living patients (84%) were rested. In 59% of patients there was reduction of thrombotic burden by >90%, and in 14% (29%) the reduction was 50% to 90%. Pa pressures fell from 33 ± 8 to 21 ± 7 mm Hg, \((P < 0.001)\). Decreased Pa pressure was not dependent on thrombus reduction.

The authors’ techniques combined a catheter-based mechanical and pharmacologic treatment of large PE was reasonably safe, with major bleeding rates of 14% compared with 9% in a recent meta-analysis of systemic thrombolysis only (Kearon C et al, Chest 2012;141:e419-48). The data, however, are not completely internally consistent, in that physiologic improvement in Pa pressure did not directly correlate with the reduction of thrombotic burden. Although it is known that imaging and physiology do not necessarily correlate precisely in other vascular beds, the authors’ observations suggest there may be more than just thrombotic burden contributing to the elevated Pa pressures in patients with PE.

Complete Replacement of Open Repair for Ruptured Abdominal Aortic Aneurysms by Endovascular Aneurysm Repair. A Two-Center 14-Year Experience


Conclusion: An endovascular aneurysm repair (EVAR)-only approach to treatment of patients with ruptured abdominal aortic aneurysm (rAAA) allows EVAR treatment of virtually all rAAA with low mortality and turnaround rates.

Summary: There is controversy regarding the benefit of EVAR in treatment of patients with rAAA. It has been suggested that improved mortality rates of rAAA in patients treated with EVAR does not necessarily reflect superiority of the endovascular procedure over the open procedure. It has been argued that patients treated with open surgery are hemodynamically less stable than those treated with EVAR. The argument, therefore, is that patients treated with EVAR for rAAA do better as a consequence of being more stable and anatomically better-risk patients. The authors’ favorable experience with EVAR for rAAA in the past led them to institute a policy of try-to-treat rAAA with EVAR whenever possible. In essence, this meant introducing adjunctive techniques, such as chimney procedures and iliac debranching as well as cooling of the aneurysm sac, to treatment of rAAA patients with EVAR. Since May 2009, all rAAA, except one, in the authors’ institutions have been treated by EVAR. The 30-day mortality was 24%. During the authors’ EVAR-only protocol for rAAA, only three patients (4%) were turned down for surgical treatment. From January 1998 until April 2009, the authors previously used an EVAR/open policy using an “EVAR-when-ever-possible” approach. In patients in whom abdominal decompression with laparotomy was performed, no decrease in mortality was observed for EVAR compared with open repair (unadjusted odds ratio, 1.1; 95% confidence interval [CI], 0.3-3.7); and adjusted odds ratio, 1.1; 95% CI, 0.3-3.7). There was a trend for increased 30-day mortality for the EVAR group in 2005 to 2009 compared with 1998 to 2004 (unadjusted odds ratio, 1.4; 95% CI, 0.4-5; and adjusted odds ratio, 1.7; 95% CI, 0.9-6.4).

Comment: Some patients with rAAA who arrive at the hospital alive are still going to die despite the use of EVAR for treatment. The report, however, does suggest that anatomic selection bias for apparent improved mortality rates with EVAR may not be the explanation for the apparent benefit of EVAR in the treatment of rAAA. EVAR avoids the physiologic challenge of an open operation for a patient in potential extremis. However, if the EVAR patient requires abdominal decompression, there is no difference in mortality compared with an open operation. Although the authors’ approach to treatment of rAAA requires considerable experience with endovascular techniques and a large array of devices immediately available, the growing ability and willingness to transfer patients with rAAAs to regional centers suggests that this approach is likely to gain increasing utilization.

Characteristics of Ischemic Brain Lesions After Stenting or Endarterectomy for Symptomatic Carotid Artery Stenosis: Results From the International Carotid Stenting Study-Magnetic Resonance Imaging Substudy


Conclusion: In patients with symptomatic carotid artery stenosis, those undergoing carotid endarterectomy (CEA) have fewer perioperative lesions on diffusion-weighted (DWI) magnetic resonance imaging (MRI) than those undergoing carotid artery stenting (CAS). CAS DWI lesions were smaller and more likely to occur in cortical areas and subjacent white matter.

