and local wound care included Santyl[®] enzymatic debrider, serial debridement, application of Apligraf[®] and STSG. The ulcer eventually healed after 8 months however the patient developed a similar ulcer on the left leg. The patient expired for her co-morbidities before the treatment protocol could be implemented on that leg.

Conclusion: In our experience, after proper diagnosis, tried and true wound care principles of debridement, a moist healing environment and wound bed support appeared to be highly effective in healing cutaneous calciphylaxis. Early recognition of the etiology of these ulcers is imperative.

Hypochlorous Acid Solution is Effective in the Treatment of Chronic Venous Ulcers

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Chronic venous insufficiency affects approximately 2.5 million people in the US per year with more than 500,000 people developing ulcerations. Of these cases, 50% will take greater than one year to heal thereby impacting patients' social and economic activities. One study estimated that \$1 billion is spent annually treating such wounds with an additional cost of \$2 billion attributed to lost wages and work days. Standard of care for chronic venous ulcerations focuses on controlling edema and venous hypertension through appropriate compression therapy. Attention must also be given to reduction in surface bioburden as venous wounds typically are highly colonized. The development of biofilm and resistant organisms can lead to critical colonization or frank soft tissue infection further compromising wound healing. Hypochlorous acid (HOCl) is a novel, FDA cleared product for cleansing, irrigating, moistening, and debriding acute and chronic wounds (VASHE™ Wound Cleanser, PuriCore, Malvern, PA). HOCl is chemically equivalent to an oxidant produced by the body's natural immune system to kill invading microorganisms. Vashe™ has been shown to be a quick acting and highly biocidal against many pathogens and bacteria, but does not affect human cells. The effectiveness of VASHE™ in chronic wounds has been reported, but the algorithm for clinical use has not been well defined. We present our clinical experience with this novel wound cleanser and define an appropriate protocol and regimen for clinical use. Patients who failed to heal with prior conventional therapy including topical anti-microbial agents and compression therapy were treated with VASHE™ Wound Cleanser. A regimen of VASHE™ soak followed by a vigorous VASHE™ scrub was utilized. All patients healed or showed significant improvement after treatment using the above regimen. No adverse effects were seen. We conclude that VASHE™ Wound Cleanser is a safe and effective product that should be incorporated into the management of chronic wounds especially those compromised by bioburden.

Collagen Carboxy-methyl Cellulose for the Management of Chronic Nonhealing Wounds

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Non-healing wounds can have many complications including socio-economic and psychological strains. Normal wound healing moves through phases in a timely and uncomplicated fashion; hemostasis, inflammation, proliferative, and remodeling/maturation. Chronic wounds, those that have been present for greater than six months, deviate from the expected sequence of repair. As wound healing stalls, providers must identify the barriers that inhibit the wound from moving to the next phase. Some barriers can include heavy drainage, high bioburden, excessive non-viable tissue which can delay or limit epithelialization of the wound margin. When barriers are identified, interventions are directed to correct the problem and support the healing process. Delays in wound healing most commonly occur during the inflammatory and proliferative phases. During these phases, leukocytes and cytokines release proteases that damage and degrade the extracellular matrix. Efforts to inhibit the release and activity of these proteolytic enzymes can allow the wound healing process to continue. Biostep® (Smith and Nephew, Largo, FL) is a collagen, carboxy-methyl cellulose and sodium alginate product that facilitates epithelial migration and tissue regeneration via unique properties. Biostep® contains EDTA (Ethylene Diamine Tetracetic Acid) which inhibits the detrimental effects of proteolytic activity in chronic wounds. We report the effective use of Biostep® on wounds that have stalled in the inflammatory and proliferative phases of wound healing. After six weeks of Biostep® application, participants were found to have increased granulation tissue and epithelialization of their wounds. Biostep® is an effective management option in wounds that have stalled.

Circulator Boot Therapy to Heal Diabetic Foot Ulcers with Osteomyelitis

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Purpose: Current standard of care for osteomyelitis associated with diabetic foot ulcers (DFU) is surgical resection of the infected bone and systemic antibiotics. Despite aggressive therapy amputation is common leaving the patient at risk for additional amputations and an associated five-year mortality rate of 39-68%. Preventing amputation is therefore critical to maintaining quality of life. Circulator boot therapy (CBT) utilizes end diastolic pneumatic compression to improve arterial circulation in the leg, thereby promoting wound healing. CBT has been used in the management of DFU complicated by osteomyelitis by combining compression with local injection of antibiotics into the affected area. We have validated the effectiveness of this technique to treat patients with DFU and underlying osteomyelitis.

Method: The study group consisted of patients with DFU and radiographically diagnosed osteomyelitis who failed to heal despite antibiotics, aggressive offloading and appropriate local wound care. Surgical debridement was refused by all study patients. Patients received three, forty-five minute CBT sessions per week plus weekly local injections of antibiotic solution into the wound as determined by culture results. Aggressive offloading and appropriate local wound care efforts were continued.

Results: We present a series of healed patients who completed a 4-6 week course of CBT plus local injection of an antibiotic.

Conclusion: Osteomyelitis complicating a DFU is often associated with amputation. CBT combined with local antibiotic injection has been shown to be effective in the management of selected patients in this group and should be considered prior to amputation.

Advanced Biological Agents are Cost Effective in the Treatment of Chronic Wounds: Fact or Fiction

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Approximately five to seven million Americans are afflicted with chronic wounds. These wounds include leg ulcers, pressure ulcers, diabetic foot ulcers and burns. The total direct cost of chronic wounds has been estimated at \$20 billion. Direct cost includes diagnostic and surgical procedures, prescriptive care, wound closure devices, hospitalizations and physician charges. Not included in this figure are indirect costs, which include lost work time and impaired quality of life. Due to the escalation of health care costs, wound care efforts are often tempered by cost containment and basic wound care is selected over advanced wound treatments based on the impression that these products are more expensive. These advanced therapies may include bioengineered extracellular matrixes, which incorporates three-dimensional, bioactive framework to support the migration and regeneration of granulation tissue across the wound surface. While these advanced therapies may initially appear more costly when compared to other wound care regimens, little data is available to evaluate this hypothesis. We will provide an analysis of data points on patients with chronic non-healing wounds treated with bioengineered extracellular matrixes. Wound types included pressure, surgical, and diabetic foot ulcer. All wounds were present for greater than 6 months and failed previous treatment consisting of serial debridement, offloading, and local topical wound care. Objective data points studied included pre- and post implantation costs, number of clinic visits, as well as time to heal. All wounds showed rapid closure post implantation with GraftJacket® (Wright Medical, Memphis, TN) with an associated reduction in all data points. We conclude that certain advanced wound care modalities should be considered in select problematic, chronic wounds to achieve rapid closure and cost efficiency. Furthermore, the general impression that the higher price tag for these products translates to increased overall wound care cost is a misconception. Development of a utilization algorithm, which includes failure to heal over a specific time despite appropriate local wound care, may be beneficial to assist with cost containment decisions.

