1:30 pm

PVSS1. NORMAN M. RICH MILITARY VASCULAR SURGERY PAPER - Vascular Surgery Knowledge and Exposure Obtained During Medical School and the Potential Impact on Career Decisions

CPT Lionel R. Brounts MD, LTC Niten Singh MD, CPT Wayne Causey MD, Lt.Col. W. Darrin Clouse MD, LTC Thomas K.Curry MD, Charles Andersen, MD
Madigan Army Medical Center, Tacoma, WA and Wilford Hall Medical Center, San Antonio, TX

OBJECTIVES: The Pathway to Primary Certification in Vascular Surgery is evolving, requiring trainees to make earlier career decisions. The goal of this study was to evaluate exposure and knowledge of vascular surgery that could impact on career decisions.

METHODS: A survey was conducted of recent medical school graduates entering military residency programs. Questions were designed to assess the following: medical school attended and degree obtained; exposure and perception of vascular surgery; and basic vascular surgery knowledge.

RESULTS: A total of 316 individuals were identified of these 218 (69%) responded to the survey. There were 131 (60%) allopathic graduates and 87 (40%) osteopathic graduates and 53 (24%) individuals entering a surgical residency. Clinical clerkships (32%) were the primary reason for specialty selection followed by lifestyle (29%). The majority of respondents (66%) did not have a vascular clinical clerkship. Regarding perception, 56% of respondents would consult interventional radiology for a peripheral arteriogram versus vascular surgery (39%). The mean score of the knowledge based questions was 69%. Exposure to vascular surgery correlated with knowledge of vascular procedures ($p<0.01$). Basic vascular knowledge questions revealed the following: students entering a surgical residency had a trend toward a higher overall score (p=NS); and the score correlated with the number of weeks spent on a surgical ($p<0.01$) and a vascular surgical ($p<0.01$) rotation.

CONCLUSIONS: Our cohort had limited exposure and knowledge of vascular surgery. Providing more clinical exposure in medical school appears necessary to ensure success of the modified pathways for primary certification in vascular surgery.

AUTHOR DISCLOSURES: CPT Lionel R. Brounts, None; LTC Niten Singh None; CPT Wayne Causey, None; Lt.Col. W. Darrin Clouse None; LTC Thomas K.Curry None; Charles Andersen, None

1:45 pm

PVSS2. Cost-Effectiveness of Abdominal Aortic Aneurysm Repair Based on Aneurysm Size

Kate C. Young, PhD MPH, Nadia A. Awad, BS, Marcia Johansson, NP, David Gillespie, MD, Michael Singh, MD, Karl Illig, MD
Univ of Rochester, Rochester, NY US

OBJECTIVES: To model the cost-effectiveness of endovascular repair (EVAR) for small abdominal aortic aneurysms (AAA).

METHODS: We developed a Markov model of a hypothetical 65-year old cohort to determine the cost-effectiveness of early EVAR for small AAAs (4.0-5.4 cm) compared to traditional repair at 5.5 cm. Repair options include both endovascular and open procedures. Probabilities were obtained from the literature. Costs reflected direct costs in 2007 dollars. Outcomes were measured as quality adjusted life years (QALYs).

RESULTS: The model demonstrated that observational management with early EVAR for 4.0-5.2 cm AAAs produced fewer QALYs at greater costs when compared to elective repair at 5.5 cm. It also showed that observational management and repair at 5.5 cm produced the same costs and outcomes as EVAR of 5.3-5.5 cm AAAs. Sensitivity analyses suggested that early EVAR can be cost-effective under certain conditions. If the long-term mortality rate after EVAR is ≤2.5% per year or the quality of life after EVAR is improved, early EVAR for AAAs ≥4.6 cm is warranted. Likewise, if the quality of life before repair is low, EVAR for AAAs ≥4.0 cm may be cost-effective.

CONCLUSIONS: Markov modeling for early EVAR for AAAs <5.5 cm is not cost-effective compared to elective repair at 5.5 cm. From a cost-effective and public policy standpoint, this analysis supports observational management of small AAAs until 5.5 cm. However, EVAR for small AAAs may be cost-effective when differences in quality of life, rupture risk and mortality are considered.

AUTHOR DISCLOSURES: Kate C. Young, None; Nadia A. Awad, None, Marcia Johansson, None; David Gillespie, None; Michael Singh, None; Karl Illig, None

2:00 pm

PVSS3. Paradigm Shifts in the Treatment of AAA: Trends in 721 Patients Between 1996 -2008

Francisco C. Albuquerque, Jr, MD, Britt H. Tonnessen, MD, Robert E. Noll, MD, Jason K. Kim, MD, W. Charles Sternbergh, MD
Ochsner Clinic Foundation, New Orleans, LA US

OBJECTIVES: Evaluation of the longitudinal trends in AAA management after availability of later-generation endografts.

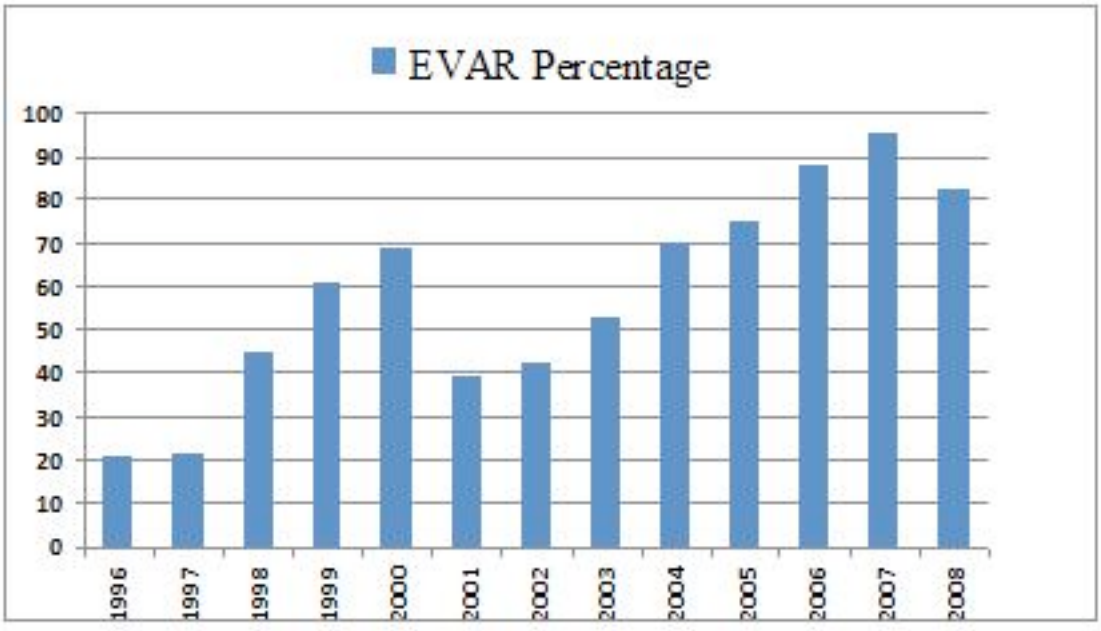
METHODS: We retrospectively analyzed non-suprarenal AAA repairs between 1/1/96 – 12/31/08 at a single institution. Patients were stratified by treatment type (EVAR vs

open) and presence or absence of rupture. 30 days mortality rates were compared with Fisher's exact test.

RESULTS: 721 patients underwent AAA repair over 12 years, 56.9%(n=410) with EVAR and 43.1%(n=311) open. A bimodal distribution of EVAR usage was observed (figure), with initial escalation in the late 1990s. A nadir of EVAR usage occurred in the early 2000s, correlating with more conservative EVAR utilization after the limitations of first generation endografts were understood. EVAR utilization increased to an average of 84% between 2005-2008 as later generation endografts became available. The overall mortality rate for the entire cohort was 3.75%, 1.95%(8/410) for EVAR and 5.8%(19/311) for open repair (p=0.005). Ruptured AAA had a mortality rate of 0% for EVAR (n=0/8) vs 31% for open (n=9/29), p=0.16. Non-ruptured AAA mortality was 1.99% (8/402) for EVAR vs 4.8% (10/282) for open, p=0.23. A trend towards lower mortality was observed between 2003-2008 [1.0% (2/210), EVAR; 4.48%(3/67), open] when compared to 1996-2002 period [3.0% (6/200), EVAR; 6.56%(16/244), open].

CONCLUSIONS: AAA treatment has undergone a profound and sustained paradigm shift, now averaging over 80% of repairs performed with EVAR since 2004. Mortality was significantly less with EVAR compared to open repair, with both modalities becoming safer over the past 5 years.

AUTHOR DISCLOSURES: Francisco C. Albuquerque, None; Britt H. Tonnessen, None; Robert E. Noll, None; Jason K. Kim, None; W. Charles Sternbergh, Cook, Inc; W.L. Gore



2:15 pm

PVSS4. Thoracic Aortic Trauma: Outcomes and Resource Utilization for Endovascular vs. Open Repair

Albeir Y. Mousa, MD, Viktor Y. Dombrovskiy, MD, PhD,MPH, Brian W. Coyle, MD, Paul B. Haser, MD, Alan M. Graham, MD, Todd R. Vogel, MD, MPH
UMDNJ, New Brunswick, NJ US

OBJECTIVES: Thoracic endovascular aortic repair (TEVAR) has evolved as a treatment option for the management of thoracic aortic trauma. We evaluated outcomes and hospital utilization for TEVAR and Open Thoracic Aortic Repair (OTAR) when utilized in aortic trauma.

