#1 - QUALITY OF LIFE OUTCOMES FOLLOWING LOWER EXTREMITY REVASCULARIZATION

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OBJECTIVE: Quality of life (QoL) is an important outcome measure in vascular surgery. We tracked the QoL before and after lower extremity revascularization.
METHODS: We enrolled 131 patients as part of a multi-faceted prospective study on lower extremity revascularization. Patients completed the Short Form 36 (SF36) and Vascular Quality of Life (VascuQoL) questionnaires at presentation, and post-intervention at one month, six months, and one year. SF36 and VascuQoL scores were compared with respect to Rutherford score, intervention type, and revascularization patency.
RESULTS: Pre-operative QoL assessment was available for all 131 patients, with complete follow-up assessment available for 90 intervention patients (27 angioplasty/stent, 63 vein bypass). 70.4% of the angioplasty group had claudication, whereas 92% of the vein bypass group had critical limb ischemia (CLI). Pre-operative VascuQoL scores, but not SF36, discriminated between higher baseline QoL in claudication versus CLI at presentation. (P<.001) VascuQoL demonstrated greater QoL improvement following angioplasty/stent compared to bypass at 1 month, even after controlling for pre-operative Rutherford score. Furthermore, VascuQoL identified distinct QoL differences between success and failure of revascularization at 6 months and 1 year, whereas SF36 only showed differences at the 1-year time point.
CONCLUSION: VascuQoL is a more sensitive measure of QoL in vascular patients than SF36. Pre-operative differences in QoL correlate with clinical severity. The improvement in QoL at 1 month is higher following endovascular revascularization than bypass, but there is no difference between procedures at 1 year. VascuQoL may also be more sensitive to the effects of revascularization failure than SF36.

Pre-op Severity	VascuQoL (Pre-op)	SF36 (Pre-op)
Claudication	3.63	48.3
Rest Pain	2.58	44.8
Tissue Loss	2.62	44.0
	P <.001	P = .274

Procedure Type	VascuQoL (1M)	SF36 (1M)
Angioplasty/Stent	5.12	52.3
Vein Bypass	3.98	46.1
	P = .003	P = .005

Outcome	VascuQoL (6M)	SF36 (6M)
Success	5.13	52.1
Failure	4.22	48.9
	P = .008	P = .252

VascuQoL and SF36 Scores

#2 - ETHNICITY IS AN INDEPENDENT PREDICTOR OF LOWER EXTREMITY MAJOR AMPUTATION:A SINGLE CENTER ANALYSIS

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Objective:
Major lower extremity amputation is associated with significant morbidity and mortality. Multiple factors

are associated with an increased risk of amputation in patients with peripheral arterial disease(PAD). We sought to determine if ethnicity is independently associated with amputation in this patient population.

Methods:
We retrospectively reviewed patients undergoing lower extremity bypass graft procedure, endovascular intervention or major amputation between 2004-2009.Ethnicity was defined as Caucasian, African-American, Hispanic and Others. Variables that were significant in univariate analysis were used in a multivariate logistic regression model to determine independent predictors of amputation.

Results:
A total of 1488 patients were identified.1051 patients underwent endovascular interventions,143 underwent bypass graft procedures and 61 both. A total of 304 amputations were performed in 243 patients. The amputation group had significantly higher incidence of diabetes, chronic renal insufficiency and chronic heart failure(P<.05). Hispanics constituted 31.7% of the patients undergoing amputation whereas they comprised 16.4% of the total patient population. Logistic regression showed that Hispanic(OR 2.9,95%CI 2.0-4.20,P <.001) and African-American (OR 2.4,95%CI 1.6-3.6,P <.001) race were independent risk factors of amputations even after controlling for diabetes, CRI, CHF and smoking status.(Table)

Conclusions:
Hispanic and African-American ethnicity were the strongest independent risk factors for major lower extremity amputation in a large series of patients with PAD. Such findings suggest that biologic, socioeconomic, and/or cultural factors may contribute to a high rate of amputation in these minorities that is independent of other major risk factors. Further investigation of such factors is needed.

	Odd Ratio (95% CI)	P-value
Diabetes Mellitus	1.79(1.29-2.49)	.001
Chronic Renal Insufficiency	1.59(1.14-2.21)	.005
ESRD	1.28(.83-1.97)	.263
CHF	1.21(.86-1.68)	.259
Smoking	.76(.56-1.10)	.065
African American origin	2.43(1.61-3.65)	<.001
Hispanic origin	2.90(2.00-4.20)	<.001

Table: Logistic Regression Model

#3 - PREDICTING FUNCTIONAL STATUS FOLLOWING AMPUTATION AFTER LOWER EXTREMITY BYPASS

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Objective: Some patients who undergo lower extremity bypass (LEB) for critical limb ischemia (CLI) ultimately require amputation. The functional outcome achieved by these patients after amputation is not well known. Therefore, we sought to characterize the functional outcome of patients who undergo amputation after LEB, and to describe the pre- and peri-operative factors associated with independent ambulation at home after lower extremity amputation.

Methods: Within a cohort of 3,198 patients who underwent a LEB between January, 2003 and December, 2008, we studied 436 patients who subsequently received an above-knee (AKA), below-knee (BKA) or minor (forefoot or toe) ispilateral or contralateral amputation. Our main outcome measure consisted of a "good functional outcome", defined as living at home and ambulating independently. We calculated univariate and multivariate associations between patient characteristics and our main outcome measure, as well as overall survival.

Results: Of the 436 patients who underwent amputation within the first year following LEB, 224/436 (51.4%) had a minor amputation, 105/436 (24.1%) had a BKA, and 107/436 (24.5%) had an AKA. The majority of AKA (75/107, 72.8%) and BKA amputations (72/105, 70.6%) occurred in the setting of bypass graft thrombosis while nearly all minor amputations (200/224, 89.7%) occurred with a patent bypass graft. By life-table analysis at one year, we found that the proportion of patients with a good functional outcome varied by the presence and extent of amputation (proportion surviving with good functional outcome = 88% no amputation, 81% minor amputation, 55% BKA, and 45% AKA, p=0.001). Among those analyzed at long-term follow-up, late survival did not significantly vary by amputation (survival at one year = 93% no amputation, 88% minor amputation, 88% BKA, and 87% AKA, p=0.44) In multivariable analysis, we found that the patients most likely to remain ambulatory and live independently despite undergoing a lower extremity amputation were those living at home pre-operatively (HR 6.8, 95% CI 0.94-49, p=0.058) and those with pre-operative statin use (HR 1.6, 95% CI 1.2-2.1, p=0.003), while the presence of several comorbidities identified patients less likely to achieve a good functional outcome: coronary disease (HR 0.6, 95% CI 0.5-0.9, p=0.003), dialysis (HR 0.5, 95% CI 0.3-0.9, p=0.02),and congestive heart failure (HR 0.5,

95% CI 0.3-0.8, p=0.005).

Conclusions: A post-operative amputation at any level impacts functional outcomes following LEB surgery. It is possible, based on pre-operative patient characteristics, to identify before LEB those patients who are most likely to achieve good functional outcomes even in the setting of major amputation. These findings may assist in patient education and surgical decision making in patients who are poor candidates for lower extremity bypass.

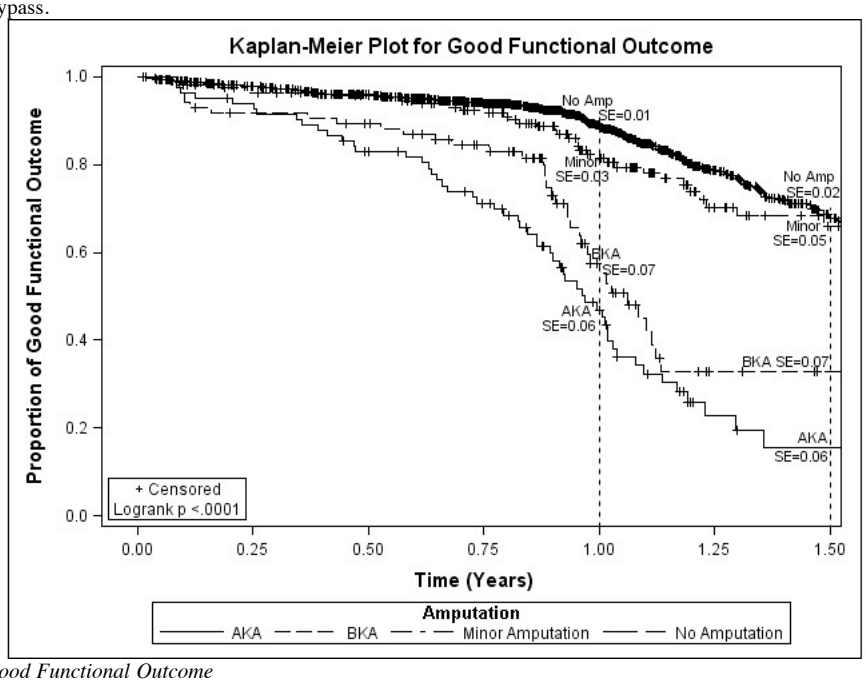

Figure 1. Good Functional Outcome

#4 - IMPACT OF GENDER AND AGE ON OUTCOMES OF TIBIAL ARTERY ENDOVASCULAR INTERVENTIONS(TAEI) IN CRITICAL LIMB ISCHEMIA(CLI)

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Objective: Female sex and age≥80 are suspected risk factors for adverse outcomes in peripheral interventions. This study reports TAEI outcomes by age and gender in patients treated for CLI.
Methods: All TAEI (Rutherford4,5,6) (2004-2010) were retrospectively reviewed. Outcomes were analyzed by Fisher's Exact, multivariate logistic regression and Cox proportional hazards regression.
Results: 221 limbs(201 patients, 60% males) were treated for CLI (74% tissue loss, 26% rest pain). Mean age was 73.3 years,(39%≥80). Co-morbidities and indications were comparable(table). Isolated TAEI were performed on 98(46%) limbs, 54% were multilevel (86% TASC C/D, p=NS). Mean FU was 8.7±7.3 months. Overall primary patency was 62% at 1year and was similar in women and octogenarians(p=NS). Limb salvage rate was 88 % and was comparable by gender but major amputation was less frequent in octogenarians (6% vs.16%,p=0.03).Complications were comparable(p=NS).
Gender or age were not predictors of limb loss(p=NS) but renal insufficiency was (OR 7.59, p= 0.01). Predictors of impaired wound healing included isolated tibial intervention (HR 0.6,p=0.01),smoking(HR 1.33 p=0.06), age≥80(HR 1.57, p=0.03) but not gender(p=NS). Overall re-intervention rate was 53% at 1-year and was higher in females (65%vs.46% p=0.03) but not in octogenarians(p=NS). Overall mortality rate was 21%, was not affected by gender(p=NS) but was higher in octogenarians (30%vs.16 %,p=0.01).
Conclusions: TAEI outcomes are not adversely affected by age or gender, and limb salvage appears improved in octogenarians despite impaired wound healing. Rate of reintervention is significantly higher in females.

Characteristic	All Patients	Females	Males	27-79 year olds	80+ year olds
DM	129 (65%)	46 (59%)	83 (70%)	84 (69%)	45 (59%)
		p-value = 0.12		p = 0.14	
CRI	87 (44%)	32 (41%)	55 (47%)	58 (48%)	29 (38%)
		p-value = 0.44		p-value = 0.16	
ESRD	38 (19%)	14 (18%)	24 (20%)	28 (23%)	10 (13%)
		p-value = 0.71		p-value = 0.07	
HTN	180 (92%)	73 (94%)	107 (91%)	109 (90%)	71 (95%)
		p-value = 0.47		p-value = 0.25	
Statin	104 (54%)	35 (46%)	69 (60%)	62 (53%)	42 (57%)
		p-value = 0.07		p-value = 0.57	
CAD	121 (63%)	41 (53%)	80 (69%)	68 (58%)	53 (71%)
		p-value = 0.03		p-value = 0.07	
COPD	36 (19%)	11 (15%)	25 (22%)	21 (18%)	15 (20%)
		p-value = 0.19		p-value = 0.72	
Malignancy	28 (15%)	14 (19%)	14 (13%)	14 (12%)	14 (19%)
		p-value = 0.25		p-value = 0.18	
Current Smoker	26 (14%)	9 (13%)	17 (15%)	23 (21%)	3 (4%)
		p-value = 0.03		p-value = 0.003	
Indication					
Rest Pain	46 (21%)	19 (21%)	27 (21%)	31 (23%)	15 (17%)
Tissue Loss	164 (74%)	58 (67%)	106 (79%)	96 (71%)	68 (79%)
Acute ischemia	11 (5%)	9 (10%)	2 (1.5%)	8 (6%)	3 (3.5%)
		p-value = 0.02		p-value = 0.07	
Wound Type					
Gangrene	76 (49%)	29 (49%)	47 (49%)	47 (52%)	29 (45%)
Ulcer	80 (51%)	29 (49%)	49 (51%)	43 (47%)	35 (54%)
		p-value = 1.00		p-value = 0.72	
Reintervention	49 (53%)	22 (65%)	27 (46%)	31 (52%)	18 (55%)
		p-value = 0.08		p-value = 0.79	
Mortality	45 (21%)	20 (24%)	25 (19%)	21 (16%)	24 (30%)
		p-value = 0.35		p-value = 0.01	

#5 - ASSOCIATION BETWEEN ADMISSION NEUTROPHIL TO LYMPHOCYTE RATIO AND OUTCOME IN PATIENTS UNDERGOING LOWER EXTREMITY ENDOVASCULAR REVASCULARIZATION.

