#1 - ANATOMIC SUITABILITY OF RUPTURED AAAS FOR ENDOVASCULAR REPAIR

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Purpose: Mortality from ruptured abdominal aortic aneurysms (rAAAs) remains high despite improvements in anesthesia, post-operative intensive care, and surgical techniques. Recent small series and single-center experiences suggest that endovascular aneurysm repair (EVAR) is feasible and may improve short-term survival. The applicability of EVAR to all cases of rAAA is unknown. The purpose of this study was to determine if EVAR would have been possible in all cases of rAAAs presenting to a single institution.

Methods: A contemporary consecutive series of rAAAs presenting to a tertiary academic center was reviewed. CT scans were retrospectively reviewed and standard preoperative measurements for EVAR were obtained. Neck diameters>30mm, neck lengths<10mm, neck angulation>60 degrees, severe iliac tortuosity, or external iliac diameters<6mm were assigned as non-candidates for EVAR.

Results: 48 rAAAs presented over a 10 year period. 45% of patients presented with free rupture and 48% of the patients were transferred from outside hospitals. Only four (8%) patients were treated with EVAR, all over the past year. Preoperative CT-As were available for review in 41 (85%) of the patients. Mean AAA diameter was 76.6 +/- 21.0 mm, with neck characteristics as follows: neck diameter 22.6 + 4.2 mm, neck length 16.4 +/- 10.3 mm, 31% of patients with neck angulation>45 degrees, iliac diameter 16.2 +/- 6.9, and external iliac diameter 7.8 +/- 1.6mm. These measurements indicated that 53% would have been candidates for EVAR with currently available devices. Criteria precluding EVAR in this cohort was neck diameter in 11% of patients, neck length in 72%, neck angulation in 27%, and poor iliac access in 18%. Overall 30-day mortality was 33%, and 1-year survival was 64%. For those who would have been candidates for EVAR, the 30-day mortality was 33%, while the patients who were not candidates for EVAR had a 30-day mortality of 27% (P>.05).

Conclusion: Only one half of rAAAs in this consecutive series were found be candidates for EVAR with conventional devices. Protocols for the endovascular treatment of rAAAs should be tailored to these results. Device and technique modifications are necessary to increase the applicability of EVAR for rAAAs.

#2 - ULTRASOUND-GUIDED ACCESS IMPROVES RATE OF ACCESS-RELATED COMPLICATIONS FOR TOTALLY PERCUTANEOUS AORTIC ANEURYSM REPAIR

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Objective: Previous experience with totally percutaneous aortic aneurysm repair has identified morbid obesity and larger sheath sizes (≥20F) as complicating factors for percutaneous access closure. We sought to evaluate the impact of ultrasound-guided femoral access on rates of technical success, conversion to open femoral repair, and access-related complication.

Methods: A retrospective review of a prospectively maintained database was performed. All consecutive patients undergoing totally percutaneous closure of large-bore-sheath (>12F) access sites with a suture-mediated closure device were included. The cohort was stratified into two groups by access technique. Group A underwent femoral access without the use of ultrasound guidance, and Group B underwent femoral access using ultrasound guidance with the intent of needle access in the common femoral artery just above the femoral bifurcation. Patient variables were evaluated, and outcome measures included technical success, requirement for conversion to open repair, and access-related complications. Recorded conversions only included those related to access closure technique.

Results: During the study period, 88 consecutive patients underwent percutaneous closure of 152 large-bore access sites after endovascular aneurysm repair. There was no difference in the proportion of morbidly obese patients (body mass index > 35kg/m2) between the two cohorts. Access-related complications were significantly reduced in Group B (Table 1). Despite the lower complication profile with ultrasound guidance, 24 sites (41%) had sheath sizes ≥20F in Group B compared to only 21 sites (24%) in Group A (P<0.05). Evaluating conversions and technical success of percutaneous closure, a significant benefit was identified for sheath sizes >20F (P<0.05). Upon comparing the two cohorts, operative time continues to decrease from 154(±64) to 101(±56) minutes after the addition of ultrasound (P<0.05).

Conclusions: The addition of ultrasound guided femoral access to totally percutaneous aortic aneurysm repair continues to increase the technical success rate and has a clinically profound impact on access-related complications. This technical adjunct appears to have the largest impact on patients requiring larger sheath sizes.

Table 1. Univariate comparison of access-related complications stratified by ultrasound-guided technique and sheath size.

Variable	Group A* n=93 sites	Group B* n=59 sites	P
All Access-specific Complications	6 (7%)	0	<0.05
<20F	3 (4%)	0	0.314
>20F	3 (14%)	0	0.110
All Conversions**	6 (7%)	1 (2%)	0.113
<20F Sheath	3 (4%)	1 (3%)	0.598
>20F	3 (14%)	0	<0.05
Technical success (All patients)	87 (94%)	58 (98%)	0.164
<20F	69 (97%)	34 (97%)	1.0
>20F	18 (82%)	24 (100%)	<0.05

* Group A underwent access without ultrasound, and Group B underwent ultrasound-guided access of the common femoral artery.

** Recorded conversions to open repair include only those conversions related to percutaneous closure technique.

#3 - ENDOVASCULAR MANAGEMENT VERSUS SURGERY FOR PROXIMAL SUBCLAVIAN ARTERY (SA) LESIONS

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Introduction: Current management of SA lesions is controversial. Subclavian to carotid artery transposition (SCT) may be challenging, but exhibits unparalleled long term results. Stent supported PTA (sPTA) seems technically easier, but is not always feasible. Long term results and comparisons have not been published. We compared both methods performed by vascular surgeons.

Methods: Prospective data collection with retrospective analysis at a tertiary care center. sPTA was performed through a retrograde transbrachial access using self expanding nitinol stents. Open surgery was SCT only. SVS/ICVS reporting standards were applied.

Results: 74 patients underwent treatment from 1/95-8/07. (median age 62.6 years, 40 female); left sided pathology: 60 (81.1%); risk factors: hypertension: 45 (60.8%) dsylipemia: 47 (63.5%), diabetes: 21 (28.4%), smoking 43 (58.1%). SA occlusion: 50 (67.6%). 40 patients (54.1%) underwent primary sPTA (62.5% occlusions) and 34 SCT (73.5% occlusions). Both groups were comparable with regard to risk factors. In 12 patients occlusions could not be recanalized (30%), and in 2 stents failed within 1 month (both for stenosis). All but one underwent subsequent uneventful SCT. All SCTs were successful. No risk factor could be identified for treatment failure, but sPTA (p=0.002). Median follow up in sPTA was 50.1 months and 52.6 in SCT. No procedure failed within follow up in either group.

Conclusion: sPTA can be performed successfully by surgeons. Primary sPTA failed in 48% of occlusions (30% of all sPTA). Prediction of failure is not possible. According to our experience we recommend primary sPTA for SA stenosis and surgery for SA occlusions.

