

# True infrapopliteal artery aneurysms: Report of two cases and literature review

Stefan Paul Mönig, MD, Michael Walter, MD, Sabine Sorgatz, MD, and Heide Erasmi, MD, *Cologne, Germany*

**Aneurysms of the infrapopliteal arteries are rare and commonly associated with trauma. Most appear as false aneurysms. Because they are quite rare events, we describe for the first time in the English-language literature two cases of a combination of true aneurysms of the popliteal and tibial arteries. Symptoms at initial examination are calf mass and distal ischemia. Clinical features, radiographic findings, surgical management, and a review of the literature on true infrapopliteal aneurysms are discussed. (J Vasc Surg 1996;24:276-8.)**

Peripheral arterial aneurysms involving the femoral or popliteal vessels are common. Aneurysmatic alterations of the infrapopliteal arteries are nevertheless rare, and in most cases result from trauma.<sup>1-4</sup> In 1915 Hans von Haberer reported the successful treatment of an infrapopliteal aneurysm caused by trauma.<sup>5</sup>

In contrast to traumatic aneurysms, nontraumatic infrapopliteal aneurysms are seldom encountered. We report two cases of popliteal artery aneurysms combined with aneurysms of the tibioperoneal trunk. The combination of an ipsilateral aneurysm of the tibioperoneal trunk with an ipsilateral popliteal aneurysm is unique in the English-language literature.

## CASE REPORT

**Case 1.** A 69-year-old man sought medical attention for a pulsating mass in the left popliteal space with no history of preceding trauma. Nicotine abuse and hypertension could be defined as existing risk factors.

Physical examination revealed nonobstructive arterial pulses on both legs; no indication of underlying peripheral vascular obstructive disease was found. Ultrasound scanning of the popliteal fossa showed an expansive aneurysmatic dilatation of the distal femoral and popliteal artery.

An arteriographic scan delineated the aneurysms of both the distal femoral artery and the popliteal artery (diameter, 4.2 cm by ultrasound). Moreover, an aneurysm of the tibioperoneal trunk was revealed (diameter, 2.1 cm by ultrasound; Fig. 1). The ultrasound examination showed no more aneurysms.

Arterial reconstruction could not be performed with autologous saphenous vein because of deep venous thrombosis of both legs and the patient's history of superficial phlebitis in the saphenous vein. Repair of the femoral and popliteal arteries was carried out by interposition of an 8-mm Dacron bypass graft; the tibioperoneal trunk was reconstructed with a 6-mm polytetrafluoroethylene (PTFE) prosthetic bypass graft. The patient's postoperative course bore no complications, so the patient was dismissed from our clinic without any symptoms. Twenty months after the arterial reconstruction, the patient is free of pain and has an unlimited walking distance. The results of the ultrasound examination of the reconstructed arteries were regular.

**Case 2.** A 39-year-old man in good physical condition had sudden, intense pain in his right popliteal space, radiating into the calf. Similar symptoms had not occurred before. The patient had a history of smoking.

Physical examination detected an enlarged popliteal pulse on the right leg with normal peripheral findings. Both legs were warm and had no signs of ischemia. An ultrasound scan of the right popliteal fossa showed an extensive popliteal aneurysm of the segments I and II (diameter, 3 cm by ultrasound). Surprisingly, arteriography of the limb revealed next to the popliteal aneurysm a second aneurysm going out from the tibioperoneal trunk (diameter, 1.7 cm by ultrasound; Fig. 2). The arteries of the leg were found to be regular, and the rest of the arterial tree offered no particular alterations concerning arteriographic and sonographic criteria. Further aneurysms were excluded by ultrasound examination.

The popliteal aneurysm was ligated from a supraglenoid approach; for the aneurysm of the lower limb a second infraglenoid approach was used. In the femoral vessels as well as in the popliteal vessels, distinct atherosclerotic lesions could be detected and were later histologically verified in both aneurysms. Reconstruction of the popliteal artery could not be performed with a venous bypass graft because the autogenous saphenous vein was too small in diameter to be used in the operation. Therefore, a Dacron bypass graft was used for the repair of the outflow tract. The

From the Department of Abdominal, Thoracic, and Vascular Surgery, University of Cologne.

Reprint requests: Stefan P. Mönig, MD, Department of Surgery, University Cologne, Joseph-Stelzmann-Str. 9, 50924 Cologne, Germany.

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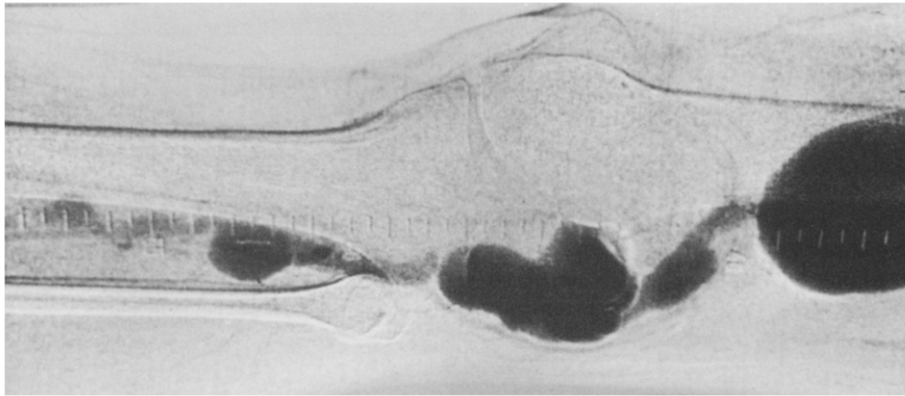


Fig. 1. Arteriogram shows aneurysm of distal femoral artery, popliteal artery, and tibioperoneal trunk.