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INTRODUCTION: Elevated neutrophil count and raised neutrophil/lymphocyte (N/L) ratio have been attributed to adverse clinical outcome and high mortality in patients with coronary artery disease. However, its effect on patients who underwent lower extremity revascularization is unclear. This study assessed the independent contribution of N/L ratio on outcome of lower extremity (LE) endovascular intervention.
METHOD: A prospective registry was maintained including all patients who underwent LE intervention between 2004-2009. Patient demographic, complete blood profiles with full differential count and outcome variables were noted. Patients were categorized based on quartiles of N/L ratio (Q1-Q4). Kaplan Meier and Cox regression analysis was used for statistical analysis.
RESULTS: A 2516 lesions were treated in 1097 patients. Their mean age was 71±11 years, 57% were male, 58% had diabetes mellitus (DM), 84% were hypertensive and 56% had coronary artery disease (CAD). During the follow-up period of 15.8 ± 14.7 months, 165 pts died and there were 154 (8%) major/minor limb amputations. Using multivariate Cox-regression, DM(Hazard ratio [HR], 2.06, 95% confidence interval [CI],1.2-3.3; p=.002), active smoking(HR 1.8,95% CI,1.1-2.8,p=.006) and pre-procedural N/L ratio in fourth quartile (HR,3.6 95% CI,2.0 -6.1,p=.001) were identified as predictor of limb loss. After adjustment for all clinical risk factor, patients with high N/L ratio (Q1 vs. Q4) also had significantly increase risk of all cause mortality (HR 3.3,95% CI,2.0-5.5),reduced primary-assisted and lower secondary graft patencies.
CONCLUSION: Increase preoperative neutrophil/ lymphocyte ratio is associated with increased risk of amputation and mortality in patients undergoing endovascular LE revascularization. Since it is easy to assess, inexpensive and routinely available laboratory parameter, we suggest use of N/L ratio in risk stratification of patients with PAD.

#6 - UPPER EXTREMITY VEIN BYPASS (UEVP) FOR CHRONIC ISCHEMIA: RESULTS OF A MODERN SERIES

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Introduction: UEVP is rarely performed. Reports dealing with distal UEVP therefore include a variety of indications, such as ischemia, trauma, aneurysm, iatrogenic injury and hemoaccess complications. The

purpose of this study was to study UEVP for chronic limb threatening ischemia.

Methods: Review of a consecutive patient series at a university based tertiary care center.

Results: 98 UEVP were performed from 1/1994 to 9/2010, 47 (47.9%) of these for limbthreatening chronic ischemia (26 male, median age: 54.3 yrs (range:14.3-77.8). Risk factors: smoking 61.7%, diabetes: 32.6%, hyperlipidemia: 71.3%, hypertension: 80.8%, renal impairment: 38.3%. Indication: rest pain: 25 (53.2%), tissue loss: 22 (46.8%). Distal anastomosis distal to the wrist: 21 (44.6%), forearm arteries: 10 (21.3%). Vein conduits: leg vein: 22 (46.8%), arm vein: 25 (53.2%). Five grafts (10.6%) failed early, including all for Buerger's disease (n=3). There was no early mortality or major amputation. Overall graft patency was good with 78.2% at one, 75.0 at three and 60.0% at five years. Grafts for gangrene performed significantly worse (patency @ 1 year: 87.6% vs 62.9%, p=0.03, log rank). Renal impairment did not influence patency (p= 0.51). There was no difference between very distal, forearm and proximal grafts (p= 0.48). Arm vein grafts performed equally well compared to leg veins (p=0.73). Long term survival was good with 70.9% at five years.

Conclusions: UEVP for limb threatening ischemia can be performed with good long patency and excellent limb salvage. Results for Buerger's disease are poor. Arm vein may be used as graft of first choice in these cases.

#7 - MASSIVE AND SUBMASSIVE PULMONARY EMBOLISM: EXPERIENCE WITH AN ALGORITHM FOR CATHETER-DIRECTED THROMBECTOMY

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Objective: The role of catheter-directed thrombectomy (CDT) for the treatment of massive or submassive pulmonary embolism (MPE or SMPE) is not clearly defined. We report our experience with an algorithm for CDT in patients with MPE and SMPE.
Methods: We retrospectively reviewed our experience treating MPE and SMPE over a 2-year period (2008-2010). Patients with computed tomography angiography (CTA) evidence of saddle or main branch pulmonary emboli in the setting of hypoxia, tachycardia, echocardiographic right heart strain (SMPE), and/or cardiogenic shock (MPE) underwent angiojet CDT (Possis, Minneapolis, MN). Outcomes including angiographic success, clinical improvement, complications, and survival to discharge were evaluated.
Results: SMPE was identified in 18 patients and MPE in 1. Four were excluded due to prohibitive bleeding risk factors. Fifteen patients (8 men, 7 women; SMPE 14, MPE 1) with a mean age of 59 (range 35-90) underwent CDT for heart strain (100%), tachycardia (67%), hypoxia (67%), and cardiogenic shock (7%). Ten (67%) also received catheter-directed thrombolysis (alteplase). Angiographic success and resolution of hypoxia, tachycardia, and heart strain was achieved in all. There were no hospital mortalities. Complications occurred in 3 (20%) including 2 cases of acute tubular necrosis (ATN) and 1 intraoperative cardiac arrest. Average hospitalization was 9 days (range 4-26 days). All were discharged on full anticoagulation. None required supplemental oxygen on discharge.
Conclusion: CDT of MPE and SMPE has a high rate of technical and clinical success in a high-risk patient population. Experience and strict patient selection criteria may improve therapeutic outcomes.

#8 - LOW INCIDENCE OF PULMONARY EMBOLISM FOLLOWING THE DIAGNOSIS OF UPPER EXTREMITY DEEP VENOUS THROMBOSIS

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Most recent Chest guidelines counsel at least 3 months of anticoagulation for acute Upper Extremity Deep Venous Thrombosis (UEDVT). Nevertheless, these guidelines are inconsistently followed, perhaps owing to limited information regarding clinical outcomes among patients with UEDVT. Our institution maintains an UEDVT registry of consecutively encountered patients with ultrasonically confirmed UEDVT. We analyzed patient characteristics, treatment, and outcomes among these patients.

Methods: Between 4/2005 and 11/2008, 300 consecutively encountered Peripheral Vascular Lab patients with UEDVTs were identified. The UEDVT sonographic characteristics, as well as patient demographics, anticoagulation treatment, PE incidence, hemorrhagic complications, and mortality were then extracted, with patient mortality verified with the Social Security Death Index.

Results: Most patients with UEDVTs were symptomatic (n=254, 85%). UEDVTs were documented in the distal innominate (n=68), internal jugular (n= 147), subclavian (n= 163), axillary (n= 105), and brachial veins (n=89); many patients demonstrated thrombosis of more than one named segment. Eighty four patients had documented malignancy (28%), 66 were post-operative/trauma patients (22%), and 58 were obese (BMI>30, 19%). In addition, 240 patients had associated or previous indewelling lines or pacemaker leads (80%). One Hundred and twelve patients (37%) had died at the time of the data base analysis.

One hundred and twenty eight patients (43%) were initially anticoagulated with heparin, with 118 patients (39%) subsequently converted to warfarin therapy. Only 6 patients (2%) suffered PE in association with their UEDVT: 2 patients suffered PE 1 week to 1 month prior to an UEDVT diagnosis, 3 patients had simultaneous diagnosis of PE and UEDVT, and only one patient suffered PE following the diagnosis of UEDVT (lovenox treated). Three of the six patients with UEDVT-associated PE had asymptomatic PEs, and there was no PE-related mortality. Among the 128 patients initially anticoagulated, 7 patients had their anticoagulation discontinued early owing to intracranial (n=4), upper gastrointestinal (n=1), and stomal (n=1) hemorrhage. Two of these patients died from intracranial hemorrhage.

Conclusions: Analysis of our UEDVT Registry outcomes suggests that the incidence of PE attributable to a documented UEDVT remains small (1-2%), regardless of treatment with anticoagulation. Given the limited morbidity and absence of PE mortality exhibited in this cohort of patients, the more limited advantages of anticoagulation must be weighed very carefully against the significant morbidity associated with chronic anticoagulation in this fragile patient group.

#9 - OUTCOMES OF ONE STAGED TRANSPOSITIONS AND TWO STAGE BASILIC VEIN TRANSPOSITIONS

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Objective: Basilic vein transpositions (BVT) provide autologous hemodialysis access in the upper extremity. Two techniques are commonly performed: the 1-stage and the 2-stage (BVT). We report and compare our experience.

Methods: A retrospective review was performed on patients that underwent BVT, June 2006 to June 2010. 106 patients, mean age 54 years, were stratified based on primary or staged BVT.

Results: 77 patients underwent 2-stage BVT. 29 underwent 1-stage. 51% of 2-stage group had previous failed permanent access. 79% of the 1-stage group had previous failed permanent access. Immediate technical success was obtained in all cases. 2-stage BVT consumed 1.6 times hospital resources than the 1-stage BVT. The rate of failure in 1-stage group was 21% . In the 2-stage group, failure rate was 18% (2 patients never matured the 1st stage). 30-day all-cause morbidity was 3% in both groups (counting all stages). 62% of the 1-stage group and 66% of the 2-stage group required secondary interventions. Primary attempt at access was achieved in 21% of 1-stage BVT and 49% of 2-stage BVT (p 0.006). Catheter dialysis at time of surgery was 14% in 1-stage BVT and 43% in 2-stage BVT.

Conclusion: Morbidity and mortality were equivalent in approaches. 1-stage BVT consumes less resources than 2-stage. However, primary attempt at access is achieved in a higher percentage of 2-stage BVT. Both have high re-intervention rates.

	One-Stage	Two Stage	P-value
Number	29	77	-
Gender, male (%)	48	38	0.17
Primary Attempt at Access (%)	21	49	0.006
Catheter based dialysis ongoing at time of surgery (%)	14	43	0.003
Failure to mature	21	18	0.5
30-day Mortality (%)	0	0	-
30-day Morbidity (%)	3	3	0.6
Secondary interventions	62	66	0.4
Endoluminal intervention in body of fistula (%)	41	36	0.4
Central venous endoluminal intervention(%)	14	12	0.5
Open surgical revision (%)	7	16	0.2
Fistula thrombectomy (%)	10	6	0.4
Excision for infection (%)	3	4	0.7
Steal Syndrome (%)	0	4	0.4

Table 1

#10 - FACTORS RELATED TO SUCCESS OR FAILURE OF DUPLEX-GUIDED BALLOON-ASSISTED MATURATION (DG-BAM) OF ARTERIAL-VENOUS FISTULAS (AVFS) FOR HEMODIALYSIS.

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OBJECTIVES: We have recently introduced office DG-BAM as a safe and effective alternative to standard contrast/fluoroscopic methodology to accelerate AVF maturation. Herein we analyzed factors associated with success and failure of this approach.

METHODS: Over the last 10 months we performed 185 DG-BAMS (range 1-8 procedures, mean 4) in 45 patients (29 m; 16 f; mean age 68.2±12.8) with 31 rad-ceph, 7 brach-ceph and 7 brach-bas AVFs. Balloon sizes (3-10mm) were chosen based on duplex measurements (1-2 mm larger than minimal vein diam). Forearm AVFs were dilated to 8mm; arm AVFs to 10mm.

RESULTS: All cases but one (99.5%) were successful dilated. This was a large AVF rupture that required surgical repair. Seven of the remaining 44 patients failed to mature their AVFs (16%) despite DG-BAM. Proximal vein stenoses (PVS) were found to be the culprit in all 7 patients. Four patients had cephalic arch stenoses and 3 had proximal subclavian vein stenoses. Arm AVFs were more commonly associated with PVS (6/14 patients; 43%) as compared to the ones placed in the forearm (1/30 patients; 3.3%) with a p value = 0.0024. All these 7 AVFs subsequently matured after successful balloon angioplasty of the venous outflow. Wall hematomas (75/185 cases; 41 %) and minor vein ruptures (35/185 cases; 19 %) did not affect maturation rates.