#4 - INFLUENCE OF AGE, ANEURYSM SIZE AND PATIENT FITNESS ON SUITABILITY FOR ENDOVASCULAR AORTIC ANEURYSMS REPAIR

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Objective: Prior to approval by the U.S. Food and Drug Administration of larger endografts (main body diameters up to 36 mm), small abdominal aortic aneurysms (AAAs) (< 5.5 cm) were shown to be more suitable for endovascular repair (EVAR) than large AAAs >5.5 cm). The purpose of this study was to assess changes in EVAR suitability with the potential use of larger endografts and the influence of age, aneurysm size and fitness in unselected patients.
Methods: We studied 186 patients referred for evaluation of nonruptured AAAs who underwent contrast-enhanced computed tomography scans with 3D reconstructions. Morphologic AAA features were measured according to SVS reporting standards. Fitness for repair was assessed using the Customized Probability Index, a validated fitness score for EVAR. Suitability for EVAR was determined by neck anatomy, iliac artery morphology and total aortic aneurysm angulation and tortuosity.
Results: The median age of the study cohort was 72 years (interquartile range [IQR], 65-79 years). The median maximum AAA diameter was 5.4 cm (IQR, 4.1-5.9). Median fitness score was 7 (IQR, -7 to +14). EVAR suitability for large AAAs significantly increased with larger endografts (35% to 63%; P<.001). Changes in EVAR suitability for small AAAs were less significant (69% to 75%; P=.06). Although maximum AAA diameter was an independent predictor for EVAR suitability with smaller endografts after adjusting for neck anatomy, it did not affect EVAR suitability with larger endografts. Aortic neck length was the only independent predictor for EVAR suitability with larger endografts (odds ratio, 1.2; 95% confidence interval, 1.1-1.2). Age, AAA size and fitness did not differ between patients suitable and unsuitable for EVAR with larger endografts.
Conclusion: Introduction of larger endografts (up to 36 mm in main body diameter) in the U.S. has resulted in significantly increased anatomic suitability for EVAR for large AAAs. Conversely, suitability has not significantly changed for small AAAs and is not influenced by age, aneurysm size or fitness. These data reveal that continued surveillance of small AAAs may be warranted as larger endografts have expanded the “window of opportunity” for EVAR for large AAAs.

#5 - THE ROLE OF PROSTAGLANDIN I2 INFUSION IN ELECTIVE OPEN REPAIR OF ABDOMINAL AORTIC ANEURYSM.

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Aim
Iloprost, the chemically stable analogue of Prostaglandin I2, is a potent vasodilator, inhibitor of platelet activation, and modulator of the inflammatory response to

ischaemia and reperfusion. This synthetic analogue has traditionally been utilized in the treatment of pulmonary hypertension & off label for use in revascularisation of critical chronic lower limb ischaemia. This study is designed to assess the effect of 72 hour Iloprost infusion in the immediate post-operative period following open elective abdominal aortic aneurysm (AAA) surgery

Methods
Between January 2000 and 2007, 104 patients had elective open abdominal aortic aneurysm repair. 53 had infra-renal aneurysms, 36 juxta-renal and 15 supra-renal aortic aneurysms, with a mean maximum diameter of 6.9cm. Male to female ratio was 2.5:1 with a mean age of 71.9 years. All emergency & endovascular procedures for aneurysms were excluded.

Results
57 patients received iloprost infusion for 72 hours in the immediate post operative period compared with 47 patients who did not. No statistically significant difference was seen between the study groups with regard to age, sex, risk factors, ASA grade or diameter of aneurysm repaired. Patients were monitored for signs of pulmonary, renal, cardiac, post operative ICU morbidity, along with local and remote effects of ischaemic insult induced by AAA repair. Statistically significant increased ventilation rates ($p<0.05$), pulmonary complication rates ($p<0.05$) and myocardial ischaemia ($p<0.05$) were noted in those patients not receiving iloprost as well as significantly higher renal indices.
Peripheral limb trashing was noted in 5 patients (9.4 %) in the non iloprost group compared with no patients who received iloprost. Increased rates of acute renal failure and bowel complications were noted in those who did not receive iloprost. ICU stay was greater than twice that of iloprost patients. All-cause morbidity affected 67% of patients not receiving iloprost compared to 40% who did. Survival rates were significantly better with iloprost than without in both 30 day ($p<0.05$) and 5 year cumulative survival ($p = 0.0187$, $h=0.20$, 95%CI=0.05 to 0.76).

Conclusion
Iloprost infusion for 72 hours after open abdominal aortic aneurysm repair is associated with improved systemic perfusion and decreased systemic ischaemia. Iloprost, as an adjunct to surgery, pertains a significant survival benefit at 30 days and 5 years with significantly decreased renal, cardiac and respiratory complications.

#6 - THE MANAGEMENT OF INTRAVASCULAR FOREIGN BODIES AND MISPLACED OR MALDEPLOYED ENDOPROSTHESES.

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INTRODUCTION: The purpose of this study was to review our experience with the management of intravascular foreign bodies and misplaced or maldeployed endoprostheses. In so doing, we hoped to obtain insight into mechanisms of misplacement and techniques to achieve recovery.
METHODS: A retrospective review identified 48 cases of misplaced or maldeployed endoprostheses at our institution over a 13 year period. Objects included 7 endografts, 15 stents, 17 catheters, 6 wires, 2 coils, and 1 filter. Twenty-two objects were intravenous and 26 were intra-arterial.
RESULTS: Etiology for displacement included dislodgment from balloon during tight passage (10), “jumping” or “watermelon seeding” (6), undersizing (2), balloon rupture (1), balloon dislodgement after placement (1), fracture (14), and technical error (11). In addition, 3 chronically indwelling catheters had fibrinous overgrowth complicating their withdrawal, necessitating retrieval from a remote site.
Endovascular management was successful in 47 of 48 cases. Thirty-three objects were retrieved and removed using snares, balloons, or occasional grasping forceps. Seven objects were repositioned into their intended destination. Six objects were retrieved and deployed into an unintended destination (“safe harbor”). One object was excluded by a second endograft (“endotrash”). Key maneuvers for success included the establishment of wire control via dual access sites ("flossing") and co-axial manipulation of the snare over the wire and endoprosthesis.
Complications included arrhythmias during the procedure in two patients. Three patients received transfusions. No ischemic complications occurred. Six patients died in the post-procedural period. Five of the deaths were secondary to disease processes present prior to the retrieval.
CONCLUSION: Endoprostheses become misplaced due to a variety of mechanisms, many of which are preventable. Retrieval or repositioning is usually possible by endovascular means. The retrieval of chronic indwelling catheters may be complicated by fibrinous overgrowth on the catheter.