METHODS: Secondary analysis of the 2005-2006 Nationwide Inpatient Sample data.

RESULTS: 1561 patients with thoracic aorta injury (mean age 44.8±18.8 years, men 77.2%) were identified. 480 underwent emergent surgical intervention: 245 OTAR (51%) and 235 TEVAR (49%). Males were 1.3 times (95%CI=1.03-1.75) as likely as females to undergo surgery and 1.8 times (95%CI=1.12-2.84) as likely to have TEVAR. Mortality after OTAR was greater compared to TEVAR (14.32%vs.8.52%;p=0.046). OTAR were 2.2 times as likely (95%CI=1.46-3.23) to have pulmonary complications compared to TEVAR. After adjustment by age, gender, and comorbidities mortality after OTAR was greater (OR=2.9;95%CI=1.42-5.75) than after TEVAR. Advanced age, stroke and cardiac complications were significantly associated with increased mortality. LOS after OTAR and TEVAR was 23.8±19.25 and 13.5±13.51 days, respectively (P=0.0029). OTAR ($83,027±58,711) was significantly more expensive than after TEVAR ($57,092±48,191;p=0.0214). A significant increase in the proportion of patients with thoracic aorta injury undergoing repair was noted between 2005 and 2006 (24%vs.40.9%,p<0.0002).

CONCLUSIONS: The implementation of TEVAR was associated with a significant increase in the number of patients receiving intervention for traumatic aortic injury and decreased mortality. TEVAR was more likely performed on males and was associated with decreased pulmonary complications and hospital resource utilization. Further implementation of TEVAR for aortic trauma may improve future outcomes and reduce hospital utilization.

AUTHOR DISCLOSURES: Albeir Y. Mousa, None; Viktor Y. Dombrovskiy, None; Brian W. Coyle, None: Paul B. Haser, None; Alan M. Graham, None; Todd R. Vogel, None

2:30 pm

PVSS5. Hospital Cost and Clinical Outcomes Following Open and Endovascular Thoracic Aortic Repair

Girma Tefera, MD, John Hoch, MD, Matthew Mell, MD, William Turnipseed, MD, Charles Acher, MD
University of Wisconsin Med.School, Madison, WI US

OBJECTIVES: The benefit of endovascular therapy of thoracic aortic pathologies has widely been reported however, the cost associated with these procedures is not well documented. The objective of this study was to perform in hospital cost and clinical outcome comparisons in patients who underwent Endovascular repair (TEVAR) to open thoracic aneurysm repair (Open)

METHODS: This is a retrospective study in a tertiary care center. TAG device was used in all TEVAR cases and comparison was made with patients treated with open technique. Demographics, procedure related morbidity and mortality, length of hospital stay as well as hospital costs were recorded. Cost was divided in total hospital cost, direct cost, operating room total cost and nursing total cost. The net margin was calculated by subtracting revenue from total hospital cost. Comparisons between Open and TEVAR were analyzed using a non parametric version of two sample t test, Wilcoxon rank sum test. All P-values reported are two-sided; $P < 0.05$ was the criterion for statistical significance. Statistical computations were performed in SAS for Windows version 9.1.3 (SAS Institute; Cary, NC, USA).

RESULTS: During a 20 month period, November 2006 to May 2008, sixty patients were identified. Of these 25 patients were in the TEVAR group and 35 in the Open group. In average, 1.8 stent grafts per patient was used (range 1-3). Morbidity and Mortality were similar in both groups. In the TEVAR group there was no death however, there was a case of lower extremity para-paresis. Five secondary interventions were performed for type I endoleaks. There was one peri-operative death in the open group but no case of paraplegia. The hospital stay was significantly shorter ($p<0.0074$) and Nursing total cost was lower ($P<0.0001$) for the TEVAR group. However Total hospital cost ($p<0.0002$), Direct cost ($p<0.0002$) and Operating room cost ($p<0.0001$) were significantly higher for TEVAR group. The net margin was significantly negative for TEVAR group, mean -$20,222 ($p<0.0013$).

CONCLUSIONS: There is significantly higher cost for TEVAR. This cost differential is primarily due to the stent graft cost. In the absence of significant benefit from morbidity and mortality this cost increase can not be ignored

AUTHOR DISCLOSURES: Girma Tefera, None, John Hoch, None; Matthew Mell, None; William Turnipseed, None; Charles Acher, None

2:45 pm

PVSS6. How Gender Affects the Outcome f Endovascular Repair of Abdominal Aortic Aneurysms

Clifford J. Buckley, MD, FACS, Christopher J. Marrocco, MD, Ruth L. Bush, MD, MPH, FACS, William T. Bohannon, MD, Marvin D. Atkins, MD, Shirley Buckley, MSN, RN, CS
Scott & White Memorial Hospital Texas A&M University , Temple , TX US

OBJECTIVES: Reports vary as to the influence of gender on the outcome of endovascular repair of abdominal aortic aneurysm (EVAR). In an effort to provide additional information on this subject, we analyzed data from 449 consecutive single center EVAR cases treated over 8 years.

METHODS: In an Institutional Review Board approved study, the clinical data for 449 patients prospectively enrolled in an aortic aneurysm data base who underwent EVAR at Scott and White Hospital and Clinic between Aug 2000 and Aug 2008 was retrospectively reviewed. Sixty five patients were female and 384 patients were men. Demographics, co-morbidities, patient survival, aneurysm rupture, presence and type of endoleak, and need for secondary interventions were assessed collectively and with respect to each of the FDA approved aortic endografts. Kaplan-Meier, Cox-Mantel log-rank and Chi square methods were used for statistical analyses.

RESULTS: Female patients were slightly older than males (71+/- 6yrs vs. 69 +/- 8yrs). Mean aneurysm size was 5.7cm (4.8-6.9cm) for females and 5.9cm (4.2-14cm) for males. Follow-up ranged from 1 to 96 months for both groups; mean follow-up was 28.94+/-22.2 mos. for females and 30.04+/-24.2 mos. for males. Co-morbidities were similar for both females and males except renal insufficiency; severe obesity and COPD were slightly less common in females. Peri-operative mortality was 1.5% for both (1/65females and 6/384males). Survival was 75% for females and 79.9% for males (p=NS). Endoleaks: TypeI 1/65 female and 6/384 males; Type II 5/65 females and 46/384 males; Type III 1/65 female and 0 male (p=NS for all). Limb occlusions: 1/65 female and 5/384 males (p=NS). Secondary intervention rate 6.2% female and 3.1% male (p=NS) There were no ruptures in either group and no statistically significant difference in endograft performance. Conversions: early 1/65 females and 3/384 males; 0 late.

CONCLUSIONS: Female gender has no significant effect on outcome for EVAR in this series. Following IFU guidelines and selecting the best endograft appropriate for the patient's arterial anatomy are the best predictors for good outcome.

AUTHOR DISCLOSURES: Clifford J. Buckley, None; Christopher J. Marrocco, None; Ruth L. Bush, Endologix, Medtronic; William T. Bohannon, None; Marvin D. Atkins, None; Shirley Buckley, None

PVSS ACADEMIC AWARD PAPERS

3:30 pm Trends in Lower Extremity Revascularization: Are Endovascular Procedures Effective in Preventing Amputation in Patients with Critical Limb Ischemia? Philip Goodney, MD *Dartmouth-Hitchcock Medical Center, Lebanon, NH*

3:45 pm Longitudinal Neurobehavioral Outcomes Following Carotid Revascularization Matthew Corriere, MD *Wake Forest University School of Medicine, Winston-Salem, NC*

4:00 PM

PVSS7. Incidence and Outcomes Following Misaligned Deployment of the Talent Thoracic Endograft

Karthikeshwar Kasirajan, MD, Naren Gupta, MD
Emory University Hospital, Atlanta, GA US
Emory University School of Medicine; Atlanta, GA US

OBJECTIVES: To assess the etiology and overall impact of proximal stent misalignment following Talent thoracic stent graft (TSG) deployment on the safety and effectiveness of the TSG. This complication refers to one of the proximal stent graft crowns lying retroflexed in an alignment that is not parallel to the wall of the aorta, following complete graft deployment.

METHODS: Data was culled by a direct physician surveys (Outside the United States [OUS] and United States [US]), a targeted literature search, and a review of all Talent TSG complaint filed to Medtronic Vascular (Santa Rosa, CA). Six independent reviewer's analyzed data on 13 asymmetric deployment reported in 12 patients, including pre and post-op computed tomogram (CT) images.

RESULTS: 9 of these events were reported before the launch of the Talent TSG in the US. Overall, 7 events are from OUS and 6 from the US. 7 of these 13 reported events occurred when the device was used outside the proposed U.S. indications for use (dissection 4, inadequate landing zone 1, ascending aorta as landing zone 2), and labeling compliance for one event could not be determined. 4 of these events occurred at the overlap of two stent grafts, and the others occurred at the proximal bare-spring of the proximal most TSG. 9/13 events occurred with the use of large diameter (> 40-mms) devices. 2 events were treated intra-operatively with a second overlapping device in one and a snare repositioning of the misaligned stent in the other. Adverse clinical sequel include persistent type I endoleaks in one, and persistent false lumen perfusion in 2 patients with dissection. No intraoperative contrast extravasations or CT evidence of perforation or retrograde dissection was noted in any patients. There were no perioperative deaths with a single report of paraplegia.