CONCLUSIONS: These data suggest that office-based DG-BAM of AVFs is feasible, safe and averts nephrotoxic contrast and radiation. PVS appear to be the most common cause of failure for AVFs subjected to BAM. Since arm AVFs are at increased risk of PVS we suggest that a careful duplex evaluation of the outflow .be performed in these cases and in all AVFs that fail to mature.

#11 - UTILIZATION OF PREOPERATIVE CAROTID IMAGING: DATA FROM A LARGE MULTI-CENTER REGIONAL DATABASE.

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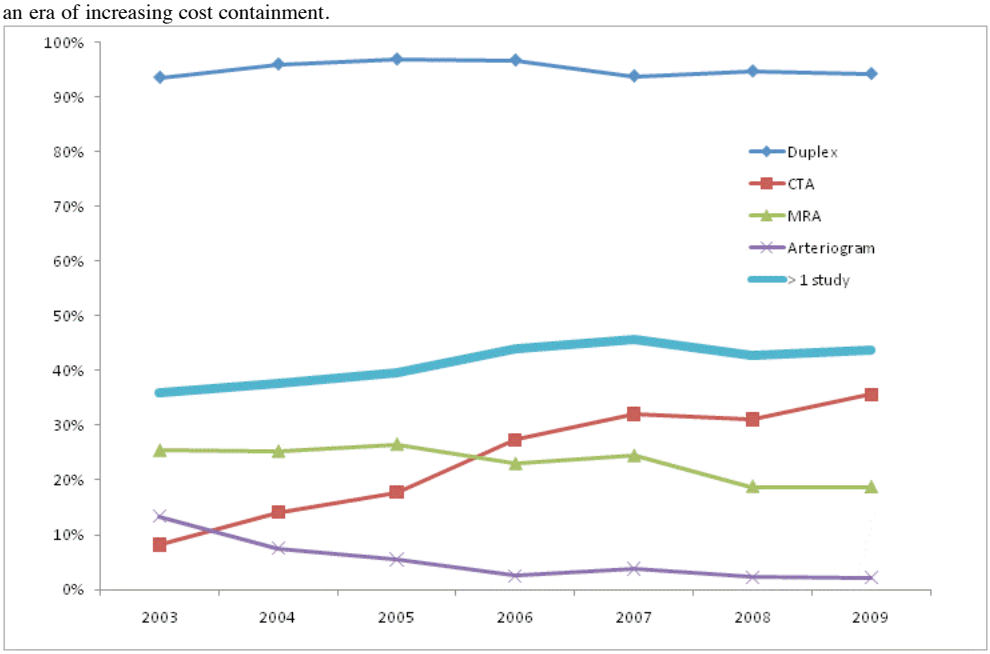
Introduction: Various preoperative imaging modalities - duplex, CTA, MRA and conventional arteriography (CA) - are used to evaluate patients prior to carotid endarterectomy (CEA). The purpose of this study is to

determine the variation in utilization and outcomes of patients undergoing CEA stratified by preoperative imaging modality

Methods: This is a retrospective analysis of 6,379 CEA performed between 2003 and 2009 within the Vascular Study Group of New England (VSGNE). The primary outcome was in-hospital stroke or death. Patients undergoing CABG-CEA and CEA at low volume centers were excluded. Outcomes were adjusted using a multivariate logistic regression risk prediction model.

Results: Duplex was obtained in 95% of patients, CTA in 25%, MRA in 23% and CA in 5%. Utilization of duplex did not vary across time or centers. CTA increased from 8% in 2003 to 36% in 2009 ($p<0.001$); 2.1% of patients underwent CEA based on CTA findings alone. Rates of utilization across centers ranged from 11% to 52% ($p<0.001$). Preoperative MRA decreased from 25% to 19%; 2.3% of patients underwent CEA based on MRA alone. Utilization across centers ranged from 9% to 49% ($p<0.001$). Preoperative CA decreased from 13% to 2% ($p<0.001$). Utilization ranged from 2.4% to 11% ($p<0.01$) across centers. The use of multiple imaging modalities increased from 36% to 44% ($p<0.001$) and ranged from 30% to 63% ($p<0.001$) across centers. The overall rate of stroke or death was 0.93% and did not change over time ($p=0.23$). Patients undergoing CA had significantly higher than predicted stroke or death rate. Both crude and adjusted rates of stroke and/or death did not vary by imaging modality.

Conclusions: Significant variation exists in imaging prior to CEA. Despite increased use of multiple imaging modalities, no changes in stroke or death have occurred. These findings may have implications in an era of increasing cost containment.



Utilization of preoperative carotid imaging over time.

#12 - RECRUITING STRATEGIES FOR POTENTIAL 0+5 VASCULAR RESIDENCY APPLICANTS

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Objectives: The "0+5" pathway was established in 2007 to allow trainees focused training culminating in vascular surgery certification only. An early concern was whether enough medical students could be recruited directly into a vascular internship without the exposure that a general surgery residency provides.

Methods: Opinions and practices were sought from program directors via survey and from trainees taking the VSITE. We hypothesized that programs that send a large percentage of their general surgical graduates to vascular fellowships have models that can be adapted to medical student recruitment.

Results: Eight programs were identified that sent 20% or more of their residents to vascular fellowships over the past 5 years (projecting a mean of 1.6 residents entering vascular fellowships in 2011). Almost all such programs have a formal mentoring system in place that match mentors to residents by interest, and almost all send residents to academic meetings prior to their senior year. 75% of such programs have formal vascular lecture exposure to MS1 and MS2 classes, offer clinical shadowing experiences, and have time on the vascular service during the MS3 clerkship; 83% offer a third- or fourth-year elective in vascular surgery. VSITE responses were collected from 156 fellows and 13 "0+5" residents. While fellows had initially been attracted to vascular surgery by the technical aspects of the field learned during residency (43%), the most important factor initially attracting medical students was an interested mentor (46%).

However, the most important factor for both residents and students in making a final decision was the technical aspects of the field (66% and 63%, respectively).

Conclusions: Programs that send a high proportion of residents into vascular surgery tend to have planned exposure at the MS1 and MS2 level, with formal opportunities available at the MS3 and MS4 levels to cultivate interest. While residents are automatically exposed to the field during residency, students most typically require a mentor for initial interest. Three steps are suggested for successful "0+5" recruiting: 1) formal lectures and/or class-wide exposure to the field at the MS1 and 2 level, 2) broad opportunities for clinical exposure at all levels, and 3) personal, focused mentoring when an interested student is identified. Students are not automatically exposed to the field the way residents are, and thus successful recruiting at this level requires specific planning and action.

#13 - ENDOVASCULAR PROCEDURES IN PATIENTS WITH EHLERS DANLOS SYNDROME

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Objective
Ehlers Danlos syndrome (EDS) is a hereditary connective tissue disorder caused by mutations in genes involved with collagen matrix formation that results in weakened blood vessels. Endovascular therapy on patients with EDS is fraught with concerns of vessel dissection and access-site complications. We describe the technical and clinical outcomes of patients with EDS who have undergone a range of endovascular procedures.

Methods
Patients with EDS undergoing endovascular procedures at a single-institution academic center from 1994 to 2010 were retrospectively reviewed. Peri-operative data including details of the procedure, hospital course, complications, and in-hospital mortality were evaluated using non-parametric tests.

Results
27 patients (8 with classic EDS, 16 with hypermobile EDS and 3 with vascular EDS) were identified that underwent a total of 53 endovascular procedures (5 diagnostic, 48 interventional). The indications for endovascular therapy included pelvic venous varices, visceral aneurysms/pseudo-aneurysms, visceral/peripheral occlusive disease, coronary artery disease and others. Median length of hospital stay was 2 days (Range: 0-21 days). The rate of peri-operative vascular injury and access site complications was low (1.9%) and was not found to be associated with the type of vascular access technique, arterial vs. venous procedures, target vessel site, sheath size or method of closure (all $p>0.1$). Median follow-up was 7.5 years. There were no late complications from the initial endovascular procedure.

Conclusions
Endovascular therapies for patients with EDS can be safely performed with a low rate of dissections and access site complications.

#14 - PRE-OPERATIVE THROMBUS BURDEN PREDICTS AAA SAC BEHAVIOR FOLLOWING EVAR

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Endoleak and sac growth remain unpredictable occurrences following EVAR, necessitating regular surveillance imaging including CT angiography. This study was designed to identify pre-operative CT variables that predict AAA remodeling and sac behavior post-EVAR.
Pre-and post-operative CT scans from 136 abdominal aortic aneurysms treated with EVAR were analyzed using M2S (West Lebanon, NH) software for size measurements. Pre-operative total sac volume and proportion of thrombus and calcium in the sac were assessed. Sac change was defined as a 3mm difference in diameter and 10mm3 difference in volume when compared to pre-operative measurements. Univariate analysis was performed for age, gender, AAA size, relative thrombus/calcium volume, device type, presence of endoleak and the effects on sac size.
Gender, device type, age, AAA size, and %calcium were not predictive of sac change post-EVAR. Increased proportion of thrombus on pre-EVAR resulted in a greater likelihood of sac shrinkage ($p=0.002$). Patients with endoleak on post-operative CT scan had less sac thrombus on pre-EVAR (mean=29.7%) than patients without evidence of endoleak (mean=40.1%)($p<0.001$). Only 2 of 30 patients with >50% pre-EVAR thrombus developed endoleak. A >50% thrombus burden resulted in endoleak in significantly fewer patients (6.7%) compared with those who had <50% thrombus (41.3%).
The proportion of thrombus on pre-operative CT may predict sac behavior following EVAR and development of an endoleak. Greater than 50% thrombus appears to predict absence of endoleak following EVAR. Aneurysms with large thrombus burden are less likely to grow and may require less vigilant post-

operative surveillance than comparable AAA with relatively little thrombus.

#15 - CHANGING TRENDS IN CONTEMPORARY OPEN ABDOMINAL AORTIC ANEURYSM (AAA): INCREASED COMPLEXITY AND MORTALITY

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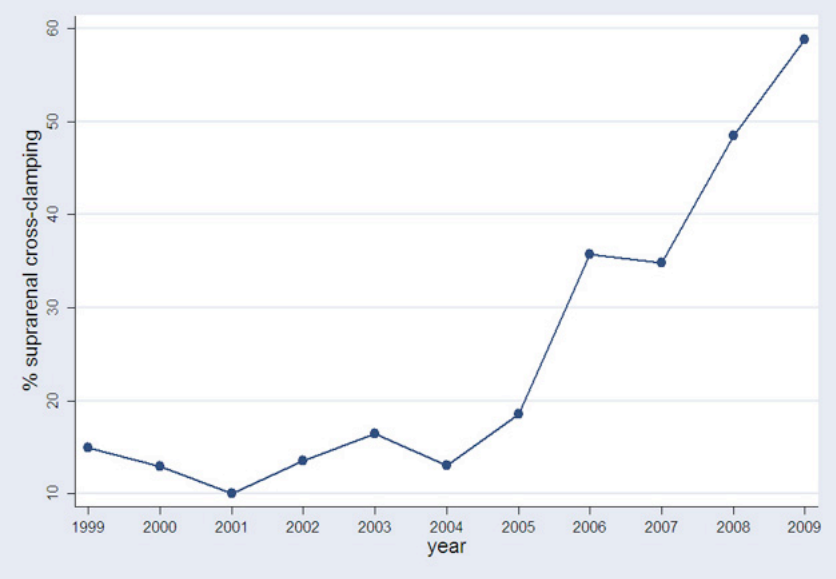
INTRO; The patient selection and techniques for the operative management of AAAs continues to evolve. We sought to examine trends in open AAA repair over a decade in which EVAR has become increasingly prevalent.

METHODS: Patients undergoing elective repair of infra- and pararenal AAAs were identified through our center's prospective vascular surgery registry during two time periods: 1999-2004 (era 1) and 2004-2009 (era 2). Data collected included comorbidities, demographics and operative characteristics.

RESULTS: A total of 811 elective AAAs were repaired during this time period, including 500 (62%) open and 311 (38%) EVAR. Compared to era 1, fewer patients undergoing open repair in era 2 had CHF (7.0 vs. 2.5%, respectively; p=0.001). Otherwise, the prevalence of other important comorbidities did not change. Open repairs in era 2 had a higher incidence of suprarenal cross-clamping (33 vs. 13%, p<0.001; see Figure) and higher mortality rates (3 vs. 4%, p=0.02). Major postoperative morbidity (26.8 vs. 31.9%, p=0.24) and post-operative length of stay (10.1 vs.10.6d, p=0.60) did not significantly change. A small increase in postoperative renal failure did not reach statistical significance (3.5 vs. 4.4%, p=0.6).