Summary: The International Carotid Stenting Study (ICSS) randomized patients with symptomatic carotid artery stenosis to treatment with CEA or CAS. The ICSS-Magnetic Resonance Imaging Substudy of ICSS compared risk of perioperative cerebral ischemia on MRI between the two groups. Initial findings were that 50% of patients treated with CAS and 17% of those with CEA had one or more new ischemic lesions on DWI imaging at a median of 1 day after treatment (Bonati LH et al, Lancet Neurol 2010;9:353-62). However, this initial study provided only preliminary results and new outcomes were only reported for the absence of one or more new DWI lesions after treatment. This was reported independently of the total number of lesions, volume of lesions, and location of lesions. The authors postulated that comparing the total number of lesions per patient would provide more information and might be better suited to compare the risk of perioperative embolism between treatments. In this current analysis of the ICSS-MRI substudy, the authors compared numbers of new DWI lesions between patients with symptomatic carotid artery stenosis treated with CAS vs CEA. They also assessed the prevalence of lesions in various patient subgroups, and in addition, compared volumes of ischemic lesions and location of ischemic lesions between treatments. There were 124 patients in the CAS subgroup and 107 in the CEA subgroup of ICSS-MRI. CAS patients had higher lesion numbers than CEA patients (1 lesion, 15% vs 8%; 2-5 lesions, 16% vs 5%; >5 lesions, 16% vs 4%). The overall risk ratio for the expected lesion count with CAS vs CEA was 8.8 (95% confidence interval, 4.4-17.5; \(P = .0001\)). Lesion counts were significantly increased among patients with lower blood pressure at randomization, those with diabetes mellitus, and in the qualifying event, in patients with left-sided stenosis, and if patients were treated at centers routinely using filter-type protection devices during CAS. Individual lesions were larger in the CEA group than in the CAS group \(P < .0001\). Total lesion volume did not differ significantly between treatment groups. Lesions in the CAS group were more likely to occur in cortical areas and in subjacent white matter supplied by leptomeningeal arteries than lesions in the CEA group (odds ratio, 4.2; 95% confidence interval, 1.7-10.2; \(P = .002\)).

Comment: Previous nonrandomized studies have also reported more frequent occurrence of perioperative DWI lesions after CAS compared with CEA. The current study has similar findings. The volume of ischemic brain lesions was similar between the two groups according to the location of lesions in the CEA vs CAS patients. Of interest is that the authors found higher rates of DWI lesions associated with the use of filter cerebral protection devices. This suggests use of filter devices for cerebral protection during CAS may not be the route to improve perioperative results with CAS. Because of higher statistical power, analysis of lesion count may be the preferred method to compare treatment of atherosclerotic carotid artery stenosis in DWI-based studies.
from 9.8% to 5.5% ($P = .004$), and 1-year major amputation decreased from 25.4% to 18.2% ($P < .001$), with a corresponding odds ratio of 0.65 (95% CI, 0.517-0.838; $P < .0001$) as the volume increased. An increase in the chance of a revision surgery (10.6% vs 8.2%, $P < .001$) was seen with higher volume, with an increased odds ratio of 1.031 (95% CI, 1.005-1.057; $P = .018$).

Comment: Although the 30-day mortality for leg bypass is quite high in this series, this is another bit of evidence that outcomes for open vascular surgical procedures are better in hospitals with higher volumes of such procedures. The data have some limitations because it is unclear whether every procedure analyzed was an additional bypass, followed a failed endovascular procedure, or was a vein or prosthetic bypass. There are some additional oddities in the data, in that 54% of the patients treated with femoral distal bypass were supposedly treated for claudication. Nevertheless, the relationship between increasing volume and favorable outcomes for LEAB seems statistically solid. The data also suggest that benefits for limb salvage may be partly due to increased reintervention rates in higher-volume hospitals with perhaps better resources and willingness to attempt revisions rather than move to amputation.

Preoperative Factors Predict Mortality After Major Lower-Extremity Amputation

Conclusion: A risk calculator was developed to predict mortality after major amputation and may facilitate decision making for surgeons and their patients facing lower extremity amputation.

