Concomitant Repair of Superficial Femoral Artery and Vein in a Case of Peripheral Vascular Trauma

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ABSTRACT

Vascular trauma results from penetrating, blunt or iatrogenic injuries. Young males are at highest risk and the leading causes of injury include motor vehicle crashes, falls, wounds from firearms, wounds from cutting or piercing instruments and burns. Peripheral vascular injuries account for 80% of all cases of vascular trauma. We report the case of a 21-year-old male patient with history of fall from 10 feet height on to a sharp metallic plate. Patient presented to emergency department with a lacerated wound of 15 x 10 cm on right mid thigh with active pulsatile bleed. After fluid resuscitation, patient was immediately shifted to operation room where examination revealed complete transection of superficial femoral artery and vein with 10 cm tissue loss of both. Both vessels were reconstructed using saphenous venous graft from opposite thigh. Postoperatively, patient made a steady recovery with strong pedal pulsations and no edema or neurological deficit. Patients with hard signs of arterial trauma should be taken for surgical exploration without any diagnostic investigations. Traumatic muscular lacerations with gross contamination of wound precluded the use of any prosthetic graft and hence saphenous venous graft was most appropriate. Review of literature reveals that patients with concomitant peripheral arterial and venous injuries have a very high amputation rate and simultaneous reconstruction of both leads to improved chances of limb salvage. It is our recommendation that such patients should receive postoperative anticoagulation to avoid thrombosis of graft in venous position.

Keywords: Lower extremity, Saphenous vein graft, Vascular injury.

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INTRODUCTION

Vascular trauma results from penetrating, blunt or iatrogenic injuries. Young males are at highest risk and the leading causes of injury include motor vehicle crashes, falls, wounds from firearms, wounds from cutting or piercing instruments and burns. Peripheral vascular injuries account for 80% of all cases of vascular trauma. A minority of patients present with hard signs of an arterial disruption, such as pulsatile external bleeding, an enlarging hematoma, absent distal pulses or an ischemic limb in which case immediate surgical exploration in the operating room, without further diagnostic testing, is preferred.

CASE REPORT

A 21-year-old male presented to emergency department with history of fall from 10 feet height onto a sharp metallic plate 2 hours back. On examination, the patient was conscious and alert with a heart rate of 130 bpm and a blood pressure of 80/40 mm Hg. There was a laceration of 15 x 10 cm on the anteromedial aspect of right mid thigh which was bone deep with evidence of gross muscular lacerations and a pulsatile bleeding. Peripheral pulses were absent distal to the site of injury. Compression bandage was applied and fluid resuscitation immediately begun. The patient was managed according to advanced trauma life support (ATLS) protocols with triple immobilization of spine, trauma series of X-rays and a focused assessment with sonography for trauma (FAST) scan of abdomen which revealed no other major injury. The patient was then immediately shifted to the operating room with cross-matched blood. Surgical exploration revealed complete transection of both superficial femoral artery and vein with a tissue loss of 10 cm of both. The long saphenous vein was also disrupted. Proximal and distal cut ends of the artery and vein were isolated after exploration of the proximal and distal parts of the wound. Both ends were freshened by excising the contused segments and both arterial ends were cleared with Fogarty embolectomy catheter. A saphenous vein graft of adequate length was harvested from contralateral unaffected thigh. The right superficial femoral artery was reconstructed using reversed saphenous vein graft and the right superficial femoral vein with unreversed saphenous vein graft (Figs 1A and B). Hemostasis was achieved. Devitalized muscle tissue was excised and muscles repaired. Vascular reconstruction was covered with viable muscle tissue and the wound was closed over drains. In the postoperative period,
patient was maintained on low molecular weight heparin, strict limb elevation and active and passive physiotherapy. Immediate postoperative examination revealed a strong distal pulsation with some pitting edema in foot and no neurological deficit. The edema subsided by day 4 postoperative and a computed tomography (CT) angiogram on day 10 revealed patent arterial graft and competent venous graft (Fig. 2). Patient was discharged on day 14 postoperative on oral anticoagulant maintaining international normalized ratio (INR) between 2 and 2.5 (Fig. 3).

**DISCUSSION**

Following blunt trauma, tissue injury is produced by local compression or rapid deceleration. In penetrating trauma, the injury is produced by crushing and separation of tissues along the path of the penetrating object. The patient in this report had a combination of blunt and penetrating injury which created vascular disruption with tissue loss. The absence of any other major injury allowed us to proceed with reconstructive vascular procedure. Traumatic muscular avulsions along with gross contamination precluded the use of prosthetic grafts making autologous saphenous vein graft the graft of choice. The systematic review of literature by Klinkert et al1 shows that the saphenous vein is superior to polytetrafluoroethylene (PTFE) with a primary patency at 5 years of 69% compared with 49%, respectively, and, has convincingly demonstrated that if the saphenous vein is available, a venous bypass should be chosen, even for patients with a short anticipated life expectancy (<2 years). The paper by Phifer et al2 supports femoral venous reconstruction following traumatic injury in view of the acute morbidity after ligation of the deep femoral veins, particularly with concomitant major arterial injury with an amputation rate of 100% in this group. Specifically, ligation of the superficial femoral vein in association with a major superficial femoral artery injury requiring an interposition vein graft for repair is a highly significant risk factor for lower extremity amputation.3,4 Previous proponents of femoral venous reconstruction stressed long-term morbidity with stasis changes following deep venous ligation.5 Since venous reconstruction was performed, the patient was maintained on postoperative anticoagulation with INR target similar to that maintained in acute deep venous thrombosis.
CONCLUSION

Concomitant arterial and venous reconstruction in combined injury in vascular trauma should be performed to improve chances of limb salvage. Patients with venous reconstruction should be placed on postoperative anticoagulation to prevent venous thrombosis.

REFERENCES