CONCLUSIONS: In the era of EVAR, open AAA repairs have become increasingly challenging. While the prevalence of important comorbidities have not changed drastically, the need for suprarenal cross-clamping has increased, with concomitant increases in post-operative mortality.



Proportion of open aortic aneurysm cases requiring suprarenal or supraceliac cross-clamping

#16 - DOES THE USE OF EXTENDER CUFFS JUSTIFY THEIR COST?

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Objective: Modular aortic stent-graft systems most often require 2-3 components depending upon the device. Differences in path lengths and availability of main body systems often necessitate additional extender cuffs for appropriate exclusion of the aneurysm. These additional pieces result in additional expense and can affect the financial viability of an EVAR program within a hospital. The purpose of this study is to determine if clinical outcomes in patients requiring additional extender cuffs justify this increased cost.

Methods: We reviewed available clinical data, images, and follow-up of 215 patients (196 males and 19 females, mean age 74±9) who underwent EVAR at a single academic center from 2004-2007. Patients were divided into two groups: the standard number of pieces (Group-A, n=98) and those requiring extender cuffs

during the index procedure (Group-B, n=117).

Results: Both groups had similar anatomy, procedural characteristics and mid-term outcomes. Overall operative mortality was 1.4% with a mean follow-up of 24 months. Group-A patients primarily underwent repair with the Zenith device (61%), while the majority of Group-B patients were treated with AneuRx (44%) or Excluder (40%) devices. The number of additional extender cuffs used ranged from 1-4 (mean 1.58). There was a 37% cost increase between the estimated average device cost per patient (Group-A $11,368.33 versus Group-B $15,600.00, p<0.01).

Conclusions: Clinical outcomes in patients who required additional extender cuffs are comparable to those treated with the minimum number of pieces. Application of EVAR to a broader patient population is warranted, however an increased number of extender cuffs will increase costs and can be minimized with appropriate preoperative planning or device selection. Consideration should be made towards per-case pricing instead of per-piece pricing to further improve cost-efficiency without compromising long-term patient outcomes.

Preoperative AAA measurements (mean)	Total (n=215)	Group A (n=98)	Group B (n=117)	P-value
AAA max diameter (mm)	58.6	58.2	58.9	NS
Neck length (mm)	24.1	23.2	24.8	NS
Associated iliac aneurysm	25.1	21.4	28.2	NS
Procedural characteristics				
Estimated blood loss (mL)	358.0	309.1	400.4	NS
Fluoroscopy time (min)	27.3	28.3	26.4	NS
Contrast use (mL)	118.3	115.3	120.8	NS
Estimated device cost ($)		11,368.33	15,600.00	<0.01
Mid-term Outcomes				
% Migration > 10mm	2.3	1.0	3.4	NS
% Type I endoleak	5.6	5.1	6.0	NS
% Re-interventions	16.7	21.4	12.8	NS
Mean sac regression (mm)	-5.1	-6.2	-4.2	NS

#17 - THORACIC ENDOVASCULAR REPAIR (TEVAR) IN THE MANAGEMENT OF AORTIC ARCH PATHOLOGY

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Objective: Conventional repair of aortic arch pathology is associated with significant mortality and stroke rates of 6-20% and 12%, respectively. As endografting has excellent results for descending thoracic aortic disease, extension of TEVAR to the arch, is a consideration.

Methods: Records of patients with aortic arch pathology treated with TEVAR were reviewed. Branch vessels were (1)covered without revascularization, (2)surgically bypassed, (3)stented, or (4)fenestrated.

Results: Between March 2006 and 2010, 59 patients with arch pathology were managed with TEVAR. Indications included: aneurysm(n=21,35.6%), dissection(Type-A:n=2,3.4%;Type-B:n=18,30.5%), transection(n=7,11.9%), pseudoaneurysm(n=6, 10.2%) or other(n=4,6.8%). Pathology was zone 0(n=1,

1.7%), zone 1(n=10,16.9%), zone 2(n=46,77.9%) or zone 3(n=2,3.4%). Interventions were emergent in 44.1% and elective in 55.9%. The left subclavian(LSA) was covered in all and revascularized(n=24,40.7%) via bypass(n=13,22.0%), stenting(n=4,6.8%), or fenestration(n=7,11.8%). The carotid was revascularized(n=11,18.6%) with bypass(n=7,11.9%) or stenting(n=4,6.8%). One patient(1.7%) required revascularization of the innominate with a homemade-branched-endograft. Technical success was 98.3%(58/59). Thirty-day mortality was 5.1%(3/59). ICU and hospital stays were 5.91+/-6.78(Range:0-34;Median 4) and 11.0+/-7.97(Range:1-40;Median: 9) days. Morbidities included: renal failure(n=3,5.1%), respiratory(n=2,3.4%), MI(n=2,3.4%), stroke(n=5,8.5%), and spinal cord ischemia(SCI)(n=2,3.4%). SCI ($p<0.001$), but not stroke($p=0.33$), was associated with LSA sacrifice. During follow-up of 9.6+/-10.1(range:0-43) months, 14 patients(23%) required nineteen re-interventions for: endoleak(n=8,13.6%), Type-A dissection(n=2,3.4%), disease extension(n=2,3.4%), steal(n=4,6.7%), or other(n=3,5.1%). All patients with steal had LSA sacrifice and were left-hand-dominant.

Conclusions: TEVAR can effectively treat aortic arch pathology in high-risk patients with similar stroke rates but lower overall morbidity and mortality compared to open repair. LSA sacrifice is associated with increased SCI and may predispose left-handed patients to symptomatic weakness.

#18 - ENTRY TEAR NUMBER IS ASSOCIATED WITH THROMBOSIS OF THE FALSE LUMEN IN PATIENTS WITH TYPE B DISSECTIONS.

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, New Haven, CT US
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Partial thrombosis of the false lumen in type B aortic dissection is a significant predictor for aortic healing as well as ultimate mortality. Initial radiological predictors of successful medical management versus those patients requiring surgical intervention would be ideal. The goal of this study is to investigate whether the quantity of identifiable entry tears on the first computed tomographic angiography (CTA) for type B aortic dissection is associated with (partial) thrombosis of the false lumen.

Methods: Type B dissection patients with a CTA obtained directly after clinical presentation and a subsequent CTA obtained at least 30 days following medical treatment were included (2005-2010). The CTAs obtained directly after presentation were investigated for the number of entry tears between the true and false lumen and for thrombosis of the false lumen. The final available CTA during follow-up was evaluated for thrombosis of the false lumen as well. The number of entry tears in patients with a (partially) thrombosed false lumen and patients with a patent false lumen were compared using the Mann-Whitney U test.

Results: Twenty-one patients were included; 9 patients had a partially thrombosed false lumen and 12 had a patent false lumen on the presenting CTA. No patients presented with complete thrombosis of their false lumen. The 9 patients with a partially thrombosed false lumen had a median of 1 entry tear (IQR 0.5 - 1, range 0 – 3) and the 12 patients with a patent false lumen had a median of 2 entry tears (IQR 1 - 3, range 1 - 4) on the presenting CTA. The number of entry tears in the patients with a partially thrombosed false lumen was significantly lower than in patients with a patent false lumen ($p = 0.031$). On the last available CTA scan during follow-up, obtained after a median of 190 days after the first CTA, there were 12 patients with a partially thrombosed false lumen and 9 with a patent false lumen. The number of entry tears on the baseline CTA was significantly higher in patients with a patent false lumen ($p=0.038$) on the last available CTA during follow-up.

Conclusion: The number of entry tears in patients with a type B aortic dissection detected on the first CTA after presentation is significantly lower in patients with a partially thrombosed false lumen. Entry tears are associated with thrombosis of the false lumen, both at the moment of presentation and during follow-up in patients with a conservatively treated type B dissection. The number of entry tears on the presenting CTA may help identify those patients most likely to benefit from medical management alone versus early surgical intervention.

#19 - ANATOMIC BIFURCATED RECONSTRUCTION OF CHRONIC BILATERAL INNOMINATE-SVC OCCLUSION UTILIZING THE Y-STENTING TECHNIQUE

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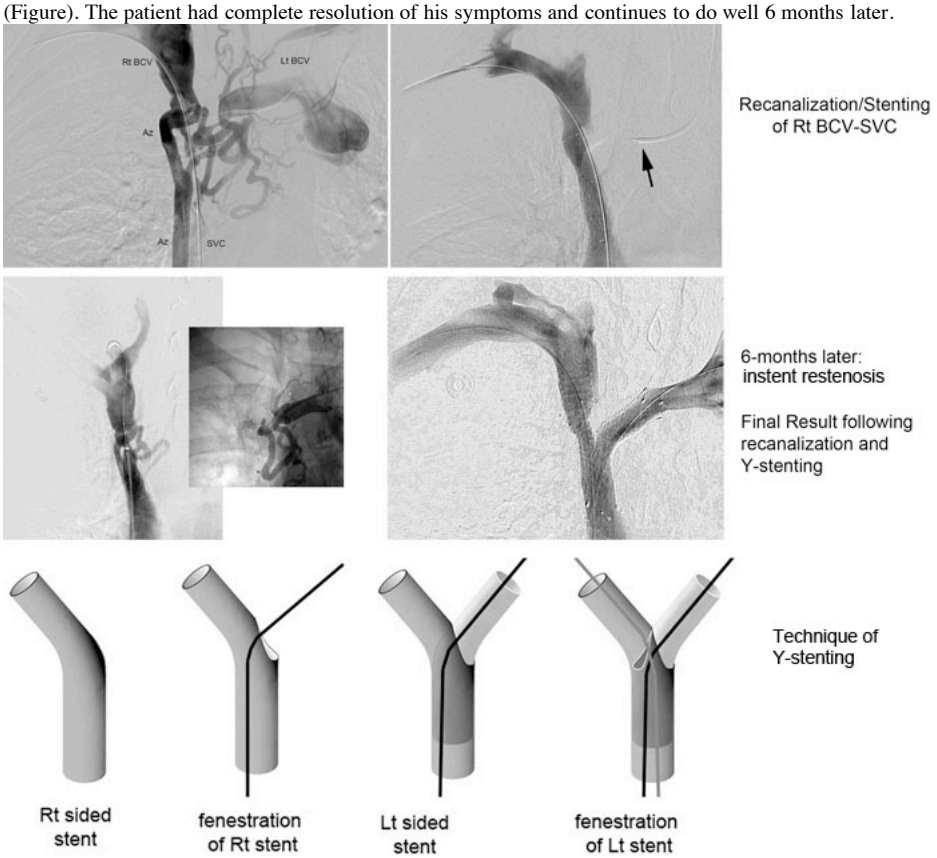
42 y.o. referred with SVC syndrome due to fibrosing mediastenitis with multiple prior failed attempts at percutaneous recanalization. We initially treated him with unilateral sharp-needle recanalization of the Rt innominate vein into the SVC stump followed by stenting. His symptoms improved but did not completely resolve. Six months later he returned with worsened symptoms and venography revealed in-stent restenosis. The patient requested simultaneous treatment of the the left side. The right stent was dilated and a 3-cm long occlusion of the left innominate vein was recanalized using sharp needle technique homing into the

struts of the right-sided stent. Following fenestration of the stent, a second stent was deployed from the left side into the SVC and the two Y limbs were sequentially dilated to allow a true bifurcation anatomy (Figure). The patient had complete resolution of his symptoms and continues to do well 6 months later.



Figure

#20 - RESECTION OF INTRACAVAL LEIOMYOMATOSIS USING ABDOMINAL APPROACH AND VENOVENOUS BYPASS.

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Northshore University HealthSystem, Skokie, IL US

Intravenous leiomyomatosis is the venous involvement of a histologically benign uterine tumor. This uncommon tumor can present contemporaneously with the primary uterine tumor or in a delayed fashion. Tumor extends up the venous system, via the iliac or ovarian veins and can involve portions or all of the inferior vena cava and can extend intracardiac. Complete resection of this tumor is the therapeutic goal. Previous reports have described the use of combined thoracic and abdominal approaches, cardiopulmonary bypass, circulatory arrest, and a single report of an entirely abdominal approach to resection without bypass. We describe two cases of tumor extending up the vena cava, but remaining intra-abdominal. Using veno-venous bypass without need for thoracotomy, we were able to resect both tumors with minimal blood loss and no hemodynamic instability. This partial bypass technique will be described. Potential benefits include decreased blood loss, less venous distention, maintainence of venous return while occluding flow in the operative field, and avoiding the significant risks associated with full bypass or circulatory arrest.