Summary: By 2050, there are expected to be >2 million lower extremity amputations per year in the United States (Ziegler-Graham K et al, Arch Phys Med Rehabil 2008;89:422-9). There are well-recognized risk factors for early mortality after amputation, including renal insufficiency, preoperative sepsis, older age, significant pulmonary and cardiac disease, as well as dependent functional status. Not all amputations are urgent, and many patients may choose to live with pain control or chronic nonhealing wounds if faced with a high-mortality procedure. To aid in the decision of whether to perform amputation for high-risk patients, the authors sought to develop a prediction tool based on preoperative factors to estimate the probability of perioperative death after lower extremity major amputation. They used the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database. Patients who underwent above-knee (AKA) or below-knee (BKA) amputation from 2005 to 2010 were identified. Univariate and multivariate analysis was performed to determine the association of preoperative factors with 30-day mortality. A computerized prediction tool was then created using multivariate models. Of 9368 amputation patients who were identified, 4032 underwent AKA and 5336 BKA. Mortality at 30 days was 12.8% for AKA and 6.5% for BKA ($P < .001$). The complication rate was 28.5% after AKA vs 26.6% after BKA ($P = .020$). Reoperation was more common after BKA (22.7% vs 17.7%, $P < .001$). Factors predicting death after AKA and BKA included older age, dependent functional status, dialysis, steroid use, preoperative sepsis, delirium, thrombocytopenia, increased international normalized ratio, and azotemia. Concordance indices of the prediction tools for AKA and BKA were 0.75 and 0.81 respectively, suggesting good predictive accuracy of the authors’ prediction tool.

Comment: The authors’ prediction tool appears accurate, but whether it will be used in clinical practice is unclear. This is a computer-based risk calculator. Values are entered for the patient’s preoperative characteristics, and the tool calculates the 30-day mortality after major amputation. The tool can be found online at https://www.surgery.wisc.edu/research/clinical-research-program/amputation_mortality_predictor/

Do Micropauses Prevent Surgeon’s Fatigue and Loss of Accuracy Associated with Prolonged Surgery? An Experimental Prospective Study

Conclusions: Significant muscular fatigue is associated with surgical procedures and has direct effects on a surgeon’s comfort and surgical accuracy. These effects are completely, or almost completely, prevented by micopauses (MPs).

Summary: Performing operations can be considered a hazard to surgeon health. Beyond obvious possible exposure to blood-borne infections, back and neck pain is also a potential, although poorly recognized factor, causing chronic ailment. There is a 72% prevalence of back or neck pain among otolaryngologists (J Laryngol Otol 2003;117:979-82). More than half of surgeons with back and neck pain attribute their symptoms directly to performing surgery. The authors postulate an effect of prolonged surgery on technical performance. A MP is a formal 20-second break every 20 minutes of work. This is a widely accepted strategy to optimize performance in individuals who have sedentary occupations, such as working in front of a computer. The authors designed an experimental crossover study where 16 surgeons were tested three times for the effects of MPs. They were tested in a controlled situation before any surgery (CTL) and twice after a prolonged, reproducible operation of at least 2 hours. One of these operations was conducted without formal MPs (WOMP) and one was conducted with formal MPs (MP). MP consisted of a 20-second break every 20 minutes. Muscular fatigue was tested by asking the surgeon to hold a 2.5-kg weight as long as possible with a stretched arm. Surgical accuracy was evaluated with a device for measuring mistakes made when following a predetermined path on a board. Visual analog scales were used to measure discomfort. The authors found a clinically significant and statistically significant difference between the CTL and WOMP groups in all three tests. MPs prevented, or virtually prevented the effects of fatigue associated with surgery (accuracy [number of errors]: CTL, 1.1; WOMP, 7.7; fatigue [seconds]: CTL, 137; WOMP, 92; WMP, 142).

Comment: The research identifies a link between long surgical procedures—and many vascular procedures are long—and surgeon fatigue, decreased strength, and importantly, decreased technical accuracy. With respect to technical accuracy, 11 of 16 surgeons (69%) made one or fewer mistakes on a test track in the control situation. None of them made fewer than four after surgery without MPs. The authors note that despite very positive responses using MP with the tested surgeons, few of the surgeons in the study continued to use MPs spontaneously after conclusion of the research! It appears even highly intelligent and motivated professionals have a difficult time breaking ingrained, but possibly adverse, habits.