RR28.

Wall Composition of Popliteal Artery Aneurysms Differs From Abdominal Aortic Aneurysms

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Objectives: The abdominal aorta and the popliteal artery have comparable elastic artery-like mechanical properties. Popliteal artery aneurysms (PAA) and abdominal aortic aneurysms (AAA) often coincide. However, PAA are more often symptomatic resulting in either thrombosis or embolism, whereas AAA are often asymptomatic. We systematically assessed aneurysm wall composition of PAA and AAA to detect differences in pathophysiology.

Methods: Aneurysmal walls of 29 PAAs and 154 AAAs were collected from patients undergoing elective open surgical repair. Elastin, collagen, smooth muscle cell (SMC), iron and extent of inflammatory cells were determined by (immuno-) histochemistry. In addition, matrix metalloproteinase (MMP)2 and 9 activity was measured via activity assays.

Results: Adventitial chronic inflammatory infiltrate (composed of T-, B-lymphocytes and plasmacells) was more often observed in AAA than in PAA ($p < 0.001$), whereas chronic inflammation at the intimal side was more often observed in PAA than in AAA ($p = 0.004$). Despite original differences in the structure of the media between both anatomical localizations, aneurysmal degradation resulted in similar degraded elastin fibers and medial SMC. Iron was more often observed in PAA walls than in AAA walls ($p < 0.001$), indicating more previous intramural hemorrhages. MMP2 activity was higher in PAA compared to AAA ($p = 0.025$), whereas MMP9 showed no difference.

Conclusions: PAA show more signs of previous hemorrhages as compared to AAA, which might be explained by more (repetitive) external trauma in PAA, possibly via bending of the knee. In addition, inflammation in PAA is mainly located in the intima while its focus in AAA is in the adventitia. Our results suggest differences in the mechanism of aneurysm formation between both localizations and contribute to a better understanding of the difference in clinical consequences.

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RR29.

LEAP Classification Predicts Lower Extremity Amputation and Mortality in Diabetic Patients

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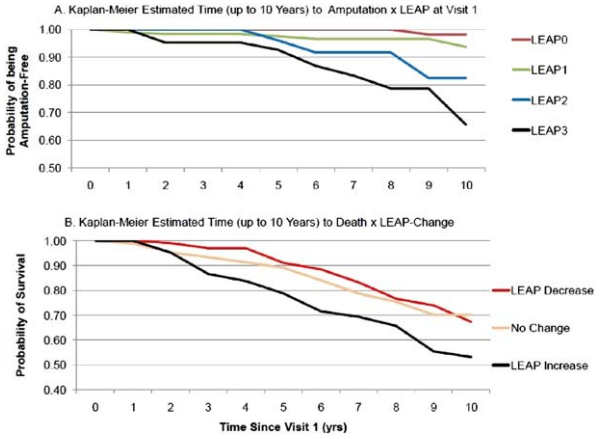
Objectives: The VA lower extremity amputation prevention (LEAP) clinic serves as a comprehensive program for limb salvage in individuals with diabetes mellitus. The aim of this study was to determine correlation of LEAP classification with likelihood of lower extremity amputation and mortality.

Methods: The LEAP clinic consists of an annual foot examination by a podiatrist who classifies patients as follows: LEAP 0 - no pathology, LEAP 1 - sensory loss and/or diminished circulation, LEAP 2 - sensory loss and/or diminished circulation with foot deformity, and LEAP 3 - sensory loss and/or diminished circulation with foot deformity and ulceration.

Results: 394 patients, who were enrolled in LEAP clinic from 1999-2008 at Washington DC VAMC with at least two clinic visits (1281 visits total), were analyzed. In multivariate analysis, for patients classified as LEAP 1, 2, or 3 at visit 1 compared to patients classified as LEAP 0, the hazard ratio of all later amputation was 2.91 (95% CI 0.27-31.83; ns), 15.97 (95% CI 1.05-243.72; $p < 0.05$), and 23.26 (95% CI 2.15 - 251.32, $p < 0.001$), respectively (Figure1A). A change in LEAP classification between visits predicted time to death (HR = 1.60, 95% CI 1.11-2.30, $p = 0.01$) (Figure 1B).