Vena Cava tumor

#21 - CHRONIC MESENTERIC ISCHEMIA IN 26-YEAR-OLD MALE: MULTIVESSEL MEDIAN ARCUATE LIGAMENT COMPRESSION SYNDROME

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Objectives: Chronic mesenteric ischemia (CMI) is a rare diagnosis for patients in their third decade of life. Other conditions can mimic the signs and symptoms of CMI including median arcuate ligament syndrome (MALS), primary arteritides, and congenital anomalies. Here we present a 26 year-old male who presented with CMI and multi-vessel mesenteric occlusive disease.
Methods: A 26 year-old male presented with a 6-month history of 40 lb. weight loss, post-prandial abdominal pain, and food fear. His physical exam showed a scaphoid abdomen with no tenderness. Laboratory evaluation was normal. CTA revealed celiac artery (CA) occlusion, >80% superior mesenteric artery (SMA) stenosis, with a large Marginal artery of Drummond supplying collateral circulation. (Figure 1)
Results: A retroperitoneal exposure of the perivisceral aorta was performed. Surgical exposure revealed compression of both CA and SMA by the MAL. The total distance of caudal arterial displacement was >3cm. Both the CA and SMA were chronically stenotic/occluded secondary to this compression. After division of the MAL, a retrograde aorto-celiac and aorto-mesenteric bypass was performed for mesenteric revascularization. The patient recovered uneventfully and was discharged home on the third day after surgery tolerating a full diet.
Conclusions: MALS is a pathologic entity that can affect more than the celiac artery. This case demonstrates multi-vessel, mesenteric arterial insufficiency secondary to MALS sufficient to promote IMA collateralization of the SMA circulation. In young patients with CMI, multi-vessel MALS must be considered. In addition to MAL release, arterial revascularization may be necessary due to stenoses from chronic compression.

CTA preop

#22 - DUODENAL OBSTRUCTION FROM MESENTERIC STENTS MIMICKING SMA-SYNDROME

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Objective: Superior mesenteric artery (SMA) syndrome is a rare condition resulting in compression of the 3rd portion of the duodenum by a narrow-angled SMA against the aorta. We report a case of a patient treated for chronic mesenteric ischemic who developed an SMA-like syndrome as a result of duodenal compression between an SMA stent and an inferior mesenteric artery (IMA) stent.

Case presentation: A 44-year-old woman with chronic mesenteric ischemia had previously been treated with multiple endovascular stents. She re-presented with persistent abdominal pain and weight loss. Angiogram performed revealed an occluded celiac artery and SMA. Mesenteric perfusion was maintained by the IMA with poor collateralization to the celiac circulation. Upon surgical exploration, there were no suitable target sites for a traditional aorto-mesenteric bypass due to the extensive length of prior stenting. A reno-hepato bypass with reversed saphenous vein was performed to improve her celiac circulation.Postoperatively, she continued to have persistent abdominal pain associated with nausea and vomiting. An upper gastro-intestinal (UGI) study was performed which revealed severe partial obstruction of the 3rd portion of her duodenum. Upon re-reviewing of her prior computer tomography scan of the abdomen, it was more apparent that the duodenum was constricted between the SMA and IMA stents that were previously placed. She underwent re-exploration and a side-to-side duodeno-jejunostomy was performed. Subsequent UGI study showed resolution of the obstruction.

Conclusion: To our knowledge, this is the first report of duodenal obstruction as a complication of multiple stent placements, mimicking SMA-syndrome.

Duodenum compressed between SMA and IMA stents

#23 - VIPS TECHNIQUE, A NOVEL CONCEPT FOR A SUTURELESS VASCULAR ANASTOMOSIS.

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Vascular and Endovascular Surgery, Padova, PADOVA, Intl. IT

Objective: To describe a novel technique (ViPS, Viabhan Padova Sutureless) that connects a vascular prosthetic graft to a target artery in a sutureless fashion without arterial cross-clamping.

Methods: A 74 year-old male with a non-healing leg ulcer presented for revascularization. Angiography demonstrated complete SFA occlusion with reconstitution of a circumferentially calcified above-knee popliteal artery. Ultrasound revealed no adequate vein for autogenous bypass creation. A 7mm Viabahn® endoprosthesis was partially deployed and its proximal end was sutured to a 7mm Polytetrafluoroethylene (PTFE) graft (Fig.1A). After surgical exposure, the circumferentially calcified popliteal artery, which could not be safely cross-clamped or sutured, was transected and the undeployed distal portion of the Viabahn was inserted into the politeal artery supported by a stiff guidewire (Fig.1B). The distal portion of the Viabahn graft was then deployed 2.5 cm into the popliteal artery with optimal apposition. The proximal end of the PTFE graft was then sutured to the common femoral artery. The distal portion of the Viabahn was ballooned to ensure apposition with the popliteal artery.

Results: Completion angiogram demonstrated a patent graft with no sign of dissection. The total operative time was 60 minutes. The patient's ulcer resolved after 2 weeks and a CT angiogram at 3 months showed a patent graft.

Conclusion: The ViPS technique is simple and easily performed with common commercially available devices. It provides an alternative for bypass creation in patients with inadequate autogenous conduit and may significantly reduce operative time, particularly in cases where challenging arterial anastomoses are required.

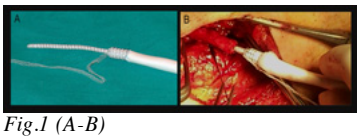

Fig.1 (A-B)

#24 - CONTAINED RUPTURED ABDOMINAL AORTIC ANEURYSM RELATED TO IGG4 AORTITIS

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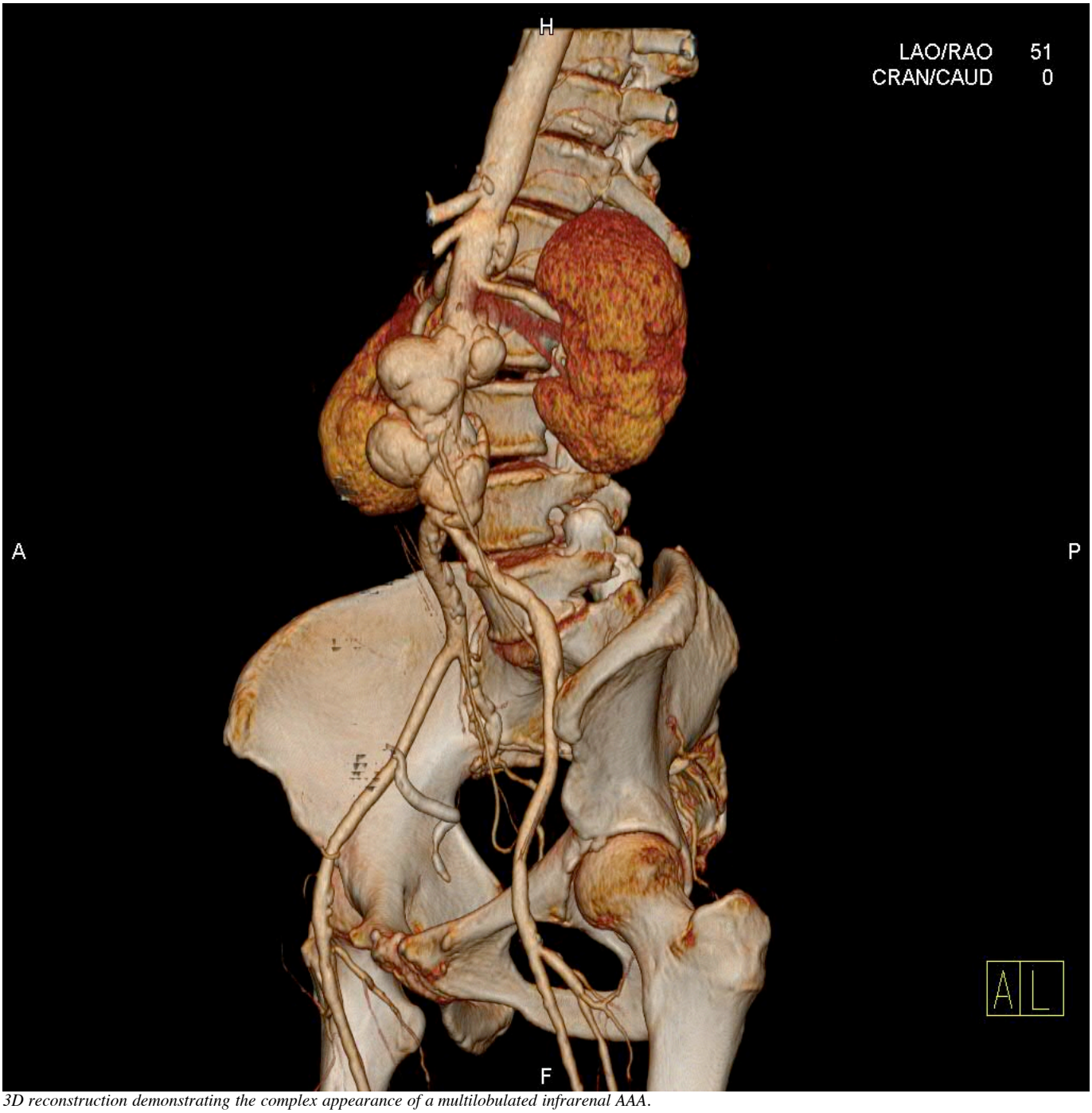
Objective: To describe a case of autoimmune inflammatory associated with rupture.

Methods: A 63 year-old woman presented with five days of abdominal pain, malaise, fevers, chills, and weight loss. Also, 6 months of debilitating back pain. Physical exam revealed a tender palpable pulsatile abdominal mass and pulsatile masses behind each knee. CTA demonstrated a multilobulated AAA (Fig. 1) and bilateral popliteal aneurysms. The appearance was concerning for primary aortic infection. Laboratory exams demonstrated a WBC of 12.3, ESR131 mm/h, normal ANA, and CRP 211 mg/L. Nuclear WBC scan was negative. Blood and urine cultures were negative. In the OR mediovisceral rotation was performed for exposure. Extensive retroperitoneal inflammation extending into the paravisceral aorta was encountered. Supraceliac clamping was possible. Repair was performed with a 16-mm Rifampin-soaked graft with reimplantation of the left renal artery. Cultures and biopsies were done.

Results: Histology demonstrated vessel wall rupture, adventitial fibrosis and inflammatory-cell infiltration, obliterative phlebitis, lymphoid follicles, perineural inflammation, and IgG4 plasma-cell infiltration, consistent with a ruptured aneurysm associated with IgG4 periaortitis. The patient had a long postoperative course with prolonged intubation, and renal failure requiring hemodialysis which resolved 8 weeks post-operatively. Immunosuppression was paramount for her improvement.

Conclusion: IgG4-related inflammatory AAA's are rare; this is the first report of one with a contained rupture. The patient's symptoms, the unusual appearance on CT, the presence of popliteal aneurysms in a woman, and the normal WBC scan were evidence of an inflammatory etiology. Tissue biopsy is critical to obtain histological diagnosis and direct treatment.



3D reconstruction demonstrating the complex appearance of a multilobulated infrarenal AAA.