Reducing Aerosolization and Contamination: The Next Generation of Ultrasound Assisted Wound Therapy

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Acute wounds usually heal via normal progression through the phases of healing. Chronic, non-healing wounds develop if this process is impeded. Proliferative phase stagnation is characterized by increased proinflammatory cytokines, decreased cellular DNA synthesis, and increased matrix metalloproteinases (MMPs). Once present, these factors allow for increases in bioburden and devitalized/necrotic tissue, further delaying healing as well as increasing the risk for infection. Debridement is essential to proper wound management as it enhances proliferative phase activity by stimulating cellular activity and removing senescent nonmigratory cells. Furthermore debridement reduces the risk of infection through elimination of necrotic tissue, an excellent medium for bacterial growth. Sharps debridement is often utilized as it achieves goals rapidly, but the success of this painful technique can be limited due to incomplete removal of necrotic debris. Also, overly aggressive removal of viable tissue is possible and undesirable. Low frequency ultrasound assisted wound treatment (UAW) is emerging as an alternative method of sharps debridement for wound care. When applied to the wound bed via a wound treatment solution (coupling medium), UAW produces deep tissue penetration of the ultrasonic energy. Associated fibrinolytic action cleaves the necrotic slough and biofilm from the underlying viable tissue without removing healthy tissue. Early UAW devices have been criticized due to aerosolization and splattering of the solution and the risk of contamination. The newest generation of UAW device has been redesigned to limit aerosolization and the risk of contamination. The Qoustic Wound Therapy System™ (Arobella Medical, Minneapolis, MN) deploys the Qoustic Qurette™, which allows highly focused ultrasound energy with significant reduction in the volume of coupling solution. This novel UAW device will be discussed. Case presentations will illustrate the reduction in aerosolization and risk of contamination while achieving effective wound debridement.

The Combined use of Ultrasound Assisted Wound Therapy and Cadexomer Iodine in the Management of an Abdominal Wound Complicated by Tunneling and Resistant Organisms

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Tunneling wounds oftentimes present unique challenges for the wound care specialist. The mechanical characteristics of a tunneling wound compromise normal physiologic processes, resulting in inflammatory and proliferative phase stagnation. Ineffective matrix formation is further diminished by excess bioburden commonly associated with these wounds. Additional insult is added when wound biofilm becomes residence for resistant organism species. Aggressive combination of antimicrobial technologies can be synergistic in successful management of these severely compromised wounds. Cadexomer iodine is a slow-release elemental iodine product (Iodosorb™, Smith and Nephew, Largo, FL) that absorbs wound exudate forming a gel that is non-occlusive and non-adherent with broad spectrum antimicrobial activity that has been found to be effective against common skin and soft tissue specific bacteria (1). Low-frequency ultrasonic wound therapy (UAW) is emerging as an effective modality for wound bed preparation and debridement. UAW delivers ultrasonic energy directly to the wound bed via a wound treatment solution providing selective debridement and is additionally associated with tissue micro-cavitations, reported to be associated with highly effective bactericidal effect (2). The newest generation of UAW, the Qoustic Wound Therapy System™ deploys the Qoustic Qurette™ (Arobella Medical, Minneapolis, MN), which provides highly focused ultrasound energy resulting in wound debridement and significant reduction in wound bioburden. We present the methodology for the successful management of a non-healing surgical abdominal wound with significant depth and tunneling complicated by the resistant organisms, illustrating the synergistic antibacterial effect with the combined use of the Qoustic Wound Therapy System™ and Iodosorb™.

Reducing Painful Debridement: Ultrasound Assisted Wound Therapy

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Debridement is considered the cornerstone of optimal wound management protocols. Serial debridement of chronic wounds stimulates proliferative phase cellular activity and reduces the risk of infection through elimination of necrotic tissue. Sharps debridement is frequently the method of choice as it achieves goals rapidly, but the success of this technique can be limited due to patient intolerance and pain. Low frequency ultrasound assisted wound therapy (UAW) is emerging as an alternative method of sharps debridement for wound care. UAW produces deep tissue penetration of the ultrasonic energy. The associated fibrinolytic action cleaves the necrotic debris, fibrin and slough removing it without damaging viable underlying tissue. In addition to selective debridement, UAW also produces tissue micro-cavitations, which have been shown to achieve a highly effective bactericidal effect. UAW has been reported to be well tolerated by patients when compared to other sharp debridement methods. UAW can also be delivered in a pulsed mode further reducing the pain. The newest generation of UAW device (Arobella Medical, Minneapolis, MN) has been redesigned to provide even less procedural pain. The Qoustic Wound Therapy System™ deploys the Qoustic Qurette™, which allows delivery of highly focused ultrasound energy. This engineering allows debridement and cavitation effect of UAW, but decreases tissue shear forces with an associated significant reduction in pain. The design of this novel UAW device will be discussed. Case presentations will illustrate the reduction in pain achieved with use of The Qoustic Wound Therapy System™ compared to other UAW devices while accomplishing effective wound debridement.

Hypochlorous Acid Enhances the Treatment of Necrotizing Soft Tissue Wounds

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Necrotizing Fasciitis (NF) is a rare, life-threatening bacterial infection of the skin, subcutaneous tissue, and superficial fascia, associated with a mortality rate of 20-60%. During the past three decades, the incidence of NF has increased and now is estimated at 0.4 cases per 100,000 (1). Pathergy can be due to a single species of bacteria or a polymicrobial process. Historically the treatment of NF included aggressive surgical debridement, systemic antibiotics and adjunctive care including hyperbaric oxygen therapy (HBOT) and local wound care. Negative pressure wound therapy (NPWT) has used effectively in the management of NF via mechanisms which enhance tissue perfusion, promote granulation tissue formation, decrease tissue edema while optimizing the wound care provided in this setting. Combining infusion of antimicrobial solution with NPWT has additional benefits of decreasing bioburden. VASHE™ Wound Cleanser (PuriCore, Malvern, PA) contains hypochlorous acid (HOCl). HOCl mimics the body's natural infection fighting capability. HOCl is a quick acting biocidal highly effective against many pathogens and bacteria, but is not toxic to human cells. HOCl has been shown to be efficacious in the treatment of venous ulcers. A series of patients with significant wounds following surgical debridement of necrotizing soft tissue infections were managed with VASHE™ infusion and NPWT. All wounds showed clearance of infective organisms as evidenced by no further progression of tissue ischemia and necrosis, reversal of tissue cellulitis, and rapid formation of granulation tissue. Patients were surgically closed sooner after initiation of VASHE™ Infusion Therapy when compared to historical controls. VASHE™ Infusion Therapy should be considered in the post surgical management of patients with necrotizing soft tissue infections and highly contaminated wounds.

Hypochlorous Acid Solution Improves Wound Healing Trajectories

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Excessive bioburden can result in inflammatory and proliferative phase stagnation and compromise of normal wound healing physiology. Bacterial proliferation, biofilm production, critical colonization and the development of resistant organisms can lead to infection, wound deterioration and devastating tissue loss. Therapies to control or eliminate wound bioburden are critical to achieving and maintaining wound healing trajectories. Hypochlorous acid (HOCl) is an oxidant produced by the body's immune system to kill invading microorganisms. A novel, FDA cleared product (VASHE™ Wound Cleanser, PuriCore, Malvern, PA) is being introduced for cleansing, irrigating, moistening, and debriding acute and chronic wounds. VASHE™ has been shown to be highly bactericidal against many pathogens, but does not affect human cells. The effectiveness of VASHE™ in chronic venous wounds has been reported. Since May 2007, 142 patients have been treated with VASHE™ Wound Cleanser at the Centers for Comprehensive Wound Care and Hyperbaric Oxygen Therapy. A regimen of VASHE™ soak followed by a vigorous VASHE™ scrub was utilized. Wound healing trajectories were analyzed in these patients prior to the initiation of VASHE™ Wound Cleanser and then recalculated 6 weeks afterward. A marked increase in the slope of the curve (decreased wound volume) was found with the use of VASHE™ Wound Cleanser. No adverse effects were seen. We present our positive clinical experience with this novel wound cleanser and conclude that VASHE™ Wound Cleanser is a safe and effective product that should be incorporated into the management of chronic wounds especially those compromised by bioburden.

