Amputation Prevention Via OCT-Guided Recanalization of Failed Venous Bypass Graft
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Venous Graft Failure in PAD
Bypass surgery in peripheral artery disease (PAD) is predominantly reserved for patients with late-stage disease, encompassing CLI patients and patients with diabetic foot ulcers and chronic kidney disease. When undergoing a surgical revascularization, great saphenous veins are most commonly used as graft conduits, followed by alternative autologous veins, and when not feasible, by synthetic bypass grafts. Bypass surgery is associated with 12-60% failure rate and bypass graft failure in patients with limb-threatening ischemia carries an amputation rate of greater than 50%, with a redo bypass often being challenging due to a lack of conduit and risk of surgical complications.

For the patients who are poor surgical candidates, percutaneous revascularization may be the only option for graft salvage. It has been recently demonstrated that continuous graft surveillance post-surgery, substantially improves their long-term grafts patency. Further advancement in technologies salvaging SVG grafts remains a major medical need for physicians managing this challenging patient population.

OCT-Guided Graft Recanalization
Luminal angiography has long been the gold standard for visualizing the treated arterial beds. Nevertheless, the structural composition of diseased vascular conduits is often not adequately visualized. Pantheris (Avinger, Redwood City, CA) is the first catheter to incorporate OCT based real time diagnostic imaging at the point of therapy, to determine plaque location, morphology, and to guide its directional cutting blade for removal of plaque from the diseased vascular conduit. Accordingly, in patients with saphenous vein graft failure, OCT may provide superior ability accurately define focal plaque eccentricities, allowing the physicians to clearly interpret and discern between structures in healthy and diseased tissues.

The ten patient case series presented herein demonstrates the benefits in the utilization of OCT-guided atherectomy system, Pantheris, for the recanalization of failed venous bypass grafts.

Revascularization of Venous Graft Stenosis

Patient 65 y.o female
Graft failure 16 years post-surgery
Diagnosis
Significant stenosis at the proximal anastomosis site and plus stenosis distally
Treatment
Pantheris
Procedure
Distal part of the vein graft did not appear occluded via angio but OCT from Pantheris shows thickened neointimal hyperplastic tissue.

Patient 83 y.o female
Graft failure 2 month post-surgery
Diagnosis
Significant stenosis in the distal portion of the graft with evidence of anastomotic stenosis.
Treatment
Pantheris and DCB
Procedure
The graft revascularization was initiated with IVUS interrogation and Silver Hawk atherectomy, but the distal aspect of the graft showed moderate stenosis with IVUS and severe stenosis with Angiography. The revascularization was completed with 7f Pantheris for its precise intravascular guidance. Pantheris identified the area of the disease and removed the neointimal hyperplasia.

OCT-Guided Pantheris atherectomy system:
- OCT imaging window, cutter blade and nosecone
- Characteristic of stenotic vein grafts treated with Pantheris.

Representative Case A
- Necrotic core adjacent to media
- Trough up to media edge following removal atheroma from venous bypass

Representative Case B
- Severe stenosis and diffuse atheroma at distal anastomosis
- Two troughs cut to medial edge