

showed that accurate percutaneous positioning was challenging, but feasible, and subsequent phlebography showed closure of the vein. After this study, a central guiding needle was added to the prototype to maintain optimal orientation to the target vein while turning the device to adequate depth. A study in a human cadaver showed that percutaneous placement of the VeinScrew implant around the proximal GSV, using the guiding needle, was feasible (Fig 2, a-d).

**Conclusions:** The current studies show the feasibility of the VeinScrew concept. Future developments and translational studies are necessary to determine its potential as a new option in the phlebologist's toolbox.

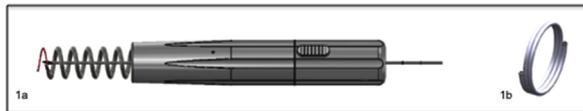


Fig 1.

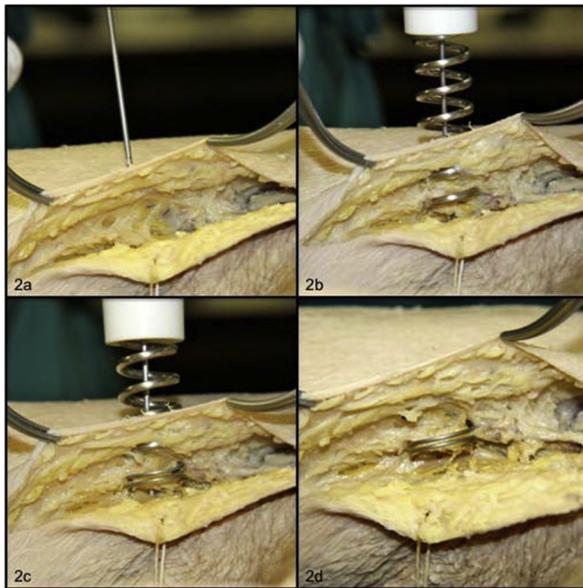


Fig 2.

**Author Disclosures:** D. Boersma: Nothing to disclose; G. de Borst: Nothing to disclose; F. Moll: Nothing to disclose.

#### FT05.

##### The Incidence and Risk Factors of Coronary Steal After Ipsilateral Arteriovenous Fistula in Patients With a Coronary Artery Bypass Graft

Sanghyun Ahn, MD, Seung-Kee Min, MD, PhD, Song-Yi Kim, MD, Sang-il Min, MD, Ho Young Hwang, MD. Seoul National University Hospital, Seoul, South Korea

**Objectives:** Ipsilateral arteriovenous fistula (AVF) may cause symptoms of coronary steal in patients who have undergone coronary artery bypass graft (CABG) using the internal mammary artery. The purpose of this study was to

evaluate the adverse effects of ipsilateral AVF on CABG and the incidence of coronary steal, and analyze risk factors for coronary steal.

**Methods:** Between 2000 and 2013, a total of 25 patients undergoing hemodialysis via upper extremity AVF, ipsilateral to the pre-existing CABG, were reviewed retrospectively. Clinical assessment related to coronary steal, echocardiography before AVF, and coronary angiography after symptoms were assessed. The definition of coronary steal was the newly developing one or more of the following symptoms within 12 weeks after AVF creation: chest pain, chest discomfort, and dyspnea.

**Results:** Three patients were diagnosed with coronary steal by our definition. LVEF was statistically lower in coronary steal group compared with the no steal group (41.7% vs 50.9%;  $P = .036$ ). Patients in coronary steal group were older at the age of CABG surgery and showed a higher incidence of RWMA than those in the no steal group, which were not significantly differences between these two groups. During the follow-up period, overall nine patients complained of one of the symptoms (chest pain, chest discomfort, and dyspnea), including patients diagnosed with coronary steal.

**Conclusions:** Coronary steal after ipsilateral AVF creation in patients with CABG using in situ ITA developed in 12%, which can be related to low LVEF. In patients with CABG requiring AVF for hemodialysis, the ipsilateral fistula to the grafted ITA should be carefully selected and performed.