CONCLUSIONS: Asymmetric deployment are unusual phenomena that tend to occur most frequently with off-label and/or inappropriate device usage, including deployment

technique not in accordance with the IFU. Currently, no major clinical sequelae have been observed as a result of asymmetric opening.

AUTHOR DISCLOSURES: Karthikeshwar Kasirajan, Medtronic; Naren Gupta, None

4:15 pm

PVSS8. Surveillance of Evar Using Wireless Intrasac Pressure Monitoring Device

Hemal J. Shah, None; Amit R. Shah, MD, William D. Suggs, MD, Nicholas Gargiulo, MD, Larry Scher, MD, Takao Ohki, MD, Evan C. Lipsitz, MD
Montefiore Medical Center; Bronx, NY US

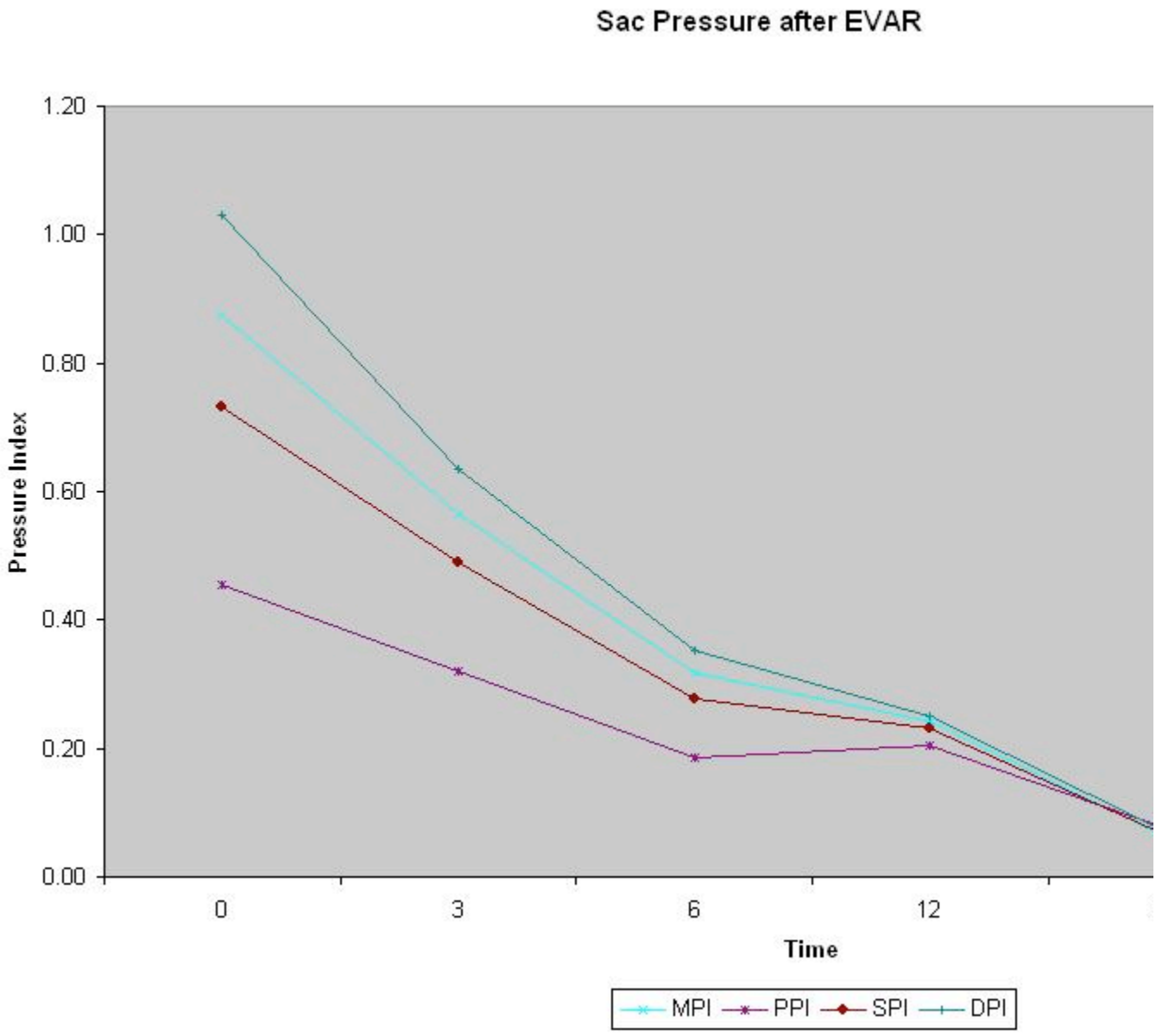
OBJECTIVES: To review our experience with wireless intrasac pressure monitoring during post-EVAR surveillance.

METHODS: A total of sixty EVAR patients were implanted with a CardioMEMS Endosure® sensor since 2004. Sac and systemic pressures were measured prior to aneurysm exclusion, post-exclusion, and at follow-up for up to 3 years. A set of pressure indices, systolic (SPI), diastolic (DPI), pulse (PPI), and mean (MPI), were used as ratios of sac to systemic pressures. CT and/or Duplex ultrasound were utilized for surveillance period. Pressure indices were compared according to t-test.

RESULTS: Sixty of sixty-one patients (98%) had successful implantation of the sensor. Mean follow-up was 17 months (range 1-42 months). A progressive decrease in all pressure indices correlated with successful sac exclusion and was observed across all follow-up periods until 24 months ($p<0.01$) after which time intrasac pressure remained low. A correlation between decreasing sac size and diminishing sac pressure was observed. Five Type II endoleaks (3 noted intraoperatively, 2 on follow-up) were discovered. In these five patients pressure indices also decreased, but not to a significant degree. Four endoleaks resolved spontaneously with continued decreasing sac pressures and one was lost to follow-up. One Type III endoleak was discovered during surveillance with increase in MPI & PPI to 1. After repair, sac pressure decreased indicating successful treatment, which was confirmed by CTA.

CONCLUSIONS: Intrasac pressure as assessed by wireless sensor monitoring decreases with successful aneurysm exclusion and continues to decrease with time. In a small subset of patients with a Type II endoleak, intrasac pressures also decreased, however to a lesser degree. The ultimate role of wireless pressure sensor monitoring post-EVAR remains to be determined, but our results and those of others suggest some clinical utility.

AUTHOR DISCLOSURES: Hemal J. Shah, None; Amit R. Shah, None; William D. Suggs, Cardiomems; Nicholas Gargiulo, Cardiomems; Larry Scher, Cardiomems; Takao Ohki, Cardiomems; Evan C. Lipsitz, Cardiomems



Sac Pressure After EVAR

4:30 pm

PVSS9. The Effect of Secondary Procedures and Alternate Operative Exposures on Early Outcomes of Endovascular Aneurysm Repair

David J. Minion, MD, Daniel L. Davenport, PhD, Eleftherios S. Xenos, MD, Ehab E. Sorial, MD, Eric D. Endean, MD
University of Kentucky Med. Ctr., Lexington, KY US

OBJECTIVES: Technical success during endovascular aneurysm repair (EVAR) often requires secondary procedures such as extension cuffs, stents, or coil embolization. Further, arterial access can be achieved from a femoral exposure, iliac exposure, or percutaneously. The purpose of this study was to determine the effect of these variables on early outcomes.

METHODS: Patients in the National Surgical Quality Improvement Program (NSQIP) participant use file who underwent elective EVAR for AAA using a modular, bifurcated configuration from 2005-2007 were stratified by the need for adjuvant interventions and type of operative exposure using CPT codes. 30-day outcomes were compared using T-test and analyses of variance (ANOVA). Composite morbidity included patients experiencing one or more of 21 complications defined by NSQIP protocol.

RESULTS: Our query yielded 2738 patients. Overall mortality was 1.0% and morbidity 9.6%. All secondary procedures were associated with increased intraoperative transfusion. Coil embolization was associated with increased morbidity. (Table I) The need for iliac exposure (either unplanned or elective) was relatively rare (n=33, 1.2% of cases) but a significant predictor of adverse outcomes (Table II). When no exposure was coded (percutaneous?), outcomes were similar to femoral exposure.

CONCLUSIONS: Coil embolization during EVAR increases perioperative morbidity. The need for iliac exposure greatly increases both peri-operative morbidity and mortality. The data suggests that there is little benefit to percutaneous access.