#7 - IMPLICATIONS OF ACUTE RENAL INJURY FOLLOWING PERCUTANEOUS RENAL ARTERY INTERVENTION

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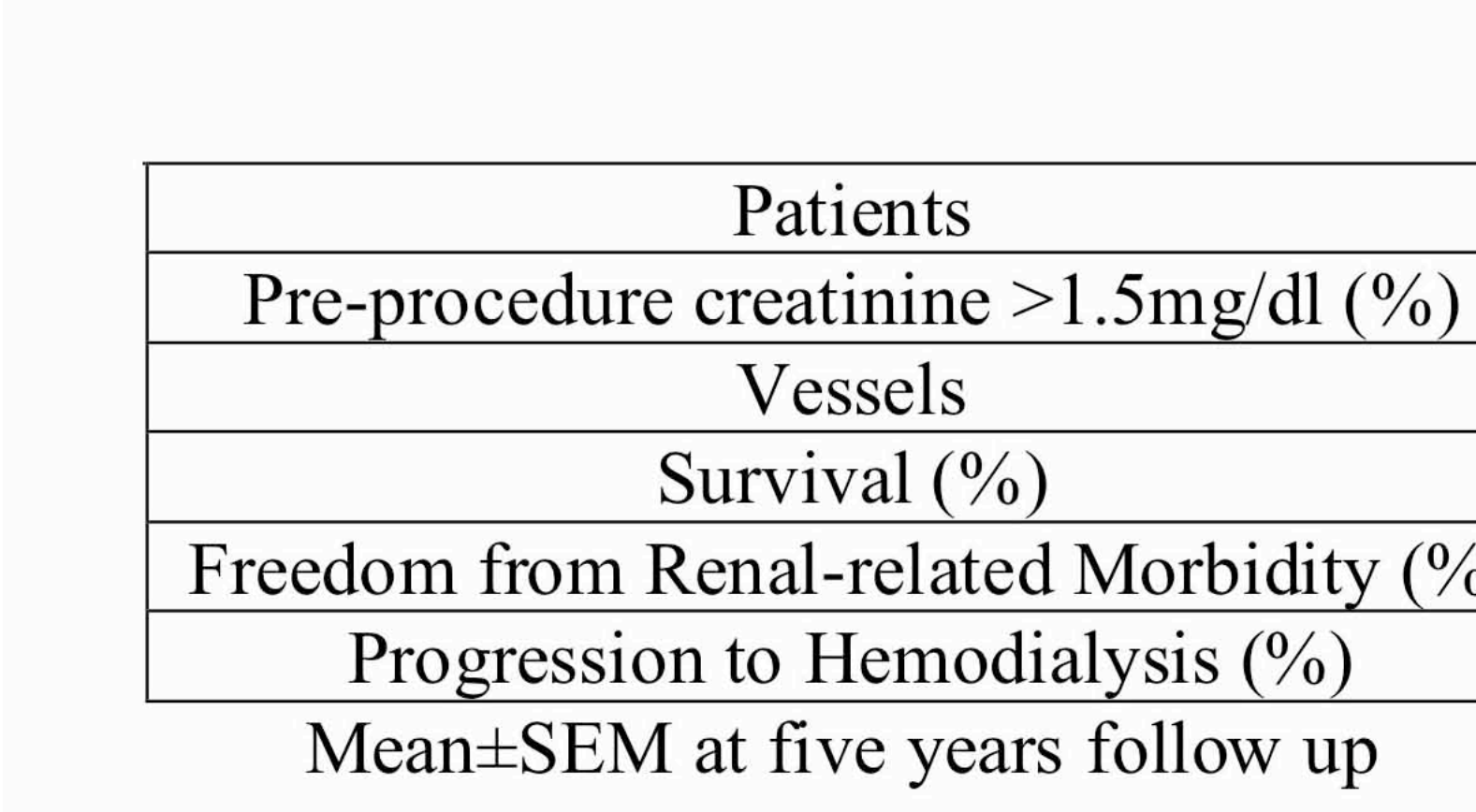
Background: Percutaneous renal artery revascularization for hypertension and renal dysfunction is now common and there is an increasing realization that the use of embolic protection devices for prevention of renal injury during renal artery intervention may be required. The frequency, cause and outcomes of acute functional parenchymal injury associated with renal intervention are poorly delineated.

Purpose: To determine the frequency of acute renal injury 30 days after renal artery interventions, to identify factors associated with renal injury, and determine whether renal injury related to renal intervention is associated with late adverse clinical events.

Methods: A retrospective analysis of patients undergoing renal artery interventions for atherosclerotic renal artery disease between 1990 and 2007 was performed. No distal embolic protection devices were used. Acute functional parenchymal renal injury was defined as a persistent increase in the serum creatinine of ≥ 0.5 mg/dl at 1 month after the procedure. Freedom from renal related morbidity (increase in persistent creatinine >20% of baseline, progression to hemodialysis, death from renal-related causes) and patient survival were measured.

Results: 418 patients underwent 581 renal artery interventions: 57% for hypertension, 23% for hypertension associated with chronic renal insufficiency and 12% for renal insufficiency. Acute renal injury occurred in 20% of the patients. The occurrence of a functional parenchymal injury was associated with a significant decrement in freedom from renal-related morbidity and markedly decreased survival at 5 years follow up (Table). At five years follow-up, 3 times as many patients with parenchymal injury progressed to hemodialysis compared to those without injury. By multi-variant analysis, the presence of a unrepaired AAA, low GFR, contralateral renal artery disease and the presence of a solitary kidney were significantly associated with parenchymal injury and poor long-term clinical benefit. Hypertension, diabetes and hyperlipidemia and contrast volume were determined to be not significant.

Conclusion: Acute renal injury occurs in approximately 20% of patients undergoing percutaneous renal artery intervention, is more likely in the presence of an un-repaired AAA and with preexisting renal disease. Acute parenchymal renal injury is a negative predictor of survival and is associated with subsequent renal failure, need for dialysis, and death



Table

#8 - EARLY RESULT RANDOMIZED CONTROLLED TRIAL OF TREATMENT FOR INTERMITTENT CLAUDICATION

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Objective
To compare angioplasty (PTA), supervised exercise (SEP) and PTA+SEP in the treatment of intermittent claudication (IC) due to femoro-popliteal disease

Methods
Over a 6 years period, 178 patients (108 men, median age 70 years) with angioplastiable femoro-popliteal lesions were randomized to: PTA, SEP or PTA+SEP. Patients were assessed prior to and at 1 & 3 month post treatment. ISCVS outcome criteria (Ankle pressures, treadmill walking distances) and Quality of Life (QoL) questionnaires (SF36 and VascuQoL) were analysed.

Results
All groups were well matched at baseline. 21 patients withdrew.
Intra group analysis:
All groups demonstrated significant clinical and QoL improvements (Friedman test, $p<0.05$).
SEP (59 patients, 8 withdrew) – 62.7% of patients (n=32) improved following treatment [20 mild, 9 moderate, 3 marked], 27.4 %(n=14) no improvement and 9.8 %(n=5) deteriorated.
PTA (60 patients, 3 withdrew) – 66.6% of patients (n=38) improved following treatment [19mild, 10 moderate, 9 marked], 22.8% (n=13) no improvement and 10.5 %(n=6) deteriorated.
PTA+SEP (59 patients, 10 withdrew) – 81.6% of patients (n=40) improved following treatment. [10 mild, 17 moderate, 13 marked], 14.2%% (n=7) no improvement and 4.0 % (n=2) deteriorated

Inter group Analysis:
PTA+SEP produce a much greater improvement in clinical outcome measures than PTA or SEP alone, but there was no significant Q0L advantage (Kruskal Wallis test, $p>0.05$).

Conclusion
SEP should be the primary treatment for the patients with claudication and PTA should be supplemented by a SEP.

#9 - SUBINTIMAL ANGIOPLASTY (SIA) VS BYPASS SURGERY (BS) FOR CRITICAL LOWER LIMB ISCHEMIA IN PATIENTS WITH TASC C AND D LESIONS: 5-YEAR PROSPECTIVE OBSERVATIONAL COMPARTITIVE STUDY.

