

was developed from this group yielded the following independent predictors of operative groin wound infection: previous groin incision, female gender, body mass index, end-stage renal disease, malnutrition, and urgent/emergency operation status. The C index of the resulting model was 0.845 and resulted in a correct classification of 88.6% of patients. Subsequent testing in the validation group (13.9% of whom sustained an operative groin wound infection) yielded an accuracy of 86.1% for our predictive model. We therefore developed a user-friendly computer program, which will be publicly accessible, that can be used to calculate an individual patient's risk of developing operative groin wound infection after lower extremity revascularization (Fig).

**Conclusions:** Our study is the first known attempt to develop and internally validate a statistical model that will accurately predict those patients who are likely to sustain an operative groin wound infection after lower extremity revascularization.

Fig. Risk calculator for postoperative groin wound infection.

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#### The Effect of Laser Wavelength on Endothermal Heat-Induced Thrombosis After Endovenous Laser Ablation

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**Introduction:** Endothermal heat-induced thrombosis (EHIT) of the common femoral vein or popliteal vein can occur after endovenous laser ablation (EVLA) of the saphenous veins. We have previously reported an incidence of 5.1% and identified that a vein diameter of  $\geq 7.5$  mm increased the risk of EHIT after EVLA using an 810-nm wavelength laser. The impact of laser wavelength on EHIT has not been previously evaluated, and we hypothesized that the incidence of EHIT would depend on the laser wavelength.

**Methods:** We identified patients having EVLA in our office from 2005-2014 with a 810-nm (hemoglobin-specific) or 1470-nm (water-specific) laser. We reviewed the records for age, gender, body mass index, CEAP class, vein(s) treated, adjunctive phlebectomy, energy delivered, EHIT (level  $\geq 3$ ) development, treatment and course. The Fisher exact test and Pearson  $\chi^2$  were used to evaluate the association between deep venous thrombosis (DVT) and the categorical variables. Logistic regression was used to evaluate the relationship between DVT and the continuous variables.

**Results:** There were 1456 veins ablated in 1118 patients (775 female, 343 male). The great saphenous vein (GSV) was treated in 1337, the small saphenous vein (SSV) in 77, and both were treated in 20 (22 procedures on accessory veins were excluded). The CEAP class for these patients was 1 (0), 2 (618), 3 (521), 4 (148), 5 (50), 6 (95) and not recorded in 2. EHIT occurred in 71 cases (4.95%), 68 after GSV ablation and three after SSV ablation. The 810-nm laser was used in 1142, and 64 (5.6%) developed EHIT. The 1470-nm laser was used in 292, with seven (2.4%) developing EHIT ( $P = .0229$  by Fisher exact test). The average energy delivered to the EHIT group ( $3475 \pm 1941$  joules) was higher than for the non-EHIT group ( $2866 \pm 1475$  joules;  $P = .0012$ ). The average vein diameter was higher in the EHIT group ( $9.3 \pm 3.9$  mm) than in the non-EHIT group ( $7.2 \pm 3.2$  mm;  $P = .0001$ ). EHIT occurred in 55 of 836 patients (6.17%) having simultaneous stab phlebectomy compared with 16 of 527 (2.95%) of patients having only EVLA ( $P = .0057$ ). Statistical analysis

confirmed there is significant association between DVT and CEAP class ( $P = .0001$ ). No differences were seen for age, body mass index, gender, anticoagulation use, combined bilateral procedures, or simultaneous GSV and SSV ablations between the two groups. EHIT in the femoral vein was at level 3 (22), 4 (18), 5 (17), and 6 (14), and treatment for the EHIT consisted of observation, anticoagulation, or antiplatelet therapy. Duration of therapy was usually brief. No pulmonary emboli occurred in any of these patients, and EHIT resolved completely in all.

**Conclusions:** This study shows that a water-specific laser fiber wavelength (1470 nm) reduces the risk of EHIT compared with a hemoglobin-specific wavelength (810 nm). It also demonstrates that CEAP class, increased energy delivery, simultaneous phlebectomy, and increased vein diameter are associated with increased risk of EHIT after EVLA.

