Family history of aortic disease predicts disease patterns and progression and is a significant influence on management strategies for patients and their relatives

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Background: While a positive family history (FH) is a known risk factor for developing an aneurysm, its association with the extent of disease has not been established. We evaluated the influence of a FH of aortic disease with respect to the pattern and distribution of aortic aneurysms in a given patient.

Methods and Results: From November 1999 to November 2011, 1263 patients were enrolled in physician-sponsored endovascular device trials to treat aortic aneurysms. Of the 555 patients who were alive and returning for follow-up, we obtained 426 (77%) family histories. Three-dimensional imaging studies were used to identify the presence of aneurysms; 36% (155/426) of patients had a FH of aortic aneurysms and 5% (21/155) had isolated intracranial aneurysms. A logistic regression model was used to compare aortic morphology between patients with a positive or negative FH for aneurysms. Patients with a positive FH of aortic aneurysms were younger at their initial aneurysm (63 vs 70 years; P < .0001), more frequently had proximal aortic involvement (root: odds ratio [OR], 5.4; P < .0001; ascending: OR, 2.9; P < .001; thoracic: OR, 2.2; P = .01) with over 50% of FH patients ultimately developing suprarenal aortic involvement (P = .0001) and had a greater incidence of bilateral iliac artery aneurysm (OR, 1.8; P = .03).

Conclusions: FH is an important tool that provides insight into the expected behavior of the untreated aorta and has significant implications for the development of treatment strategies. These findings should be used to guide patient’s management with regard to treatment, follow-up paradigms, genetic testing, and screening of other family members.

A case-matched validation study of anatomic severity grade score in predicting reinterventions after endovascular aortic aneurysm repair

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Background: In 2002, the Society for Vascular Surgery created the anatomic severity grading (ASG) score to classify abdominal aortic aneurysms (AAAs). Our objective was to identify the predictive capability and cutoff value of preoperative ASG score for reintervention after endovascular aneurysm repair (EVAR).

Methods: We completed a retrospective review of AAA patients treated with elective EVAR from 2007 through 2011. Patients who had reinterventions as well as preoperative M2S (M2S Inc, West Lebanon, NH) three-dimensional reconstructions were identified and compared with a case-matched control group of patients without reintervention. ASG component scores (neck, aortic, and iliac) and total ASG scores were calculated using M2S software.

Results: Of the 623 patients treated with EVAR, 79 (13%) had reinterventions of which 45 had preoperative M2S three-dimensional reconstructions available for ASG score calculation. The reintervention group (mean age, 74 ± 8; 80% male) had a mean ASG score of 18 ± 5 (range, 8-30) compared with a cohort of 45 EVAR patients (mean age, 74 ± 7; 80% male) who had a mean ASG score of 13 ± 4 (range, 6-21; P < .0001). The mean AAA diameter for all patients was 52 mm ± 14 and was not significantly different between the groups.

After area under the receiver-operating curve analysis, an ASG score of 17 was highly predictive for reintervention (area = 0.8; sensitivity = 60%; specificity = 78%; positive predictive value = 73%; negative predictive value = 66%). An ASG score of 13 was highly predictive for freedom from reintervention (sensitivity = 93%; specificity = 47%; positive predictive value = 64%; negative predictive value = 88%). The lowest ASG score that yielded a 100% reintervention rate was 22. The majority of reinterventions fell into three categories: proximal extension cuff (n = 18; 40%), distal extension limb (n = 7; 16%), and type II endoleak embolization (n = 13; 29%). Those that received proximal extensions had significantly higher mean total ASG score (19 vs 15; P = .0005), mean neck score (3.28 vs 2.36; P = .047), and mean aorta score (7.39 vs 2.36; P = .004). Those that received distal extensions had a significantly higher mean iliac score (9.00 vs 6.86; P = .013), and those that required an embolization had a significantly higher mean aorta branch score (1.92 vs 1.19; P = .017).

Conclusions: Preoperative total ASG score strongly predicts reintervention after EVAR. Use of a cutoff ASG value predictive of prohibitive reintervention rates could help guide the decision between endovascular vs open AAA repair.
Endovascular management of pararenal aortic aneurysms with multiple overlapping uncovered stents

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Objective: This study aims at evaluating the safety and efficacy of a porous stent system consisting of multiple overlapping uncovered stents in the treatment of complex aortic aneurysms with vital branches.