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Aptly executed revascularisation pilots to high patency and significantly reduced amputation rates .Our primary aim is to evaluate SIA and BS in maintaining amputation free survival. Secondarily end points are to investigate whether SIA reduces the risk of Major Adverse Events (MAE) and enhances Quality Time without Symptoms of disease or Toxicity of Treatment (Q-TWiST) in a cost-effective manner.

Form 2002-2007, 1276 patients were referred with PVD. We performed a prospective parallel group comparison of 334 primary procedures (SIA=206, BS=128) in 309 patients (NSIA=190, NBS=119) with CLI. Mean age (SIA 73+/-13yrs vs. BS 70+/-14yrs, p=0.127) and co-morbidity severity scores (P>0.05) were similar between groups. However, 55% were females in the SIA group vs. 35% in OS, p=0.0005.

5-year amputation free survival rates were similar; SIA (72.9%) vs BS (71.2%) p=0.9765. 5year-Primary patency were; SIA 72.8%vs BS 65.3% p=0.7001. 5-year assisted primary patency was improved with SIA 82.8% vs BS 68.2%p=0.1061. 5 Year Secondary patency rates were SIA 85.9% vs72.1% p=0.2624. Mean number of procedures (+/- SD) for SIA is 1.19+/-0.50 and for BS is 1.10+/- 0.41, p=0.078

Risk of MAE (P<0.002) and length of hospital stay (LOS SIA14+/-16days vs. LOS BS24+/-23days, P<0.0001) were significantly reduced with SIA. Q-TWiST was significantly improved (P<0.001) and cost per QALY (P<0.05) reduced with SIA. 5 year survival rate were comparable.

SIA enhances symptom-free survival rate without MAE and further Q-TWIST, cost effective, allows for a high patient turnover without compromising QALY and technically successful in most patients. SIA is the gold paradigm in management of CLI.

#10 - IMPACT OF AGGRESSIVE ENDOVASCULAR RECANALIZATION TECHNIQUES ON SUCCESS RATE IN CHRONIC TOTAL ARTERIAL OCCLUSIONS (CTO)

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Purpose: To evaluated our experience with a number of aggressive approaches for the recanalization of chronic total arterial occlusions (CTO).

Methods: Retrospective review of our departmental operative logs identified 90 patients (49 males, 61.4±13.7 yrs) who underwent attempted CTO recanalization in 101 limbs between 7/1999 and 7/2007. We determined our success rate based on the technique(s) used for CTO recanalization: 1) traditional catheter-guidewire probing, usually using a glide or regular directional catheter with a coaxial glide wire or spring coil guidewire. 2) wedged balloon angioplasty at the occlusion's leading edge followed by guidewire probing. 3) attempted traversal from a contralateral approach for iliac lesions. 4) open access into the diseased artery prior to guidewire recanalization. 5) Puncture with the stiff end of a guidewire. 6) Directional sharp-needle puncture following multi-projection triangulation, using a home-made 21-gauge coaxial system.

Results: The occluded segments consisted of: iliac (54), femoropopliteal (43), occluded stents (1 SFA, 3 iliac). Mean occlusion length was 8.7±4.7 cm. A subintimal channel was created in 59 procedures. Conventional recanalization techniques were successful in 71 procedures (70%). Probing with the guidewire's stiff-end was attempted in 29 procedure and was successful in 13, improving procedural success to 83%. Sharp needle recanalization was attempted in 9 limbs and was successful in 7, improving overall recanalization success to 90%. The 2 failures of needle recanalization occurred in one patient with heavily calcified aortic wall and thick atheroma at the puncture point. Successful conventional recanalization rate included the use of a contralateral femoral or brachial approach in 4 procedures (successful in all), and wedge-balloon angioplasty to assist recanalization in 3 procedures (successful in 2). A hybrid open approach allowing selective access across the occlusion was used in another 3 procedures (successful in all). Procedural complications included access hematoma (2), dissection (2), thromboembolism managed by thrombaspiration or stenting (2), and self-limited extravasation (1).

Conclusions: The use of aggressive recanalization techniques following failure of traditional means improved procedural success in CTO from 70% to 90%. In our experience, sharp recanalization techniques are safe and could offer substantial time saving if used early during difficult procedures.

#11 - PERCUTANEOUS MECHANICAL THROMBECTOMY OF ACUTE LOWER EXTREMITY ISCHEMIA

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BACKGROUND: Data is limited regarding the efficacy of percutaneous mechanical thrombectomy (PMT) for the treatment of acute lower extremity (LE) ischemia. The current study was undertaken to evaluate the immediate and long-term results following PMT for occluded LE bypass grafts, stents, and thromboembolic events involving native arteries.
Methods: Forty-one patients underwent PMT (Angiojet, Possis Medical, Inc.) during a 3-year period. Technical success rate, major complications, limb salvage rate, and length of hospital stay were recorded for each patient. Ultrasound follow-up with clinical correlation was performed at 6 weeks, 6 months, and 1 year.
RESULTS: PMT was performed for occluded synthetic bypass grafts (n=17), vein bypass grafts (n=5), stents (n=5), and native arterial vessels (n=14). The immediate technical success rate was 88% (n=36). Adjunctive catheter directed thrombolysis was required in 66% of patients. Additional endovascular procedures were performed in 65% of patients. The mean hospital stay was 5.58 days (range 3-15 days). A major bleeding complication occurred in one

patient. Twenty patients required additional endovascular and or open vascular procedures to maintain patency during the first year follow up. For all patients, the 6-week, 6-month and 1-year ankle brachial index (ABI) was 0.93, 0.87, and 0.98 respectively. The one-year limb salvage rate was 88%.
Conclusion: Percutaneous mechanical thrombectomy is a safe and effective treatment for acute lower extremity ischemia. PMT is associated with a high technical success rate and acceptable limb savage rate at one year.