**Author Disclosures:** S. Ahn: Nothing to disclose; H. Hwang: Nothing to disclose; S. Kim: Nothing to disclose; S. Min: Nothing to disclose; S. Min: Nothing to disclose.

#### FT06.

##### Neuromuscular Electrical Stimulation in the Management of Intermittent Claudication: A "Stimulating" Prospect



Adarsh Babber, MBBS, MRCS, Raveena Ravikumar, MBBS, MRCS, Katherine Williams, MBBS, MRCS, Alun H. Davies, FRCS, DSc. Imperial College London, London, United Kingdom

**Objectives:** There is a significant global health and economic burden of peripheral arterial disease (PAD), which is estimated to affect 202 million people worldwide with a U.S. treatment expenditure of \$4.37 billion in 2001. Symptomatic PAD most commonly presents with intermittent claudication or lower limb pain on exertion that settles with rest. This limits exercise tolerance and impairs quality of life. Management strategies include best medical therapy for cardiovascular risk-factor modification with supervised exercise, before progressing to invasive endovascular or surgical interventions. Neuromuscular electrical stimulation (NMES) is a novel emerging noninvasive technology. The Revitive IX foot-plate device stimulates the calf muscle pump, improving lower limb circulation. The aim of this study was to assess the efficacy of this NMES device in the management of PAD.

**Methods:** Patients meeting the inclusion criteria were recruited from the vascular outpatient clinic. During

an initial appointment, baseline measures, including the primary outcome of absolute walking distance (AWD) and secondary outcome of initial claudication distance (ICD) were determined by a treadmill test. Secondary outcomes included quality of life scores from the disease-specific Intermittent Claudication Questionnaire (ICQ) and generic EuroQoL 5D (EQ-5D) questionnaire. All patients were then instructed to undergo 30 minutes of NMES daily for 6 weeks before follow-up, and repeated measures were undertaken. Statistical significance for continuous data was calculated by paired *t*-test.

**Results:** A total of 20 consecutive patients (16 males and 4 females), with an average age of 70.8 years, completed the study protocol. The mean AWD improved significantly over the intervention period by ~ 85 meters (102.3 vs 187.2 meters;  $P = .002$ ), as did the mean ICD by 38 meters (50.5 vs 88.2 meters;  $P = .0008$ ). Disease-specific ICQ scores improved from 44.3 at the baseline appointment to 35.21 ( $P = .009$ ) at 6 weeks, with the EQ-5D measures also improving significantly (0.5427 vs 0.6443;  $P = .005$ ) over the same period.

**Conclusions:** This proof-of-concept study has shown that NMES reduces the symptom burden of PAD by improving exercise tolerance and quality of life. This data warrant a robust randomized controlled trial to assess the efficacy of NMES as a noninvasive management strategy in PAD, which may delay disease progression and therefore the need for invasive interventions. NMES devices are portable, safe, and may prove an effective strategy to reduce the global health and economic burden of PAD.

**Author Disclosures:** **A. Babber:** Nothing to disclose; **A. H. Davies:** Nothing to disclose; **R. Ravikumar:** Nothing to disclose; **K. Williams:** Nothing to disclose.

#### FT07.

##### Endovascular Revascularization Superior to Major Amputation in Nonambulatory Patients With Ulceration and Gangrene



Rafael Santini Dominguez, MD<sup>1</sup>, Jonathan Ramirez-Vazquez, MD<sup>2</sup>, Sigfredo Villarin-Ayala, MS<sup>3</sup>, Ivan Iriarte, MD<sup>4</sup>, Jorge L. Martinez-Trabal, MD<sup>1</sup>. <sup>1</sup>St. Lukes Memorial Hospital General Surgery Program, Ponce, Puerto Rico; <sup>2</sup>St. Lukes Memorial Hospital General Surgery Program, Bajadero, Puerto Rico; <sup>3</sup>Ponce Health Sciences University Medical School, Hormigueros, Puerto Rico; <sup>4</sup>Ponce Health Sciences University Medical School, Ponce, Puerto Rico

**Objectives:** Nonambulatory status is considered a relative contraindication for revascularization in the setting of limb-threatening peripheral arterial disease (PAD). It is common practice to amputate the affected limb without attempting an endovascular revascularization. We sought to determine whether a limb preservation procedure in this population could be justified in terms of morbidity and mortality.