AUTHOR DISCLOSURES: David J. Minion, W.L.Gore; Daniel L. Davenport, None; Eleftherios S. Xenos, None: Ehab E. Sorial, None; Eric D. Endean, None

Table I: 30-day outcomes by adjuvant interventions. *P<.05, T

Secondary Procedure	Occurrence n, %	Mortality %	Morbidity %	LOS d±SD	Intraop.Transf. %	30- %
None	1793, 65.5	0.9	9.3	3.3±5.7	9.9	1.3
Other Stent(s)	99, 3.6	0.0	13.1	4.1±5.5	22.2*	2.0
Ext. Cuff	824, 30.1	1.2	10.1	3.4±5.9	14.2*	1.2
Addt'l Ext. Cuffs	269, 9.8	1.9	11.5	3.7±4.9	16.7*	2.2
Coil Emb.	90, 3.3	2.2	16.7*	4.0±7.2	22.2*	0.0

Table II: 30-day outcomes by operative approach for access. *P<.(

Approach	Occurrence n, %	Mortality %*	Morbidity %*	LOS d±SD*	Intraop.Transf. %*	3 %
Femoral	1730, 63.2	0.9	8.9	3.1±4.2	10.5	1
Iliac (+/-Femoral)	33, 1.2	6.1	21.2	6.5±9.2	42.4	3
Uncoded/Percutaneous	975, 35.6	1.1	10.5	3.8±7.8	12.2	1
Total	2738	1.0	9.6	3.4±5.9	11.5	1

4:45 pm

PVSS10. Long-Term Outcomes of Evar in Octogenarians

Rodrigo B. Fonseca, MD, Caron B. Rockman, MD, Abhishek Pitti, MD, Neal Cayne, MD, Tom S. Maldonado, MD, Glenn R. Jacobowitz, MD, Thomas Riles, MD, Patrick J. Lamparello, MD, Mark A. Adelman, MD
New York University Vascular Surgery, West Orange, NJ US
NYU Medical Center; New York, NY US

OBJECTIVES: The utilization of endovascular abdominal aortic aneurysm repair (EVAR) in suitable patients has resulted in decreased perioperative morbidity and mortality. Octogenarians as a subgroup have been more readily offered EVAR as it is less invasive, and therefore presumably better tolerated. The purpose of this study is to investigate periprocedural and late EVAR outcomes in octogenarians as compared with patients less than 80 years of age.

METHODS: From January 2003 to May 2008, 322 patients underwent EVAR. A total of 117 octogenarians were compared to 205 patients less than 80 years of age. A retrospective review of the demographic data, aneurysm details, perioperative morbidity, mortality and late outcomes were analyzed.

RESULTS: There were no significant differences in the rates of perioperative myocardial infarction, stroke, death, intestinal, or arterial ischemic complications between the two groups. Octogenarians had a significant higher rate of pulmonary complications (5.1% vs. 1%, $p < .03$) and access-site hematomas (12% vs. 2.4%, $p= .001$) than younger patients. When all significant perioperative morbidity was combined, octogenarians were twice as likely to develop complications following EVAR than younger patients (27.4% vs. 11.7%, $p=.001$). The overall endoleak rates were similar in both groups (17.5% vs. 12.6%, p=NS).

CONCLUSIONS: EVAR can be performed safely and effectively in octogenarians, and the incidence of major complications including MI, stroke, and death is unchanged compared to younger patients. However, there is a significantly increased rate of some types of perioperative complications in octogenarians, as well as perioperative complications as a whole. Our findings suggest EVAR remains a suitable form of therapy in the elderly group provided there is an appropriate preoperative evaluation and perioperative monitoring following repair.

AUTHOR DISCLOSURES: Rodrigo B. Fonseca, None; Caron B. Rockman, None; Abhishek Pitti, None; Neal Cayne, None; Tom S. Maldonado, None; Glenn R. Jacobowitz, None; Thomas Riles, None; Patrick J. Lamparello, None; Mark A. Adelman, None

5:00 pm

PVSS11 - PREDICTORS OF DIAGNOSTIC SUCCESS WITH RENAL ARTERY DUPLEX ULTRASONOGRAPHY

Nasim Hedayati, MD, David J Del Pizzo, BS, RVT, Sean E Harris, Michael Kuskowski, PhD, William C Pevec, MD, Eugene S Lee, MD, PhD, Christy Pifer, BS, David L Dawson, MD *University of California, Davis, Sacramento, CA US*

OBJECTIVES: Renal artery duplex ultrasound scanning (RA-DUS) can evaluate and follow up renal artery disease and arterial reconstructions. In a complete study, flow in the renal artery from its origin to intra-parenchymal branches is evaluated. RA-DUS is technologist-dependent, but other factors affect the likelihood of a complete diagnostic examination. This study evaluated the clinical and technical factors that affect the ability to do a complete RA-DUS examination.

METHODS: A prospective evaluation of consecutive patients undergoing RA-DUS from July 2008 to February 2009 was performed. Patient age, gender, BMI, technologist experience, care setting (inpatient vs outpatient), bedside examination, smoking prior to the test, fasting state, and recent abdominal operation were evaluated. A multivariate logistic regression analysis was performed. A p-value < .05 was considered significant.

RESULTS: During this period, 250 patients underwent RA-DUS (mean age 59.9 ±17.8 years, 57% (143) female). Eighty seven (35%) of examinations were limited by being non-diagnostic for renal artery stenosis or inadequate for visualization of the entire artery. Only technologist experience (OR=0.92; p=0.042), bedside examination (OR=4.17, p=0.016) and recent abdominal surgery (OR=3.45, p=0.047) predicted a limited examination. Patient's BMI, NPO status, and smoking prior to the exam did not affect study completeness.

CONCLUSIONS: One-third of the RA-DUS studies were limited in our prospective study. A more experienced technologist is more likely to perform a complete RA-DUS examination. Recent abdominal surgery and bedside exams were predictive of a limited examination. Vascular laboratories should consider these parameters in order to improve the yield of complete RA-DUS studies.

AUTHOR DISCLOSURES: Nasim Hedayati, None; David J Del Pizzo, None: Sean E Harris, Michael Kuskowski, William C Pevec, None; Eugene S Lee, Christy Pifer, None; David L Dawson,

5:15 pm

PVSS12. Can We Treat Short Aortic Necks Effectively?

Jeffrey Jim, MD, Luis A. Sanchez, MD, Brian G. Rubin, MD, Andres Fajardo, MD, Patrick J. Geraghty, MD, Gregorio A. Sicard, MD
Washington University School of Medicine; Saint Louis, MO US

OBJECTIVES: While EVAR has been shown to be an effective way to treat AAAs, certain anatomic characteristics, like a short aortic neck, limit its applicability. Until recently, commercially available devices were approved for the treatment of AAA with an aortic neck length >15mm. The purpose of this study is to evaluate the outcomes of the recently approved Talent endograft for AAAs with a short aortic neck length (10-15mm).

METHODS: 154 patients were enrolled in the endovascular arm of the prospective Talent eLPS trial from February 2002 to April 2003. Subgroup analyses were performed for AAA with 10-15mm aortic neck and those with >15mm neck. Safety and effectiveness endpoints were evaluated at 30 days, 1 year and five years post procedure.

RESULTS: Patients treated with aortic neck lengths of 10-15mm (n=35) and those with >15mm (n=102) had similar age, gender and risk factor profile. There was no statistically significant difference in freedom from major adverse events and mortality rates at 30 and 365 days. Similarly, there was no difference in the effectiveness endpoints at 12 months. At five years, there is no difference in migration rate, endoleaks, or change in aneurysm diameter from baseline. In addition, there is no difference in freedom from aneurysm-related mortality (94% vs. 99%).

CONCLUSIONS: AAAs with short aortic necks and otherwise suitable anatomy for endovascular repair can be safely and effectively treated with the Talent endograft with excellent 1 and 5 year outcomes.

AUTHOR DISCLOSURES: Jeffrey Jim, None; Luis A. Sanchez, Medtronic, Cook, Gore, Aptus Endosystems; Brian G. Rubin, None; Andres Fajardo, None; Patrick J. Geraghty, None; Gregorio A. Sicard, None

	Neck Length	
	10-15mm	**>15mm**
•Safety Endpoints % (m/n)		
Freedom from MAE-30 days	85.7%(30/35)	91.2%(93/102)
Freedom from MAE-365 days	79.4% (27/34)	83.3%(80/96)
Freedom from All-Cause Mortality-30 Days	97.1%(34/35)	99.0%(101/102)
Freedom from Aneurysm-Related Mortality-365 Days	97.0%(32/33)	98.9%(92/93)
•Effectiveness Endpoint at 12 months % (m/n)		
Successful Treatment	87.5%(21/24)	93.7%(74/79)
Technical failure	0.0%(0/35)	2.0%(2/102)
Surgical Conversion	0.0%(0/32)	0.0%(0/91)
Freedom from Secondary Procedures	96.9%(31/32)	97.8%(89/91)
Aneurysm Rupture	0.0%(0/32)	0.0%(0/91)
Graft Migration	3.6%(1/28)	0.0%(0/83)
Graft Patency	100.0%(23/23)	100.0%(78/78)
Type I Endoleak	0.0%(0/23)	3.8%(3/78)
Type III Endoleak	0.0%(0/23)	0.0%(0/78)

1:30 pm

PVSS13. Regional Variability in Aortic Remodeling after Thoracic Endografting for Type B Dissection

J. Patrick Austin, MD, Martin R. Back, MD, Murray L. Shames, MD, Ann S. Lopez, ARNP, Bruce Zwiebel, MD
University of South Florida Vascular, Tampa, FL US

OBJECTIVES: We reviewed our mid-term results with thoracic endograft exclusion of acute and chronic type B aortic dissections to address whether intervention conferred favorable changes in patient symptomatology, regional aortic size, and luminal morphology.

METHODS: From September 2005 to January 2009, 26 patients (19 men, 7 women, mean age 56 yrs, range 32-81 yo) required 28 implantations of thoracic endograft devices for complicated type B aortic dissection (20 acute, 8 chronic). Indications for endograft intervention were renal/mesenteric/lower limb malperfusion in 15 cases, aneurysm or pseudoaneurysm formation in 8 patients, persistent back pain or difficult BP control in 3 cases and extensive intramural hematoma formation in 2 patients. Associated with exclusion of proximal dissection entry sites, 76% (13/17) of covered left subclavian arteries were revascularized by carotid-subclavian bypass/transposition. Adjunctive endovascular renal revascularization (stenting) was done in 5 of the 15 (33%) malperfusion cases. Intravascular ultrasound (IVUS) was used for procedural guidance in all cases. Surveillance CT aortic imaging was performed within 1 month of endovascular treatment and at yearly intervals with follow-up ranging from 1 to 36 months (mean 13 mo).