#12 - INFRAINGUINAL ATHERECTOMY: A RETROSPECTIVE REVIEW OF A SINGLE-CENTER EXPERIENCE

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Infrainguinal Atherectomy: A retrospective review of a single-center experience
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Objective: By decreasing plaque burden, atherectomy provides a potentially promising alternative to conventional angioplasty and stenting as a means of revascularizing patients with peripheral arterial disease. An improved atherectomy device (SilverHawk) has recently received FDA-approval, but the results of therapy with its use are unclear. We therefore analyzed a consecutive series of patients undergoing atherectomy.
Methods: A thorough retrospective chart review of 32 patients (10 women, 12 men) who underwent 37 infrainguinal atherectomy procedures was performed. Mean patient age was 67 years. Co-morbidities included hypertension (94%), hyperlipidemia (74%), DM (61%), CAD (59%), active smoking (26%), and end-stage renal disease (20% on dialysis or s/p transplant). Indications for intervention included critical limb ischemia (65%), claudication (32%), and atheroembolism (2%); 35% of patients had undergone previous infrainguinal interventions. Treatment was confined to the femoro-popliteal (FP) segment in 70% of patients; 30% underwent tibial artery (TA) atherectomy + FP atherectomy. The Trans-Atlantic Inter-Society Consensus (TASC) distribution of FP lesions was: A (44%), B (40%), C (12%) and D (4%). Angioplasty of the atherectomized lesion was performed in 38% of cases and adjunctive therapy for tandem lesions in 41%. The influence of co-morbidities, patency, and complication rates were analyzed by the Chi-Square Test and Life-Table Analysis.
Results: The mean post-procedure ankle-brachial index increase was 0.21, and toe pressures increased by 10 mmHg. The mean follow-up was 6 months. Minor complications occurred in 11% of patients, repeat intervention in 32%, minor amputations in 13.5%, and below-knee amputations in 13.5%. Kaplan-Meier life-table analysis revealed 73%, 63%, and 56% primary patency rates and 76%, 71%, 62% primary-assisted patency rates at 3, 6, and 12months, respectively (Table 1). Patency rates for isolated FP atherectomy were 80%, 68%, 59% (primary) and 75%, 51%, 51% (primary-assisted) at 3-, 6-, 12-months, respectively (Table 2). Patients with diabetes requiring insulin therapy had a 5-fold risk of failed atherectomy.
Conclusions: In general, our atherectomy results mirror those reported in contemporary series of FP balloon angioplasty and/or stenting. Insulin-requiring diabetes is a significant risk factor for failed atherectomy. Given that atherectomy has a higher procedural cost than simple angioplasty or stenting, future investigations must be conducted to compare these treatment alternatives in patients carefully stratified by indication, risk factors, co-morbidities, and TASC class.

Table 1
All Atherectomy 3 month 6 month 12 month
Primary Patency 73% 63% 56%
Primary Assisted Patency 76% 71% 62%
Secondary Patency 76% 71% 62%

Table 2
Isolated FP Atherectomy 3 month 6 month 12 month
Primary Patency 80% 68% 59%
Primary Assisted Patency 75% 51% 51%
Secondary Patency 75% 51% 51%

#13 - THE VALUE OF SCREENING FOR ABDOMINAL AORTIC ANEURYSMS AND CAROTID DISEASE IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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Objective: To determine the prevalence of abdominal aortic aneurysm (AAA) and carotid occlusive disease (COD) in patients with coronary artery disease undergoing coronary artery bypass grafting (CABG).

Methods: A retrospective review of all patients scheduled for CABG between 1/2002 and 6/2006 was undertaken. The study population included 601 patients who had undergone at least one non-invasive vascular evaluation of the carotids (357), abdominal aorta (471), or both (227). The mean age was 64±17 years, and 446 were males. An abdominal aortic aneurysm was defined as an aortic transverse diameter ≥ 30mm. The effect of age, gender and major comorbidities (smoking, hypertension [HTN], diabetes mellitus [DM], hyperlipidemia [HLP], and cerebrovascular accident [CVA]) on the incidence and size/severity of AAA and COD was statistically evaluated.

Results: The prevalence of AAA in the above screened population was 60/471 (12.7%), and was significantly higher in males (12.1% vs 0.6%, P<0.0001). Prevalence of AAA ≥ 5.0 cm was 19 (4%), all occurring in males. The prevalence of AAA≥6.0 cm was 11 (2%). The severity-gradated (≥50%, ≥60%, ≥70%, ≥80%) prevalence of carotid stenosis in the screened 357 patients was 25.2%, 15.7%, 12.3%, and 10.4%, respectively. Bilateral significant stenosis (>50%) was present in 6.7%. AAA and COD >50% coexisted in 7 of 227 patients. Significant predictive variables for AAA were: age (63±16 vs. 70±13 yrs, P<0.01), male gender (57/302 vs. 3/109, P<0.0001), smoking (31/159 vs. 28/252, P=0.04), and DM (16/170 vs. 44/241, P=0.03). Significant predictive variables for COD >50% were: HTN (70/167 vs. 20/100, P=0.008), DM (46/106 vs. 44/161, P=0.053), HLP (61/147 vs. 29/120, P=0.03), and a history of CVA (28/38 vs. 62/229, P<0.0001)

Conclusion: Our study demonstrates a much higher prevalence of both AAA and COD on routine screening of patients undergoing CABG compared to the historic general population prevalence of AAA (3-6% males, 1% females) and COD (4-5%). Routine screening for AAA and COD in patients undergoing CABG is a high yield practice that could translate into significant mortality and morbidity prevention

#14 - EXTENDING THE LIMITS OF ARCH AND THORACIC AORTIC ENDOGRAFTING THROUGH UTILIZATION OF A DOUBLE-BARREL COAXIAL STENTING TECHNIQUE

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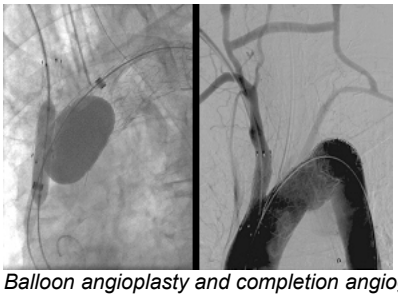
Objective: Thoracic endovascular aortic repair (TEVAR) may involve either planned or inadvertent coverage of aortic branch vessels. Vital branch vessels may be preserved by surgical debranching techniques or by placement of additional stents to maintain vessel patency. We report our technique and experience with the placement of double-barrel stents during TEVAR to maintain patency of aortic arch branches during planned or inadvertent endograft coverage.

Methods: Six patients underwent placement of double-barrel coaxial stents during TEVAR (innominate n=3; L CCA n=2; L SCA n=1) using Gore TAG endografts. Both self-expanding (n=5) and balloon-expandable (n=1) stents were utilized for the branch vessel component. Two cases of inadvertent coverage of the left carotid artery were treated by retrograde left common carotid stent deployment alongside the endograft. Four planned procedures involved endograft deployment proximally into aortic arch zone 0 with a double-barrel innominate stent and carotid-carotid bypass (n=3) and zone 2 with a double-barrel subclavian artery stent.

Results: Double-barrel coaxial stent deployment was technically successful with maintenance of branch vessel patency and absence of type I endoleak in all 6 cases. One case of zone 0 endograft placement with an innominate stent was complicated by a left hemispheric stroke related to a technical problem with the carotid-carotid bypass. On follow-up of 2 to 18 months all double-barrel stents and endografts remain patent without endoleak, migration or loss of device integrity.

Conclusions: Use of the double-barrel stent technique is a useful approach to gain additional proximal fixation length during TEVAR. Moreover, the technique uses commercially available devices and permits complete aortic arch coverage (zone 0) without a sternotomy. Although initial outcomes are encouraging, long-term durability remains unknown.