**Methods:** From January 2012 to January 2014, 52 nonambulatory patients with severe PAD with tissue loss were divided into patients who underwent major amputation ( $n = 19$ ) and endovascular revascularization for limb preservation ( $n = 33$ ). Both groups were compared based on postoperative morbidity, including acute kidney injury, transfusions, acute myocardial infarction, and stroke within

1 year, and 1-year mortality. The Rutherford classification and the Society for Vascular Surgery (SVS) Lower Extremity Threatened Limb Classification were used for PAD severity classification. The revascularized patients were subdivided in patients whose limb was preserved and the patients who required a major amputation at 1 year. Multivariate Cox regression was used to evaluate the relevance between risk factors and eventual major amputation.

**Results:** The mean age was 69.1 for the revascularization group and 74.6 for the amputation group ( $P = .16$ ). There was no significant difference in patient comorbidities in both groups, including gender, end-stage renal disease, coronary artery disease, American Society of Anesthesiologists, diabetes mellitus, and hypertension, except for hyperlipidemia being higher in the revascularized group ( $P = .02$ ). SVS ( $P = .09$ ) and Rutherford classification ( $P = .10$ ) did not show any significant difference. Postoperative morbidity ( $P = .89$ ) was similar in both groups. Mortality at 1 year was 33% in the amputated group and 12.0% in revascularized group ( $P = .18$ ). SVS classification of 3 ( $P < .01$ ) and Rutherford of 6 ( $P = .09$ ) were significantly associated with mortality. Endovascular revascularization showed a protective effect in terms of mortality (hazard ratio [HR], 0.10;  $P = .10$ ). The number of limbs needed to be revascularized to prevent one death was five (NNT =  $1/[.33 - .12]$ ). The limb salvage at 1 year for the revascularized group was 50% (18 of 36). Factors associated with major amputation after revascularization were coronary artery disease (HR, 3.26;  $P = .14$ ), end-stage renal disease (HR, 2.54;  $P = .27$ ), higher TASC (HR, 2.37;  $P = .12$ ), and higher SVS classification (HR, 1.05;  $P = .93$ ).

**Conclusions:** Revascularization in nonambulatory patients is associated with a decrease in amputations and mortality at 1 year. Data suggest a protective effect is derived from revascularization even in those patients who were amputated. The high percentage of limb salvage and the NNT to prevent one death supports the use of endovascular revascularization in nonambulatory patients.

**Author Disclosures:** **I. Iriarte:** Nothing to disclose; **J. L. Martinez-Trabal:** Nothing to disclose; **J. Ramirez-Vazquez:** Nothing to disclose; **R. Santini Dominguez:** Nothing to disclose; **S. Villarin-Ayala:** Nothing to disclose.

#### FT08.

##### Results of Open or Endovascular Management of Thrombosed Popliteal Artery Aneurysms Following Successful Intra-arterial Thrombolysis in a Multicentric Registry



Walter Dorigo, MD<sup>1</sup>, Raffaele Pulli, MD<sup>2</sup>, Carlo Pratesi, MD<sup>1</sup>. <sup>1</sup>University of Florence, Florence, Italy; <sup>2</sup>University of Bari, Bari, Italy

**Objectives:** This study compared early and late results of peroperative intra-arterial thrombolysis, followed by open or endovascular management of thrombosed popliteal artery aneurysms (PAAs), in a retrospective multicentric registry.

**Methods:** From January 2000 to December 2011, 312 open and endovascular interventions for PAA were performed in seven Italian hospitals. In 43 patients with thrombosed or embolizing PAAs and mild to moderate limb ischemia intra-arterial thrombolysis was carried out; in 12 of these patients, thrombolysis was ineffective (10 cases) or