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Guess the Case

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INTRODUCTION

A 71-year-old man was seen with a 4-day history of persistent right lower leg and foot pain that began acutely, with new-onset severe right calf claudication at a distance of less than 20 feet. The pain started shortly after he completed mowing his yard. The patient had no history of claudication.

His medical history was significant for hypertension, type 2 diabetes mellitus, and laparoscopic cholecystectomy. He had no history of arrhythmia, stroke, or hypercoagulable condition. On physical examination, his right leg was cool from the calf to his toes, with slightly dusky-appearing skin and 3-second capillary refill. His foot was tender to palpation, with decreased movement. The right femoral artery had a 2+ palpable pulse. There was no palpable pulse or Doppler signal at the right popliteal, dorsalis pedis, or posterior tibial artery. Ankle-brachial index was 0.00 on the right and 0.83 on the left. The left leg had 2+ palpable pulses at the left femoral, popliteal, dorsalis pedis, and posterior tibial arteries.

An angiogram demonstrated complete occlusion of the distal right superficial femoral artery at the level of the adductor canal (Figure 1). After percutaneous intra-arterial pharmacologic thrombolysis with urokinase alfa and catheter-directed mechanical thrombolysis, in-line flow was restored to the distal leg arteries. A second angiogram demonstrated an arterial abnormality (Figure 2).

Question: What is the diagnosis and what treatment would you recommend?

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Diagnosis and Treatment

The patient had an acutely thrombosed right popliteal artery aneurysm. This was confirmed by the angiogram that demonstrated an aneurysmal lumen in the popliteal artery after successful thrombolysis (Figure 2). After thrombolysis, ultrasonographic measurement demonstrated that the diameter of the aneurysm was 2.1 cm. The patient underwent percutaneous endovascular treatment of the popliteal aneurysm with a covered stent graft (Viabahn; W. L. Gore & Associates, Flagstaff, Ariz). This treatment completely excluded the aneurysmal sac (Figure 3). The patient began an antiplatelet clopidogrel bisulfate regimen and was discharged home the following day. His leg pain and claudication completely resolved with this treatment. His postoperative ankle-brachial index was 0.92 on the right lower extremity. He remains asymptomatic with a patent popliteal stent graft at 5 months after placement.

DISCUSSION

Popliteal artery aneurysms are the most common peripheral arterial aneurysms, accounting for more than 70% of all peripheral aneurysms.[1,2] While the natural course of most arterial aneurysms is continued growth and eventual rupture, the most common clinical presentation of a popliteal artery aneurysm is acute limb ischemia from thrombosis of the aneurysm. Rupture is rare, seen in less than 10% of patients diagnosed as having popliteal artery aneurysms. Up to one third of the patients may be asymptomatic at the time of diagnosis.

About 50% of patients with popliteal aneurysms have concomitant abdominal aortic aneurysms, and 50% of patients have a concurrent popliteal aneurysm in the contralateral leg.[1,2] Asymptomatic lesions can be found with careful physical examination of the popliteal space, which may identify prominent pulsations. If the aneurysm is thrombosed, a firm mass without pulsations may be palpated. Confirmation of the diagnosis by duplex ultrasonography should follow.

Once diagnosed, additional evaluation of the arterial system and distal outflow at the tibial vessels is usually necessary in preparation for definitive treatment. Long-term limb salvage and primary

Figure 1. The angiogram reveals an occlusion of the distal right superficial femoral artery at the level of the adductor canal (arrow).

patency rates are significantly influenced by proximal inflow and distal runoff vessel status.[2,3] Arteriography has traditionally been used for this evaluation of the distal leg arteries, but computed tomographic angiography has been substituted because it is less invasive and can offer additional anatomic information on the popliteal space, as well as 3-dimensional reconstruction of the arterial structures.

Elective repair of asymptomatic popliteal artery aneurysms exceeding 2 cm in diameter or containing mural thrombus is recommended, as the risks of development of limb ischemia and eventual limb loss increase with diameter and with time.[2–6] Emergent repair in patients who are initially seen with acute thrombosis is associated with decreased long-term patency and with increased mortality and carries a 16% to 67% amputation rate.[2] The 5-year patency after emergent repair of symptomatic aneurysms ranges from 39% to 70%.[2,6,7]

Figure 2. The angiogram obtained after successful pharmacologic and mechanical thrombolysis. An arterial abnormality is identified at the level of the knee (arrow).

Figure 3. A postdeployment angiogram demonstrates complete exclusion of the previously identified popliteal artery aneurysm with the covered stent graft without evidence of endoleak.

The ''gold standard'' for repair is ligation with exclusion of the aneurysmal sac and bypass with a reversed saphenous vein. This technique can yield 5-year primary patency rates ranging from 82% to 97% in elective cases.[2,3,7] The long-term durability of the reconstruction is dependent on the choice of conduit, the quality of the inflow and outflow arteries, and the urgency of repair.[3–5] Autologous vein offers greater long-term patency than prosthetic conduits.[5] Ensuring good distal outflow also improves long-term patency rates. Therefore, clearing the outflow arteries via thrombolysis in patients who present acutely with an ischemic limb is critical for successful treatment.

Endovascular repair using a standard commercially available covered stent graft may be a viable option for a certain population of patients.[8] Because of concerns about migration, fracture, thrombosis, or stenosis of the stent graft, the durability of endovascular repair is uncertain regarding its exposure to repetitive knee joint flexion. Although long-term studies are needed to clearly delineate the optimal role for this technique, several studies[4,9,10] have demonstrated comparable primary and secondary

patency rates in elective endovascular repair vs traditional open repair.

An endovascular approach to repair the popliteal artery aneurysm for the patient in this case report was selected because of his excellent inflow and disease-free 3-vessel distal runoff, as well as the decreased operative time and minimal morbidity associated with the percutaneous endovascular technique. In addition, the excellent clinical response to thrombolysis and suitable vascular anatomy facilitated the ease of endovascular stent graft repair. The addition of clopidogrel therapy was based on its reported contributions to long-term patency of popliteal stent grafts in coronary artery bypass grafting,[11] femoropopliteal artery stenting,[12] and hemodialysis grafts.[13] The duration of antiplatelet therapy after popliteal artery aneurysm stent graft repair has yet to be fully elucidated.[8]

Follow-up surveillance is focused on duplex imaging of the reconstruction for stenosis or aneurysmal changes. Because of the high incidence of aneurysmal variations to the contralateral popliteal artery and the aorta in these patients, ultrasonographic screening of these vessels is also recommended.

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