Balloon angioplasty and completion angiography of innominate artery and aortic arch double-barrel stents

#15 - EARLY OUTCOMES OF THORACIC ENDOVASCULAR STENT GRAFT REPAIR FOR ACUTE COMPLICATED TYPE B DISSECTION USING GORE TAG® ENDOPROSTHESIS

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Objective: To assess technical success and early outcome of thoracic endovascular aortic repair (TEVAR) for symptomatic complicated acute type B thoracic aortic dissection treated at a single institution using a commercially available device.
Methods: All patients with symptomatic complicated acute type B thoracic aortic dissection treated with TEVAR since FDA approval of Gore TAG® endoprosthesis in March 2005 were identified from a prospectively maintained vascular registry. Clinical indications, operative technique, peri-operative complications, follow-up imaging and mortality were analyzed.
Results: Between March 2005 and August 2007, 111 TEVARs using the TAG endoprosthesis have been performed, of which 12(10.8%) were for complicated acute type B thoracic aortic dissection. Average follow-up was 4.4 ± 4.3months. Technical feasibility and success with deployment proximal to the entry tear was 100%(requiring coverage of the left subclavian artery in 4(33.3%). Adjunctive procedures required at the time of TEVAR included renal stent (2), iliac stent (1), and access-artery open repair (2). Ten patients (83.3%) had immediate resolution of the malperfusion deficit. Three subsequent interventions were required: renal stent for persistent malperfusion(1), proximal coverage of left subclavian for Type I endoleak (1), and stent graft for aneurysmal progression of infrarenal aorta (1). Major perioperative complications included paraplegia (16.6%), renal failure requiring hemodialysis (16.6%), and stroke (8.3%). Perioperative mortality was 8.3% occurring in one patient presenting with rupture. CT angiogram confirmed thoracic false lumen thrombosis at dissection entry level and no evidence of thoracic aneurismal degeneration in 7/8(87.5%) at one month interval and 6/6(100%) at six months. Survival at 1 year by life table analysis was 84% (Standard error ±10.7%).
Conclusions: For complicated acute type B thoracic aortic dissection, TEVAR using commercially available stent grafts has high technical success, excellent results at resolving mal-perfusion, and acceptably low complications and perioperative mortality.

#16 - DIRECT AND INDIRECT MEASUREMENT OF PATIENT RADIATION EXPOSURE DURING ENDOVASCULAR AORTIC ANEURYSM REPAIR

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Objective: With increasing complexity of endovascular procedures, concern has grown regarding patient radiation exposure. Abdominal aortic aneurysm (AAA) repair represents the most common complex endovascular procedure currently performed by vascular specialists. Our study evaluates the patient radiation dose received during endovascular AAA repair.

Methods: Over a three month period we prospectively monitored the radiation dose in a series of consecutive patients undergoing endovascular AAA repair. All patients underwent standard endovascular AAA repair with one of two commercially available grafts using the GE OEC 9800 unit. Direct measurement of maximum radiation dose at skin level (peak skin dose, PSD) was recorded using GAFCHROMIC radiographic dosimetry film. Indirect measurements of radiation dose (fluoroscopy time and dose-area-product) were recorded with the C-arm dosimeter.

Results: A total of 12 consecutive patients undergoing standard endovascular AAA repair were evaluated. Mean PSD was 0.75 Gy (range: 0.27 - 1.25 Gy). Mean total flouroscopy time was 20.6 minutes (range: 12.6 – 34.2 minutes) with an average of 8% spent in cinefluoroscopy. 48% of total fluoroscopy time was spent in normal field of view and 52% in magnified view. The mean dose-area-product was 15,137.4 cGy•cm2 (range: 5207.1-24,535.7 cGy•cm2). PSD correlated with Dose-Area-Product ($r=0.9$, $p<0.05$) but not total fluoroscopy time ($r=0.18$, $p>0.05$).

Conclusion: PSD of all patients was well below the accepted 2.0 Gy threshold for skin injury. PSD correlates with dose-area-product but not total fluoroscopy time. Despite the complexity and duration of endovascular AAA repair, the procedure can be performed safely without excessive radiation exposure.

Radiation Dose

#17 - DEVICE-SPECIFIC LONG-TERM POSTPLACEMENT COSTS OF ENDOVASCULAR ANUERYSM REPAIR

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Background: Long-term postplacement costs increase the global cost of endovascular aneurysm repair by 44% over 5 years. Secondary procedures and endoleaks greatly increase long-term expense. This study evaluates device-specific long-term postplacement costs using two different endografts.
Methods: AneuRx (Medtronic/AVE Inc.) and Zenith (Cook) endografts were used to treat 250 patients with abdominal aortic aneurysms between December 1998-June 2006. A relative value unit based hospital cost accounting system was used to calculate direct and indirect costs. Institutional overhead expenses, professional services costs, and outpatient visits were also included. Costs were valued in 2006 dollars. To examine long-term costs, patients with <1 year follow-up were excluded. The initial 50 patients between December 1995-98 were exluded to limit learning curve effects on cost. Life-table analysis was utilized in cost comparison to negate any bias created by different follow-up times.
Results: Cumulative 5-year postplacement costs per patient were $12,465 (AneuRx) and $10,606 (Zenith, P=.22). Mean follow-up duration was 38.5+/-5.2 months (AneuRx) and 32.8+/-3.8 months (Zenith), P=.12). For both devices, largest cost components were secondary procedures (59.5% AneuRx vs. 56.4% Zenith) and radiologic studies (29.2% AneuRx vs. 34.9% Zenith). Life-table analysis demonstrated AneuRx freedom from secondary procedures and endoleaks was 51% and 58% at 5 years while Zenith freedom was 80% (P<.05) and 83% (P=.05)
Conclusions: There was a significant reduction in secondary procedures and endoleaks in patients treated with Zenith compared to AneuRx. The corresponding 15% reduction in cost, however, was not statistically significant. Further study with a large cohort of patients is warranted.

#18 - INCIDENCE AND OUTCOME OF FILTER OCCLUSION DURING CAROTID ARTERY STENT PROCEDURE.

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Introduction: Recent reviews of device specific complications using neuroprotection have addressed technical difficulties during delivery as well as adverse outcomes, intra-operative and 30-day. Little has been written, however, regarding the relevance of filter occlusion during carotid stent procedure. METHODS: A retrospective review was conducted of patients undergoing carotid artery stent procedures using a variety of neuroprotection devices from 2003 to 2007. Prospective databases from two institutions were examined for incidence and management of filter occlusions during procedure as well as adverse neurologic events (intra-op and 30 day) associated with filter occlusion. RESULTS: 283 carotid artery stent procedures were performed on 256 patients (163 male, 93 female). 177 (62.5%) arteries were asymptomatic and 106 were symptomatic. Neurologic adverse events occurred in 6 patients (2.1%); 3 of these resolved completely at 72 hours. Neuroprotection was used in 95% of all patients and filters were used in 221 stent procedures: Boston Scientific Filter Wire (n=81); Guidant Accunet (n=100); Angioguard (n=17); Abbot Emboshield (n=23). Filter occlusion occurred in 11 patients (4.5%) in whom this form of neuroprotection was employed: Angioguard (n=5); Accunet (n=2); Emboshield (n=2); EPI Filter wire (n=2). Two of the 11 patients with filter occlusions suffered a neurologic event. There was no correlation between filter occlusion and gender, symptoms, stent, or filter type ($p>0.05$). Filter occlusion was managed with export catheter directed aspiration in 7 patients and with prompt filter retrieval in 5 patients. CONCLUSIONS: Filter occlusion is an infrequent event does not appear to be filter-specific and can be managed successfully by catheter-directed aspiration or filter retrieval. The majority of patients with filter occlusion do not suffer from atheroemboli as a result of this occlusion.

#19 - IMPACT OF TIBIAL RUNOFF ON SUPERFICIAL FEMORAL ARTERY ENDOLUMINAL INTERVENTIONS FOR CLAUDICATION.

