Changing Presentation of Knee Dislocation and Vascular Injury: From High-Energy Trauma to Low-Energy Falls in the Morbidly Obese

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Objectives: Reports in the surgical literature of low-energy (LE) knee dislocations (KD) in obese patients have been increasing in recent decades. Little is known about the risk factors for KD by LE mechanisms and the outcomes of these patients compared with those with high-energy (HE) trauma.

Methods: Complete KDs presenting to the emergency department of a large urban level I trauma center were reviewed. Patient demographics, body mass index (BMI), injury mechanism, associated neurovascular injuries, and vascular repairs required were recorded. Risk factors for KD and concomitant injuries were compared between HE dislocations (defined as motor vehicle accidents) and LE dislocations (defined as low energy falls or sports injuries).

Results: Between January 1995 and April 2012, there were 53 patients with KD, of which 28 (52.8%) had HE injuries and 25 had LE injuries, with 18 (34.6%) of the latter group classified as obese (BMI ≥30 kg/m²). LE KDs in obese patients were associated with increased rates of concomitant arterial and nerve injuries compared with both HE KD patients and nonobese LE KD patients (P<.04 and P<.001, respectively). The rates of arterial and nerve injuries were greatest in the obese BMI (≥40 kg/m², P=.01 and P<.001, respectively). Despite the isolated nature of their injury, obese patients with LE KD stayed in hospital just as long as multisystem trauma, HE KD patients and significantly longer than nonobese LE KD patients. During a 17-year period, LE KD in the obese represented an increasing proportion and eventual majority of all KDs at our institution (P<.02).

Conclusions: LE KDs in obese patients are becoming increasingly prevalent. These patients are more likely to have vascular and nerve injuries and are more likely to require open vascular repair than patients with HE trauma or nonobese patients with LE KD. The epidemic of obesity in the United States presents unique challenges in the management of KD.

Table. Knee dislocation and associated injuries by mechanism and body mass index (BMI, kg/m²)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>High-energy (n = 28)</th>
<th>Low-energy (n = 32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated extremity injury, No. (%)</td>
<td>12 (42.9)</td>
<td>8 (71.4)</td>
</tr>
<tr>
<td>Any vascular injury, No. (%)</td>
<td>3 (10.7)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Popliteal repair, No. (%)</td>
<td>2 (7.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Nerve injury, No. (%)</td>
<td>2 (7.1)</td>
<td>1 (3.1)</td>
</tr>
<tr>
<td>Length of stay, mean ± SD days</td>
<td>11.4 ± 15.9</td>
<td>3.7 ± 3.0</td>
</tr>
</tbody>
</table>

SD, Standard deviation.

Medicare Age-Stratified Comparative Effectiveness of Carotid Revascularization Procedures: A National Evaluation

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Objective: The Center for Medicare and Medicaid Services (CMS) recently convened a meeting to discuss the National Coverage Decision for carotid artery stenting (CAS). This study evaluates the national outcome of carotid revascularization stratified by Medicare age (65 years).

Method: Data from the Nationwide Inpatient Sample (Healthcare Cost and Utilization Project, Agency for Healthcare Research and Quality) were used to identify all patients who underwent carotid endarterectomy (CEA) and CAS during a 5-year period (2005 to 2009). The primary end point was death, stroke, or cardiac complications.

Results: A total of 678,081 hospitalizations were identified with 87.9% (599,813) CEA and 12.1% (82,268) CAS. Most of the total procedures were done in patients aged ≥65 years (513,393; 75.7%). CAS patients were more likely to be symptomatic (11.8% vs 8.7% for ≥65 years, 16.0% vs 11.3% for <65 years; P<.0001), had emergent/urgent admissions, and had the procedure at a teaching hospital. About one-third of patients aged <65 years (32.1% CEA vs 32.3% CAS, P = NS) and more than half of patients aged ≥65 years (53.6% CEA vs 56.7% CAS; P<.0001) were medically high risk. The Table reveals the rates of the primary end point in the different subgroups. Multivariate logistic regression showed that CAS, being symptomatic, and “high-risk” status were independent predictors of the primary end point in both age groups. CAS was also associated with significantly higher costs than CEA.

Conclusions: This population-based evaluation showed that CAS was associated with higher rates of adverse outcomes and cost in patients undergoing carotid revascularization.