Granulation to Closure: Utilization of Hypochlorous Acid Solution after Negative Pressure Wound Therapy

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Wound closure is optimally achieved when an orderly transition from inflammation through proliferation and remodeling is realized. Negative Pressure Wound Therapy (NPWT) has been demonstrated to be effective in maximizing the formation of granulation tissue. The wound specialist is then challenged with the decision of what product to transition to once the end points of NPWT have been attained, complete wound base granulation with minimal depth and undermining. The ideal therapy after NPWT would maintain the presence of the fibroblast, limit bioburden and provide proper wound moisture to promote neoepithelialization. Hypochlorous acid (HOCl) (VASHE™ Wound Cleanse, PuriCore, Malvern, PA) is a novel, FDA cleared product for cleansing, irrigating, moistening, lubricating, and debriding acute and chronic wounds. HOCl is an oxidant produced by the body's natural immune system to kill invading microorganisms and is highly effective in decreasing wound bioburden. VASHE™ Wound Cleanser has been demonstrated to improve healing rates of chronic venous leg ulcers. A series of patients with non-healing surgical wounds are presented to illustrate the successful transition to hypochlorous acid following NPWT and the excellent wound healing trajectories that can be attained with the use of this new technology. VASHE™ Wound Cleanser is cost efficient and optimizes patient care by achieving effective transition after NPWT to allow complete wound closure.

Preliminary Results of Boomerang PlusWire Diagnostic Trial: A Prospective Evaluation of the Boomerang PlusWire (Catalyst™) System for Arterial Access Management

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Background: VCDs were designed to achieve immediate hemostasis, early ambulation, and reduce bleeding complications, but can cause implant related catastrophic complications. The Boomerang Catalyst System is a next generation, novel device designed to achieve hemostasis in the lab leaving no residual foreign body in the vessel or tissue tract. The Catalyst System is comprised of a proprietary coated segment (enhances hemostasis, minimizes tract ooze) and hemocompatible disk to tamponade an arteriotomy. Preliminary clinical results are reported.

Methods: Data were collected in a freestanding cath lab affiliated with a major medical center on 50 subjects undergoing diagnostic coronary or peripheral procedures. Patients with active fixation devices within 90 days, multiple or suprainguinal punctures were excluded. Arterial access below bifurcation, superficial femoral, and profunda femoris arteries were not excluded. Catalyst Wire was inserted on procedure table for a minimum of 5 minutes, removed after subject transferred to gurney and manual compression applied while in lab.

Results:

Demographics: (%) (Range)

Gender Male 19 (55.9)
 Gender Female 15 (44.1)
 Age-Yr Mean (±) 61.3 (±14.3)
 Median (Range) 65.5 (30,82)

Comorbidities: (%)

Hypertension 26 (76.5)
 Diabetes 11 (32.4)
 Smoking 6 (17.7)
 PVD & Dialysis 1 (2.9)

Pre-anticoag: (%)

Aspirin 18 (52.9)
 Plavix 7 (20.6)
 Coumadin 1 (2.9)
 Prior Femoral Access 15 (44.1)

Procedure: (%)

Sheath 5F 3(8.8)
 Sheath 6F 31 (91.2)
 Final Hemostasis in Lab 34/34 (100)
 Device Success: 34/34 (100)

Procedure: Mean (Stdev) Median (Range)

Dwell Times 5.2(±0.5) 5(5,7)
 Hold Times 7.1(±2.6) 7(2,34)
 Time to Ambulation 65.7 (±17.2) 60(60,120)
 Time to Same Day Discharge 129.7 (±25.3) 120(120,235)

Adverse Events: (device-related) (non-device-related)

Total Events 0(0%) 3(8.8%)
 DVT-84 yo, dehydration & renal insufficiency 0(0%) 1(2.9%)
 Pseudoaneurysm* (Noncompliant subjects) 0(0%) 2(5.8%)
 *Literature reports incidence 0.02%-9.0%

Conclusions: Arteriotomy closure was achieved in all subjects in the cath lab. Adverse events occurred in 3 subjects after discharge and were thought not to be device-related. The Catalyst System is safe and effective, demonstrating final hemostasis in all subjects in the cath lab. This device demonstrated significantly reduced hold times, earlier times to ambulation and accelerated times to discharge over standard manual compression alone.

“Critical Limb Ischemia in Patients with Normal Ankle Brachial Index Values”

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Abstract: The Ankle Brachial Index is a widely accepted non-invasive method used to screen patients with suspected underlying peripheral arterial disease. While it may be useful as a basic screening tool, its reliability is questioned as the author has found patients with ABIs in the normal range to have underlying and asymptomatic Critical Limb Ischemia.

Purpose: While the Ankle Brachial index is recommended as a non-invasive screening tool to detect and screen for patients with suspected peripheral arterial disease. Its focus is typically on values in the abnormal range in conjunction with symptoms of PAD. PAD screening is recommended in patients who are over the age of 70, or who are over the age of 50 and who are diabetic or/and are smokers. The purpose of this article is to question the reliability of the ABI in light of a number of clinical findings by the author where patients exhibited normal ABI values and were asymptomatic, yet were found to have Critical Limb Ischemia.

Materials/Methods: A retrospective study was conducted on a series of patients who were evaluated with the PADnet system (BioMedix) in an office setting. The patients evaluated were all over the age of 50 with a variety of co-morbidities and underlying medical conditions.

The Ankle Brachial Index is a component of the PADnet system, as are segmental pulse volume recordings taken at the thigh, leg, ankle and great toe.

Results/Discussion: The Ankle Brachial Index was used as a screening tool on all patients seen for initial evaluation in the author’s practice, which specializes in wound management and limb salvage. Additionally, the ABI was also used to determine whether patients would benefit from additional vascular assessment in the form of the PADnet system. The PADnet includes Ankle Brachial Index as a component of its testing method. Segmental waveforms are also evaluated and recorded at the mentioned sites of bilateral thighs, legs, ankle and great toes. Questions were raised after evaluating a number of patients who had exhibited “normal” or non-critical ABI values, but showed dampened and monophasic waveforms, indicating Critical Limb Ischemia when tested with the PADnet system.

Conclusions: The Ankle Brachial Index is not a reliable modality in the assessment of Peripheral Arterial Disease. The author is an advocate of active screening for PAD and previously used the ABI for this purpose. Upon regular use of the PADnet system, the ABI was found to be seriously flawed as patients with Critical Limb Ischemia were periodically seen with ABI values not considered critical or warranting further investigation. When utilized as a basic screening tool, the ABI may in fact, provide misleading information, which can delay in the delivery of more definitive arterial evaluation and treatment. Further investigation regarding these concerns must be conducted.

Aspiration Thrombectomy Is Safe And Effective In Treating Thrombus Containing Lesions In Acute Coronary Syndrome

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Background: Multiple devices have been developed in an attempt to prevent distal embolization in patients undergoing percutaneous coronary intervention (PCI) and thereby preventing impaired microcirculatory reperfusion. However, there is a paucity of device specific data and controversy remains concerning the overall effectiveness of these devices.

Objectives: The aim of this study was to evaluate the safety and efficacy of an aspiration thrombectomy (AT) catheter in patients with acute coronary syndrome (ACS) undergoing PCI.

Methods: We analyzed 59 consecutive patients with ACS in whom an aspiration catheter (Pronto; Vascular Solutions, Inc; Minneapolis, MN) was used to perform AT in native coronary arteries (n=49) and saphenous vein grafts (SVG; n=10) with angiographic presence of thrombus. Patients were placed in Group A (Gp A; n=50) if AT was the first line of therapy or Group B (Gp; n=9) if an alternative intervention strategy was performed before AT (bailout group).

