

DEEP VEIN ARTERIALISATION: CASE REPORT

Cvetanovski Vlatko¹, Arsovski A¹, Mitevski A¹, Cvetanovska M², Kondov B³, Dimitrov Z⁴

¹Private General Hospital “Remedika”, Department of surgery, Skopje, Goce Delchev University, Shtip, North Macedonia,

²University Clinic for infectious diseases and febrile conditions, Faculty of Medicine Skopje, Ss. Cyril and Methodius University, North Macedonia

³University Clinic for thoracic and vascular surgery, Faculty of Medicine, Ss. Cyril and Methodius University, Skopje, North Macedonia

⁴Public Healthcare Institution “General Hospital Gevgelija”, Department of surgery, Gevgelija, North Macedonia

Abstract

Critical lower limb ischemia in the absence of distal arterial circulation presents an urgent situation, which must be treated immediately if we want to save the foot or limb from amputation.

According to Fountain these patients are classified in Class III or in Class IV.

Approximately 14%–20% of patients with critical lower limb ischemia are unsuited for distal arterial reconstruction and face major distal amputation.

Some patients with critical limb or foot ischemia will achieve wound healing with conservative therapy, it is impossible to predict who these patients will be, and it is therefore recommended that revascularization remains an important first-line treatment.

We present our first clinical case of arterialization of deep posterior tibial vein in treatment of critical ischemia of the foot.

Arterialization of the veins in properly selected patients can prevent major amputation in patients with critical limb ischemia where no other treatment option could be performed.

Key words: arterialization of vein, deep vein, deep vein arterialization, critical limb ischemia

Introduction

In critical ischemia without arterial run-off, one of the treatment options to enable revascularization is to turn the course of the flow reversely through the venous system to treat rest pain, to promote healing of the ulcers or to salvage the limb from amputation [1-3].

Atherosclerosis obliterans (AO), especially associated with diabetes mellitus, thromboangiitis obliterans (TO) in most cases, and popliteal artery aneurysms with distal bed thrombosis are conditions that justify the indication of this procedure [3].

An aging population and the rising incidence of diabetes have contributed to the increasing number of patients with critical limb ischemia (CLI)[4,5].

Although some CLI patients will achieve wound healing with conservative therapy, it is impossible to predict who these patients will be, and it is therefore recommended that revascularization remains an important first-line treatment.

We present a case when we use distal deep venous arterialization as a unique procedure in urgent treatment of critical ischemia of foot in which the venous bed is used as an alternative conduit for perfusion of peripheral tissues.

Case report

We present a case of 47 years old male patient, with acute onset of pain in right foot, three hours before admission to our surgery ambulance.

The pain was follow up with cold foot, colorless and patient could not walk.

He is smoker for more than twenty years.

Patient was directed to vascular surgeon from emergency medical service.

Clinical examination

Despite trophic changes on the skin in the calf and on the foot, patient also had reduced hair in the calf and brittle nails on the right foot.

We examined absence of pulsation on a. dorsalis pedis and on medial retromaleolar artery of the right foot.

Patient has been referred to color Doppler ultrasound.

Doppler ultrasound

Common femoral artery, deep femoral artery and superficial femoral artery has neat ultrasound sonograms.

From the beginning popliteal artery was passable without major disorder in blood circulation.

We examined absent of blood perfusion in a. tibialis posterior and also partial occlusion of a. tibialis anterior.

Patient was follow up immediately to CT angiography.

CT angiography findings

CT angiography on native series only detected presence of calcification in projection of large blood vessels of lower extremities.

On the arterial contrast phase made CT series we could examined neat hemodynamic of the common femoral artery, deep femoral artery and in the superficial femoral artery of right leg.

Arterial circulations of both arteries of the right calf were with significantly compromised circulation with lots of thrombotic masses.

In right calf we examined weak collateral circulation on the part of separation of posterior tibial artery.

On venous phase of CT examination, circulation in deep and superficial venous system in left lower extremity was adequate.

After receiving the findings from CT angiography we concluded that only procedure that could be done in this case is to try to perform in situ arterialization of one deep vein in the calf in order to save the right foot from amputation.

Preoperative management

Preoperative we done additional routine laboratory and examination by anesthesiologist.

Once again preoperative in operating room, we had performed color-doppler ultrasound on the venous system of right limb in order to once again recheck the both venous systems for presence of thrombus and to perform mapping of perforating veins in right calf in order to close all these communications between two venous systems in the leg intraoperatively.

We do not have visualized any large thrombus on both venous systems on performed second color-Doppler ultrasound.

Patient was operated in general anesthesia.

Surgical technique

Intraoperatively we administered 5000 IU of heparin.

With color Doppler ultrasound we marked the origin of posterior tibial artery and surrounding deep vein.

We performed this procedure with posterior approach. In order to ensure arterial flow via vein, 2 cm below the inflow of deep posterior tibial vein in the popliteal vein we insert a valvulotome in it and we destroyed all valves from point of entrance to the foot arch.

In order to ensure the arterial flow on the dorsal part of the foot, we complete the destruction of valves at the level of first interdigital space.

After preparing the vein, we continue the procedure with preparation of place for anastomosis on the posterior tibial artery. 3 cm distal to the origin of the artery we managed to perform anastomosis between a. tibialis posteriors and surround vein with continuous suture made with 6.0 polypropylene sutures.

Intraoperatively we noticed presence of pulse and trill in the plantar venous arch.

Postoperative care

Patient was admitted in Intensive care unit and we administered continuous heparin therapy with 25000 IU/24 hours in first four with targeted APTT over 60 seconds.

After two days patient was transferred on surgical department and we switch the anticoagulant therapy on low molecular weight heparin with dose of 1 mg/kg body weight.

Postoperative color Doppler ultrasound was performed to assess arterial inflow and arterialized flow in the graft, the anastomosis, and venous runoff.

The velocities in the postanastomotic venous system were typically high due to the small caliber of the venous arch or vena comitans.

Patient start with physical therapy second day after performed the venous arterialisation. On forth day after surgical procedure patient could walk without assistance.

Conclusion

Arterialization of the veins in properly selected patients can prevent major amputation in patients with critical limb ischemia where no other treatment option could be performed.

Additional research is necessary to better understand the physiologic mechanisms involved in tissue perfusion and thereby improve clinical outcomes in this challenging patient group.

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