#25 - ENDOVASCULAR REPAIR OF A MYCOTIC ANEURYSM OF THE ASCENDING AORTA

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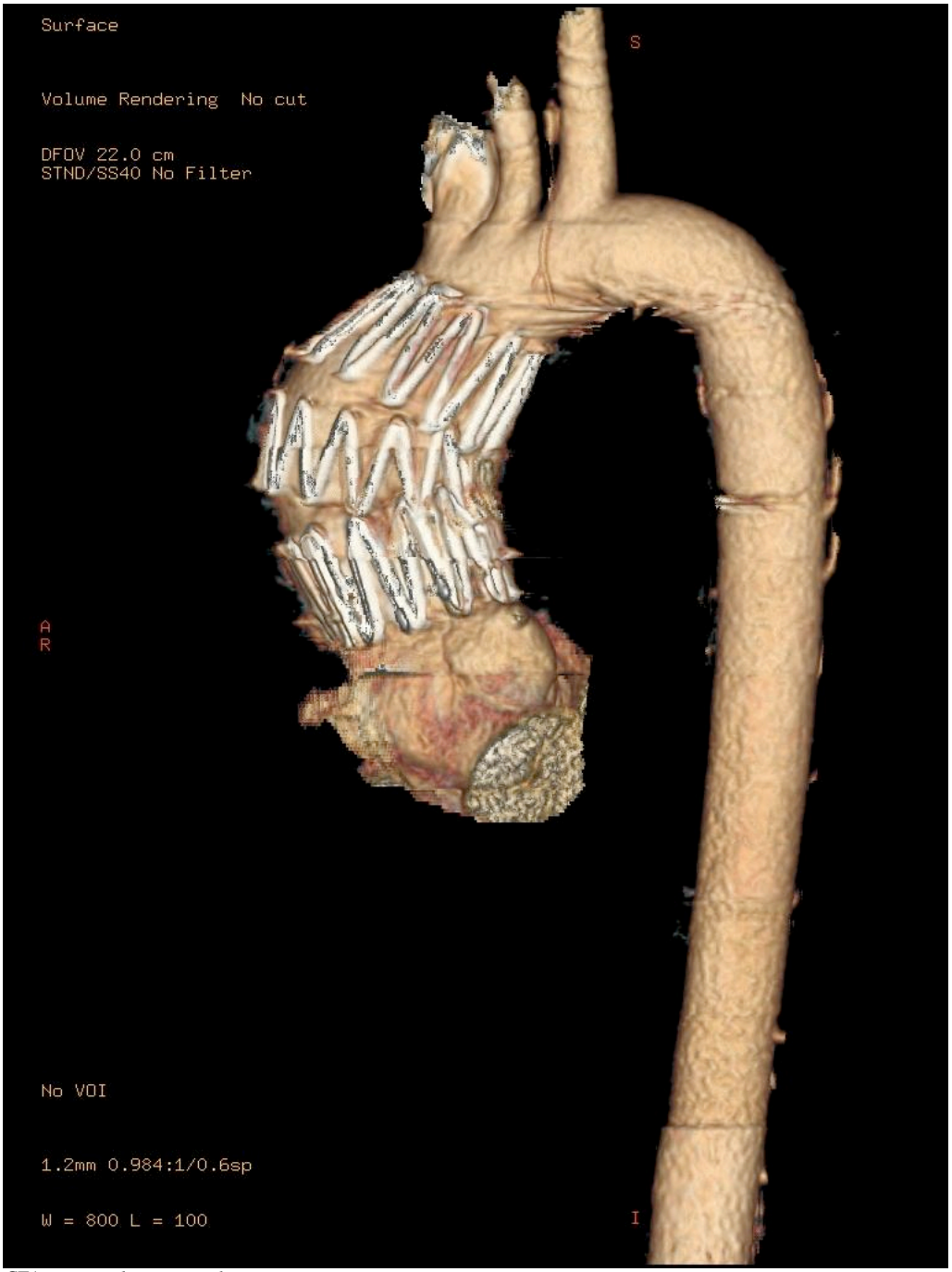
Objective: Thoracic aortic endovascular repair has significantly altered the therapeutic strategy for descending aortic pathology since its introduction in 1992. Endovascular approaches to the ascending aorta have been limited to a few case reports, and are usually associated with debranching procedures.
Methods: A case report of an enlarging ascending aortic mycotic aneurysm in a 32 year old male with cystic fibrosis is presented. This patient underwent orthotopic bilateral lung transplantation complicated by hemorrhage and requiring re-exploration, with subsequent Candida wound infection/fungemia resulting in multiple debridement procedures. Postoperative CT imaging revealed the presence of a growing pseudoaneurysm, likely at an aortic cannulation site. The patient was considered high risk for open aortic resection, and wished an endovascular solution.
Results: Bilateral femoral arteries and the right brachial artery served as access sites for IVUS and device

delivery. A Cook TX2 proximal extension piece was modified on the back table to reduce the length of one side of the stent graft and reproduce a lesser curvature configuration. After device deployment, a TEE revealed the leading edge of the stent graft at the sinotubular junction without impingement on the aortic valve or coronary arteries. The patient tolerated the procedure well and was discharged home on postoperative day #2. The pseudoaneurysm was successfully excluded without evidence of endoleak one month after the index procedure.
Conclusions: Endovascular repair of the ascending aorta is safe and feasible in selected patients. Larger studies will be required to determine the long term durability of the procedure.



CTA one month postprocedure

#26 - AORTIC ARCH INTERVENTION AND PSEUDOANEURYSM EXCLUSION IN A PATIENT WITH CONGENITAL CARDIAC AND AORTIC ANOMALIES.

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University of Mississippi Medical Center; Jackson, MS US

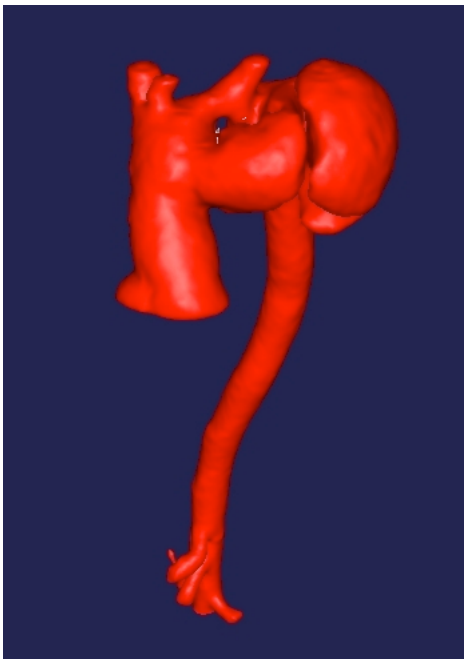
A 32 year old male presented to his cardiologist in follow-up for continued monitoring of congenital cardiac anomalies and prosthetic mitral valve. The patient was born with L-transposition (congenitally corrected transposition of the great vessels), a patent ductus arteriosum and aortic co-arctation. He underwent multiple operations which included mitral valve repair and ascending aortic to descending aortic Dacron bypass for treatment of co-arctation at age eight.

The patient had been well since that time and is maintained on Coumadin anticoagulation. He is able to exercise regularly despite echocardiography showing moderate global hypokinesis with an ejection fraction of 35%. Despite being asymptomatic, the patient's cardiologist elected to obtain a CT Scan of the Chest out of concern for Dacron expansion and downstream sequelae.
On CT Scan the patient was found to have disruption of the distal anastamosis of his ascending to descending aortic bypass with resultant 6cm pseudoaneurysm. The pseudoaneurysm had dual inflow from both the bypass as well as the patent native co-arcted aorta which measured 12mm in diameter. L-transposition and the bypass graft complicated the anatomy due to a very short span of asceding aorta proximal to the bypass and prominent angulation of the aorta at the level of the bypass.

The patient was referred to both cardiothoracic and vascular surgery for evaluation and consideration of open and endovascular surgical options. After discussion with our cardiothoracic colleagues, it was felt that open intervention would be quite complicated with significant morbidity and mortality due to previous interventions. His pathology, though complicated anatomically, was felt to be amenable to endovascular repair.

Bilateral groin access and left brachial access were obtained with the patient under general anesthesia. The procedure was begun by deploying three 10mm x 38mm iCast stent grafts to exclude the native orifice of the co-arctation and divert all flow into the left subclavian artery. Next, we attempted to advance a Lundequist wire into the ascending aorta in order to deliver the prosthesis. However, the acute angulation and short distance of "purchase" within the ascending aorta did not allow for graft delivery. Hence, the Lundequist wire was redirected into the innominate and R subclavian artery. This allowed a stable platform for graft delivery. A 28mm x 10cm Gore TAG graft was delivered and deployed within the previously placed Dacron graft. A second 28mm x 10cm Gore TAG graft was used to maximize radial force and, finally, a 28.5 x 3.3cm Gore Excluder Aortic cuff was deployed to optimize proximal seal within the previously constructed Dacron graft. All aortic graft deployments were performed under adenosine arrest. Balloon angioplasty of the graft was performed within proximal fixation, distal fixation and highly angulated portions of the graft. Completion angiography revealed pseudoaneurysm exclusion.

The patient tolerated the procedure without complication and was discharged post-operative day 2. Follow-up CT angiography at one month revealed patent and well-expanded prostheses and pseudoaneurysm thrombosis.



Pre-operative imaging

#27 - EARLY OUTCOMES OF AORTIC AND SELECTIVE VISCERAL BRANCH STENTING FOR ACUTE COMPLICATED TYPE B DISSECTION IN PATIENTS WITH AORTIC ORIGIN OF THE LEFT VERTEBRAL ARTERY

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Objective: To assess technical feasibility and early outcome of endovascular repair of complicated acute type B thoracic aortic dissection (CABD) with aortic origin of the left vertebral artery(AoLV) treated at a single institution.

Methods: Two patients with CABD were unable to be treated with conventional thoracic endografting secondary to AoLV precluding coverage of entry tear. Both presented with visceral malperfusion and were treated with aortic true lumen and selective mesenteric artery stenting. Baseline preoperative demographics and imaging, operative technique, peri-operative complications, follow-up imaging, and mortality were analyzed.

Results: Between April 2010 and July 2010, two patients with AoLV presented with CABD. Indication for repair was visceral malperfusion in both. One patient failed a prior attempt at endovascular fenestration. Intravascular ultrasound (IVUS) was utilized to demonstrate dynamic malperfusion in each. Successful treatment required placement of a Wallstent (Boston Scientific, Natick, MA) to support the aortic true lumen proximal to the Celiac artery origin in both. Selective visceral branch artery stenting (Celiac +/- Superior Mesenteric) was performed via brachial access for persistent malperfusion on IVUS. These stents were deployed retrograde into the aortic stent. Both patients (100%) had resolution of the malperfusion deficit by intraoperative IVUS and clinical course. Neither patient required conversion to open aortic surgery. Both have patent visceral perfusion on follow up duplex ultrasound without symptoms of mesenteric insufficiency.

Conclusions: For CABD in patients with AoLV, aortic wall stenting with selective visceral branch stenting is successful in treating visceral malperfusion with minimal morbidity and short-term freedom from open revascularization.

#28 - BRANCHED ENDOGRAFT FOR THORACOABDOMINAL ANEURYSM REPAIR USING UNMODIFIED MODULAR COMPONENTS: A CASE REPORT

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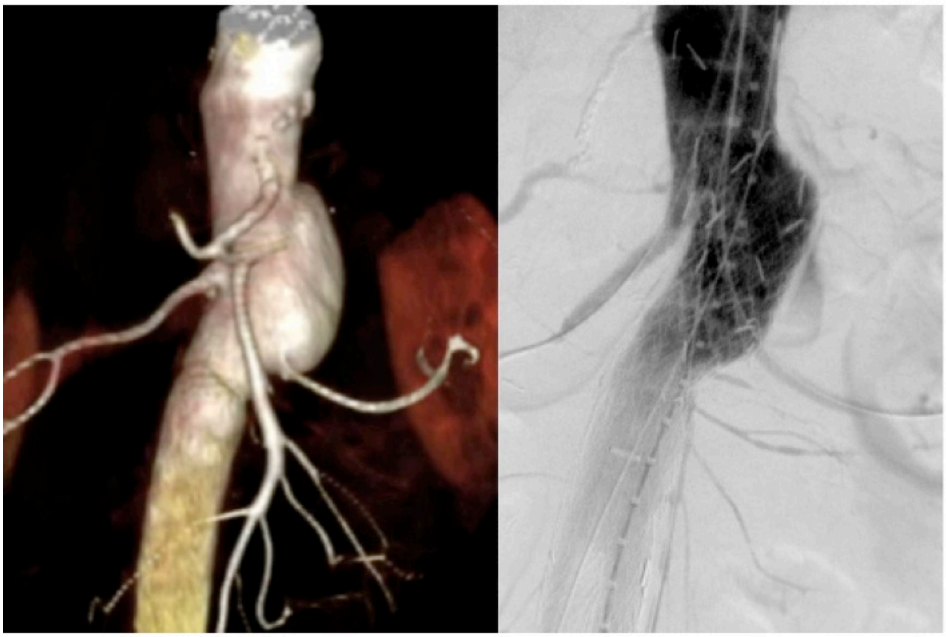
Background: Open repair of thoracoabdominal aortic aneurysms is associated with significant morbidity. Endovascular repair requires branched grafts, which are currently not readily available without device modification. The purpose of this study is to report a case of successful exclusion of a 7 centimeter, expanding thoracoabdominal aneurysm in a high-risk patient using unmodified, modular components.

Methods: The branched graft was constructed using a series of Excluder cuffs with iCast stents deployed between the layers of cuffs. The overlapping portion of iCast stents were molded by overexpansion, followed by crushing them between the layer of the cuffs, then re-expanding the central area of the crushed end to create a flaired end for improved seal.

Results: There was a very faint Type III endoleak at completion of the case. The endoleak was resolved on a post-operative scan at one month.

Conclusion: Creation of branched endografts is possible without current device modification. This technique may be useful in high-risk patients or bail-out situations. However, long-term durability is unknown.