Methods: Data of all patients with aortic aneurysms treated in our center with multiple overlapping uncovered stents between February 2010 and December 2011 were retrospectively reviewed. Preoperative characteristics, intraoperative details, and follow-up outcomes were documented. Technical success was defined as successful deployment of the stents to target locations without procedure-related complications. Clinical success was characterized by complete shrinkage or stabilization of the aneurysm, preservation of vital branches, and absence of major complications. Patients were grouped, according to rapidity of aneurysm thrombosis, into fast-thrombosis group (complete thrombosis of aneurysmal sac was achieved in ≤6 months) and a delayed-thrombosis group (>6 months required for complete thrombosis). Possible factors affecting the speed of thrombosis were analyzed statistically with the Fisher exact test and the t-test.

Results: This porous stent system was used to treat 34 patients (23 men, 11 women; mean age, 65.7 years). Technical success was achieved in all patients (100%). Regular follow-up over 6 months was achieved in 29 patients (mean length of follow-up, 11.4 months). Complete thrombosis of the aneurysm sac within 12 months was observed in 24 patients (83%). Aneurysm shrinkage was documented in seven patients (24%) and stabilization in 21 (72%). All branch arteries covered by bare stents stayed patent during follow-up. The overall clinical success rate reached 97% in the follow-up group. Risk factors for delayed thrombosis included fewer stents implanted ($P = .013$), longer sac entrance ($P = .043$), and use of antiplatelet medication ($P = .040$).

Conclusions: An alternative method of management of complicated aortic aneurysm appears to be feasible using overlapping bare stents, which may prevent aneurysm growth while preserving vital branches. The short-term outcome of our study seems encouraging but is not sufficient to draw a robust conclusion. Further hemodynamic and clinical studies are warranted to evaluate long-term efficacy.

Clinical significance of type II endoleaks after thoracic endovascular aortic repair

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Background: To evaluate the clinical significance of type II endoleaks (ELII) after thoracic endovascular aortic repair (TEVAR).

Methods: From January 1997 to June 2012, a total of 344 patients received TEVAR in our institution. ELII was diagnosed in 30 patients (8.7%; 13 males; median age: 65 years, range: 24 to 84 years), representing the study population of this retrospective, single-center analysis. Mean follow-up was 29.5 months (range, 8 months to 9.5 years).

Results: Primary ELII was observed in all but two cases (28/30; 93.3%). The most common sources of ELII were the left subclavian artery (LSA; 13/30; 43.3%) and intercostal/bronchial vessels (13/30; 43.3%), followed by visceral arteries (4/30; 13.4%). Overall mortality was 33.3% (10/30). ELII-related death (secondary rupture) was observed in 20% (2/10). Reintervention (RI) procedures for ELII were performed in 9 of 30 patients (30.0%); 5 of 9 (55.6%) in cases with ELII via the LSA. Indications for RI were diameter expansion in five and extensive leakage in four cases. Treatment was successful in five patients (55.6%) but failed in four cases (44.4%). In 12 of 21 (57.1%) untreated patients, ELII sealed during follow-up. In conservatively treated patients, an increase in aortic diameter has been only observed in a patient with secondary ELII.

Conclusions: The results presented herein suggest that the clinical impact of ELII after TEVAR must not be underestimated. Albeit a transient finding in most cases, ELII is associated with a relevant RI rate, particularly in cases involving the LSA. RI seems indicated in patients with increasing aortic diameter and/or extensive leakage. Careful surveillance of all patients with ELII is recommended.

The effect of surgeon’s specialty and volume on the perioperative outcome of carotid endarterectomy


Background: Several studies have demonstrated better outcomes for carotid endarterectomy (CEA) at high-volume hospitals and providers. However, only a few studies have reported on the impact of surgeons’ specialty and volume on the perioperative outcome of CEA.

Methods: This is a retrospective analysis of CEA during a recent 2-year period. Surgeons’ specialties were classified according to their Board specialties into general surgeons (GS), cardiothoracic surgeons (CT), and vascular surgeons (VS). Surgeons’ annual volume was categorized into low volume (<10 CEAs), medium volume (10 to <30 CEAs), and high volume (≥30 CEAs). The primary outcome was 30-day perioperative stroke and/or death; however, other perioperative complications were analyzed. Both univariate and multivariate analyses were done to predict the effect of specialty/volume and any other patient risk factors on stroke outcome.

