

Revascularization of infrapopliteal arteries with duplicated great saphenous vein after gunshot injury

Ateşli silah yaralanması sonrası dublike büyük safen ven ile infrapopliteal arterlerin revaskülarizasyonu

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ABSTRACT

Popliteal artery injuries are among the most challenging of all extremity vascular injuries. Herein, we report a 29-year-old male case who had a previous surgery due to right crural gunshot injury. He was admitted with the complaint of rest pain. On lower extremity angiography, the previously implanted saphenous vein graft was observed to be occluded and posterior and anterior tibial arteries were filling from the collaterals. Revascularization of both anterior and posterior tibial arteries was performed with duplicated great saphenous vein. Dual saphenous vein may provide improved configuration and anastomotic patency, compared to single grafts.

Keywords: Graft occlusion; popliteal artery; saphenous vein; vascular.

ÖZ

Ekstremit vasküler yaralanmaları içinde popliteal arter yaralanmaları, en zorlu olanlardır. Bu yazıda daha önce krural bölgesinden ateşli silah yaralanması nedeniyle ameliyat edilen 29 yaşında bir erkek olgu sunuldu. Hasta istirahat sırasında ağrı yakınması ile başvurdu. Alt ekstremit anjiyografisinde önceki ameliyatında implante edilen safen ven greftinin tıkalı olduğu ve anterior ve posterior tibial arterlerin kollateraller ile dolduğu izlendi. Dublike büyük safen ven kullanılarak, hem anterior hem de posterior tibial arterler revaskülarize edildi. Tekli greftlere kıyasla, dual safen ven daha iyi bir konfigürasyon ve açıklık sağlayabilir.

Anahtar sözcükler: Gref tıkanması; popliteal arter; safenöz ven; vasküler.

Popliteal arterial injuries account for 18% of all extremity arterial injuries in the overall population.^[1] The outcome of a penetrating popliteal artery injury predominantly depends on the mechanism of injury. The mechanism of injury is gunshot in 40% of cases.^[2] The most destructive effects of this type of injury are seen on vessels due to kinetic energy of the bullet. The amputation rate for gunshot wounds reaches 20% due to the associated soft tissue injuries and septic sequelae.^[3]

Herein, we report a male case who had a previous surgery due to right crural gunshot injury and in

whom revascularization of both anterior and posterior tibial arteries was performed with duplicated great saphenous vein.

CASE REPORT

A 29-year-old man was admitted with right crural gunshot injury. His initial operation was saphenous vein graft interposition from the infrageniculate popliteal artery to the tibioperoneal trunk. One month after the operation, the patient was readmitted to our outpatient clinic with intermittent claudication.

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His affected leg was slightly cold, and distal peripheral pulses were not palpable. Monophasic flows were detected in the anterior and posterior tibial arteries using the color Doppler ultrasonography. On digital subtraction angiography (DSA), the popliteal artery and saphenous graft were observed to be thrombosed, and anterior and posterior tibial arteries were filling from the collaterals (Figure 1). The patient was scheduled for surgery and a written informed consent was obtained.

During redo surgery, the popliteal artery was dissected from the perivascular tissues, and was well exposed. The infrapopliteal arterial embolectomy was performed with the 3Fr and 4Fr Fogarty catheters; however, the catheters did not pass beyond 10 cm. According to preoperative DSA, we decided to revascularize both anterior and posterior tibial arteries. The saphenous vein graft was prepared from the contralateral - above- the knee level. The saphenous vein was, then, duplicated. The proximal end of the saphenous vein was anastomosed to the popliteal artery. One of duplicated ends was anastomosed to the posterior tibial artery. Subsequently, we opened a hole in the interosseous membrane and directed the other end to the anterior compartment through this hole. Then, we anastomosed it to the anterior tibial artery. Postoperatively, peripheral pulses were palpated, and there were no complications. The patient was discharged on the postoperative Day 4 with dual

antiplatelet therapy including aspirin 300 mg/day and clopidogrel 75 mg/day. At six months of follow-up, repeated DSA showed a patent bypass (Figure 2).

DISCUSSION

Popliteal vessel injuries are the most limb-threatening and challenging among all peripheral vascular injuries.^[1,3,4] The popliteal artery is a true end artery with poor collateral supply, and the popliteal vein is responsible for the majority of lower leg and foot's drainage. Therefore, popliteal vascular injuries pose the greatest risk of limb loss, compared to any other peripheral vascular injuries.^[5]

In case of popliteal artery injuries, end-to-end anastomosis is used as an initial treatment option, if there is no undue tension. On the other hand, the use of this technique becomes very difficult if there is more than 2 cm of loss in the vessel. Vein patch angioplasty is an alternative treatment option for partial injuries. Of note, dividing the geniculate collaterals to prevent mobility should be avoided due to the effect of disturbing the perfusion of the extremity.^[5] In case of venous injuries, venous repair increases the



Figure 1. A preoperative digital subtraction angiography image showing a thrombosed popliteal artery, saphenous graft, and collaterals.



Figure 2. A postoperative digital subtraction angiography image showing a patent duplicated saphenous vein graft (black arrow). Proximal and distal anastomoses are shown by white arrows.

success of arterial repair and reduces the need for a fasciotomy. However, if more complex repairs are required, ligation is appropriate.^[5] The selected conduit for protecting the venous outflow from the injured extremity is the reversed autogenous saphenous vein harvested from the contralateral leg. In these injuries, synthetic grafts should not be used as much as possible to prevent postoperative infections. Duplicated great saphenous vein are relatively common and the incidence in thigh and calf was 8% and 25% respectively.^[6] The accessory great saphenous veins run parallel to the main trunk within the thigh and leg, in an anterior or posterior location.

Isolated occlusive injury to one infrapopliteal arteries rarely results in limb ischemia and does not, as a rule, require therapeutic intervention. A single actively bleeding traumatized vessel or arterial pseudoaneurysm can be treated by simple ligation or angiographic embolization; however, when the tibioperoneal trunk or two infrapopliteal arteries are injured, repair is required. If two or more crural arteries are repaired, at least one may continue to be patent, and the chance of limb salvage, thus, increases. In addition, in traumatic cases, no collateral network contributes to the distal flow as in atherosclerotic cases. In our case, previous gunshot injury resulted in extensive destruction of infrageniculate popliteal artery. In control DSA, only anterior and posterior tibial arteries were able to be visualized. We, therefore, decided to revascularize both of them with a reversed saphenous vein graft. During harvesting, we noticed that saphenous vein was duplicated, and it was implanted as well.

In conclusion, in injury or peripheral vascular disease, duplicated saphenous vein should be considered, if infrapopliteal arteries of revascularization with a saphenous vein graft was planned, as we consider that dual saphenous vein provides better configuration and anastomotic patency compared to single grafts.

Declaration of conflicting interests

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