Pre-operative CT angiogram and Intra-operative completion angiogram

#29 - ENDOVASCULAR REPAIR OF BILATERAL ILIAC ANEURYSMS IN A PATIENT WITH LOEYS-DIETZ SYNDROME

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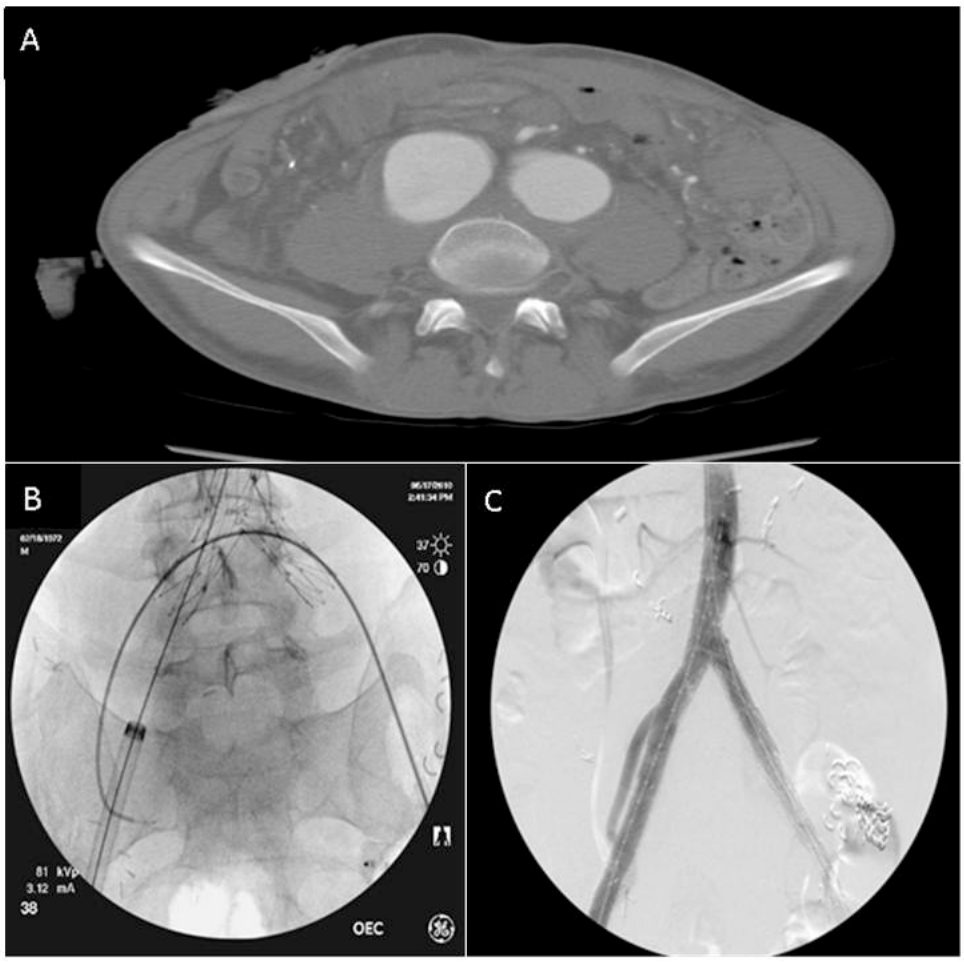
BACKGROUND: Loeys-Dietz Syndrome (LDS) is a rare congenital connective tissue disorder (CTD) caused by mutations in the gene encoding for TGF-β receptors I and II with patients presenting with multiple thoracic and abdominal aortic aneurysms and dissections, arterial tortuosity, and spontaneous organ perforation. Endovascular treatment of the thoracic aorta has met with mostly poor outcomes and open repair is mostly advocated for direct repair of aneurysmal degeneration.

CASE REPORT: A 38-year-old male presented with enlarging asymptomatic bilateral common iliac artery aneurysms measuring 5.3 and 4.3 cm (Figure A). He had an extensive prior surgical history including an acute Type A aortic dissection requiring root replacement, total colectomy with end ileostomy for colonic perforation, and splenectomy for rupture. Given his hostile abdomen, we performed an endovascular repair of his iliac aneurysms. The left hypogastric artery was coil embolized, and a double barrel endograft configuration was used to preserve right hypogastric flow. This involved an Endologix aortic unibody endograft into the infrarenal abdominal aorta and bilateral proximal common iliac arteries. From the left CFA up and over and via the right side through the limb (Figure B), concurrent deployment of a Gore Viabahn and Excluder limbs were overlapped in the Endologix iliac limb and distally landed into the external iliac and hypogastric (Figure C). Postoperatively, the patient recovered well and was discharged in two days. Follow-up CT-A at 6 months confirmed exclusion of both aneurysms with excellent perfusion of his pelvic vessels and patency of the double barrel configuration.

CONCLUSION: This case is the first reported totally endovascular treatment of iliac aneurysms in a patient with LDS. Multiple previous abdominal catastrophes limited direct open repair of the aneurysms, and careful endovascular planning resulted in a good outcome at six months. Long-term follow-up will be necessary to ensure that further aneurysmal degeneration in this LDS patient does not occur.



#30 - PRESERVATION OF HYPOGASTRIC ARTERY BLOOD FLOW DURING EVAR USING A PRELOADED COMMERCIALLY AVAILABLE ENDOGRAFT

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Objective: To describe a novel approach to preserve pelvic perfusion during endovascular aortic aneurysm repair (EVAR) in patients with aortoiliac aneurysms extending to the iliac bifurcation.

Methods: A 72 year-old male presented with a 7.4 cm abdominal aortic aneurysm with bilateral common and internal iliac involvement. In order to maintain pelvic perfusion, preservation of the patient's left hypogastric artery was pursued. Two weeks following right hypogastric artery embolization, EVAR of the patient's aneurysms was performed using a branched endograft approach. A 22 mm main-body bifurcated endograft was deployed and its uncovered proximal stent removed. The contralateral gate was preloaded with a wire and catheter (Figure 1A). The device was resheathed and placed in the left common iliac artery. The preloaded wire in the contralateral gate was snared from the right side establishing through-and-through femoral access. A contralateral femoral sheath was advanced up and over the aortic bifurcation from the right side into the contralateral gate of the bifurcated endograft. The repair was bridged to the left hypogastric artery using a balloon-expandable stent-graft, followed by standard EVAR.

Results: Completion angiography demonstrated exclusion of patient's aneurysms without evidence of endoleak and maintenance of pelvic blood flow through the left hypogastric artery (Figure 1B).The patient recovered without complication and was discharged home on post-operative day four.

Conclusion: Preservation of hypogastric artery blood flow during EVAR to maintain pelvic perfusion is feasible using a pre-loaded commercially available endograft.

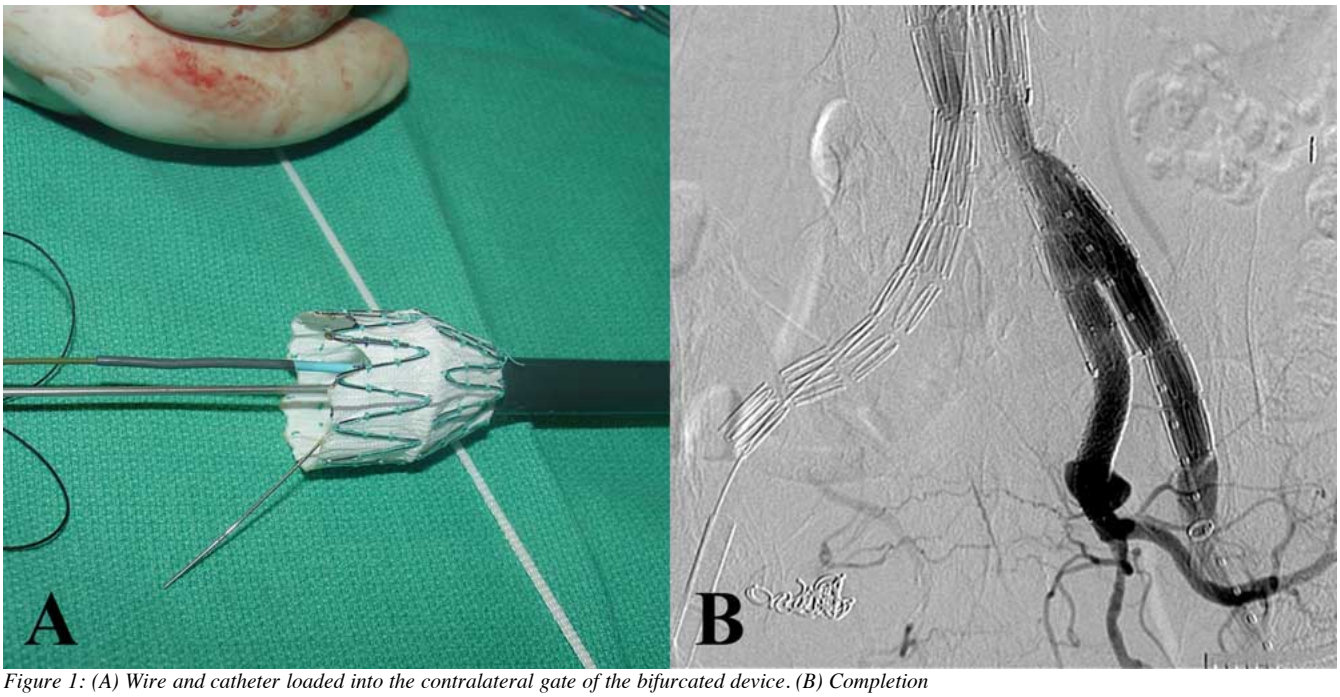

Figure 1: (A) Wire and catheter loaded into the contralateral gate of the bifurcated device. (B) Completion angiography.

#31 - OPEN REPAIR OF VERTEBRAL ARTERY: A SEVEN-YEAR SINGLE-CENTER REPORT

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Claudio Ramirez, Paris, Intl. FR
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AIM: To report the long-term results of proximal and distal vertebral artery (VA) open repair (OR).
METHODS: From January 2002 to December 2009, 73 cases of VA OR were performed (73 patients, 40 men; mean age 66.5±15.2 years). Symptoms of vertebrobasilar insufficiency were present in 61 cases (83.5%). Forty-six have had a proximal VA OR and 27 a distal one. Bypass grafting using a saphenous vein graft was performed in 25 cases (34.2%). Direct transposition was used in 48 (65.7%), mostly into the common carotid artery (CA).
RESULTS: Mean duration of follow-up was 34.9±31.3 months. A stroke was present in 3 patients (4.1%), two hemispheric (2.7%) and one vertebrobasilar (1.3%), which turned lethal. The two hemispheric strokes occurred in the subgroup of 32 procedures combined with a CA reconstruction. A transient Horner syndrome was found in 16 cases (21.9%) and a transient vocal palsy in 6 (8.2%). Early postoperative occlusion occurred in 2 cases (2.7%). A total of 7 (9.5%) patients died during follow-up, one from a stroke. Cumulative Kaplan-Meier survival rate was 93% at 3 years and 90% at 6 years. Assessment of late patency was obtained in 54 (85.7%) of 63 survivals by duplex scanning (83.3%) or angiography (16.6%). Significant vertebrobasilar symptom-free rate was 78.5% at 6 years. Primary patency rate was 87.8% at 3 years and 77.7% at 6 years.
CONCLUSIONS: VA OR provides excellent long-term results. Patients with combined CA and VA reconstruction are at higher risk of postoperative stroke than patients undergoing isolated VA OR.

#32 - OPERATIVE OUTCOMES FOR COMBINED CAROTID ENDARTERECTOMY AND GREAT VESSEL REVASCULARIZATIONS OF THE AORTIC ARCH

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Objective: Atherosclerosis (ASO) of the arch vessels and extracranial carotid artery requires a patient-specific plan to repair clinically important lesions. This report details a selected cohort treated for multifocal disease using carotid endarterectomy (CEA) with simultaneous bypass or endovascular intervention for the innominate (IA), common carotid (CCA), subclavian (SA), or vertebral (VA) arteries.
Methods: A retrospective query (1998-2010) identified 31 patients (16 women, 15 men) who underwent combined CEA and brachiocephalic revascularization for symptomatic (n=23) or high-grade asymptomatic (n=8) ASO, including: SA occlusion (n=15), tandem >70% origin CCA stenosis (n=11), tandem >50% ICA stenosis (n=3), and VA stenosis (n=2). Symptoms manifested as anterior (Stroke/TIA/Amaurosis; n=8) or

posterior (vertebrobasilar; n=4) cerebral ischemia, SC aneurysm (n=1) or upper extremity claudication (n=10).
Results: All patients completed CEA with patch angioplasty. Open repair of concomitant lesions was performed in 17 and stent-angioplasty (IA-2, CCA-9, distal ICA-3) in 14. Early (<30-day) outcomes demonstrated 100% survival, no stroke or MI. Duplex testing confirmed all interventions were technically successful (<50% stenosis). During a mean follow-up of 42 mo. three patients ceased surveillance. Of those remaining, 86% (n=24) are asymptomatic with patent repairs; while 4 experienced some neurologic symptoms (dizziness-3, amaurosis -1) and are being treated medically. A single asymptomatic restenosis of a CCA-SA bypass was identified at 8 and 32 mo. and was treated by balloon angioplasty.
Conclusion: The application of CEA with either open or hybrid endovascular interventions can be safely performed and is equally effective in selected patients with complex cerebrovascular occlusive disease.