RESULTS: Early symptom resolution was achieved in all patients and 30-day operative mortality was 7% (2/28) due to early abdominal aortic rupture or pulmonary failure. Neurological complication rate was 7% due to single episodes of stroke and lower limb paralysis (post-op hypotension). No worsened renal function or need for dialysis occurred during early or late follow-up. Two patients developed late (>30 day) recurrent malperfusion (renal or mesenteric) requiring distal thoracic endograft extensions. Cumulative survival was 81% for the study cohort (3 late non-aortic related deaths). The proximal descending thoracic (containing the dissection entry) was the largest diameter segment (32-100mm) of the thoracoabdominal aorta in all but 4 patients. Early post-op CT imaging revealed thombosis of the false lumen and true lumen expansion along the endografted segment in all cases. The false lumen remained patent in the (unexcluded) distal thoracoabdominal and iliac segments. Aortic diameters regressed between 4 and 21mm within the excluded segments containing a thrombosed false lumen in 90% of patients. Mid-arch diameters (non-dissected) did not change during follow-up. Expansion (3-12 mm) occurred in all unexcluded distal thoracoabdominal segments (with patent false lumens) when initial aortic diameters were >35mm. Smaller diameter aortas

(<35mm) in these locations did not expand (change +4 to -4 mm). One patient required open thoracoabdominal aortic replacement 6 months after proximal endografting due to progressive distal dilatation (initial diameter 50mm).

CONCLUSIONS: Endograft exclusion of complicated type B aortic dissection can ameliorate initial symptomatology and facilitate early favorable proximal thoracic remodeling. The residual dissected thoracoabdominal segment containing a patent false lumen, may be prone to further dilatation when initial aortic diameters are large (>35mm). Ongoing surveillance is mandatory and the late natural history of the distal thoracoabdominal segment appears independent of early proximal aortic endografting results.

AUTHOR DISCLOSURES: J. Patrick Austin, Cook, Medtronic, Gore; Martin R. Back, Cook, Medtronic, Gore; Murray L. Shames, None; Ann S. Lopez, None; Bruce Zwiebel, None

1:45 pm

PVSS14. Trends In Utilization of Vena Caval Interruption

Phillip S. Moore, MD, Jeanette S. Andrews, MS, Timothy E. Craven, MSPH, Ross P. Davis, MD, Matthew A. Corriere, MD, Christopher C. Godshall, MD, Matthew E. Edwards, MD, Leslie H. Williams, MS, Randolph Geary, MD, Kimberley J. Hansen, MD
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OBJECTIVES: To examine national trends in utilization of vena caval interruption (VCI) from 1998 - 2005.

METHODS: Hospital discharge data from the Nationwide Inpatient Sample (NIS) were used to examine trends in the utilization of VCI for the years 1998-2005 using methods for complex surveys. VCI performed in the absence of deep venous thrombosis (DVT) or pulmonary embolus (PE) was categorized as prophylactic (pVCI).

RESULTS: During the study period, the estimated rate of hospitalizations with a diagnosis of DVT or PE rose by 14% and 59%, respectively. The estimated weighted frequency of VCI increased from 52,860 procedures in 1998 to 104,114 procedures in 2005 (0.15% and 0.27% of all discharges, respectively), representing an 80% increase. Logistic regression models revealed that the rate of pVCI increased at a significantly higher rate than VCI associated with DVT/PE (176% vs. 42%; p=<0.001), after adjusting for age, gender, and hospital characteristics. Common diagnoses were selected to characterize the pVCI group: major surgery (59%), hemorrhage (29%), head injury/stroke (22%), extremity/pelvic fracture (22%), malignancy (19%), solid/hollow organ injury (19%), spine injury/paralysis (10%), and morbid obesity (6%). pVCI in the setting of morbid obesity and head injury/stroke rose significantly over time(p <0.001 and p=0.019,

respectively), while pVCI associated with other diagnoses demonstrated no change. 10% of pVCI occurred in the absence of all the above diagnoses.

CONCLUSIONS: From 1998-2005, estimated rates of VCI increased almost two-fold while the rates of pVCI increased almost three-fold. Morbid obesity and head injury/stroke demonstrated significant increase in pVCI.

AUTHOR DISCLOSURES: Phillip S. Moore, None; Jeanette S. Andrews, None; Timothy E. Craven, None; Ross P. Davis, None; Matthew A. Corriere, None; Christopher C. Godshall, None; Matthew E. Edwards, None; Leslie H. Williams, None; Randolph Geary, None; Kimberley J. Hansen, None

2:00 pm

PVSS15. Endovascular Treatment of Peripheral Arterial Trauma

Sheila M. Coogan, MD, Jaime Valdes, MD, Ali Azizzadeh, MD, Kourosh Keyhani, MD, Adel D. Irani, MD, Charles C. Miller III, PhD, Anthony L. Estrera, MD, Hazim J. Safi, MD
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Texas Tech University Health Sciences Center Paul L. Foster School of Medicine, El Paso, TX US

OBJECTIVES: The use of stent graft technology has led to a novel approach in the management of peripheral arterial trauma. Covered stents may be inserted and deployed percutaneously through a remote site and are ideal for treating arterial ruptures, pseudoaneurysms and arteriovenous fistulas. We reviewed our experience with stent grafts in treating patients with peripheral arterial trauma.

METHODS: A retrospective review of a prospectively collected institutional trauma registry was performed. Between July 1st , 2004 and Feb 28th 2009, 223 patients with peripheral artery injuries presented to our institution. Of these, 108 required open or endovascular repair. Charts for all patients receiving a stent graft for treatment of peripheral arterial trauma were reviewed. Age, gender, Injury Severity Score (ISS), mechanism of injury, injured vessel, pre-operative angiographic findings, fluoroscopy time, technical success, limb salvage, length of stay, mortality, and follow-up were recorded.

RESULTS: 17 patients underwent endovascular repair using Viabahn stent grafts (WL Gore, Flagstaff, AZ). Median age was 39 years old (13 to 88). Five patients were female. The median ISS was 17 (range 9-57). The mechanism of injury was: gunshot wound (8), iatrogenic (6), blunt trauma (2), stab wound (1). Injured arteries included: 3 axillary, 5 popliteal, 3 subclavian, 3 carotid, 2 iliac, and 1 superficial femoral artery. The most common pre-operative angiographic findings were pseudoaneurysm, contrast

extravasation, occlusion and arterio-venous fistula. Technical success was 100%. The mean fluoroscopy time was 11.9 minutes. The 30 day patency rate was 88% (15/17). Two patients required subsequent open bypass prior to discharge due to stent thrombosis. One patient subsequently required amputation. Three patients died during the follow-up period from causes unrelated to their arterial repair. Mean length of stay was 21.5 days (1 to 93). The median follow-up time was 13 months (range 1-55 months).

CONCLUSIONS: Endovascular repair using stent grafts is feasible for a variety of peripheral arterial injuries with acceptable short term results. Patient recovery is dependent on the severity of associated injuries. Long term surveillance is needed to determine durability.

AUTHOR DISCLOSURES: Sheila M. Coogan, None; Jaime Valdes, None; Ali Azizzadeh, None; Kourosh Keyhani, None; Adel D. Irani, None; Charles C. Miller, None; Anthony L Estrera, None; Hazim J. Safi, None

2:15 pm

PVSS16. Racial/Ethnic Disparities In Amputation and Revascularization - A Nationwide Inpatient Sample Study

Kakra Hughes, MD, David Rose, MD, Tolulope Oyetunji, MD, Cherie Phillips, MD, Wayne Frederick, MD, Terence Fullum, MD, Edward Cornwell, III, MD, Julie Freischlag, MD, David Chang, PhD
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OBJECTIVES: Several reports have suggested that patients of minority status presenting with critical limb ischemia are more likely to undergo a major limb amputation when compared to white patients. This study is undertaken in an attempt to evaluate what improvement has been made in recent years to correct this discrepancy, and to determine how an increase in adoption of endovascular techniques might impact on this disparity.

METHODS: The Nationwide Inpatient Sample Database (NIS) was queried three times to identify all patients admitted with critical limb ischemia; all patients undergoing an open or endovascular lower extremity revascularization procedure; and all patients who underwent a major lower extremity amputation from 1998 to 2005. Comparisons were done between the different ethnic groups in each of these queries.

RESULTS: The NIS identified 240,139 patients presenting with critical limb ischemia. Of the 186,239 patients who had ethnicity data, there were 68.2% White 19.5% Black, 9.0% Hispanic, and 1.24% Asian patients.
A second NIS query identified 83,328 patients undergoing open or endovascular revascularization for critical limb ischemia. Of the 63,639 of these for whom ethnic data was available, 73.7% were White,15.9% Black, 7.4% Hispanic and 1.1% Asian. 76.7%

open and 23.3% endovascular interventions were performed in Whites; 76.8% open and 23.2% endovascular interventions in Blacks; 73.9% open and 26.0% endovascular interventions in Hispanics; and 75.2% open and 24.8% endovascular interventions in Asians.
A third query of the NIS revealed that 111,548 patients underwent a major lower extremity amputation during the study interval. Among the 84,498 of these patients who had race data recorded, 61% were White, 25.4% Black, 10.1% Hispanic and1.1% Asian. White patients were noted to have a statistically significant higher incidence of cardiac and pulmonary comorbidities in all three queries whereas Blacks were more likely to have diabetes mellitus and renal failure. The mean Charlson Comorbidity Scores for the different ethnic groups undergoing amputation were 2.1 for Whites, 2.0 for Blacks, 2.3 for Hispanics, and 2.5 for Asians. Whereas these Charlson Score differences amongst the ethnic groups achieved statistical significance (i.e. Blacks were significantly healthier than Whites; whereas Asians and Hispanics were less healthy than Whites), these small differences may not necessarily be clinically meaningful.