Results: Patients in Gp A had a baseline TIMI grade flow (TGF) 0, 1, 2 or 3 in 78%, 6%, 4%, and 12% and in Gp B, 56%, 11%, 11%, and 22% (p = 0.24). In Gp A, TGF improved 2.3+/-1.1 flow grades after AT, in Gp B 0.57+/-0.5 flow grades after any initial intervention (p=0.0004) and 1.4+/-0.7 flow grades after AT (p=0.05). Angiographic thrombus reduction following AT was seen in 82% of patients (84% in Gp A and 67% in Gp B) (p=0.35). Final TGF 3 was similar in both groups. Average percent thrombus reduction was 52% in native coronaries and 73% in SVG's after AT (p=0.05). AT of stent thrombosis (ST) was performed in 20% of cases. TGF improved from 0 to 3 in 70% of patients with ST following AT. No angiographic complications or gross embolization occurred with AT. In Gp B there were 2 patients in whom embolization was noted after initial balloon inflation.

Conclusion: AT with the Pronto device is safe and effective in the treatment of thrombus containing lesions during percutaneous coronary intervention of ACS patients. AT is also effective in patients undergoing SVG interventions and those presenting with ST. Greater amount of thrombus removal and reestablishment of TGF 3 flow was seen in those patients treated initially with AT as compared to those in whom AT was used as a bailout strategy.

Innovative Hybrid Procedure For Dissection Thoracic Aorta In A Patient With A Previous Bentall Operation

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Background: Dissections of the thoracic aorta starting from the arch are seen in 5% cases. A 42-year-old man with Marfans syndrome, with a previous Bentall procedure, presented with acute chest pain. Investigations revealed a dissection of the aorta, starting just distal to the left common carotid artery to the renal level. A hybrid combination of surgical and endovascular treatment was planned for sealing the dissection.

Methods: A redo sternotomy was performed and under femoro-femoral CPB a short segment of Dacron graft was interposed between the previous Bentall graft and the arch of aorta. On to this graft 2 additional grafts were anastomosed – a 14 X 9mm bifurcated graft, one to the right common carotid and one to the left common carotid – and a 9mm side arm to facilitate the positioning of the endograft – Figure 1. After coming off CPB a guide wire was manipulated from the femoral artery into the newly anastomosed graft, and snared into the side conduit with a 20mm Microvena snare. A 32 x 200mm Zenith stent graft (Cook, USA) was deployed just distal to the bifurcated graft upto T9 level. Surgical ligation of the distal innominate and the proximal left common carotid were done.

Results: The false lumen was successfully obliterated with a complete recovery and no neurological deficit and both radials well palpated.

Conclusions: Surgical treatment for dissections entails a high morbidity and mortality; we present a hybrid surgical and endovascular technique which is technically successful with a lower rate of complications.

Atorvastatin Inhibit Intimal Hyperplasia and Oxidative Stress of Rabbit Carotid Artery Induced by Vascular Adventitial Injury

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Background: Both vascular adventitia and oxidative stress have been shown to play a key role in atherosclerosis. However, whether they function interactively in the process remains uncertain. We therefore studied the relationship between intimal hyperplasia and oxidative stress of rabbit carotid artery induced by vascular adventitial injury and the modulating effect of atorvastatin.

Methods: The left carotid artery adventitia of rabbit was injured by combining collagenase digestion and mechanical dissection, meanwhile the contralateral one served as a negative control. After surgery, 24 male New Zealand White rabbits were fed with high cholesterol diet (HC), high cholesterol diet plus atorvastatin (0.25mg/kg /day) or regular chow (C, n=8 in each group) for 12 weeks. HE staining was used to reveal morphological changes in vessels after adventitial injury, RQ-PCR to measure expression of mRNA of p22phox, subunit of NADPH oxidase, antioxidant heme oxygenase-1, ROS sensitive gene MCP-1 and PDGF, and fluorescence probe to detect ROS produced in vessels.

Results: Neointimal hyperplasia was observed in all carotid artery with adventitial injury characterized by extensive intimal thickening. Atherosclerotic lesions were found in vascular adventitial injury of HC group which were attenuated by atorvastatin. A modest the level of ROS production, ratio of p22phox/HO-1 mRNA, and expression of PDGF and MCP-1 were shown in the neointima of carotid artery in the control group and which was significantly increased in the endothelium and atherosclerotic lesions in HC group and decreased by atorvastatin.

Conclusions: Oxidative stress caused by increased NADPH oxidase activity may be one of the mechanisms involved in intimal hyperplasia lesion formation induced by adventitial injury. Atorvastatin could attenuate the intimal hyperplasia lesion by inhibition of NADPH oxidase dependent oxidative stress.

Manuka Honey Alginate Wound Dressing (Comvita, UK) Facilitates Healing Of Chronic Diabetic Lower Extremity Ulcerations

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Introduction: The antibacterial effects of honey and its use in the treatment of wounds can be traced back to ancient Grecian societies and even extending in the World War II era. However, with the discovery of penicillin and the development of systemic antibiotics, topical antibacterials fell out of use. In recent years the use of honey as a means of wound healing has been mostly popular within the European nations and the eastern hemisphere, with most research in this area arising from within these geographic regions. With the continued emergence of resistant organisms there is now a renewed interest in alternative topical antimicrobial options.

Objective: Investigate the efficacy and antimicrobial effects of Comvita Manuka Honey Alginate Wound Dressing in reducing and resolving lower extremity wounds.

Methods: Case series including three patients with chronic non-healing wounds of the lower extremities despite conservative local wound care. Conventional therapy was replaced with daily Manuka Honey dressings. Weekly evaluation, photos and wound cultures were taken to monitor and assess wound healing.

Results: All 3 patients showed marked decrease in wound size with complete resolution within 6-12 weeks. Periodic superficial wound cultures revealed 2 patients with MRSA wound colonization with no evidence of active clinical infections occurring at any time during the treatment period.

Conclusion: The use of Manuka Honey was associated with a positive wound healing outcome and provided some measure of antimicrobial protection during the wound healing process.

Significance of the Study: Although this may be a limited case series, it serves as clinical evidence for continued research into the use of Manuka Honey in the treatment and management of chronic wounds.

Apligraf Outcome Atlas

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Evidence supports the claim that tissue-engineered bilaminate skin substitutes speed the healing process of chronic wounds possibly by changing the wound environment and chemistry. Apligraf® (Graftskin, Organogenesis Inc., Canton Mass) is an FDA-approved cultured bilayered skin equivalent composed of a dermal and epidermal layer. Following its application, side-to-side comparisons of wounds of similar etiology demonstrates a variety of appearances. Out of this finding arises a need to provide the clinician a visual vocabulary describing the day-to-day and week-to-week appearance of the wound after Apligraf application. Following this catalogue we need to determine if the findings can be classified as predictors of healing. Ultimately a question arises as to why wounds respond in different ways.

Endovascular Therapy of Chronic Mesenteric Ischaemia

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Background: Atherosclerotic disease resulting in progressive stenosis or occlusion of one or more mesenteric arteries is considered the most common cause for chronic bowel ischaemia (CMI). This condition is associated with gastrointestinal symptoms such as diarrhea, postprandial abdominal pain and significant weight loss. Historically, the treatment for CMI has been surgical revascularization, however, surgery carries a significant procedural complication rate and mortality.

Objective: To evaluate the safety and assess role of endovascular therapy in patients (pts) with mesenteric vascular occlusive disease.

Patients and Methods: Between September 2002 and January 2006, we treated 32 patients (45% male; mean age 60 -12 years). Thirty patients had atheromatous stenoses and two patients had Takayashu arteritis. 12.5% of the lesions were chronic occlusions. It was evaluated perioperative morbidity and mortality, restenosis and recurrent symptoms.