#33 - RESULTS OF STAGED CAROTID ENDARTERECTOMY AND CORONARY BYPASS IN PATIENTS WITH SEVERE CAROTID AND CORONARY DISEASE

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Objective: To evaluate our experience with staged carotid endarterectomy (CEA) followed by coronary artery bypass grafting (CABG) for patients with severe carotid and coronary artery disease.

Methods: From 1998 to August of 2010, 40 of 5468 patients who were referred for isolated coronary surgery were found to have significant carotid disease. All patients underwent CEA followed by subsequent CABG within 30 days of the CEA. Severe carotid stenosis was defined as >70%.

Results: Average patient age was 65.5+/-10.6 years and 32 (80%) were male. Severe carotid stenosis was unilateral in 37 of the patients, bilateral in three, asymptomatic in 37. Patients underwent CEA with either patch angioplasty or eversion technique. General anesthesia (GA) with selective shunting was used in all cases. There were zero deaths, zero strokes, and one MI (2.5%) immediately after CEA. After CEA, CABG was performed within 30 days and there were two (5.0%) deaths one from MI and the other from MSOF. There were two strokes (5.0%) with one having permanent effects. The perioperative mortality, stroke and MI rates after both operations were 5.0, 5.0 and 5.0% respectively.

Conclusions: Staging of carotid endarterectomy followed by CABG in the immediate perioperative period is an acceptable approach to patients with severe carotid and coronary disease. Despite the presence of known severe coronary disease, the performance of CEA under GA as the initial procedure was well tolerated. We propose that this strategy is a viable option for patients who present with severe disease in both coronary and carotid distributions.

#34 - INPATIENT HOSPITALIZATION PRIOR TO ELECTIVE VASCULAR SURGERY IS ASSOCIATED WITH INCREASED RISK OF PERIOPERATIVE INFECTIONS.

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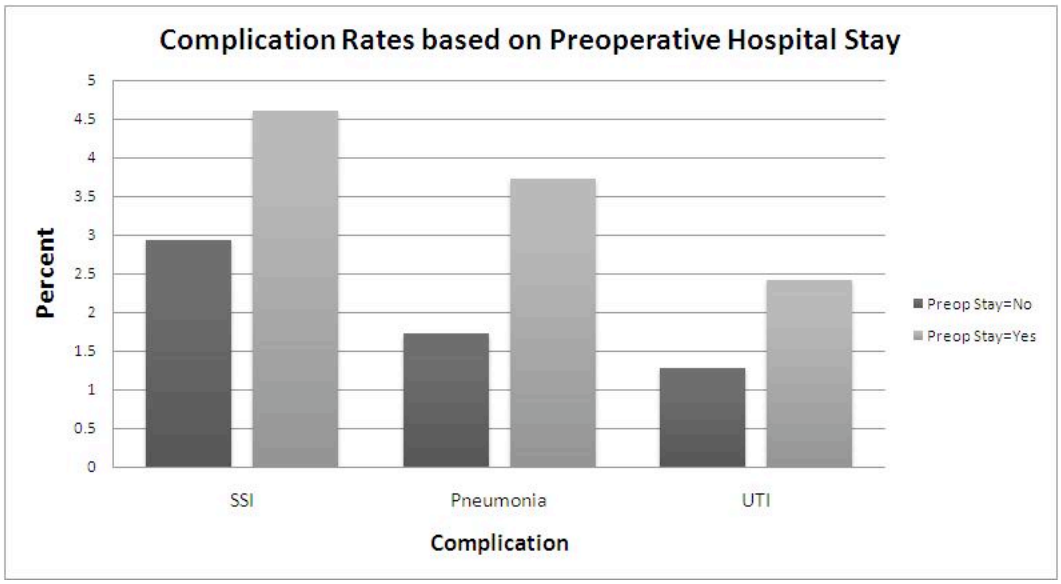
Objective- Hospitalization may increase colonization with resistant bacteria, but associations between inpatient status and postoperative infection have not been established. We examined the influence of inpatient hospitalization prior to elective vascular surgery on risk for perioperative surgical site infection (SSI), pneumonia, and urinary tract infection (UTI).
Methods- Elective vascular procedures were identified from the 2005-2008 ACS-NSQIP participant use datafile using CPT codes and categorized according to operative site and procedure type. Emergency procedures and patients with preoperative wound infection, sepsis, or pneumonia were excluded. Categorical comparisons were performed using X2. 30-day risk for SSI, pneumonia, and UTI were evaluated using logistic regression adjusting for preoperative WBC, diabetes, and wound classification in multivariable models.
Results- 41,815 procedures were analyzed, of which 8042 (19.23%) were inpatients preoperatively. Inpatients had higher incidences of SSI (4.6% vs. 2.9%), pneumonia (3.7% vs.1.7%), and UTI (2.4% vs. 1.3%) (P<0.001 for all comparisons) (Figure). Preoperative hospitalization was associated with increased 30-day risk for SSI (OR 1.51; 95% CI 1.34-1.71; P<0.001), pneumonia (OR 2.12; 95% CI 1.84-2.45; P<0.001), and UTI (OR 1.84; 95% CI 1.54-2.19; P<0.001). Subgroup comparisons based on procedure type demonstrated higher rates of perioperative infections for abdominal (pneumonia), cerebrovascular (pneumonia, UTI), dialysis access (pneumonia, UTI), endovascular graft (SSI, pneumonia, UTI), and lower extremity revascularization procedures (SSI, pneumonia, UTI) (P<0.05).
Conclusion- Hospitalization before elective vascular procedures increases risk of perioperative infections. Avoidance of elective preoperative hospitalization may reduce the incidence of infectious complications.



#35 - GENDER RELATED DIFFERENCES IN EMBOLIC POTENTIAL DURING CAROTID ANGIOPLASTY AND STENTING

Rami O Tadros, M.D., Ageliki G Vouyouka, M.D., Constantinos T Spyris, BS, Christine Chung, BS, Sung yup Kim, M.D., Daniel Han, BA, Michael L Marin, M.D., Peter L Faries, M.D.

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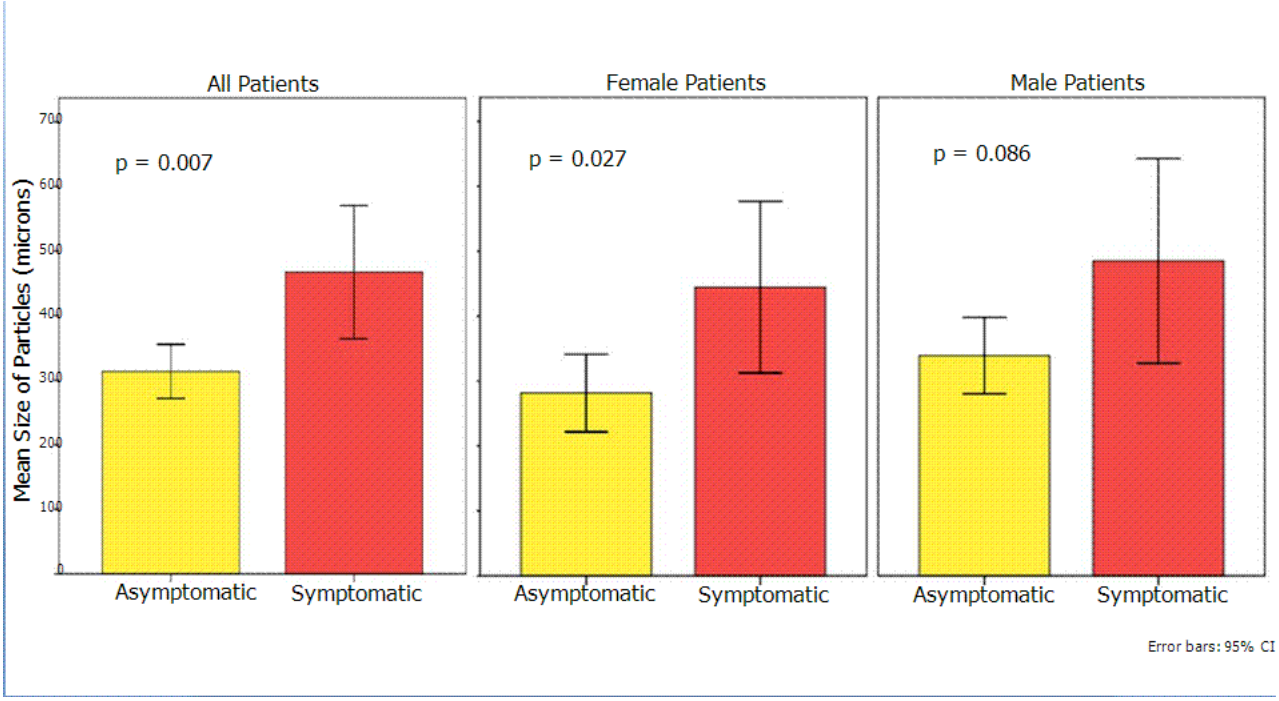
Objective: Carotid angioplasty and stenting (CAS) is an alternative to carotid endarterectomy (CEA). CAS outcomes and risk factors affecting postoperative complications in women are not well defined. We sought to determine the effect of gender on particle size captured by carotid filters, co-morbidities influencing embolization, and results after CAS.
Methods: Embolic debris from 183 consecutively collected carotid filters were analyzed using photomicroscopy and imaging software. Patient co-morbidities, preoperative cerebrovascular symptoms and outcomes (perioperative major adverse events, MAE) were examined.
Results: The mean age was 71.0 years (55.7% male). Men (M) were more likely than women (W) to be smokers (M:70.5% vs.W:55.6%, p=0.049) and have coronary artery disease (M:67.7% vs.W:48.7%, p=0.011). Symptomatic (S) patients had larger mean particle size compared to asymptomatic (AS) patients (S:467.3μm vs. AS:309.5μm, p=0.007, table). On subgroup analysis, a larger mean particle size was observed in symptomatic woman compared to asymptomatic women (S:444.5μm vs. AS:281.5μm, p=0.027). In men, a trend towards a larger mean particle size in symptomatic patients did not reach statistical significance (S:485.1μm vs. AS:339.1μm, p=0.086). Periprocedural stroke and major adverse events did not statistically differ between men and women (p=NS).
Conclusions: Preoperative cerebrovascular symptoms are associated with a greater mean particle size in symptomatic women compared to asymptomatic women. This difference in mean particle size was not observed in men. The impact of an increased mean particle size in symptomatic women on carotid stenting outcomes requires further investigation.



table

#36 - DOES A CONTRALATERAL CAROTID OCCLUSION ADVERSELY IMPACT CAS OUTCOMES?

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Background: Carotid artery stenting (CAS) has taken a large role in the treatment of extracranial cerebrovascular disease in the past decade. Contralateral carotid occlusion is described as a risk factor for inferior outcomes in CAS; however, there is no definitive data to demonstrate this risk.
Methods: Retrospective review of 417 CAS procedures done from May 2001 to July 2010 at a single center using self-expanding nitinol stents and mechanical embolic protection devices. Patients were divided into those with a pre-existing contralateral carotid occlusion (Group A, n=39) versus those without a contralateral occlusion (Group B, n=378). Patient demographics and co-morbidities as well as 30-day and late death, stroke, and myocardial infarction (MI) rates were analyzed. Mean follow-up was 4.0 years (0-9.4 years).
Results: Overall mean age of the 314 men and 103 women was 70.5 years. In group A, there were 2 (5.13%) octogenarians and 9 patients (23.08%) with symptomatic disease as compared to group B, with 53 (14.02%) octogenarians and 121 (32.01%) symptomatics. The overall 30-day death, stroke, and MI rates were 0.48%, 1.92%, and 0.72%. When comparing group A to group B these results were: death (0% vs 0.53%), stroke (2.56% vs 1.85%), and MI (0% vs 0.80 %). Long-term outcomes for groups A and B: death (25.64% vs 22.22%), stroke (5.26% vs 3.39%), and MI (15.38% vs 13.98%).
Conclusions: Contralateral occlusion during CAS does not appear to affect short- or long-term outcomes; however, these results were not statistically significant.