Results: Nine hundred and fifty-three CEAs were performed by 24 surgeons: 122 by seven GS, 383 by 13 CT, and 448 by 4 VS. Patients’ demographics/clinical characteristics were similar between specialties, except the incidence of coronary artery disease, which was higher for CT ($P < .0001$). The indications for CEA were symptomatic disease in 38%...
for VS, 31% for GS, and 23% for CT (P < .0001). The perioperative stroke and death rates were 4.1%, 2.9%, and 1.3% for GS, CT, and VS, respectively (P = .126). A subgroup analysis showed that the perioperative stroke rates for symptomatic patients were 5.3%, 2.3%, and 2.3% (P = .511) and for asymptomatic patients were 3.6%, 3%, and 0.72% (P = .099) for GS, CT, and VS, respectively. Perioperative stroke rates were significantly higher for nonvascular surgeons (GS and CT combined) vs VS in asymptomatic patients (3.2% vs 0.72%; P = .033). Perioperative stroke/death was also significantly lower for high-volume surgeons: 1.3% vs 4.1% and 4.3% for medium- and low-volume surgeons (P = .019) (1.3% vs 4.15% for high vs low/medium combined; P = .005). More CEAs were done for asymptomatic patients in the low/medium-volume surgeons (78%) vs high-volume surgeons (64%; P < .0001) with a stroke rate of 4.6% for low/medium-volume surgeons vs 0.51% for high-volume surgeons (P = .0005). A univariate logistic analysis showed that the odds ratio of having a perioperative stroke was 0.3 (95% confidence interval [CI], 0.13-0.73; P = .008) for high-volume surgeons vs low/medium-volume surgeons, 0.4 (95% CI, 0.16-1.07; P = .069) for VS vs CT/GS and 0.2 (95% CI, 0.06-0.45; P = .0004) when patching was used. A multivariate analysis showed that the odds ratio of having a perioperative stroke for CT VS was 2.1 (95% CI, 0.71-5.92; P = .183); for GS vs VS, 1.8 (95% CI, 0.49-6.90; P = .3709); for low-volume surgeons (vs high-volume) 3.4 (95% CI, 0.96-11.77; P = .0581); medium- vs high-volume surgeons 2.2 (95% CI, 0.75-6.42; P = .1509).

Conclusions: High-volume surgeons had significantly better perioperative stroke/death rates for CEA than low/medium-volume surgeons. Perioperative stroke/death rates were also higher for nonvascular surgeons in asymptomatic patients.

Drug-coated balloon angioplasty after directional atherectomy improves outcome in restenotic femoropopliteal arteries

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Background: Restenosis remains an unresolved problem despite different treatment modalities and new stent technology in femoropopliteal arteries. No standard therapy has proven to provide acceptable outcome data for this entity. Directional atherectomy alone did not result in satisfactory long-term patency rates. The outcome might be improved in conjunction with drug-coated balloon angioplasty.

Methods: In this retrospective study, restenotic lesions of the femoropopliteal arteries were treated with directed atherectomy in 89 lesions of consecutive patients (58% male; mean age, 69 ± 11 years). All patients received adjunctive treatment with conventional balloon percutaneous angioplasty (PTA; n = 60) or drug-coated balloon angioplasty (DCB; n = 29).

Results: Lesion location was in the stent (DCB [n = 27] vs PTA [n = 36]) and in native restenotic vessels (DCB [n = 2] vs PTA [n = 25]). The 1-year Kaplan-Meier freedom from restenosis estimates (95% confidence intervals) in the DCB and PTA groups were 84.7% (70.9%-98.5%) and 43.8% (30.5%-57.1%), respectively. In a multivariable Cox model for restenosis, DCB treatment had a hazard ratio (95% confidence interval) of 0.28 (0.12-0.66; P = .0036) compared with the PTA group. In the multivariable model for procedural success, the effect of treatment did not differ between PTA and DCB (P = .134).

Conclusions: The combination of directed atherectomy with adjunctive DCB is associated with a better event-free survival at 12 months of follow-up compared with PTA after directed atherectomy.