Results: The technical success rate was achieved in 31 pts (96.8%). The brachial access was used in 83.3% and the femoral approach in 16.6% of patients. During a follow-up of 1-83 months (mean-29 months), just one patient had recurrent pain due to restenosis of stent, that was treated with new endovascular intervention.

Conclusions: Percutaneous endovascular techniques for CMI are safe and accurate. The inherent lower procedural morbidity and mortality makes the endovascular approach the preferred revascularization treatment for these patients with chronic mesenteric ischaemia.

Emergency CABG For PTCA Balloon Catheter Breakage

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Aims & Objectives: The reported incidence of emergency CABG after PTCA ranges from 0.32 to 7%. Breakage of a PTCA catheter is a rare and dreaded complication of PCI.

Methods: A 42-year-old male presented with acute inferior MI and was taken up for primary intervention. Angiography revealed TVD with a critical lesion in the mid RCA. PTCA with stenting of the culprit lesion was planned. The lesion was successfully dilated but on attempting to remove the catheter resistance was encountered. A slight force led to a break in the catheter. Simultaneously there was a hemodynamic deterioration and ventricular fibrillation. With external cardiac massage and ventilation the patient was shifted to the OR and total vented cardiopulmonary bypass immediately instituted. The heart was arrested and a quadruple bypass performed with antegrade and retrograde cardioplegic protection. A long fresh clot was extracted from the RCA.

Results: The patient did well. He is now on 2 years follow-up and doing well. A CT angio showed perfectly functioning grafts.

Conclusions: A multi-disciplinary approach is mandatory for tackling emergency unstable PCI crash patients. A system that encourages early admission of trouble, notification of the surgeon and a coordinated and team effort to get the patient on CPB is important. Important tips are: Early resuscitation in the cath lab, minimizing time to OR, meticulous myocardial protection and a complete myocardial revascularization. An OR standby and a designing of cardiac hospitals so that the catheterization laboratory and OR are next to each other is essential for the successful management of the rare cardiac cath lab crash patient.

Is Multislice CT Angiography Adequate As The Sole Diagnostic Criteria To Proceed For CABG?

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Objectives: Rapid advances in multislice computed tomography (MSCT) have facilitated increasingly accurate coronary imaging. The present study was designed to assess the accuracy of the 64 slice MSCT scanner with conventional coronary angiography (CCA) and to conclude whether or not MSCT angiography alone could give sufficient and accurate information to proceed with coronary artery bypass grafting (CABG).

Methodology: 50 stable patients with proven severe CAD on CCA for elective CABG underwent MSCT prior to CABG.

Results: An excellent correlation was found between the two modalities. Comparing the maximal percent diameter luminal stenosis by MSCT versus CCA, the Spearman correlation coefficient between the two modalities was 0.99 ($p < 0.0001$). Bland-Altman analysis demonstrated a mean difference in percent stenosis of $0.6 \pm 2.3\%$ (95% confidence interval 5.1% to -3.9%). 93.4 % of the observations were within ± 1.96 standard deviation.

Conclusions: MSCT is a valuable tool for the cardiac surgeon. It helps in precise planning of the CABG especially off-pump CABG. On the basis of our findings we recommend MSCT as a sole criteria for proceeding for CABG without CCA in selected cases.

Computed Tomography Angiography (CTA) Use in Percutaneous Coronary Intervention (PCI) Planning and Execution: A Validation Study of 3D Coronary Features

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Background: Computed tomography angiography (CTA) has revolutionized the coronary evaluation arena and can be potentially used to guide PCI. We sought to validate the CTA three-dimensional (3D) output and compare it to a previously validated 3D-reconstruction algorithm performed on catheter based coronary angiograms.

Methods: Twenty patients who underwent catheter based angiography (ANGIO) and CTA were included. The CT-3D centerline data was extracted and compared to forward projected 3D coronary models of orthogonal angiographic views. The CT-3D centerlines were forward projected into the ANGIO centerlines allowing a comparison and an error calculation. A single vessel, two vessels, all vessel, vessel length, lesion length, foreshortening, optimal view map (OVM) comparison and error calculation were completed between both modalities.

Results: Phantom data showed a single vessel error of 0.68 mm, 2.02 mm two vessels error, and 1.45 mm overall error between CTA and ANGIO. Table 1 includes the comparison for all 20 patients. Vessel size comparison between CTA and ANGIO (2.63 /- 0.28 mm vs. 2.60 /- 0.24 mm; p=0.45) and lesion length comparison (13.67 /- 5.56 mm vs. 13.95 /- 5.72 mm; p=0.005). Foreshortening values were 9.28 /- 6.66 % for angiography and 1.42 /- 0.93 % by CTA.

Discussion: CTA provides an accurate representation of the coronary tree features (centerlines, vessel size, and optimal angiographic views) when compared to standard angiography. This was also corroborated by our phantom data. Therefore, these validation data provide support for the use of CTA to plan and execute interventions.

	Mean Error (mm)	Median Error (mm)	SD	Range (mm)
LAD/LM/SB	2.08	1.89	0.8	0.78-3.75
Circumflex	2.74	2.79	1.0	1.47-4.86
Overall	2.42	3.57	1.5	2.0-6.25

Table 1. Error calculation of the entire major coronary artery tree resulting from the comparison between CTA and ANGIO. LAD= left anterior descending artery, LM= left main, SB= side b

Novel Palliative Wound Dressing* Promotes Healing

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Introduction: Wounds are a tragic problem at the end of life, with little expectation that wounds will heal (1). A novel wound dressing was developed for palliative treatment of wounds to reduce pain and prevent infection. Palliation was achieved, and surprisingly, nearly ½ of wounds treated healed or were healing.

Methods: Retrospective case study review of 323 wounds in hospice patients treated over 30 month period. Wounds treated included pressure (44%), neuropathic (10%), and arterial (10%). 231 wounds were treated with the novel dressing, 92 received other treatments

Results: Median age of patients was 82. Average length of time that patients lived after treatment started was less than 90 days, with a majority of patients living less than 30 days. No new wound infections were reported. Pain relief was significant, as assessed by nurse and physician observation. Despite short treatment times, nearly 50% of wounds in the novel treatment group were healed or healing, compared to 20% in the other treatment group.

Conclusion: Using a novel dressing designed for palliation not only reduced pain and prevented infection, but resulted in wound healing more than double that of wounds treated with other methods.

**Proprietary mixture containing liquid hydrogel, lidocaine, and antibiotic on gauze.*

Marañón's Hyperlipemic Test Was Successful To Predict Which Diabetic Patient Will Have Heart Disease

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The test was performed by given orally to a fasting person 100g of olive oil, serum cholesterol test was measured before the intake and two to three hours after the intake. The test is considered positive when the value of serum cholesterol increases from the fasting value. The most accurate serum cholesterol value was found at the third hour. At the present time beside the serum cholesterol is measured, insulin, glucagon (in some participants), triglycerides, and High-density lipoprotein cholesterol (HDL-c), We have used this tests in patients with diabetes, prediabetes, and with obesity. This test has been done for the past four years. Two males with severe diabetes and heart disease complication, one has 4 coronary by pass surgery twelve years ago and another one had myocardial infarction is blind and on dialysis, were studied with using this test and both were found to give a positive test: their serum cholesterol level increased at 2 and 3 hours after taking 100 g olive oil, despite they are treated with Lipitor and the fasting serum cholesterol levels are within normal limits.