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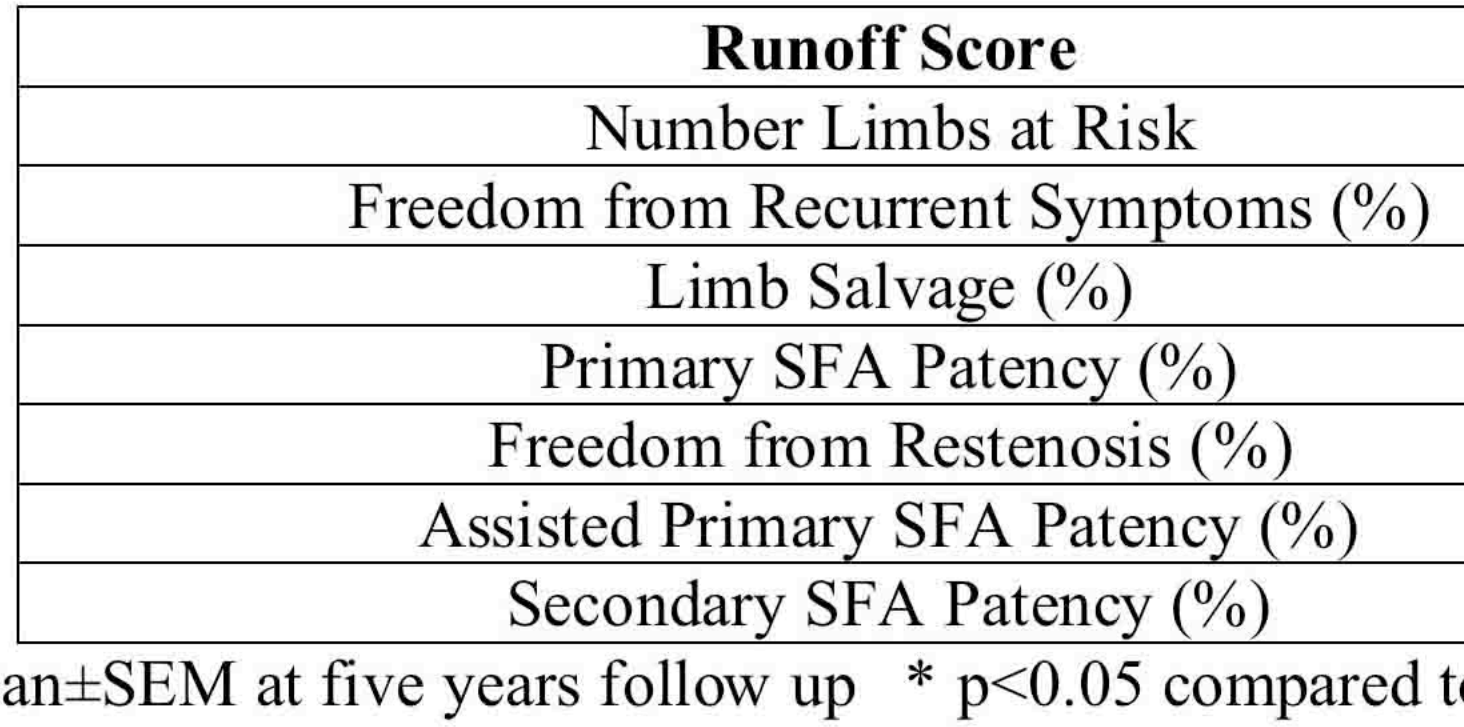
Background: While aggressive endoluminal therapy for superficial femoral artery (SFA) occlusive disease is commonplace, the implications of tibial vessel runoff on long term outcomes of these interventions in patients with claudication is unclear. Runoff is known to negatively effect graft patency but no data is available on the impact of runoff on percutaneous SFA interventions and its implications during follow up.

Purpose: To examine the impact of tibial runoff on longterm outcomes of SFA interventions for claudication.

Methods: A prospective database of patients undergoing endovascular treatment of the SFA between 1986 and 2007 was queried. Patients with Rutherford symptom classification 1, 2 and 3 were selected. Patients with concomitant tibial interventions were excluded. Angiograms were reviewed in all cases to assess tibial runoff. Post procedure runoff was scored according to the SVS criteria such that a higher score implies worse runoff. Three run-off score groups were identified: < 5, 5-10 and >10. Kaplan-Meier survival analyses were performed to assess time-dependent outcomes. Factor analyses were performed using a Cox proportional hazard model for time dependent variables.

Results: 481 limbs in 347 patients (70% male, average age 66 years) underwent endovascular treatment for claudication. 87% had hypertension, 51% had diabetes mellitus, 67% had hyperlipidemia and 16% had chronic renal insufficiency (1% on hemodialysis). Technical success was 98% with 61% SFA undergoing angioplasty, 19% SFA had primary stenting and 2% SFA had an atherectomy. Overall mortality was <1% and overall morbidity was 16% at 90 days after the procedure. At 5 years, vessels with runoff scores of 5 or greater had significantly lower freedom from recurrent symptoms and a lower freedom from restenosis (Table). Primary and assisted primary patency were significantly worse in patients with a runoff score >10 (Table). However, secondary patency was equivalent between the groups. A runoff score >5 and >10 was associated with incremental lower limb salvage

Conclusions: Following SFA percutaneous interventions for claudication, runoff score can identify patients more likely to develop restenosis and recurrent symptoms and more importantly identify patients at a high risk of limb loss. Defining such subgroups allow a clear risk stratification of patients with claudication and can guide the intensity of surveillance in the out patient setting.



Table

#20 - BALLOON-MOUNTED COVERED STENT THERAPY OF COMPLEX ENDOVASCULAR PATHOLOGY

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Erlanger Medical Center; Chattanooga, TN US

Objective: Covered stents have shown utility in the peripheral arterial system for exclusion of aneurysms and extravasation, while addressing intimal hyperplasia. Previous limitations were large delivery systems and lack of precision due to the self-expanding design. The current study was undertaken to review our experience with a balloon-mounted covered stent and to determine its clinical application for complex endovascular issues.

Methods: All stents were Atrium iCast, which is a balloon-mounted, PTFE covered stent with a 6F/7F delivery system. A retrospective review was performed of 49 patients with 64 lesions. Life Table analysis was performed. The most commonly treated vessels were the iliac and renal arteries. Indications for covered stent placement were unstable plaque/thrombus (59%), restenosis of previous PTA/stent (25%), and aneurysm/endoleak exclusion (16%). Patency was assessed by angiogram or duplex ultrasonography. The primary endpoints were patency and technical success.

Results: Mean follow-up was 13 months. Technical success rate of stent placement was 98%. Six-month and 12-month primary patency was 96% and 84%. Twelve-month assisted primary patency was 98%. Stents placed for restenosis after previous PTA/stent had a primary patency of 85% and a 15% restenosis rate at 12 months. Successful exclusion of plaque/thrombus and aneurysm/endoleak was 100%. Major procedural complications included pseudoaneurysm (n=2), stent deployment failure (n=2), and access site bleeding (n=1).

Conclusions: Balloon-mounted covered stents exhibit acceptable patency and are highly successful in treating unstable plaque/thrombus and aneurysm related pathology. Additionally, they provide an excellent alternative when dealing with restenosis after endovascular intervention.