CONCLUSIONS: Although Blacks make up only 12.8% of the US population, they make up a disproportionate19.5% of patients admitted for critical limb ischemia with a corresponding 25.4% of patients undergoing amputation. A relatively low 15.9% of patients undergoing peripheral revascularization were listed as Black. This disparity remained constant across the study period, unaffected by increased adoption of endovascular intervention. Blacks presenting with critical limb ischemia are more likely to have diabetes and renal failure whereas Whites are more likely to have cardiac and pulmonary comorbidities.

AUTHOR DISCLOSURES: Kakra Hughes, None; David Rose, None: Tolulope Oyetunji, None; Cherie Phillips, None; Wayne Frederick, None; Terence Fullum, Ethicon Endosurgery, Inc.; Edward Cornwell, III, Non; Julie Freischlag, None; David Chang, None

Ischemia		
	Cardiac	Pulmon
White (%)	33.4	23.7
Black (%)	26.7	13.5
Hispanic (%)	27.8	12.9
Asian (%)	32.1	13.5
P–Values Black v White	<0.05	<0.05
Intervention		
	Cardiac	Pulmon
White (%)	29.1	25.3
Black (%)	24.4	15.2
Hispanic (%)	24.5	14.0
Asian (%)	26.9	14.0
P–Values Black v White	<0.05	<0.05
Amputation		
	Cardiac	Pulmon
White (%)	31.8	20.4
Black (%)	25.1	11.8
Hispanic (%)	26.4	11.8
Asian (%)	29.7	11.2
P–Values Black v White	<0.05	<0.05

Comorbidities

2:30 pm

PVSS17. Role of Location of Infra-Popliteal DVTs

Saadi Alhabouni, MD, Anil Hingorani, MD, Enrico Ascher, MD, Natalie Marks, MD RVT, Alexander Shiferson, DO, Nirav Patel, DO, Kapil Gopal, MD, Theresa Jacob, PHE
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OBJECTIVES: Acute infra-popliteal DVTs are often missed since many lower extremity venous duplex studies do not assess the infra-popliteal vein segments. These could be an important source of thrombo-emboli. In this study, we wanted to assess the effect of the location of acute infra-popliteal DVTs on the risk of pulmonary embolism (PE).

METHODS: Study population - In this study, we reviewed 2894 consecutive lower extremity venous duplex studies performed for 2248 patients at our vascular lab between November 1st, 2007 and July 31, 2008. Those included 1227 (54.6%) female patients [average age 71.5 (range 16-102) years] and 1021 (45.4%) male patients [average age 70.0 (range 17-101) years].
All studies to evaluate for pulmonary embolism were noted, and all positive studies were identified. (A positive study for pulmonary embolism was defined as having a filling defect on chest CT with IV contrast following a PE protocol (CTA) or having a high level of suspicion on a ventilation / perfusion (V/Q) scan). 319 such studies were identified [237 (74.3%) CTA (77 positive studies(32.5%), 160 negative studies(67.5 %)), 82 (25.7%) V/Q scans (2 positive studies (2.5%), 80 negative studies(97.5%))]
All isolated acute infra-popliteal DVTs were identified (n=165). They were divided into three groups: Calf muscle vein (CMV) DVTs (n=116, 70.3%), Tibial/Peroneal (TP) vein DVTs (n=15, 9.1%), and a mixed group with both CMV and TP vein involvment(n=34, 20.6%)). The incidence of PE in each of these groups was then evaluated.
Statistical analysis - Chi-square analysis and Fisher's exact test were undertaken using the WINKS SDA version 6.0.5 software (Texas Soft).

RESULTS: DVTs localized to the Calf muscle veins: A total of 116 (70.3%) acute CMV DVTs were noted. Of which, 101 (87.1%) were acute occlusive DVTs with evidence of PE in 5 (4.95%), 15 (12.9%) were acute non-occlusive DVTs with evidence of PE in one (6.67%). The overall incidence of isolated acute CMV DVTs was 3.5% with evidence of PE in 6 (5.17%).
DVTs localized to Tibial/Peroneal veins: A total of 15 (9.1%) acute TP DVTs were noted. Of which, 11 (73.3%) were acute occlusive DVTs with evidence of PE in 2 (18.2%), 4 (26.7%) were acute non-occlusive DVTs with no evidence of PE (0%). The overall incidence of isolated acute TP DVTs was 0.52% with evidence of PE in 2 (13.3%).

The mixed group (DVT in both vein segments): A total of 34 (20.6%) acute DVTs were noted in the mixed group. Of which, 28 (82.4%) were acute occlusive DVTs with evidence of PE in 5 (17.9%), 6 (17.6%) were acute non-occlusive DVTs with no evidence of PE (0%). The overall incidence of acute mixed infra-popliteal DVTs was 1.17% with evidence of PE in 5 (14.7%).

CONCLUSIONS: The location of infra-popliteal DVT (CMV, TP, or mixed) does not influence the rate of PE (p=0.139). All infra-popliteal DVTs should be treated with the same aggressiveness.

AUTHOR DISCLOSURES: Saadi Alhabouni, None; Anil Hingorani, None; Enrico Ascher, None; Natalie Marks, None; Alexander Shiferson, None; Nirav Patel, None; Kapil Gopal, None; Theresa Jacob, None

2:45pm

PVSS18. Does Gender Still Matter? Time-Trend Analysis of Gender Related Differences in the Management of Peripheral Arterial Disease (PAD) In NY, NJ and FL States: 1998-2007

Natalia Egorova, PhD, Ageliki G. Vouyouka, MD, Sharif Ellozy, MD, Daniel Silverberg, None; Windsor Ting, MD, Victoria Teodorescu, MD, Michael Marin, MD, Peter L. Faries, MD
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OBJECTIVES: Gender- related differences still challenge the management of PAD in women. We analyzed the time-trends of such differences.

METHODS: Data for PAD patients from New York, New Jersey and Florida state hospital discharge databases (1998-2007) were analyzed using univariate and multivariate logistic regression analyses.

RESULTS: The 1,500,000 PAD patient-discharges analyzed showed a slight increase in total PAD admissions and a slight decrease of inpatient procedures for both genders (Fig1 a and b). Compared to men, women had 17-25% fewer PAD admissions and 25-33% fewer vascular procedures ($p<0.0001$). They were persistently more likely than men to be admitted emergently (75% vs. 71% in 1998 and 80% vs.77% in 2007), to undergo a major amputation, and to be discharged to a nursing home. Over the study period, the amputation rate declined by 50% in women and 33% in men, the number of open procedures decreased by 50% and 41%, while endovascular procedures increased by 95% and 104%, respectively. Overall hospital mortality was marginally higher for women than men (4.74% vs. 4.26%, $p<0.0001$); but was lower for female octogenarians (6.91% vs.7.26% $p<0.0001$). Female mortality rates were persistently higher than men for amputations (9.82 % vs. 8.82%, $p<0.0001$), and open vascular procedures (5.48%

vs.4.00%, P<0.0001) but similar to men after endovascular procedures (2.87% vs. 2.10%). Time trends showed improved mortality for both genders with stable difference between the genders.

CONCLUSIONS: Despite improved mortality and amputation rates over time, there is still a gender related disparity in the PAD outcomes that merits further investigation

AUTHOR DISCLOSURES: Natalia Egorova, None; Ageliki G. Vouyouka, None; Sharif Ellozy, None; Daniel Silverberg, MD, Windsor Ting, None; Victoria Teodorescu, None; Michael Marin, Medtronic; Peter L. Faries, None

3:30 pm

PVSS19. Only Insulin Use Is Associated with Poorer Limb Salvage and Survival in Diabetic Patients with Chronic Limb Ischemia

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OBJECTIVES: Our goal was to compare the outcomes in patients with disabling claudication (DC) or critical limb ischemia (CLI) in order to see if diabetics (DM) have poorer patency and limb salvage (LS) rates than non-DM, and how the treatment regimen affects these outcomes.

METHODS: All patients who presented with DC or CLI between 06/2001-09/2008 were included. Non-DM patients were compared to those with DM who are currently managed by diet only or oral medications (D-OM), oral medications plus insulin (OM+INS) or insulin (INS).