Conclusions: The Marañón's hyperlipemic test is useful to predict heart disease in patients with diabetes or prediabetes. Glucagon test is the most useful test to predict heart disease although, there is a correlation of high lipids and high glucagon. The people that will not have heart disease did not show changes in the serum values of insulin, glucagon and lipids and the serum value of HDL-c increased. High lipid levels is the first sing of beta and alpha cell abnormalities. Cardiologist could use this test to differentiate etiological cause of hyperlipidemia and diagnose the cause of it due diabetes or prediabetes. It was found also that these people with hyperlipidemia do not tolerate well alcohol, and the high increase were seen in the triglycerides levels. These patients have also intolerance to carbohydrates and fat and should be advised to become vegetarians, loose weight, exercise and control their stress.

Fasting Test Irrelevant to Fight Diabetes Epidemic

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Marañón's glycemic modified test was used in all these studies. The test consists in given to a 12-hour fasting subject a 25% glucose solution was given orally, blood tests were taken before the solution and a half and one hour after the solution. The blood test measured were insulin, glucose, cholesterol, triglycerides, HDL-c and in some glucagon.test). Was used in the prevention of diabetes and it was found

1)

Using this test in 100 volunteers was found 14% normal, 17% with hyperinsulinemia, 34% with Impaired Glucose Tolerance (IGT), and 32% with diabetes.

2)

Using this test in the 3,715 smack fasting blood test. A 5-family members with familiar hypertriglyceredemia and one family member with familiar hypercholesterolemia was found Impaired Glucose Tolerance in all of them.

3)

Using this test in people with Acanthosis Nigricans, were found in the studied subjects 50% with diabetes and 50% with IGT.

4)

Using this test after gastric by pass surgery cases who were told (by fasting glucose) that their diabetes were cured, we found they have very high postprandial blood sugar levels.

In conclusion fasting blood tests of insulin, glucose, cholesterol, triglycerides and HDL-c are useless to diagnose hyperinsulinemia, impaired glucose tolerance, prediabetes, diabetes levels and diabetes with low levels of insulin that need treatment with insulin, and patients with heart disease.

Rapid Healing of Chronic Leg Ulcers Treated with a Cultured Epidermal Autograft (Bioplast)

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A prospective randomized double-blind clinical trial testing the efficacy of a novel serum-free produced cultured epidermal autograft to close venous stasis leg ulcers was conducted at the Grant Hospital in Columbus, Ohio. Both the control patient group (N=5) and patient group receiving then autograft (N=10) received standard of care consisting of weekly dressing changes and high compression bandaging. Both wound area and wound depth were measured, photographed and analyzed using digitalized tracings over the 12 weeks of this study. Eighty (8/10) percent of the autograft treated wounds closed in an average 4.2 weeks requiring an average of 1.2 autografts per wound. By contrast only 20% (1/5) of the standard of care only group closed during this 12 week trial. Patients in the autograft group stated feeling reduced pain relative to the control group. Long-term (12 months) follow-up study revealed a healing rate to 90% in the autograft group with no evident breakdown in previously closed wounds. There were no further wound closures in the control group. The grafting procedures were conducted in an out-patient setting grafting requiring no stitching or surgical other intervention or over-night hospitalization, and was well-accepted by both patients and nursing staff. The vitality of serum-free tissue culture prepared grafts and their excellent take recommends this procedure as the treatment of choice for chronic venous stasis ulcers.

CT Coronary Angiography - New Perspectives in Diagnostics of Coronary Artery Disease. Personal Experiences

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Background: Multidetector coronary angiography (MSCT) as noninvasive procedure made this modality as useful alternative to the gold standard coronary angiography in the evaluation of coronary artery disease. Our study based on 2-year outcomes for patients evaluated with CTA.

Methods: A contrast - enhanced 64 slice CT was performed (Siemens Somatom Sensation 64 CT scanner) in the group of 851 to evaluate patients suspected of having coronary artery disease and also in patients after coronary by pass surgery to detect progression of the disease. The scan protocol with 64 x 0.6 mm slice collimation 0.33 gantry rotation time and simultaneous ECG registration were used. Images were reconstructed with 0.6 slice thickness at 0.4 mm increment. For post-processing we used Siemens Syngo Circulation and Siemens Syngo 3D software. All patients with heart rate above 65 bpm at baseline received 50 mg metoprolol orally (mean heart rate was 60 ± 5 mg). Before the angiography, patients also received nitrites sublingual. 100 ml of contrast was utilized and imaging acquisition was performed with the bolus tracking technique (Siemens Syngo CareBolus). The presence of atherosclerotic lesions, calculations of the severity of stenosis, quantification of plaque morphology, bypass graft patency as well as proximal and distal anastomoses were evaluated by two experienced readers.

Results: All patients had CTA performed with documented follow up. 112 patients had normal results with no soft or calcified plaque. 522 patients had evidence of nonobstructive luminal irregularity. In 133 patients severe obstructive plaques of different coronary arteries were detected. 15 of them had a left main stenosis. All patients with severe lesions ultimately underwent catheterization and immediate stenting if possible. Patients with calcified lesions and diffuse disease had by pass surgery (74% predictive value for revascularization). In our group of 140 patients after bypass surgery, 23 of them had grafts totally occluded, 109 had patent grafts, and 8 had grafts with significant stenosis, which was also confirmed by invasive angiography.

Conclusions: Multidetector 64 slice CTA is a valuable tool for direct visualization of coronary artery disease for specification of coronary lesions (soft vs. calcified plaques) and for assessment of the patency of bypass grafts. Our experiences show that MSCT represents nowadays an exceptional diagnostic procedure for the detection and evaluation of atherosclerotic disease.

Renal Artery Stenting Guided by the Metricath System - A Novel Balloon Catheter Sizing Device

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Background: Renal artery stent restenosis is in part attributed to suboptimal stent deployment. The Metricath (MC) low pressure balloon catheter derives accurate vessel lumen dimensions from the volume of fluid and pressure within the balloon after its inflation.

Methods: The MC balloon was used to measure renal artery stent dimensions after successful deployment based on visual angiographic results. Adjunctive balloon post-dilation was performed using higher pressures and or larger balloons based on MC lesion minimal lumen diameter (MLD) measurements compared to nominal stent diameter.

Results: 16 patients underwent angioplasty and stenting of 20 renal lesions. MC guidance resulted in adjunctive intervention in 90% of lesions. The lesion MLD improved from 4.40 ± 0.77 mm to 5.17 ± 0.82 mm ($p < 0.001$) and the distal stent MLD improved from 4.75 ± 0.80 mm to 5.52 ± 0.93 mm ($p < 0.001$) after adjunctive balloon post-dilation. Lesion MLD to reference vessel diameter improved from $77.4 \pm 15.2\%$ to $91.2 \pm 17.5\%$ ($p < 0.001$) and lesion MLD to nominal stent diameter improved from $76.2 \pm 7.1\%$ to $90.0 \pm 9.4\%$ ($p < 0.001$) after adjunctive balloon post-dilation. Stent expansion to ³ 85% of nominal stent diameter improved from 10% of lesions before to 65% of lesions after adjunctive balloon post-dilation guided by the MC results.

Conclusion: MC guidance during renal interventions disclosed a large proportion of under-deployed stents that were further optimized by adjunctive balloon postdilation at higher pressures.

The Potential Use of Extracorporeal Shockwave Therapy (ESWT) in the Treatment Chronic and Sub Acute Wounds

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Background: Since 1981 extracorporeal shock waves have been used successfully for the disintegration of calcified deposits in the urethral system. Since 1990 shock waves have proved effective for orthopedic indications such as fasciitis plantaris (heel spur), epicondylopathia humero-radialis (tennis elbow) and tendinosis calcarea of the shoulder. Shock wave therapy is also widely used for treatment of pseudoarthroses and delayed healing bone fractures. Treating infected non-unions connected with chronic skin lesions with ESWT a significant impact on wound healing was observed. After successful animal trials we started a pilot trial (phase II clinical trial).