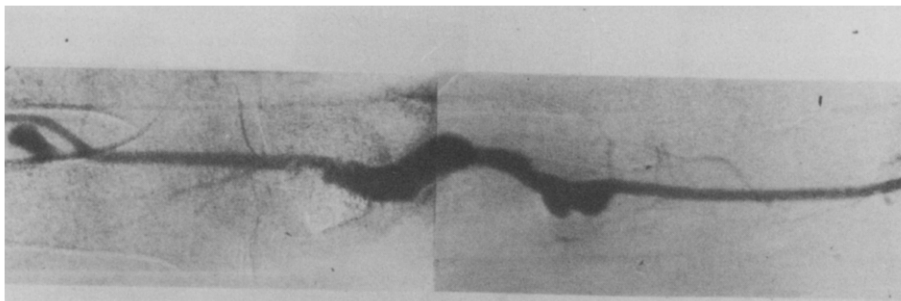


Fig. 2. Preoperative arteriogram shows popliteal artery aneurysm and tibial artery aneurysm.

aneurysm that was located in the lower limb was resected tangentially; the defect in the arterial wall was closed with a patch of vein. The patient's postoperative course was regular, so the patient was dismissed in good condition. Clinical investigation 32 months after operation revealed an unlimited walking distance. Results of an ultrasound examination were regular.

## DISCUSSION

A check of the literature revealed only 13 cases of nontraumatic infrapopliteal aneurysms reported before 1995 (Table I). The combination of an aneurysm of the lower limb with an ipsilateral popliteal aneurysm that was found in the two patients of our clinic is unique in the English-language literature. Thus, including our own cases, a total of 15 cases have been reported up to now. As a possible reason for nontraumatic aneurysms of the lower limb's vessels next to atherosclerotic origin, different kinds of vasculitis are discussed.<sup>13</sup>

The cases reported in the literature were mostly detected by chance during diagnostic procedures because of peripheral obstructive vascular disease that was symptomatic with cramping pain and claudica-

tion. In addition, some patients had a swelling of the leg because of venous stasis.<sup>7,9,11</sup>

As has been shown in earlier case reports, ultrasound scanning is helpful in the diagnosis of popliteal aneurysms. In the past, the diagnosis of tibial artery aneurysms has been confirmed most commonly by arteriography. Arteriography gives important information about the condition of the proximal arterial branches and the outflow tract, and therefore gives information about possibilities for reconstruction. In doubtful cases, computed tomography and magnetic resonance imaging can give further information.

The preferred treatment of symptomatic popliteal aneurysms is widely agreed to be surgical treatment.<sup>16</sup> The indication for surgery must consider possible complications. Whereas rupture is a rare event in aneurysms of extremities—as opposed to aneurysms of the abdominal aorta—peripheral embolization or complete thrombotic occlusion of the aneurysmatic artery can be limb-threatening.<sup>16-18</sup> Shortell et al.<sup>18</sup> concluded that surgical repair is indicated in all patients with popliteal artery aneurysms. Operative treatment is associated with little or no risk of limb loss, and no deaths have occurred in patients who

**Table I.** Infrapopliteal artery aneurysm

Author	n	Age	Male/female	Localization	Operation
Pappas <sup>6</sup>	1	—	—	Posterior tibial artery	—
Carey <sup>7</sup>	1	79	M	Anterior tibial artery	Ligation
Izquierdo <sup>8</sup>	4	—	—	—	Ligation/venous bypass interposition
Jenyo <sup>9</sup>	1	60	F	Posterior tibial artery	Ligation
Yao <sup>10</sup>	1	46	M	Posterior tibial artery	—
Rowe <sup>11</sup>	1	67	M	Posterior tibial artery	Excision
Borozan <sup>12</sup>	1	61	F	Anterior tibial artery	Ligation
Katz <sup>13</sup>	1	37	M	Posterior tibial artery	Venous bypass
Kars <sup>14</sup>	1	60	M	Anterior tibial artery	Ligation
Hasaniya <sup>15</sup>	1	32	F	Posterior tibial artery	Ligation
Current study	2	69/39	M	Tibioperoneal trunk	PTFE-bypass/venous patch

were asymptomatic. Therefore, surgical therapy should be performed if patients are free of symptoms before these complications arise.<sup>19,20</sup> Indication for operation is absolutely given when the aneurysm is symptomatic.<sup>18</sup> The most favorable graft material is autologous saphenous vein.<sup>16-18</sup>

Although infrapopliteal aneurysms are rarely encountered, the physician should also consider the infrapopliteal location when aneurysms elsewhere in the arterial tree are diagnosed. Because of the lack of experience in infrapopliteal artery aneurysms, a standard treatment plan has not been defined. Symptomatic aneurysms and large aneurysms with laminated thrombus should be considered for surgical repair.<sup>12,13</sup> Yao and McCarthy<sup>10</sup> reported an aneurysm that they observed for 7 years without development of symptoms or enlargement. They postulated that asymptomatic aneurysms, particularly if they are small, may be observed. Even if rupture of an infrapopliteal aneurysm was described only once at the site of polyarteritis nodosa, complications such as embolization or thrombotic arterial occlusion are likely.<sup>15</sup> Therefore, we think that even asymptomatic aneurysms of the leg should be considered for surgical reconstruction with autologous vein, whenever possible.

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