Table. Incidence of primary endpoint (death, stroke, cardiac) in patients undergoing carotid revascularization

<table>
<thead>
<tr>
<th>Patient subgroup</th>
<th>CEA</th>
<th>CEA 95% [CI]</th>
<th>CAS</th>
<th>CAS 95% [CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire cohort</td>
<td>4.3%</td>
<td>4.1-4.4</td>
<td>6.0%</td>
<td>5.4-6.4</td>
</tr>
<tr>
<td>Age &lt;65</td>
<td>3.6%</td>
<td>3.4-3.9</td>
<td>5.2%</td>
<td>4.5-5.9</td>
</tr>
<tr>
<td>&lt;65, asymptomatic</td>
<td>3.0%</td>
<td>2.8-3.3</td>
<td>3.9%</td>
<td>3.2-4.6</td>
</tr>
<tr>
<td>&lt;65, symptomatic</td>
<td>8.3%</td>
<td>7.4-9.3</td>
<td>12.0%</td>
<td>9.9-14.1</td>
</tr>
<tr>
<td>Age ≥65</td>
<td>4.3%</td>
<td>4.1-4.7</td>
<td>6.3%</td>
<td>5.7-6.8</td>
</tr>
<tr>
<td>≥65, asymptomatic</td>
<td>3.8%</td>
<td>3.6-4.0</td>
<td>4.1%</td>
<td>3.6-4.6</td>
</tr>
<tr>
<td>≥65, symptomatic</td>
<td>12.0%</td>
<td>11.2-12.8</td>
<td>22.5%</td>
<td>20.2-24.7</td>
</tr>
</tbody>
</table>

CAS, Carotid artery stenting; CEA, carotid endarterectomy; CI, confidence interval.

Variation in Smoking Cessation After Vascular Operations

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Objective: Smoking is the most important modifiable risk factor for patients with vascular disease. Vascular operations represent a potential opportunity for surgeons to influence smoking cessation. The purpose of this study was to examine smoking cessation rates after vascular procedures and delineate factors predictive of postoperative smoking cessation.

Methods: The Vascular Study Group of New England (VSGNE) registry was used to analyze smoking status preoperatively and at 1 year follow-up. Of 10,734 patients who underwent operations between 2003 and 2009, follow-up smoking data were available for 7807 (73%). Subsequent procedures on a single patient were excluded. Factors independently associated with smoking cessation were determined using multivariate analysis. Variation between centers was evaluated by calculating expected rates of cessation from the multivariate model and by analysis of means. VSGNE surgeons were surveyed regarding their smoking cessation techniques (an 85% response).

Results: At the time of their procedure, 2,606 of 7,807 patients (33%) were self-reported current smokers. Of these, 1,177 (45%) quit within the first year of surgery, with significant variation by procedure type (CAS, 27%; carotid endarterectomy, 43%; infragenular bypass, 46%; endovascular aneurysm repair, 49%; open abdominal aortic aneurysm [AAA] repair, 50%). Age >70 years (odds ratio [OR], 1.90; 95% confidence interval [CI], 1.30-2.76, P<.001), dialysis dependence (OR, 2.38; 95% CI, 1.04-5.43; P=.04), and open AAA repair (OR, 1.30; 95% CI, 1.03-1.63, P = .027) were independently associated with smoking cessation. Chronic obstructive pulmonary disease (OR, 0.76; 95% CI, 0.65-0.9, P=.001) and CAS (OR, 0.5; 95% CI, 0.27-0.92, P = .025) were associated with continued smoking. Independent of these factors, there was significant variation in smoking cessation rates based on surgeon (from 17 to 85%) and center (from 28 to 62%, Fig). Among survey respondents, 85% offered pharmacologic therapy and/or referral to a smoking cessation specialist. Patients of these surgeons had higher smoking cessation rates than those who did not offer medications or referral (48% vs 33%, P<.001).

Conclusions: Patients frequently quit smoking after vascular surgery, particularly after open AAA repair, but cessation rates vary widely between centers and surgeons. This variation presents an opportunity for vascular surgeons to impact smoking cessation at the time of surgery.

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Management of Isolated Calf Deep Vein Thrombosis: Is Treatment or Follow-Up Warranted

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Objectives: There is no consensus regarding the management of isolated calf deep vein thrombosis (DVT). The aim of this study is to determine the proper management of isolated soleal, gastrocnemius, peroneal, and posterior tibial vein thrombosis in an outpatient population. We further aim to identify the results of management of below the knee DVT (BDDVT) with serial ultrasound imaging during a 30-day period vs anticoagulation.

Methods: A retrospective review was conducted for records from January 2009 to December 2010 to identify patients with BDDVT. Trauma inpatients were excluded from the study. Univariate and multivariate analyses were conducted as well as descriptive statistics of the data.

Results: The study included 225 outpatients with isolated BDDVT. The cohort consisted of 41% male, predominantly Caucasian (88%) patients, who were a mean age of 64 years. Thrombus was present most frequently in the soleal vein (40.3%), followed by the gastrocnemius (25%), peroneal (23.5%), and the posterior tibial vein (11.3%). Anticoagulation was used to treat 30.7% of initially diagnosed BDDVTs. No statistically significant difference was noted in the rate of proximal propagation (P = .70), or pulmonary embolism (P = .60) with or without anticoagulation. A decrease of new thrombus in additional calf veins was seen with anticoagulation, 1.4% vs 14.1% without anticoagulation (P = .01).