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#### Revision Using Distal Inflow: A Safe and Effective Treatment for Ischemic Steal Syndrome After Access Creation

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**Introduction:** Ischemic steal syndrome (ISS) is a dreaded complication after hemodialysis access creation. Its management is complex and varied, with most requiring surgical revision for correction of symptoms. Revision using distal inflow (RUDI) has been described in small series for the treatment of ISS. We present our experience with RUDI for the treatment of ISS and pathologic high flow (HF).

**Methods:** We retrospectively reviewed consecutive patients who underwent RUDI for ISS from April 2010 to March 2014. Data collection included demographics, medical histories, subsequent procedures, volume flows, access usage, limb salvage, and patient survival.

**Results:** We performed 32 RUDI procedures in 31 patients (18 women, 13 men). Indications for surgery were pathologic HF in 15 and ISS in 21. Sixteen percent had prior plication for ISS or HF. Seventy-one percent of patients had a history of diabetes, and 52% had a history of atherosclerotic disease. Time to intervention from creation was 40 months (range, 6-88 months). Accesses included one upper arm graft and 30 brachial artery-based fistulas. Outflow included 26 cephalic veins and four basilic veins. Distalization targets were 20 radial arteries, nine ulnar arteries, and three distal brachial arteries. Mean flow reduction was 994 mL/min. Primary assisted patency at 1 year was 73%, and secondary patency was 88%. The RUDI in one patient was revised from a distal brachial to radial inflow. A single access was ligated for continued heart failure after RUDI. ISS symptom resolution was reported as complete in 81% and partial in 19%.

**Conclusions:** RUDI is an effective and lasting treatment of ISS and HF and comparable to reported experiences with distal revascularization-interval ligation, proximalization of the arterial inflow, and plication. Patient selection is key for optimizing relief of symptoms and maintaining use of the access.

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#### Exploring Patient Involvement in Decision Making for Vascular Procedures

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**Introduction:** Initiatives to develop patient-centered approaches to health care are a priority that may have profound effects on health care, particularly within value-based purchasing and risk-sharing models. Patient-centered care requires more direct engagement of patients in their own care, including treatment decisions. Patient participation in treatment selection for vascular procedures has not been characterized, and the potential effects of greater patient involvement are unknown. We conducted a prospective study among patients undergoing vascular procedures to identify important sources of information and characterize experienced vs desired decision-making roles.

**Methods:** Patients undergoing elective vascular procedures were identified from an outpatient clinic and vascular laboratory. An instrument consisting of multiple choice and open-ended response items related to patients' roles in decision making, sources of information, and perceived treatment success was administered. Diagnostic, demographic, and educational data were collected. Descriptive statistics are presented as count (%) for

categoric variables or mean  $\pm$  standard deviation for continuous variables. Categoric responses are presented as median (interquartile range) based on a 1-5 ordinal scale.

**Results:** The participants were 74 patients undergoing intervention for abdominal aortic aneurysm ( $n = 20$ ), hemodialysis access ( $n = 14$ ), carotid stenosis ( $n = 20$ ), and peripheral arterial disease ( $n = 20$ ). Mean age was  $68.8 \pm 12.4$  years, 43% were women, and 26% were African American. Highest educational level was college or graduate school for 35% of participants, 61% had computer access, and 41% regularly used e-mail. Participants identified providers as the most important information sources (1 [1, 1] for doctors and 2 [1, 3] for nurse practitioners, where 1 = "very important" and 5 = "not important"), whereas family and friends, written materials, and other patients were less important (3 [1, 5], 3 [2, 4], and 3 [2, 5], respectively), and television/video and internet resources were least important (4.5 [3, 5] and 5 [3, 5], respectively). Although participants had high levels of confidence in provider recommendations (1 [1, 1] for all procedure categories, where 1 = "very satisfied" and 5 = "not satisfied"), they had a strong preference to discuss all potential treatment options (1 [1, 1], where 1 = "strongly agree" and 5 = "strongly disagree") and to choose their treatment together with their doctor (1 [1, 2]) as opposed to only discussing the recommended treatment (2 [1, 3]) or delegating selection to the doctor alone (2 [1, 3]). Patients undergoing hemodialysis access and abdominal aortic aneurysm procedures most often reported discussion of more than one option (1.5 [1, 3] and 1.5 [1, 5], respectively), whereas discussion of multiple options was less common for peripheral arterial disease (2 [1, 3.5]) and carotid stenosis (3 [1, 5]). Thirty-seven participants (50%) considered their first treatment successful, 27 (36.5%) considered another subsequent treatment successful, and 10 (13.5%) considered none successful.