Methods: To perform the study a Dermagold® device from MTS (Konstanz, Germany) was used. Since most often surface defects are involved, the shock wave head was modified in that the shock wave would no longer be focused but be roughly plane to the treatment area. The treatment was performed on an outpatient basis and no anesthesia was necessary due to the defocusing of the shock wave. Till April 2007, 261 patients were enrolled in the study. The patients were treated in an average of 3 sessions (1-10) depending to their tendency for regeneration and epithelialization in part in weekly, in part in biweekly intervals. The etiology of skin lesions included post-traumatic wounds (93) resulting from direct trauma associated with necrosis of epithelial and non-epithelial structures. Disturbed healing wounds (104) were defined as partial or complete failure to heal after primary closure. Additionally arterial insufficiency ulcers (6), venous stasis ulcers (34), decubital ulcers (16) and burn wounds (8) were included.

Results: Of the 261 patients with skin lesions, 190 (72.8%) showed complete healing; 7 (2.7%) had more than 50% epithelialization; 16 (6.1%) had less than 50%; 7 (2.7%) showed no improvement of the lesion; and 41 (15.7%) were lost to follow up. None of the patients experienced any worsening of the wound.

Discussion: Unfocused shock wave therapy in this non-randomized study showed an overall treatment response (100% wound epithelialization) in 190 (73%) of the patients. During mean follow-up period of 41 days (until wound healing), there was no treatment-related toxicity, infection or deterioration of any ESWT-treated wound. The ability to effectively achieve wound closure and implement shock wave technology as either an adjunct to standard therapy or as a stand-alone treatment for complex wounds needs to be evaluated in controlled trials that are currently underway.

Unique Endovascular Approach to Treat Common Iliac Artery Aneurysm with Contralateral Aorto-uni-iliac Endograft and a Femoral Bypass: A CASE STUDY

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Background: About 20% of (abdominal aortic aneurysm) AAA also present with co-existent iliac aneurysms. We present a unique endovascular way to repair bilateral iliac aneurysms in patients with a history of prior open repair of a ruptured AAA.

Case Study: Our patient, a 79 year old gentleman with a history of ruptured AAA repaired emergently 5 years ago. The repair was complicated by wound infection and a mesh repair was performed for a large incisional hernia. Patient also underwent a right common femoral-popliteal bypass 10 years prior to presentation. On follow-up, bilateral <2.0cm iliac aneurysms were detected and followed for several years. In the last 6 months he began to experience unbearable back and right lower quadrant pain. Physical exam revealed a large hernia with loss of the entire abdominal wall. Bowel peristalsis could be seen through the mesh. At this time his right iliac aneurysm had increased to 3.5cm. A 3D CT reconstruction revealed bilateral tortuosity of the external iliacs, particularly on the right side which had a 180 degree double turn.

The prior open surgery with mesh and massive abdominal wall hernia made the open repair unlikely. The absence of a proximal neck of the right common iliac aneurysm and the high tortuosity of the right external iliac, excluded the option of placing an endo tube graft.

An endograft (Zenith® by Cook Inc. Bloomington, IN) with supra-renal stent was delivered through the left common femoral artery and deployed at the level of the renal arteries. The right internal iliac was occluded. A left femoral to right external iliac artery bypass was then performed. The patient returned home within 48 hours. On follow-up patient's pain was much improved.

Conclusion: This is a unique way of treating iliac aneurysm in which the endograft is delivered through the iliac artery contralateral to the symptomatic iliac aneurysm. This was done in order to avoid both the risk of puncturing the right severely tortuous external iliac, and the risk of embolism by passing through the aneurysm. The right aneurysm could then be excluded by left femoral to right external iliac bypass and ligating the external iliac distal to the aneurysm preventing flow into the aneurysm from either direction.

Efficacy and Compatibility of Dermacyn® Solution with OASIS® Matrix for the Treatment of Venous Ulcers, Post Traumatic, and Post Surgical Wounds

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Introduction: The evaluation of combined wound care therapies is rarely undertaken. This is a pilot study to evaluate the efficacy and compatibility of Dermacyn® with OASIS® Matrix for the treatment of non-infected, graft ready venous ulcers, post traumatic, and post surgical wounds.

Objective: To evaluate the incidence of 100% closure (epithelialized) of the wounds at any time during a 12 week period.

Patients and Methods: Only patients with non-infected, graft-ready venous leg ulcer, of at least 3 months are randomized in the study. SOS or saline control (30 mL) was applied twice daily before grafting the matrix and once everyday thereafter. A dressing was saturated with either SOS or saline and placed in the wound bed. The matrix was replaced every week. Planimetric assessment was conducted on Days 0 and 3, and weekly thereafter for up to 12 weeks.

Results: At this time, twelve patients are randomized in the study (i.e. 5 on saline and 7 on SOS). The average starting volumes (in cm³) were: 0.726 (range 0.46-1.1) and 0.65 (range 0.1-1.97) for the control and SOS groups, respectively. Complete epithelialization occurred in an average of 9.6 and 7.6 weeks for the same groups.

Conclusion: These preliminary results suggest that SOS might induce a faster epithelialization than saline solution when combined with the OASIS® matrix.

Native Valve Fungal Infective Endocarditis

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Infective endocarditis is an acute or subacute disease process, the major pathogens are staphylococcus and streptococcus; fungal infection accounts for only 2 percent of cases. The most common fungal pathogens are the *Candida* species, *albicans* and *parapsilosis*. Fungal infection is usually seen in patients with prosthetic heart valves or other valvular disease, intravenous drug users, patients who have indwelling central venous catheters and in low birth weight neonates.

Case: We present a 44-year-old African American male who came to our ER with complaints of subjective fever, chills, abdominal pain and generalized weakness for a 2-week duration. Patient also reports decreased appetite with weight loss of about 35 pounds in the past month. Denies any surgical history or recent hospitalization. Social history is significant for tobacco and alcohol abuse for 30 years and occasional intravenous drug abuse of cocaine. Patient on presentation was alert, oriented but looked very fatigued with tachycardia, hypotension and a temperature of 99.8 F. Other positive findings were desquamation of bilateral palms, conjunctiva injection and sub conjunctiva hemorrhage, positive jugular venous distension, 4/6 blowing decrescendo diastolic murmur at the left upper sternal border radiating to the apex and bi-basilar crackles. Chest x-ray showed cardiomegaly with pulmonary edema and bilateral minimal pleural effusion. ECHO cardiogram revealed 2.1 cm aortic vegetation with flail and wide open insufficiency with an ejection fraction of 35 %. Patient's urine drug screen was positive for cocaine. Blood cultures x 3 were positive for budding yeast and confirmed *Candida albicans*.

Conclusion: Our patient fulfilled the Dukes criteria for definitive infective endocarditis. He was managed in the ICU with intravenous fluids, pressors, diuretics and antifungal medications. He was treated with an aortic valve replacement, debridement of the annular abscess (found during the procedure) and continued on post-operative antifungal medications for six weeks. The risk factor contributing to our patient condition is intravenous cocaine abuse. Fungal infective endocarditis is a rare presentation, which needs recognition of risk factors, vegetation >2 cm has a high probability of being a fungal infection and warrants a combined approach of early antifungal therapy plus surgical valve replacement. Relapses are common even with adequate therapy and surgery, so regular follow up is needed as part of the treatment plan.

Excimer Laser Photoablation Is Changing How We Manage Popliteal Artery Occlusions

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Objective: Primary objective of this study is to collect evidence that Excimer Laser Photoablation is effective in the treatment of popliteal artery occlusion in patients with critical limb ischemia (Rutherford classification 5-6-7).

