Relationship: Consultant. (B) Commercial Interest; Endologix; Type of Relationship: Consultant. **A. Hamdan:** Commercial Interest: Endologix; Type of Relationship: Consultant. **M. L. Schermerhorn:** Commercial Interest: Endologix; Type of Relationship: Consultant.

Effects on Renal Function After Percutaneous Mechanical Thrombectomy Using AngioJet

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Objectives: Percutaneous mechanical thrombectomy (PMT) is a popular and useful tool for thrombus removal in acute thrombotic syndromes. The AngioJet uses high-pressure spray to break up and aspirate thrombus in addition to delivering plasminogen activators. This is known to cause hemolysis, and all practitioners have noted periprocedural hematuria. Despite this, to our knowledge, there is no study evaluating the consequences to renal function after using this device. We sought to determine the incidence of acute kidney injury, and associated risk factors after using the AngioJet for thrombolysis.

Methods: With Investigational Review Board approval, we retrospectively reviewed a prospectively maintained database of all patients managed by the vascular surgery service from 2009-2012 with procedural codes describing thrombolysis (Current Procedural Terminology [CPT] codes 37201, 37187, 37209, and 75898), and/or PMT (CPT 37187). We identified those treated with the AngioJet and reviewed demographics, indications, laboratory values before and after the procedure (up to 3 days), and determined the incidence of acute kidney injury (AKI). AKI was defined as an increase in creatinine (Cr) >25% of baseline within 24 to 72 hours. Patients on dialysis before AngioJet or without laboratory values before and 24 to 72 hours after treatment were excluded.

Results: We identified 144 lysis procedures, and 53 were treated with the AngioJet. Average age was 50 (range, 87-20; median, 49). Arterial thrombus was the indication in 68%; venous in the rest. AKI occurred in 15 of 53 (28%). Baseline Cr in AKI and non-AKI patients was similar, whereas Cr after AngioJet was not ($P = .01$). Only four patients had a baseline Cr >1.4 (two in each group). Average age of the AKI group was 54 (range 36-74, medium 49), 47% were male, and only one had a baseline Cr >1.4 mg/dL (not significant for all). Average creatinine increase from baseline in AKI group was 0.5 mg/dL (167% rise; $P = .003$) compared with −0.07mg/dL (NS) in non-AKI patients. When compared with 53 lysis cases that did not use AngioJet, the Cr change in the AngioJet group was higher ($P = .03$).

Conclusions: This preliminary study suggests that AKI may occur in more than one-quarter of patients treated with the AngioJet, independently of traditional risk factors for AKI (diabetes, baseline Cr, and age). This risk may be due to hemolysis and is under-reported in the literature. Prospective studies and long-term consequences should be undertaken to better define this risk.

Author Disclosures: **M. R. Abate:** None; **D. Burks:** None; **A. Ali:** None; **M. R. Smeds:** None; **G. A. Escobar:** None.

Increasing Obesity Adversely Affects Limb Salvage Following Lower Extremity Revascularization in a 20-Year Population-Based Study

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Objectives: We have previously reported trends of decreasing amputations along with increasing endovascular interventions for peripheral arterial disease (PAD) in a defined population between 1990 and 2009. The aim of this study was to analyze preoperative risk factors affecting outcomes in these patients.

Methods: A retrospective cohort study of residents of a single county was conducted. Procedures were identified by International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)/Current Procedural Terminology codes and data collected

Table. Multivariate analysis of preoperative factors affecting outcomes with lower extremity revascularization procedures

	MALE (n = 217), HR (95% CI)	P *value*	*Amputation (n = 85), HR (95% CI)*	P *value*	*AFS (n = 466), HR (95% CI)*	P *value*	*Mortality (n = 301), HR (95% CI)*	P *value*
Race								
Nonwhite	2.0 (1.02-3.9)	.04	–		–		–	
White	1.0 (reference)							
Chronic dialysis								
Yes	2.0 (1.1-3.4)	.01	2.7 (1.4-5.0)	.002	2.2 (1.4-3.6)	<.001	2.0 (1.2-3.4)	.01
No	1.0 (reference)		1.0 (reference)		1.0 (reference)		1.0 (reference)	
Diabetes mellitus								
Yes	1.5 (1.1-2.1)	.008	2.4 (1.3-4.1)	.003	1.5 (1.2-1.9)	.002	1.4 (1.1-1.8)	.007
No	1.0 (reference)		1.0 (reference)		1.0 (reference)		1.0 (reference)	
Type								
CLI	2.4 (1.8-3.3)	<.001	5.0 (2.6-9.5)	<.001	2.1 (1.7-2.7)	<.001	2.0 (1.5-2.6)	<.001
Claudication	1.0 (reference)		1.0 (reference)		1.0 (reference)		1.0 (reference)	
Urgency of procedure								
Emergent	2.3 (1.5-3.6)	<.001	–		1.7 (1.1-2.7)	.01	1.7 (1.1-2.6)	.009
Elective	1.0 (reference)				1.0 (reference)		1.0 (reference)	
Congestive heart failure								
Yes	–		1.7 (1.01-3.0)	.048	2.2 (1.6-3.0)	<.001	2.3 (1.7-3.2)	<.001
No			1.0 (reference)		1.0 (reference)		1.0 (reference)	
Age								
>75	–		–		2.1 (1.6-2.7)	<.001	2.3 (1.8-2.9)	<.001
≤75					1.0 (reference)		1.0 (reference)	
BMI								
≥35	–		–		1.5 (1.01-2.1)	.04	–	
<35					1.0 (reference)			
COPD/emphysema								
Yes	–		–		1.3 (1.01-1.8)	.04	1.4 (1.1-1.9)	.02
No					1.0 (reference)		1.0 (reference)	
Hematocrit ≤30								
Yes	–		–		–		1.6 (1.07-2.3)	.02
No							1.0 (reference)	
Coronary artery disease/intervention								
CAD with intervention	–		–					
CAD with no intervention					1.1 (.85-1.5)	.38	1.2 (.87-1.6)	.30
NO CAD					1.4 (1.04-1.8)	.02	1.6 (1.2-2.1)	.003
					1.0 (reference)		1.0 (reference)	