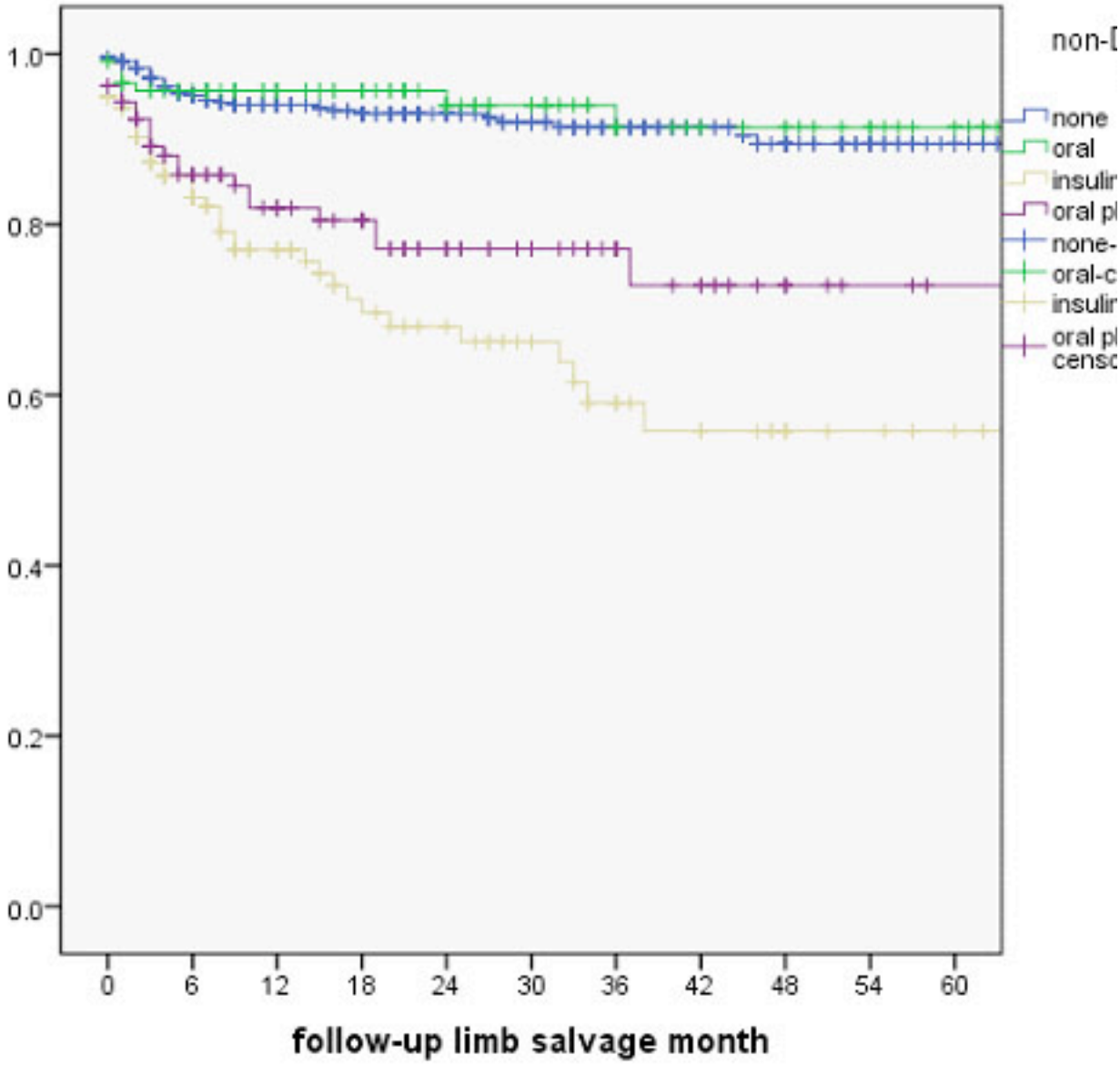
RESULTS: Of the 746 patients (886 limbs) there were 446 limbs in non-DM, 135 in D-OM, 118 in OM+INS, and 187 in INS groups. There were more patients with CAD, htn, and renal insufficiency (RI) in DM than non-DM, with INS having the highest RI/dialysis (46%/20%). Gangrene and foot sepsis were significantly more in patients in OM+INS (45%/3%) and INS (50%/6%) than non-DM (15%/0.2%) and D-OM groups (25%/1%, P<0.001). More patients in INS (14%) and OM+INS (9%) had primary amputation than non-DM (4%) and D-OM (4%, P<0.01). Overall survival following revascularization was similar in D-OM and non-DM, and OM+INS and INS, the latter group being significantly worse (P<0.001). LS rate in D-OM and non-DM was also identical, whereas OM-INS and INS had significant worse LS, with OM-INS marginally better than INS (P=0.091, Figure). PP was worse in EV treated patients on insulin than non-DM and D-OM patients (P<0.001), whereas PP was similar between groups in open-treated patients. Multivariate analysis showed that CAD, RI, COPD, insulin use, functional capacity, statin drug use and need for infrapopliteal interventions independently predicted survival, whereas insulin use, gangrene, need for infrapopliteal interventions and nonambulatory status

predicted limb loss.

36 mo	Non-DM	D-OM	OM-INS	INS	P
Survival	72±3%	71±5%	43±6%	40±5%	<0.001
Limb salvage	91±2%	91±4%	77±5%	59±6%	<0.001
PP (EV)	71±4%	78±6%	59±8%	53±8%	<0.001
PP (Open)	61±4%	57±10%	55±11%	57±9%	0.651

CONCLUSIONS: Diabetic patients who present with limb ischemia can be subgrouped into three distinct subgroups based on their diabetic regimen. The survival and LS rates of those controlled with diet or OM are nearly identical to non-diabetics, both of which are significantly better than OM+INS or INS. The PP rate in EV-treated patients are worse in patients who are on insulin. Being on insulin independently predicts survival and limb loss.

AUTHOR DISCLOSURES: Hasan H. Dosluoglu, None; Purandath Lall, None; Linda M. Harris, None; Maciej L. Dryjski, None



Limb salvage in groups after revascularization

3:45 pm

PVSS20. Evaluation of Peripheral Atherosclerosis: Angiography vs. Intravascular Ultrasound

Zachary M. Arthurs, MD, Paul D. Bishop, MS, Lindsay Feiten, BS, Matthew J. Eagleton, MD, Daniel G. Clair, MD, Vikram S. Kashyap, MD
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OBJECTIVES: Angiography remains a critical component for diagnostic imaging and therapeutic intervention in peripheral arterial disease (PAD). However, inherent limitations exist prompting this study to compare angiography to corresponding intravascular ultrasound (IVUS) imaging in PAD.

METHODS: From 2004-2008, patients undergoing angiography for PAD (n=93) were recruited in a prospective observational analysis. At the time of angiography, diseased lower extremities were interrogated via a 10-cm IVUS pullback with registration points. IVUS data were analyzed with radiofrequency techniques for vessel and lumen diameter, plaque volume, plaque composition, and cross-sectional area (VH™, Volcano Corp). Similarly, vascular surgeons (n=3) blinded to the IVUS data graded corresponding angiographic images according to vessel diameter, degree of stenosis, degree of calcification, and extent of eccentricity. Statistical analyses of matched IVUS/angiograms were performed utilizing SPSS 16.0 (Chicago, IL).

RESULTS: The distribution of demographic and risk variables were typical for PAD: 54% male, 96% hypertension, 78% hyperlipidemia, 44% diabetic, 87% tobacco history, 65% coronary artery disease, and 8% end-stage renal disease. Symptoms precipitating the angiographic evaluation included claudication (53%), rest pain (18%), and tissue loss (29%). Angiographic and IVUS interpretation were similar for luminal diameters, but angiography underestimated vessel diameter (5.2 ± 0.8 vs. 7.0 ± 0.7 mm, $P < 0.05$). There was a significant correlation for stenosis determination ($r=0.655$) utilizing the two-dimensional diameter method; however, angiography underestimated vessel area stenosis by 10% (95% confidence interval = 0.3-21%, $P<0.05$). Concentricity and calcification grading between angiography and IVUS were discordant. Additional data obtainable by IVUS only included plaque morphology (fibrous 63%, necrotic 14%, calcific 9%) and plaque volume.

CONCLUSIONS: In the evaluation of peripheral arterial disease, angiography provides accurate luminal diameter. Actual vessel diameter, degree of stenosis, and interpretation of plaque morphology are discordant from IVUS data. These data imply that the addition of IVUS may aid in the performance and durability of endovascular therapies.

AUTHOR DISCLOSURES: Zachary M. Arthurs, None; Paul D. Bishop, Volcano Corp; Lindsay Feiten, None; Matthew J. Eagleton, None; Daniel G. Clair, None; Vikram S. Kashyap, None

4:00 pm

PVSS21. Impact of Transfusion Policy on Acute Coronary Syndrome After Major Vascular Reconstruction.

Panos Kougias, MD, William F. Johnston, MS, Catherine Cagiannos, MD, Tam T. Huynh, MD, Carlos F. Bechara, MD, Peter H. Lin, MD
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OBJECTIVES: Multiple blood transfusions have been associated with inferior outcomes in critically ill individuals, generating guidelines favoring restrictive transfusion policies. Vascular surgery patients are at high risk for acute coronary syndrome (ACS) due to coexistence of vascular and coronary artery disease (CAD). This study was designed to investigate the impact of a restrictive transfusion approach, as indicated by accepting a perioperative hemoglobin (Hb) level as low as 8 gm/dl, on the incidence of ACS and mortality after major vascular reconstruction.

METHODS: Using a case-control design 45 patients who underwent vascular reconstruction and developed postoperative ACS were compared to 135 patients treated with similar procedures who did not suffer ACS postoperatively. Fisher's exact test was employed to compare categorical variables. Logistic regression, which included an equation with interaction expansion variables for CAD and perioperative Hb levels, was used to assess the relative impact of these two variables on the occurrence of ACS.

