Traumatic Disruption of Saphenous Vein Graft Bypassed to the Dorsalis Pedis Artery

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We describe a rare case of traumatic disruption of saphenous vein graft bypassed to the dorsalis pedis artery. The vein graft was disrupted at the level of ankle joint by blunt trauma and symptoms of acute foot ischemia were recognized. The injured vein graft was reconstructed with cephalic vein graft interposition. He has been free from any events of foot ischemia at 10 months follow-up with patent vein graft to the dorsalis pedis artery.

Keywords: vascular trauma, saphenous vein graft, distal bypass

Introduction

The vein grafts passing through the subcutaneous route are considered to be exposed to the risk of traumatic injury at all times, however, no report was found in the literature. We report a case of traumatic disruption of saphenous vein graft bypassed to the dorsalis pedis artery which was successfully reconstructed by cephalic vein graft interposition.

Case Report

A 60-year-old man riding a motorcycle was hit by a car, injured his right ankle by the toppled motorcycle, and referred to our hospital with complaints of pain and coldness of his right foot. He suffered insulin-dependent diabetes and diabetic nephropathy, and has been receiving 3 times/week hemodialysis for recent 8 years. Furthermore, he has undergone left distal bypass from the common femoral artery to the malleolar posterior tibial artery and the dorsalis pedis artery with a bifurcated saphenous vein graft for ischemic toe gangrene 2 years before, and right distal bypass from the common femoral artery to the malleolar posterior tibial artery and the dorsalis pedis artery with a bifurcated saphenous vein graft for ischemic toe gangrene 4 months before.

The patient’s consciousness was clear, and hemodynamic state was stable. His right forefoot was cold and pale without lacerated wound or subcutaneous bleeding. Pulsation of the bypass graft passing through the subcutaneous route of his right lower extremity disappeared below the knee level and blood flow sound of the dorsalis pedis artery was not audible by Doppler stethoscope. Pulsation of bypass graft of his left lower extremity was well recognized. X-ray examinations of his right foot revealed no bone fracture or articular dislocation. Color-assisted duplex ultrasonography was not attempted because the SVG had been occluded from below the knee level. With the diagnosis of acute critical foot ischemia caused by traumatic graft occlusion, the patient was transferred to the operating room immediately after informed consent was obtained.

Under local anesthesia, the saphenous vein graft passing through the subcutaneous route was exposed at the middle portion of right lower leg. After systemic heparinization (Heparin sodium 5000 units/body, intravenously), thrombectomy was attempted proximally and distally (Fogarty Thru-Lumen Embolectomy Catheter, 3 French in size, Edwards Lifesciences...
and right dorsalis pedis artery were patent (Fig. 3). The saphenous vein graft to the posterior tibial artery was occluded eight months after the operation, however, he has been free from any events of foot ischemia at 10 months follow-up with patent vein graft to the dorsalis pedis artery.

**Discussion**

The vein graft to the dorsalis pedis artery usually passes through the subcutaneous route, runs inside of the leg, overrides in front of tibia at the ankle level, and reaches to the dorsum of forefoot. The graft is sandwiched between skin and tibia or talus at the ankle level, and firmly adhered to surrounding tissues. So, the saphenous vein graft of this case directly received external force by blunt trauma and easily disrupted without bone fracture, articular dislocation, or hemorrhagic complications. Hematoma around the disrupted SVG was not recognized, because there was no loose space for hematoma formation and thrombotic occlusion with vascular torsion immediately occurred after injury. Furthermore, he had received bifurcated bypass grafting to the dorsalis pedis artery and the posterior tibial artery individually because his plantar arch was occluded, and the graft occlusion to the dorsalis pedis artery induced acute forefoot ischemia.

Hafez, et al. analyzed 550 patients with 641 lower limb arterial injuries, and indicated that independent risk factors for limb loss were bypass occlusion for revascularization, combined above- and below-knee injury, tense compartment, arterial transection, and...
Associated compound fracture. Moniz, et al. investigated clinical outcome of infrainguinal arterial injuries, and concluded that distal vascular injuries combined with complex orthopedic fractures are most likely result in limb loss. Padberg, et al. also reported that most of infrapopliteal blunt arterial injury had local associated injuries, such as bone fracture, severe soft tissue injuries, or nerve dysfunction, and blunt injury of the infrapopliteal arteries was associated with a high incidence of limb loss. In this case, the saphenous vein graft was completely disrupted and severe forefoot ischemia due to graft occlusion was presented, however, the patient fortunately had no concomitant orthopedic injury or open contaminated wound.

Alvarez-Tostado, et al. reported a successful treated case of acute critical ischemia secondary to blunt tibial artery injury by endovascular maneuver. Recanalization of the injured posterior tibial artery was achieved by using coronary balloon-expandable stents. In this case, we did not consider endovascular treatment because surgical exposure and revision of the saphenous vein graft was considered to be easy. However, endovascular treatment has a potential to become an option of revascularization for infrapopliteal blunt arterial injury with concomitant skeletal injuries.

Disclosure Statement
The authors have no conflict of interest to declare.

References