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CASE REPORT

Arteriovenous Fistula and Pseudoaneurysm Formation following Heel Endoscopy

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Introduction

Traumatic arteriovenous (A-V) fistula and/or pseudoaneurysm can result from a penetrating or blunt injury. Iatrogenic injuries to blood vessels following operations such as knee endoscopy, lumbar discectomy, and temporomandibular joint endoscopy have been well described. Recently, there has been an increase in endoscopic orthopaedic procedures with application to virtually any joint. In this paper, we describe the first report of a pseudoaneurysm and arteriovenous fistula between the lateral plantar branch of the posterior tibial artery and an adjacent vein as a complication of endoscopy of the heel.

Case Report

Six weeks after endoscopy of the left heel for excision of heel spurs, a 48-year-old female was referred to us with continued pain and numbness in her left heel which started soon after her operation. No intraoperative problems were reported by the surgeon performing endoscopy. She had no history of peripheral vascular disease, hypercholesterolaemia, smoking, or trauma.

On physical examination, two puncture sites were visible on the medial and lateral aspects of the left heel. There was a palpable thrill and an audible bruit over the heel in the posterior tibial artery distribution, and the heel was pulsatile. She had slight left foot weakness on dorsal and plantar-flexion. There was partial analgesia on the plantar aspect of her foot. Colour-flow duplex imaging showed an arteriovenous fistula, and arterial and venous dilatation in the area of the lateral plantar branch of the posterior tibial artery.

Fig. 1. Intraoperative arteriogram with pseudoaneurysm.

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She was taken to the operating room 6 weeks from her initial endoscopy and underwent arteriography which showed an A-V fistula and a pseudoaneurysm (Fig. 1). After controlling the posterior tibial artery, the pseudoaneurysm was opened. The lateral plantar branch of the posterior tibial artery was ligated proximally and distally. The vein was also tied off. A completion arteriogram revealed successful closure of the A-V fistula (Fig. 2). Postoperatively, she had a palpable dorsalis pedis pulse and pain relief.

Discussion

There has been a tremendous increase in endoscopic orthopaedic operations over the past few years. Vascular injuries have been quite rare and have represented less than 1% of all complications, from a survey of the members of the Endoscopy Association of North America. This survey reported a total complication rate of 5.6%, after 375 000 arthroscopies having been performed.[1]

Endoscopy of the heel for a calcaneal bone spur is a relatively new procedure. There is an increased inherent risk involved with the natural learning curve of the procedure.[2] The anatomy of the heel is moderately complex with the structures of the tibio-talo-calcaneal tunnel running in close proximity to the plantar fascia and the common location of heel spurs. The tibio-talo-calcaneal tunnel contains the posterior tibial artery and nerve, the flexor hallucis longus tendon, the medial calcaneal nerve, and branches of the medial calcaneal nerve. The posterior tibial veins are superficial and medial to the posterior tibial artery. The posterior tibial artery bifurcates into the medial and lateral plantar arteries just proximal to the transverse septum. The medial branch passes above the septum and the lateral branch passes obliquely below the septum. Both of these branches pass within 2–10 mm of the plantar fascia. The bifurcation of the posterior tibial artery varies, usually occurring directly under or proximal to the sustentaculum tali, or occasionally distal to the sustentaculum tali.[3] The lateral plantar branch of the posterior tibial artery runs just below the plantar fascia and can be injured during introduction of the endoscopy or during further manipulation.

Fig. 2. Intraoperative arteriogram with resected A-V fistula.

The treatment of acquired A-V fistulae consists of identification and ligation of the involved vessels. In the case reported here, there was also a pseudoaneurysm, and this was resected, with ligation of the lateral plantar branch of the posterior tibial artery. This led to resolution of her symptoms.

The development of an A-V fistulae after an endoscopic procedure has been relatively uncommon. However, with the increase in the application of endoscopic procedures, there may be an increase in the incidence of iatrogenic vascular injuries. In patients with peripheral arterial occlusive disease, some of the arterial branches could be major collaterals and iatrogenic vascular injury could result in the increased likelihood of limb-threatening ischaemia. Heightened awareness during the learning curve of these procedures is necessary. The surgeon must use caution, particularly during endoscopy near arteries with occlusive disease when the vessel is the dominant arterial supply to the limb. Preoperative colour flow duplex mapping of the vessels may be helpful in selected cases.

References

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