ENDOVASCULAR

CRT-300.00

Percutaneous Coiling Closure of Ascending Aortic Pseudoaneurysm

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BACKGROUND Ascending Aortic Pseudoaneurysms (AAPs) are a rare but life-threatening complication of AA surgeries. Open repairs using surgical grafts are the current standards of care. Endovascular therapies remain less studied options for high-risk patients. We present a case of percutaneous coiling of AAP.

CASE REPORT A 61 year-old female was admitted for chest pain with a prior history of surgical AAP repair following an AA surgical graft for a Type A dissection. A CT angiography of the chest showed a 6x4cm AAP arising from the proximal portion of the previous graft. The AAP neck was estimated at 7mm, arising 20 degrees from the anterior/oblique lower end of the previous graft. Due to her multiple cardiac surgeries and comorbidities, she was not a candidate for CT surgery. Instead, an endovascular approach was selected for treatment. Initially, an attempt was made using an Amplatzer cribiform occluder. However, due to the short AP diameter, adequate wire needed to advance the delivery sheath was unsuccessful. A percutaneous coiling procedure was instead performed. After getting bilateral common femoral accesses, a 6 Fr IMA guide catheter was used to engage the AAP. A 4 Fr Glidecath with 0.014" wire was advanced into the IMA guide wire to access the AAP. Thirty-five 0.035in Azur Framing Coils and Azur with Hydrogel Coils ranging from 20x50mm to 6x20mm were then introduced into AAP. The patient tolerated the procedure without complications. A three-month follow up CT scan showed a thrombosed AAP with minimal residual shunt.

DISCUSSION Retrospective studies report high mortality for open surgical repairs for AAP. Endovascular approaches are however limited to case reports as they are offered to high-risk patients. Septal occluders and stent grafts were used successfully in previous studies with similar in-hospital mortality rates compared to open repairs. In the case of septal occluders, narrow neck aneurysms posed a challenge for delivery of the occluder, a problem we also encountered. Similarly, the current stenting material was primarily designed for the abdominal aorta and the tortuous nature of the AA and its proximity to the aortic valve and coronaries make it difficult to translate this technique. Coiling has been used primarily as an adjuvant to other endovascular techniques but only a handful of case reports have been published reporting its stand-alone use.

CONCLUSION Patients who are at high risk for surgical repair of AAP have several available endovascular options for treatment depending on the size and characteristics of the AAP.

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Performance Characteristics of Alcohol-Mediated Endovascular Renal Denervation

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BACKGROUND Efficient and safe neurolysis is key to performing a successful renal denervation procedure. Chemical neurolysis based on the perivascular infusion of alcohol via endovascular technique represents a safe and effective method which includes performance characteristics essential to the procedure.

METHODS The Peregrine System™ Infusion Catheter contains 3 micro-needles which are deployed through the media of an artery into the adventitial region. The device is directed into the renal arteries using standard endovascular techniques. A small volume of Dehydrated Alcohol (0.3 mL-0.6 mL) when infused through the catheter, distributes circumferentially and axially along the vessel. The infusion is performed at a single site of each renal artery. Alcohol is a well-characterized neurolytic agent and functions in a consistent, dose-dependent fashion by a combination of cellular dehydration, extraction of lipids, and precipitation of proteins of target tissue. Targeted delivery of the alcohol to the perivascular space ensures that the perirenal nerves are destroyed while preserving adjacent tissue.

RESULTS No procedural vascular adverse events have been reported with the use of the Peregrine Catheter. The delivery mechanisms of the device are highly flexible and atraumatic. Alcohol, as a hygroscopic agent, distributes evenly at the site of infusion. Ablation depths of up to 13 mm, as measured from the IEL, are observed. Alcohol is distributed circumferentially around the vessel (with some variation due to adjacent anatomic structures) to form a 'cuff' surrounding the artery at the infusion site. An ablation area of up to 57 mm2 have been reported based on morphometric measurements. Renal norepinephrine has been reduced by 64%-86% compared to controls. Since a single deployment and infusion is required at each renal artery, procedure time, contrast, radiation exposure are all reduced.

CONCLUSION Preclinical data has shown that endovascular alcohol-mediated renal denervation using the Peregrine Catheter incorporates the performance characteristics required to produce more effective neurolysis of the sympathetic perirenal nerves. On-going and completed clinical trials continue to demonstrate promising results of both safety and effectiveness.

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Treatment of Upper Extremity Critical Limb Ischemia via Orbital Atherectomy—A Single Center Observational Retrospective Analysis

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BACKGROUND Upper Extremity Critical Limb Ischemia (UE-CLI) can be devastating and may result in amputation. Distal vessel calcification has been shown to be a major factor in causing hand ischemia. Atherectomy in the upper extremities is not typically considered due to the small anatomy; however, the Peripheral Orbital Atherectomy System (OAS) (Cardiovascular Systems, Inc.) can access treatment areas with a reference vessel diameter of 1.5mm.

METHODS A retrospective, observational, single center (Merit Health Center, Jackson, MS) analysis of 12 patients with calcific disease of the radial artery and UE-CLI was completed to ascertain a treatment algorithm using orbital atherectomy. Demographics, wound healing, and outcomes were assessed.

RESULTS All patients had good flow to the hand after intervention and none experienced complications during or immediately post-procedure (Figure). The patients have not returned for repeat procedures on the lesions presented here. This retrospective analysis revealed the following important elements for a treatment algorithm using the OAS for UE-CLI: 1. Make sure ACT is therapeutic (~250 seconds); 2. Use very gentle wire manipulation; 3. Utilize a small OAS crown (1.25 mm); 4. Be aggressive with vasodilators and give it through the exchange catheters; 5. Balloon size for angioplasty should match the size of the vessel. Complete long and low pressure inflations. If a small area does not respond, use a smaller balloon with higher atmosphere inflation pressure.

CONCLUSION Upper Extremity Critical Limb Ischemia (UE-CLI) can be treated with endovascular techniques. Obtaining good outflow to the fingers is critical for wound healing and preventing amputation. Orbital atherectomy is a useful tool in preparing vessels for balloon angioplasty; particularly in cases where calcification is present.