Conclusions: In an outpatient population, serial ultrasound imaging is adequate management for BDDVT. There is no significant reduction in the rate of pulmonary embolism or proximal propagation for patients managed with anticoagulation vs serial duplex ultrasound imaging for isolated calf DVT. Owing to the formation of new thrombus, serial ultrasound imaging is warranted in an outpatient population.

Vascular Surgery Attending Night Float Call System Improves Quality of Life Without Decreasing Productivity

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Objectives: To examine the impact of the vascular surgery attending night float call system on productivity and quality of life.

Methods: A pre and post implementation study was performed. The mean productivity and quality of life over a year were compared before and after the implementation of the attending night float call system. The mean productivity and quality of life of 20 vascular surgeons who continued to continue the call system were compared to the mean productivity and quality of life of 20 vascular surgeons who stopped their call system.

Results: The productivity of the 6-month period before and after the attending night float call system was unchanged. However, during the week, the person who was on call for the weekend is no longer on call Monday through Thursday, nights only. There was no appreciable change in productivity during the day. Productivity was determined by comparing the group’s work relative value units 6 months before and 6 months after the revision. In addition, each partner answered a Likert scale questionnaire (1 = strongly disagree, 5 = strongly agree).

Conclusions: The attending night float call system has improved your quality of life. Mean score was 4.83 in response to, “The group spent more time with their family.” No appreciable change in productivity was noted (P = .41). This can be attributed to the fact that the attending night float system continues to be a part of the vascular surgery practice.

Utilization of Motor-Evoked Potential Monitoring During TEVAR: Can the Incidence of Spinal Cord Injury Be Reduced?

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Objectives: This study reviewed the benefits of motor-evoked potential (MEP) monitoring in reducing the risk of spinal cord injury (SCI) during thoracic endovascular aortic repair.

Methods: We performed a retrospective study using a prospective database of all patients undergoing elective TEVAR at our institution. All patients underwent intraoperative MEP monitoring. The incidence of SCI and the benefit of using intraoperative MEP was analyzed.

Results: Between December 2008 and December 2011, 105 elective TEVARs were performed in our institution. All procedures were performed with general anesthesia with intraoperative MEP monitoring. Sixty-two patients (59%) underwent concomitant performance of left carotid-subclavian bypass. Intraoperative MEPs showed a significant change in six cases (5.7%), all of which recovered with hemodynamic management and in two cases (1.9%) by using a cerebrospinal fluid drain. There were no instances of paraplegia or paraparesis. One patient (0.9%) had a type I endoleak and six (5.7%) had a type II endoleak. The 30-day mortality for this cohort was zero.

Conclusions: Use of MEPs changed the management in 5.7% of our patients, and was instrumental in preventing SCI in these patients. Using MEPs has allowed us to use cerebrospinal fluid drains on a selective basis versus routine. MEP monitoring is an inexpensive modality that may help reduce significant morbidity and long-term mortality for this patient population.

Surgical Management of Vascular Trauma From Dog Bites: The 10-Year Experience of a Level I Trauma Center

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Objectives: Vascular trauma from dog bites presents with a combination of crush and penetrating injury to the vessel, as well as significant adjacent soft tissue injury that carries with it an increased potential for infection. We present our 10-year experience in managing vascular trauma from dog bites to provide guidelines for treatment.

Methods: We identified 317 patients admitted with dog bites from October 2000 to August 2011 from our database. Twenty-one (6.6%) of these patients (n = 22 limbs) had vascular injuries requiring surgical intervention. Patient demographics, anatomic location of injury, clinical presentation, imaging, method of repair, and infection rates were reviewed for assessment of efficacy in preserving limb function. Pediatric patients were managed at the regional Children’s Hospital and therefore not included in this study.

Results: Amongst the 22 surgically treated limbs, there were 20 arterial and seven venous injuries (6 of the 7 were combined injuries), 18 (81.8%) involved the upper extremity, and four (18.2%) involved the lower extremity. The brachial artery was the most commonly injured vessel (n = 11/27, 40.7%), followed by the radial artery (n = 7/27, 25.9%). Associated injuries requiring repair included muscle and skin (n = 12/21, 57.1%), bone (n = 5/21 23.8%), and nerve (n = 4/21, 19%). Surgical repair of vascular injuries consisted of resection and primary anastomosis (n = 6: 3 arterial, 3 venous), interposition bypass of artery (n = 15), and ligation (2 arterial, 4 venous). All patients had debridement of devitalized tissue combined with pulse lavage irrigation and perioperative antibiotics. Additional postoperative antibiotic therapy was administered for a mean of 15.9 ± 2.6 days. Five patients (23.8%) developed postoperative wound infections but this did not compromise their vascular repair. All 22 limbs (100%) were viable at discharge and remained viable at 1-year follow-up.

Conclusions: Dog bite vascular injuries are associated with significant adjacent soft tissue trauma. Despite aggressive debridement and perioperative antibiotic therapy, nearly one fourth of these patients sustained wound infections requiring prolonged antibiotic therapy. All infections were successfully managed with broad-spectrum antibiotics and all limbs were preserved at one-year follow-up.