RESULTS: Comorbidities such as pulmonary disease, hypertension, renal insufficiency, diabetes, and hyperlipidemia were equally distributed between the groups and had no impact on the occurrence of ACS or death. History of CAD that had been optimally managed preoperatively, was more often present in the ACS group (16 vs. 56%) and was independent predictor of ACS (OR: 6.62, CI: 3.16-13.88, $p<0.001$) and postoperative death (OR: 5.08, CI: 2.0-12.85, $p=0.001$). Postoperative hemoglobin (Hb) levels as low as 8 gm/dl were well tolerated and had no impact on the occurrence of ACS (OR:0.61, CI:0.29-1.26, $p=0.181$) or death (OR:1.33, CI:0.52-3.43, $p=0.547$). The presence of CAD did not increase the odds of either ACS (OR:3.43, CI: 0.75-15.6, $p=0.112$) or death (OR: 2.02, CI: 0.5-19.55, $p=0.543$).

CONCLUSIONS: Our findings indicate that a restrictive transfusion policy is justified in patients undergoing major vascular reconstruction, even in the presence of appropriately managed CAD. Further prospective studies are needed to clarify the impact of transfusion policy on outcomes among vascular surgery patients.

AUTHOR DISCLOSURES: Panos Kougias, None; William F. Johnston, None; Catherine Cagiannos, None; Tam T. Huynh, None; Carlos F. Bechara, None; Peter H. Lin, None

4:15 pm

PVSS22. Cerebral Reserve Is Decreased In Elderly Patients with Carotid Stenosis

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OBJECTIVES: Octogenarians and even patients over 70 have unexplained poor outcomes with carotid angioplasty and stenting (CAS). We sought to evaluate whether older patients may have compromised intracranial collaterals and cerebral reserve (CR) and be intolerant to otherwise clinically silent emboli generated during CAS.

METHODS: 1024 Cerebral blood flow (CBF) studies performed between 1991 and 2001 with stable xenon computed tomography scans (Xe/CT) were reviewed. CBF was measured before and after 1 gm IV Acetazolamide (ACZ), a cerebral vasodilator. The normal response to ACZ is an increase in CBF. In areas of significant compromise of CR, CBF drops representing a "steal" phenomenon. CBF changes were categorized as normal or abnormal. Age, gender, cerebral symptoms, intracranial, carotid and vertebral disease were evaluated (Table 1). Logistic regression was used to determine the effect of age on CR in the entire group and a subgroup of 179 patients with significant carotid stenosis > 50%.

RESULTS: 916 studies were suitable for analysis. Carotid occlusion was predictive of decreased CR (OR 3.9, p=0.03) regardless of age. There was also a trend with severe carotid stenosis >70% (OR=3) and women (OR=1.8) (P=0.08). Age ≥70 had no effect on CR in a heterogeneous population with and without carotid disease; neither did a history of stroke, carotid or intracranial stenosis. Age ≥70 was not predictive of carotid, vertebral or intracranial occlusive disease.
In patients with significant carotid stenosis (N=179), age≥70 was predictive of poor CR (OR=2.7, p=0.03), so was the presence of PVD (OR=3.7, p=0.03). This trend was also seen in women (OR=2.3, P=0.08). Previous stroke, MI, CHF, diabetes, intracranial or vertebral stenosis, race and statin therapy were not.

CONCLUSIONS: Age ≥70 is associated with poor cerebral reserves in patients with significant carotid stenosis as measured by CBF response to an ACZ challenge. Patients ≥70 may be more sensitive to minor cerebral emboli and could therefore be at a higher risk of stroke during CAS.

AUTHOR DISCLOSURES: Rabih A Chaer, MD, James Shen, None; Atul Rao, None Jae S Cho, None; Ghassan Abu Hamad, None; Michel S Makaroun, None

Table 1. Patient characteristics

Characteristic	Overall population N=916	Carotid stenosis population N=179
	Frequency (n) or Mean±SD	Frequency (n) or Mean±SD
Mean Age (years)	61.4±14	67.5±12
Race (White)	91%(832)	95%(170)
Sex (Female)	44%(404)	40%(71)
Diabetes mellitus	24% (222)	34%(60)
Renal failure	8% (73)	11%(19)
PVD	21%(189)	26%(46)
Stroke	11%(104)	12%(22)
Statin therapy	7% (60)	11%(20)
Antiplatelet therapy	22%(198)	25%(45)
Coronary artery disease	85% (775)	89%(160)
Congestive heart failure	19% (170)	32%(58)
History of myocardial infarction	23% (207)	34%(61)
Indication for Xe/CT		
Stroke	47%(426)	
VBI	3%(28)	
Intracranial occlusive disease	1%(10)	
Carotid stenosis	40%(363)	
Cerebral aneurysm rupture	16%(147)	
CNS tumor	<1%(3)	
Trauma/Intracranial bleed	1%(11)	
Other	5%(46)	

Patient characteristics

4:30 pm

PVSS23. The Impact of Endovascular Treatment for Uretero-Iliac Artery Fistula: A Single-Center Experience

Rafael D. Malgor, MD, Gustavo S. Oderich, MD, James C. Andrews, MD, Joseph J. Ricotta, MD, J. Chad Fleming, MD, Thomas C. Bower, MD, Haraldur Bjarnason, MD, Audra A. Duncan, MD, Manju Kalra, MBBS, Peter Gloviczki, MD
Mayo Clinic; Rochester, MN US

OBJECTIVES: Review the results of open surgical and endovascular treatment for ureteral-iliac artery fistula (UIAF).

METHODS: Data of all patients with UIAF were reviewed from 1996 to 2008. Endpoints were early morbidity and mortality, survival, patency, arterial infection and freedom from recurrent bleeding.

RESULTS: There were 18 patients, 5 male and 13 female, with mean age of 67 years. Predisposing factors were prior tumor resection in 15 patients, radiation (14), ureteral stents (13), ileal conduits (4), and aortofemoral grafts (2). All patients presented with hematuria which was massive in 7. Eleven patients (61%) underwent iliac artery stent grafting (IASG) including four internal iliac artery exclusion. Three patients underwent direct iliac artery repair, 3 had femoral crossover bypass with iliac embolization, and 1 had ureteral exclusion. There were no early deaths. Early complications were 2 enterocutaneous fistulas following direct iliac artery repair, a TIA, hemothorax, femoral access thrombosis in 1 patient each . One possible infection occurred after IASG in a patient with enteric contamination. Mean follow-up was 26 months. At 5-years, overall survival was 45% versus 90% expected for the general population (P<.001). Freedom from recurrent bleeding at 3-years was 76%. Primary and secondary IASG patency at 3-years was 82% and 100%.

CONCLUSIONS: Iliac artery stent grafts are a safe, effective, and durable option in patients with UIAF. Stent graft infections are uncommon, but patients with enteric fistulas should be considered for extra-anatomic reconstruction with iliac embolization. Direct open iliac artery repair carries a high risk of enterocutaneous fistula.

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4:45 pm

PVSS24. Outcomes Of Aortic Surgery In Renal Transplant Patients

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OBJECTIVES: Transplantation of elderly patients has become increasingly common. Many patients present with concomitant occlusive or aneurysmal aortoiliac disease. The optimal strategy for the timing and management of concomitant aortoiliac disease is unknown. Prior to the availability of endovascular therapies, our policy was to provide open repair of occlusive or aneurysmal disease prior to cadaveric transplantation or if a living donor was available by simultaneous aortoiliac reconstruction with renal allo-transplantation. Since the advent of endovascular methods, our strategy changed to take advantage of endovascular treatment pre-transplant. This study examines the outcome of

both approaches.

METHODS: We performed a retrospective review of 12 patients between 1996 and 2009 who underwent both a renal transplantation and a major abdominal aortic procedure (indication aneurysm, 5; occlusive disease, 7) either simultaneously (n=5), within the month prior (n=2) or subsequent to renal transplantation (n=5). All patients with occlusive disease had aortobifemoral bypass, two prior to transplant and five simultaneous with transplantation. In order to assess renal transplant status, patients' creatinine levels were followed every 3 months. Of the 12 patients, 8 had open aortic procedures, while 4 patients underwent endovascular aortic aneurysm repair (EVAR). Patients who underwent endovascular aortic aneurysm repair were followed with CT scans at 6 month intervals.

RESULTS: Aortic reconstruction done simultaneously, metachronously or distant subsequent to renal transplantation was successfully employed in all twelve patients. All of the patients who underwent EVAR have functional renal allografts. Among the patients with open aortic repairs, three are deceased and one patient has had failure of two renal allografts. No patients had limb loss and aortic grafts (one limb required a secondary procedure) remained patent. Five year patient (90%) and kidney survival (75%) are equivalent to results in the general population without aortic disease. Two patients had aortobifemoral bypass and pancreas-kidney transplantation without complication. There were no major complications related to these procedures, however 2 renal transplants developed hematomas post-operatively requiring evacuation and 1 ABF developed a femoral wound infection requiring evacuation and sartorius flap closure. The 30-day mortality rate in all patients was zero. The length of stay for patients receiving simultaneous procedures ranged from 5 to 17 days.

CONCLUSIONS: The coexistence of aortic disease and renal transplantation is becoming an increasingly common clinical scenario. Exclusion from transplantation of patients with major aortoiliac disease is commonplace in many transplant centers as registry data suggests a poor outcome. Appropriate planning with a vascular surgical team can lead to outcomes which are comparable to the general transplant population without significant aortoiliac occlusive disease.

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