**Conclusions:** Patients experience varying participation levels in decision making for vascular procedures and often believe that their treatments are unsuccessful. Although patients consider providers an important source of information and have confidence in their recommendations, they prefer to discuss all treatment options being considered. Patients also prefer shared decision making over complete delegation to the provider. Increasing patient involvement in treatment decisions has potential to improve patient satisfaction but may require tools to facilitate more active participation. Potential impacts on other outcomes remains to be determined.

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#### Vascular Mock Oral Exams: A Review of the 8-Year Experience of the SAVS Mock Oral Program

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**Introduction:** In 2006, the Southern Association for Vascular Surgery (SAVS) implemented a mock oral examination program for current vascular trainees to help prepare them for the Vascular Surgery Certifying examination (VCE) of the American Board of Surgery (ABS). This report examines the 8-year experience with that program.

**Methods:** The SAVS mock oral examinations were structured to conform as closely as possible to the VCE. Examinees were administered three 30-minute examinations by examiners with whom they had no affiliation. A structured set of examination materials was used. Examinations were graded according to the contemporary standards of the ABS, and examinees were provided direct feedback from examiners at a debriefing session after the examination. A letter detailing the examinee's performance was also mailed to his or her program director. Participating examinees and examiners were identified from SAVS Recorder records and contacted via e-mail with a request to participate in an anonymous online survey. The survey for examinees asked about passage on ABS examinations and perceptions of the SAVS mock oral program. Examiners were asked for their perceptions of applicant performance as well as perceived areas for training improvement. Data are summarized using counts and percentages.

**Results:** From 2006 to 2014, 158 examinees and 86 examiners participated in the SAVS mock orals program. Thirty-three percent of examinees contacted and 35% of examiners contacted completed the anonymous survey. Twenty-seven examinees (60%) reported passage of the SAVS mock oral exam on their first attempt and seven of nine (78%) reported passage on the second attempt. Stage in training was significantly associated with passage of the mock orals ( $P = .002$  by Fisher exact test), with second-year fellowship trainees performing substantially better than first-year trainees. Overall, examinees participating in the SAVS program reported a first-time VCE pass rate of 93% (27 of 29). A recent ABS communication to vascular surgery program directors reported a first-time national pass rate of 83% for 2008 to 2013. A separate query of VCE passage for the examinee cohort is currently underway through ABS psychometricians (to ensure confidentiality), and those results will be added to this presentation when available. Of those who took the SAVS mock orals, 95% (42 of 44) reported that they will (or have) used the SAVS mock orals as a guide to their preparation for the VCE. One hundred percent of examinees questioned "would recommend" the SAVS mock oral examinations to future trainees. Ninety percent of examiners felt as though the SAVS mock oral examinations were "comparable" to the VCE, and 87% "strongly agreed" that the exercise was a valuable preparatory tool. Examiners identified "ability to describe technical aspects of open vascular techniques" and "management of complications associated with vascular disease processes and operations" as commonly displayed weaknesses among examinees (80% and 77% respectively).

**Conclusions:** The SAVS mock oral program is perceived to be of benefit by examinees and examiners. Reported first-time VCE board passage rates are favorable compared with national rates. Deficits in the description of open surgical techniques and complication management were commonly noted deficiencies in contemporary vascular surgical trainees.

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