BMI, Body mass index; *CAD*, coronary artery disease; *CI*, confidence interval; *COPD*, chronic obstructive pulmonary disease; *HR*, hazard ratio.

through record review. Study end points were major adverse limb events (MALE), major amputations (AMPU), amputation-free survival (AFS) and mortality. Statistical analysis was performed using the Cox-proportional hazards model.

Results: A total of 1906 lower extremity procedures were performed in 957 limbs with PAD; 622 patients (males, 363; females, 259) with a mean age 67.8 years, (range, 27-98). These included 713 open, 610 endovascular), and 75 hybrid revascularizations; and 192 primary and 340 secondary amputations. Half the procedures (52%) were performed for critical limb ischemia (CLI) and 7% were emergencies. The study population was predominantly white (96%); comorbidities included dyslipidemia in 62%, coronary artery disease in 47%, 26% with a prior intervention, current smoking in 42%, diabetes mellitus in 37%, and renal insufficiency (serum creatinine >2.0 mg/dL) in 8%. On univariate analysis the most significant risk factor associated with MALE and AMPU was presence of CLI (hazard ratio [HR], 3.1/7.1), followed by renal insufficiency on dialysis (HR, 3.2/5.2), emergency procedure (HR, 3.0/2.5), diabetes mellitus (HR, 2.0/3.9), and congestive heart failure (HR, 1.9/3.4). The prevalence of significant obesity (body mass index >35 kg/m^2) increased from 6% in the 5-year interval of 1990 to 1994 to 12% in 2005 to 2009, and was also significantly associated with MALE, AMPU, and AFS (HR, 2.4/4.3/1.5). In addition, factors associated with AFS and mortality included, age >75 years (HR, 2.4/2.8), anemia (HR, 2.7/2.8), and coronary artery disease without intervention (HR, 1.6/1.8). Table I summarizes multivariate analysis for factors significantly associated with all end points.

Conclusions: This population-based study confirms the traditional risk factors for adverse outcomes following revascularization for PAD. Severe obesity is emerging as an important risk factor not previously reported especially in light of increasing incidence in the population.

Author Disclosures: **A. Rathore:** None; **M. Kalra:** None; **J. A. Nienaber:** None; **T. Bower:** None; **A. A. Duncan:** None; **G. Oderich:** None; **R. De Martino:** None; **M. Fleming:** None; **P. Gloviczki:** None; **C. Heins:** None; **W. S. Harmsen:** None.

Early and Midterm Outcomes of Polytetrafluoroethylene-Covered Stent Versus Bare Metal Stent in the Primary Treatment of Severe Iliac Artery Obstructive Lesions

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Objectives: This study compared early-term and midterm outcomes of polytetrafluoroethylene-covered stent (CS) vs bare-metal stent (BMS), in the primary treatment of severe TransAtlalntic Inter-Society Consensus for the Management of Peripheral Arterial Disease II (TASC II) C and D iliac artery obstructive lesions.

Methods: Between January 2009 and July 2014, 134 patients underwent 177 iliac arteries stenting. A CS was implanted in 91 iliac arteries (51%) and BMS in 86 (49%). All patients were prospectively enrolled in a dedicated database. Thirty-day outcomes, midterm patency, and limb salvage were compared; follow-up results were analyzed with Kaplan-Meier curves. Clinical presentation, lesion site, extension and laterality, were evaluated for their association with patency in the two groups using multiple logistic regressions.