Methods: From November 2005 to May 2007, 75 patients with popliteal artery occlusion were treated. There were 39 female, 23 males, between the ages 30-95. 33% of the patients also had distal superficial femoral artery occlusion. Procedural technical and acute clinical success occurred in 98% of cases able to cross lesions with guide wire, quick cross sheath, laser catheters and adjunctive balloon angioplasty. We re-established blood flow to at least one popliteal run off vessel.

Results: Bailout stenting: In 75 patients study, 12 required popliteal stents and in the superficial femoral lesions 17 stents were used. 35% had gangrene and 30% had skin ulcers of the leg, ankle and foot. Seven patients required below knee amputations and two above knee and there was one trans-metatarsal. The 3-6 months clinical success was 92%. Success is defined as leg preservations healing skin ulcers, absence of significant claudication.

Conclusions: Excimer laser photoablation is effective in the treatment of patients with popliteal artery occlusions, no fibrinolytic therapy was used, hospital stay was short and there was no need for intensive care unit in most of the cases.

Radiofrequency Ablation (RFA) as Definitive Treatment for Symptomatic Varicose Veins and Chronic Venous Insufficiency

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Purpose: To review effectiveness of radiofrequency ablation (RFA) as a definitive treatment for symptomatic varicose veins and chronic venous insufficiency in a clinic on an outpatient basis strictly under local anesthesia.

Method: RFA was selected as the method of choice on consecutive 300 patients at Scottsdale Vascular Clinic. All patients selected were symptomatic. All fell in CEAP Class IV to VI. Total limbs treated were 375 with obvious bilateral disease among 75 patients. All patients were treated with RFA strictly under 1% lidocaine and tumescent anesthesia. All patients were treated in an outpatient basis.

Results: We observed 99% immediate closure of greater saphenous vein along with communicators after RFA. Patients were free of symptoms within one week in 98%. The most common complications were phlebitis among 5% of patients. No patient required any hospitalization except one patient developed deep vein thrombosis with pulmonary embolism after 30 days of surgery. The intraoperative and 2 weeks post ultrasound of the treated limb did not show any evidence of deep vein thrombosis in that patient.

Conclusion: In our experience RFA ultrasound is an effective way of treating symptomatic varicose veins and chronic venous insufficiency as an outpatient basis in a surgical clinic with most success and least complications strictly under local anesthesia.

Pulsed Acoustic Cellular Therapy Increases Expression Of Vascular Endothelial Growth Factor And Von Willebrand Factor In Cremaster Muscle Flap Model

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Background: Myocardial damage arising from activation of leukocytes and inflammatory factors is thought to contribute to vascular damage and an impairment of myocardial function. We hypothesized that Pulsed Acoustic Cellular Therapy (PACE) induces neovascularization and improves blood supply to tissues. Aim of study was to assess effect of PACE on muscle flap microcirculatory hemodynamics, neovascularization and improvement of blood-supply and muscle flap healing.

Methods: Cremaster muscles were dissected in 42 Lewis rats divided into 5 groups: 1) Non-ischemic baseline controls (n=10); 2) PACE with 500 impulses (n=8) and 3) 200 impulses (n=8) immediately before dissection; 4) PACE with 500 impulses (n=8) and 5) 200 impulses (n=8) 24h before dissection (n=6). Microcirculatory hemodynamics (number of rolling, sticking and transmigrating leukocytes in postcapillary venule, functional capillary index and RBC velocity) were recorded at 1,2,3,4 hours after dissection. Tissue oxygenation (Licox probe) and histological evaluation were performed. Mechanism of vasculogenesis was evaluated by immunostaining with monoclonal antibodies characteristic for cell vascular endothelial growth factor (VEGF) and von Willebrand factor (vWF).

Results: Post-treatment increase in capillary activation was seen in group 2 compared to groups 4 and 1 immediately after flap dissection (14.11 ± 3.85 vs. 12.59 ± 3.7 vs. 13.46 ± 3.2 respectively). Licox probe showed no significant difference between control group and groups 2, 3, 4 and 5 ($18-20$ mmHg vs. 18.03 ± 1.8 mmHg).

Histology demonstrated no damage to small vessels and capillaries. We observed increased expression of VEGF in acute phase and significant upregulation 24h after 500 impulses of PACE application compare to control group (without any treatment) and compare to group with 200 impulses of PACE. Treatment with 200 impulses of PACE induces vWF expression in acute phase and 24h after treatment. However, treatment with 500 impulses PACE is more effective for new vessels formation, especially 24h after treatment. Increased expression of VEGF and vWF on aged vessels may be a sign of repair process of endothelial cells after 500 PACE treatment.

Conclusions: PACE increased capillary perfusion acutely after 500 impulses and presented stable capillary perfusion over 24h observation comparable with normal controls. This study confirmed that treatment with PACE increased synergistic expression of VEGF and VWF on the endothelial cells of blood vessels which may induce repair process of aged vessels. Moreover, upregulation of VEGF and VWF on the endothelial cells facilitated new blood vessels formation.

Using Ethiodol To Treat Thoracic Duct Injury In A Patient With High-Output Chylous Leak After Aortic Debranching In Preparation For Endovasculare Repair Of Arotic Arch Aneurysm: A Case Study

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Background: Thoracic duct injury is a rare yet serious predicament encountered after thoracic and neck surgery. The reported incidence ranges from 0.5-2% following chest operations and 1-3% following major neck dissections. With the increase in complex vascular operations in recent years to treat a broad range of conditions, from thoracic outlet and subclavian steal syndromes to aortic arch debranching in preparation for endovascular repair of thoracic aneurysms, this incidence is projected to rise. We report a minimally-invasive approach using ethiodol, an oil-soluble contrast agent with known sclerotic properties to successfully treat thoracic duct injury. Our patient developed a high-output chylous leak after aortic de-branching in preparation for endovascular repair of an aortic arch aneurysm. We believe that such a minimally-invasive approach will be particularly valuable in managing this rare, yet serious complication.

Case Report: A 71 year-old man presented with an incidentally discovered thoracic aortic aneurysm, which increased in size from 3 to 5.5 cm over 3 years, necessitating surgical intervention. Since the patient's comorbidities placed him at a higher risk for open repair, an endovascular approach was selected. However, because the aneurysm extended from the left common carotid to the decending aorta, leaving no proximal neck for fixation, a staged procedure was planned. The patient underwent a right to left carotid retropharyngeal bypass, transposition of the left common carotid into the left subclavian. Post-operatively, before the aneurysm could be repaired, the patient developed a significant cervical chyle leak of 1-2 liters per day. Conservative management failed, and a more aggressive approach was warranted. Due to patient's severe comorbidities a less invasive technique was chosen. Lymphangiography was performed using Ethiodol. This resulted in sclerosing the duct, and resolving the chyle output. He subsequently, underwent endovascular aneurysm repair.

Conclusion: With mortality rates of up to 50% in untreated patients, early aggressive repair of thoracic duct is essential. Conservative management is unsuccessful in nearly half of the patients, thus necessitating definitive treatment through ligation of the thoracic duct. However, aggressive surgical management does not always produce satisfactory results and has many complications. Furthermore, surgery often compounds the patients' poor physical condition. Superimposed thoracic duct injury leads to critical losses of fluids, electrolytes, lymphocytes, antibodies, proteins, and coagulation factors, causing further morbidity from malnutrition, immunosuppression, and coagulation abnormalities, placing the patient at a yet higher risk for a second invasive intervention. In special circumstances, Ethiodol lymphangiography offers a non-invasive alternative to open repair.