Early management of pediatric vascular injuries through humanitarian surgical care during U.S. military operations

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Background: The objective of this report is to describe our experience of pediatric vascular injuries in a U.S. military combat support hospital in Baghdad, Iraq. A retrospective study was designed using Joint Theater Trauma Registry (JTTR) records in order to evaluate the pediatric (age <18 years) population presenting with vascular trauma to a combat hospital in Baghdad, Iraq between April 2006 and August 2008. Demographic data comprised casualty, age, gender, and mechanism of injury. Physiologic data included presenting vital signs (rectal temperature, blood pressure, and heart rate), arterial pH, base deficit, hemoglobin (g/dL), and international normalized ratio.

Results: Twenty-five children, median age 14 years (range, 5-17 years), median weight 48 kg (range, 15-80 kg) sustained 18 (72%) blast and 7 (28%) gunshot wounds. The mean Injury Severity Score was 25 ± 16.2. The median operative time for the vascular repairs was 189 minutes (range, 41-505 minutes). Patients were tachycardic (mean ± standard deviation, 136 ± 29 bpm), hypotensive (109/63 ± 29/19 mm Hg), and acidemic (pH 7.26 ± 0.07; BD -5.57 ± 5.1 mEq/L) on arrival to the emergency department and were physiologically improved upon admission to the intensive care unit 3 hours later. Repair techniques were ligation (14; 39%), saphenous graft (11; 31%), lateral suture (7; 19%), end anastomosis (2; 5%), patch (1; 3%), and thrombectomy (1; 3%). Twenty-four hour mean transfusion requirements included crystalloid 102 mL/kg (range, 19-253), transfused blood 47 mL/kg (range, 0-119), fresh frozen plasma 14 mL/kg (range, 0-68), and apheresis platelets (1.2 ± 3.68 units). Over a follow-up of 22 ± 5.5 days, the amputation-free survival was 80%.

Conclusions: This is the largest reported wartime series to demonstrate in children that damage control resuscitation despite high injury severity permits simultaneous limb salvage.
Surgeon education decreases radiation dose in complex endovascular procedures and improves patient safety

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Objective: Complex endovascular procedures such as fenestrated endovascular aneurysm repair (FEVAR) are associated with higher radiation doses compared with other fluoroscopically guided interventions (FGIs). The purpose of this study was to determine whether surgeon education on radiation dose control can lead to lower reference air kerma (RAK) and peak skin dose (PSD) levels in high-dose procedures.

Methods: Radiation dose and operating factors were recorded for FGI performed in a hybrid room over a 16-month period. Cases exceeding 6 Gy RAK were investigated according to institutional policy. Information obtained from these investigations led to surgeon education focused on reducing patient dose. Points addressed included increasing table height, utilizing collimation and angulation, decreasing magnification modes, and maintaining minimal patient-to-detector distance. Procedural RAK doses and operating factors were compared 8 months pre- (group A) and 8 months post- (group B) educational intervention using analysis of variance with Tukey pairwise comparisons and t-tests. PSD distributions were calculated using custom software employing input data from fluoroscopic machine logs.

Results: Of 447 procedures performed, 300 FGIs had sufficient data to be included in the analysis (54% lower extremity, 11% thoracic endovascular aneurysm repair, 10% cerebral, 8% FEVAR, 7% endovascular aneurysm repair, 5% visceral, and 5% embolization). Twenty-one cases were investigated for exceeding 6 Gy RAK. FEVAR comprised 70% of the investigated cases and had a significantly higher median RAK dose compared with all other FGIs (P < .0001). There was no difference in body mass index between groups A and B; however, increasing body mass index was an indicator for increased RAK. PSD calculations were performed for the 122 procedures that focused on the thorax and abdomen (group A, 80 patients; group B, 42 patients). Surgeon education most strongly affected table height, with an average table height elevation of 10 cm per case after education (P < .0001). The dose index (PSD/RAK ratio) was used to track changes in operating practices, and it decreased from 1.14 to 0.79 after education (P < .0001). These changes resulted in an estimated 16% reduction in PSD. There was a trend toward a decrease in patient to detector distance, and the use of collimation increased from 25% to 40% (P < .001) for all cases; however, these did not result in a decrease in PSD. The number of cases that exceeded 6 Gy RAK did not change after education; however, the proportion of non-FEVAR cases that exceeded 6 Gy decreased from 40% to 20%.

Conclusions: Surgeon education on the appropriate use of technical factors during FGIs improved operating practice, reduced patient radiation dose, and decreased the number of non-FEVAR cases that exceeded 6 Gy. It is essential that vascular surgeons be educated in best operating practices to lower PSD; nonetheless, FEVAR remains a high-dose procedure.