Results: Overall, mean age was 69 ± 9.27, with a Society for Vascular Surgery comorbidity score of 0.89 ± 0.55 with no differences after stratification by CS and BMS ($P = .7$); iliac lesions were classified as TASC II C in 96 (54%) and D in 81 (46%), with 89 being monolateral and 44 bilateral (67% vs 33%). Comparing CS and BMS, technical success was 99% in both groups ($P = .2$); 30-day cumulative rate of surgical complications (4% vs 7%; $P = .51$), mortality (0% vs 1.3%; $P = .34$), and morbidity (3% vs 4.5%; $P = .63$) were equivalent. At 18 months, the primary patency of CS vs BMS was similar (95% vs 92%; $P = .74$) and was maintained after stratification by TASC II C (97% vs 94%) and D (91% vs 89%); secondary patency was 97% vs 93% ($P = .91$) and limb salvage was 99% and 98% ($P = .25$), respectively. Multivariate analysis indicated that CS in long-segment stenosis involving both the common and external iliac artery was positive predictor of patency (odds ratio, 2.8; 95% confidence interval, 1.1-8.6; $P = .03$).

Conclusions: Overall, the use of CS for severe iliac lesions has similar early-term and midterm outcomes compared with BMS. In a subcategory of TASC II D lesions, with long-segment severe stenosis of both common and external iliac artery, CS should be considered as primary line of treatment.

Author Disclosures: **M. Piazza:** None; **L. Milan:** None; **P. Scrivere:** None; **S. Bonvini:** None; **J. J. Ricotta:** None; **F. Grego:** None; **M. Antonello:** None.

Increased Pulse Pressure in Patients with Critical Limb Ischemia Predicts Procedural Complications and Reinterventions

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Objectives: Pulse pressure (PP) is a noninvasive measure of arterial stiffness. Because it reflects lower arterial elasticity and compliance, PP is thought to limit the success of endovascular interventions. In this study, we sought to determine whether increased PP was associated with worse long-term outcomes in patients undergoing endovascular infrapopliteal interventions.

Methods: From 2004 to 2014, 596 patients underwent infrapopliteal angioplasty for critical limb ischemia (CLI). PP was derived from blood pressure measurements obtained ≤24 hours of the procedure. Patients were divided into two groups, those with PP <80 and those with PP ≥80. Outcomes included procedural complications, reintervention, major amputation, and mortality. Predictors were identified using multivariable logistic regression, Cox regression models, and Kaplan-Meier survival estimates.

Results: Of 596 patients, 323 patients had a PP <80 and 273 had a PP ≥80. Patients with PP ≥80 were more likely to have hypertension (88% vs 82%; $P = .04$); however, no other significant differences in patient demographics and comorbidities were identified. Three-year reintervention rates and mortality were significantly more common in patients with PP ≥80 (29% vs 20%, $P = .02$; 55% vs 45%, $P = .01$, respectively; Table). A Cox proportional hazards model illustrated that, over time, mortality was significantly higher in patients with PP ≥80 (hazard ratio, 1.1; 95% confidence interval [CI], 1.3-2.0). In multivariable analysis, a PP ≥80 was a predictor of procedural complications (odds ratio, 1.8; 95% CI, 1.2-2.8; $P \leq .01$) and reinterventions (odds ratio, 1.7; 95% CI, 1.2-2.6, $P \leq .01$).

Conclusions: Increased PP is associated with increased procedural complication rates, reintervention, and 3-year mortality, suggesting that arterial stiffness plays an important role in outcomes after endovascular intervention for CLI.

Table. Outcomes for patients with pulse pressure (*PP*) <80 and PP ≥80

Outcomes[a]	*PP < 80 (n = 323)*	*PP ≥ 80 (n = 273)*	P *value*
Stent	91 (28)	91 (33)	.17
Procedural complications	46 (14)	60 (22)	.01
Length of stay, days	8.1 [7.7]	6.1 [6.4]	<.01
3-year			
Reintervention	58 (20)	69 (29)	.02[b]
Repeat PTA/S	34 (12)	48 (16)	.15[b]
Bypass	23 (8)	32 (13)	.04[b]
Restenosis	79 (27)	82 (34)	.07[b]
Major amputation	45 (15)	30 (12)	.36[b]
Mortality	145 (45)	150 (55)	.01[b]

PTA/S, Percutaneous transluminal angioplasty/stenting.
[a]Data are shown as number (%) or mean [standard deviation].
[b]Based on proportional hazards.

Author Disclosures: **D. B. Buck:** None; **V. Lee:** None; **J. D. Darling:** None; **J. C. McCallum:** None; **S. L. Zettervall:** None; **P. A. Soden:** None; **M. L. Schermerhorn:** Commercial Interest: Endologix; Type of Relationship: Consultant. **R. J. Guzman:** None.

Impact of Surgical Specialty and Operator Experience on Outcomes Following Carotid Endarterectomy

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Objectives: Carotid endarterectomy (CEA) is commonly performed by general surgeons, cardiothoracic surgeons, neurosurgeons, and vascular surgeons, with each specialty having differences in residency structure, operative experience, and subspecialty training. The aim of this study was to evaluate the effect of surgeon specialty on outcomes after elective CEA.

Methods: Patients who underwent elective CEA were identified from the 2007 to 2009 Nationwide Inpatient Sample (NIS). Physician identifiers in the NIS were used to determine surgical specialty and operative experience. Multivariate analysis adjusted for surgeon experience and mortality risk was used to compare differences in demographics, complications, outcomes, and hospital covariates.