SHORT REPORT

Transluminal Coil Embolization of an Inferior Gluteal Artery Aneurysm by Ultrasound-guided Direct Puncture of the Target Vessel

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Pseudoaneurysms of the inferior gluteal artery are rare. We describe a case of an inferior gluteal pseudoaneurysm that presented as a painful mass in the buttock. A percutaneous thrombin injection under ultrasound guidance failed to occlude the sac, probably due to the wide neck of the aneurysm. Subsequently, transluminal coil embolization by ultrasound-guided direct puncture of the inferior gluteal artery achieved complete thrombosis of the sac. Ultrasound-guided coil embolization is recommended in the treatment of peripheral aneurysms where catheter placement using conventional interventional procedures is difficult.

Gluteal aneurysms are uncommon, and the majority are pseudoaneurysms caused by penetrating or blunt trauma to the buttock.1,2 In the past, the treatment for gluteal aneurysms was surgical repair. Recently, transcatheter embolization has been recognized as an alternative treatment.3,4 Here, we report a case of an inferior gluteal pseudoaneurysm that was successfully treated with transluminal coil embolization by direct puncture of the inferior gluteal artery under ultrasound guidance.

Case Report

A 78-year-old woman presented with a painful swelling in the right buttock. There was no history of trauma or infection. She had been undergoing antiplatelet therapy with ticlopidine for 5 years due to a cerebral infarction. The patient was also receiving a calcium channel blocker for hypertension and sulfonylureas for diabetic mellitus. Physical examination revealed a nonpulsatile mass in the right buttock. The right lower extremity had decreased pulses, and the ankle brachial index was 0.68 on the right and 1.08 on the left. A CT scan showed a $7 \times 4.5$ cm aneurysm with a mural thrombus under the gluteus maximus muscle (Fig. 1). Arteriography demonstrated a pseudoaneurysm arising from the right inferior gluteal artery (Fig. 2). The right external iliac artery was occluded and the common femoral artery was filled through collateral vessels from the superior gluteal and obturator arteries. Catheter placement into the inferior gluteal artery using a conventional interventional procedure was unsuccessful. Embolization of the internal iliac artery can cause ischemia of the lower extremity, since it occludes the superior gluteal artery, which is an important vessel for providing blood flow to the lower extremity. Furthermore, surgical treatment via a posterior approach through the right buttock is a relatively invasive procedure for elderly people. Therefore, we initially attempted a percutaneous thrombin injection into the pseudoaneurysm. Under ultrasound guidance, a 22-gauge needle was inserted into the sac through the buttock and 1500 U of bovine thrombin (1000 U/ml) were injected into the aneurysm sac. This thrombin injection occluded the aneurysm sac, but partial thrombolysis occurred the following day. Subsequently, we attempted coil embolization of the inferior gluteal artery via ultrasound-guided direct puncture of the target vessel. The
The patient was placed in the prone position. An 18-gauge needle was used to puncture the inferior gluteal artery under ultrasound guidance (Fig. 3(A)), and a microcatheter (Renegade-18; Boston Scientific Corp., Natick, MA) was inserted into the needle and advanced into the inferior gluteal artery. Two microcoils (VortX; Boston Scientific Corp.) were released proximal to the aneurysm via the microcatheter. A completion angiogram demonstrated complete occlusion of the pseudoaneurysm (Fig. 3(B)). A contrast-enhanced CT scan the following day revealed obliteration of the sac without hematoma or pseudoaneurysm formation at the puncture site. The patient had no subsequent complaints and was discharged 5 days after the procedure. A follow-up CT scan 5 months after the procedure revealed complete resolution of the pseudoaneurysm (Fig. 4), and the patient remains asymptomatic with no buttoc claudication.

**Discussion**

Gluteal artery aneurysms are uncommon, and the inferior gluteal artery is less frequently involved than the superior. The etiology of gluteal aneurysms includes pseudoaneurysms secondary to penetrating or blunt trauma to the buttock, atherosclerosis, polyarteritis nodosa, infection or persistent sciatic artery. In the case we describe, the cause was unknown. The aneurysms present as a swelling in the buttock which may or may not be pulsatile and may be associated with symptoms of sciatic nerve compression. The most frequently used treatment option is surgical repair. Recently, however, several reports have demonstrated that transcatheter embolization is an effective and less invasive management option.
In our case, it was technically impossible to advance a catheter into the inferior gluteal artery using a conventional interventional procedure despite multiple attempts. Hence, an ultrasound-guided percutaneous injection of bovine thrombin was attempted. However, this initial percutaneous thrombin injection failed to occlude the pseudoaneurysm. Kang et al.\textsuperscript{5} reported that pseudoaneurysms with large necks have a higher recurrence rate following thrombin injection. Pothier et al.\textsuperscript{6} described the use of balloon occlusion of the aneurysm neck to achieve complete thrombosis of the sac with thrombin. In our case thrombin injection probably failed due to the wide aneurysm neck. This type of aneurysm appears to require not only thrombin but also multiple coils or gelatin sponges as a nidus for thrombosis, or occlusion of the feeding artery to prevent recanalization of the sac.

Lopez et al.\textsuperscript{7} occluded a pseudoaneurysm post-catheterization by filling the sac with coils via a direct puncture. However, packing with coils is costly and may inhibit shrinkage of the thrombosed sac. Furthermore, abscess formation is a possible complication if the origin of the aneurysm is mycotic. Embolization of the feeding artery by direct puncture of the aneurysm sac is an alternative procedure. However, retrograde cannulation of the feeding artery is usually difficult, and if unsuccessfully treated, the aneurysm may rupture. Therefore, we attempted transluminal coil embolization by ultrasound-guided direct puncture of the inferior gluteal artery. The catheter could be successfully advanced just to the proximal side of the pseudoaneurysm and the sac was occluded with two coils. A hematoma, pseudoaneurysm, or sciatic nerve injury associated with direct puncture of the inferior gluteal artery did not occur. Coil embolization with this technique appears to be a safe, less invasive and cost-effective method for treating pseudoaneurysms, and can also be applied to other peripheral aneurysms in various locations. If access to the target vessel via the femoral or brachial artery is impossible and the target vessel can be safely cannulated under ultrasound guidance, we recommend this approach, especially, for poor surgical candidates.

In conclusion, our case demonstrates that transluminal coil embolization by direct puncture of the target vessel under ultrasound guidance is an effective treatment for a pseudoaneurysm. This approach represents an alternative method to conventional interventional procedures.

References


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