Conclusions: The identification of sensory loss and/or diminished circulation in the feet of diabetic patients should prompt swift action to prevent progression to LEAP 3 and thereby decrease the chance of lower extremity amputation and death.



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RR30.

Intraoperative DynaCT During Endovascular Aneurysm Repair

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Objectives: The aim of this study was to evaluate the use of intraoperative DynaCT (IODCT) to asses for successful aneurysm exclusion during endovascular aneurysm repair (EVAR).

Methods: Patients with EVAR who underwent IODCT were retrospectively evaluated. IODCT was performed with the 8sDSA protocol using 10s contrast injection and a 20s image acquisition time on Artis zeego with syngo DynaCT (Siemens Healthcare, Forchheim, Germany). Findings were compared with post-procedural multi slice detector CT (MDCT). 2D images and 3D post-processing reconstructions (Aquarius Workstation, TeraRecon, San Mateo, United States) were reviewed. Radiation dose was documented and contrast doses were compared between the two modalities. Statistical analysis was performed using a paired T-test. Results are expressed as mean ± standard error of the mean.

Results: On table, completion IODCT was performed on 12 patients undergoing EVAR (one infrarenal, 2 juxtarenal, 9 thoracoabdominal) and 5 patients undergoing treatment for persistent endoleaks (2 type Ia, 3 type III). 12 cases did not show an endoleak on completion IODCT, and this was confirmed on follow-up MDCT. In 5 cases, IODCT detected an endoleak at the completion of the procedure (one type Ia, one type II and 3 type III endoleaks). Type I and III endoleaks were immediately treated and were not detected on follow-up MDCT. The type II endoleak was not visualized on follow-up MDCT. No branch occlusions, stent fractures or component separations were noted on IODCT, and this correlated with follow-up MDCT. Mean skin dose was 0.552Gy (± 0.0099) for IODCT and dose length product was 2.665 Gy*cm (± 0.200) for MDCT. Mean contrast dose was 40cc for IODCT compared to 105.29cc (± 26.248) for MDCT ($p < 0.001$).

Conclusions: IODCT is of sufficient quality to serve as an imaging modality for evaluating aneurysm exclusion in EVAR with lower contrast dose than MDCT. It could potentially replace the need for follow-up MDCT.

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RR31.

Peak Perioperative Troponin I Levels With The Revised Cardiac Risk Index Predict Outcomes Following Vascular Surgery

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Objectives: An elevated cardiac troponin value above the Upper Reference Limit (URL) is associated with an increased risk of death following vascular surgery. We hypothesized that combining the peak postoperative troponin level with the preoperative Revised Cardiac Risk Index (RCRI) score would optimally predict long-term outcomes following vascular surgery.

Methods: Two hundred and five consecutive patients underwent vascular surgery between January 2005 and December 2007 at the Minneapolis Veterans Affairs (VA) Medical Center and 164 (80%) had routine troponin I assays drawn following surgery. Survival was determined from the centralized VA electronic medical records and long-term mortality was determined at 2.5 years following the vascular surgery. Patients with a peak troponin that exceeded the URL were categorized into LOW POS (<3X URL) and HIGH POS (≥3X URL) and together with the preoperative RCRI score, used to predict mortality, based on a log-binomial regression analysis.

Results: Eighty-five (41.5%) patients had an elevated peak postoperative troponin value and their long-term risk of death was increased relative to the remaining cohort (39% vs 6%; $p < 0.05$). Among the HIGH POS group, the risk of death was nearly 3-fold higher than the LOW POS group ($p < 0.05$) and more than 7.5-fold higher than the NEG group ($p < 0.05$). Based on results from the log-binomial regression analysis, combining the HIGH POS group with an RCRI score of ≥3 had a long-term risk of death that was 8.69 times higher than all remaining patients (RR = 8.69, 95% CI: 1.26-60.16; $p = 0.029$).

Conclusions: Patients with an elevated postoperative Troponin I value have an increased risk of mortality. When the peak troponin is 3X the URL, the risk of long-term mortality is 3-fold higher and when combined with an RCRI of 3 or more, increases by 9-fold. These data suggest that an optimal strategy for postoperative risk-stratification should consider preoperative clinical risk and peak postoperative cardiac troponin values.

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