#21 - ARTERIAL CALCIFICATION INCREASES IN DISTAL ARTERIES IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE

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Objective: The aim of this study was to determine if significant differences in plaque composition exist between the popliteal and tibial vessels in patients with severe peripheral arterial disease (PAD).
Methods: Forty-four patients with PAD required either above knee (n=38), below knee (n=5) or through knee (n=1) amputation for pedal sepsis/gangrene. The fifty-one vessels (anterior tibial, n=9; posterior tibial, n=10; peroneal, n=3; popliteal, n=29) obtained, underwent intravascular ultrasound (IVUS) evaluation ex vivo within 24 hours of amputation. Sequential IVUS data was obtained at known intervals throughout the vessel length, and then analyzed with radiofrequency techniques for quantification of plaque composition, plaque volume, and total vessel volume. Plaque composition was categorized as fibrous, fibro-fatty, necrotic core, and dense calcium. Clinical data was obtained via review of electronic records at the time of amputation. Two-sided t-tests were performed to compare components within each plaque. Results are expressed as mean percentage±SEM.
Results: Tibial vessels had more dense calcium within these plaques than popliteal arteries (33.8±5.6% v. 10.6±1.9%, P<0.001). Consequently, distal vessels had less fibro-fatty and fibrous plaque than popliteal arteries (7.7+1.4% v. 13.1+1.2%, P<0.005; 42.4+4.7% v. 61.4+2.2%, P<0.001), respectively. Necrotic core plaque composition was found to be similar when comparing tibial verses popliteal arteries (16.1% vs. 14.9%, p = NS). Clinical factors including diabetes, hyperlipidemia and chronic renal insufficiency were not associated with plaque composition differences using a univariate analysis.
Conclusions: As we progress distally in the arterial tree of patients with PAD, calcium plaque content increases with decreasing burden of fibrous/fibro-fatty plaque. Our data suggests that this occurs irrespective of other salient clinical factors including diabetes and renal failure.

#22 - IMPAIRED HYPERAEMIC AND RHYTHMIC VASOMOTOR RESPONSE IN TYPE 1 DIABETES MELLITUS PATIENTS- A PREDICTOR OF EARLY PERIPHERAL VASCULAR DISEASE

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Objectives

The smooth muscle of distal vascular networks exhibits periodical contraction and relaxation known as rhythmical vasomotion. The nature of microvascular vasomotion has been shown to correlate with severity of peripheral vascular disease. We present basal and post-ischaemic hyperaemic laser dopppler flowmetry vasomotion in control and type 1 adult diabetic patients.

Methods

This is a prospective case control study. Laser Doppler flowmetry was used to measure vasomotion and hyperaemic responses in age and body mass index matched male subjects (25 Diabetes Mellitus and 13 controls), all with ankle/brachial pressure index >1.0.

Results

The frequency of resting vasomotion was raised in diabetics compared to controls 8 (5-9) min-1 vs. 5 (4-6) min-1 (median (range); p<0.0001). The post ischaemic hyperaemia response was significantly higher in the IDDM group compared to the controls 11 (7-12) min-1 vs. 6(5-7) min-1 (median (range); p<0.05). Post ischaemic hyperaemic flux (expressed as percent increase from resting) was significantly lower in the IDDM group compared to controls (234 ± 62 vs. 453 ± 155 %, p<0.01). The time to achieve peak post ischaemic response was also significantly increased in the NIDDM group compared to control: 21.4 ± 0.4 vs. 12.8 ± 5.4 (mean ± SD, p<0.0).

Conclusions

Vasomotion frequency and its change during hyperaemic insult is significantly different in Diabetes Mellitus subjects compared to controls. The results are similar to patients with macrovascular atherosclerosis. These changes may give us an early indication of diabetic patients who will progress to develop peripheral vascular disease.

#23 - INFRAPOPLITEAL PROSTHETIC BYPASS FOR LIMB SALVAGE: HAS ITS TIME COME AND GONE?

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Purpose: In patients presenting for limb salvage who have limited or no conduit, some groups have proposed prosthetic reconstruction to tibial vessels with or without adjuncts such as arteriovenous fistulas, vein cuffs, or patches. However, more recently, percutaneous treatment of infrapopliteal occlusive disease has been used to treat selected patients. In this study, we outline our experience with infrapopliteal prosthetic bypasses for salvage with specific attention to limb salvage and patient survival.
Methods: From 1982 to 2007, 434 infrapopliteal bypasses were performed for limb salvage. There were 127 (29%) performed using vein cuff, 48 (11%) with AV

fistula, and 259 (60%) with direct anastomosis to the infrapopliteal vessels. Patient demographics demonstrated 57% male, 49% diabetic, 32% current smokers, and 25% with renal failure. Data was compiled from our vascular registry, inpatient and outpatient charts, as well as vascular lab studies performed in follow-up.
Results: Operative mortality was 4.4%; indications were 187 (43%) rest pain, 154 (35%) ulcer, and 93 (21%) gangrene. Wound complications consisted of 25(6%) who presented with wound infection, 28 (6.5%) graft infection, 66 (15%) immediate occlusion, 179 (41%) late occlusion. Immediate limb loss was 40 (9%). Mean follow-up for this series was 25 months (range: 101 – 203 months). Primary patency at one and three years was 56% and 36% respectively. Limb salvage was 74% and 62% respectively and patient survival was 81% and 64% at one and three years respectively.
Conclusion: Infrapopliteal reconstruction for limb salvage using prosthetic bypass with or without adjunct has results that are similar to those reported for percutaneous treatment. Complications for patients undergoing prosthetic bypass are significantly worse than those reported for percutaneous treatment without a decrease in limb salvage. Percutaneous treatments may be a better option for patients who have limited conduit or would not tolerate spliced vein reconstruction.

#24 - ARTERIOVENOUS FISTULA CONSTRUCTION USING FEMORAL VEIN IN THE THIGH AND UPPER EXTREMITY: SINGLE CENTER EXPERIENCE

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Objective: To determine the outcome of femoral vein (FV) access as either a transposition arteriovenous fistula (AVF) to the superficial femoral artery or translocation as an autogenous upper arm graft.

Methods: This is a retrospective review of all end stage renal disease (ESRD) patients who underwent FV access at the University of Colorado Health Sciences Center from December 2004 to May 2007. Demographics, number of prior access procedures, FV dialysis access procedure, periprocedural complications, mean follow-up, secondary access related procedures and access function were recorded. Complications were subdivided into FV harvest site and ischemia related.

Results: Nineteen patients underwent FV access during the study period - 10 FV transpositions and 9 FV translocations. The median number of prior access procedures was 2. The median hospital stay was 3 days and there were no perioperative deaths. Eight patients had FV harvest site complications – 7 wound infections, one involving the AVF requiring ligation and one compartment syndrome requiring fasciotomy. Five patients had ischemic complications – three required distal revascularization interval ligation and one required AVF ligation. Seventy-nine percent of patients had a functioning access at a mean follow up of 6 months (range 23 days to 3 years). Five FV accesses required one or more endovascular procedures to maintain function.

Conclusion: The use of FV access in ESRD is durable at intermediate follow-up but has significant morbidity. As such it should be reserved for patients who have exhausted all other autogenous options.