

PENETRATING TRAUMA TO THE AXILLARY ARTERY

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Abstract

Axillary artery injuries due to penetrating trauma are relatively uncommon. Management of these injuries is challenging due to the complex local anatomy, rigid chest walls, and associated injuries. Open exposure with direct open vascular repair has been the mainstay of operative management. We report a clinical case of a 51-year-old man victim of penetrating trauma to the axillary artery caused by a chain-saw and repaired by open surgery with a great saphenous vein interposition graft.

INTRODUCTION

Vascular injuries to the upper limb occur more frequently due to penetrating than blunt trauma.^{1,2} Among these injuries, axillary artery is the most uncommon and together with subclavian arterial injuries constitutes less than 5% of all civilian vascular traumas.³

We report a successful open surgery repair of a vascular penetrating injury to the axillary artery.

CASE REPORT

A 51-year-old man sustained a penetrating lesion triggered by a chain-saw on the axillary fold. He received initial medical support by the extra-hospital emergency team. Thereafter, he was transferred to our facility with hemodynamically stable.

On physical examination, he presented an open wound on the axillary fold (Fig. 1) with no active bleeding, a small local, non-expanding hematoma, and signs of arm ischemia without palpable brachial, radial and ulnar pulses. The patient also showed signs of brachial plexus injury once he was not able to extend his wrist. Furthermore, he experienced impaired sensation in his upper left limb.

A computed tomography angiogram of the chest and upper limb revealed a total axillary artery transection (Fig. 2) with a thrombosed proximal and distal stump. A well-defined regional hematoma was adjacent to that segment of the artery, and no active bleeding was noted. There was an axillary vein and brachial plexus associated injuries.

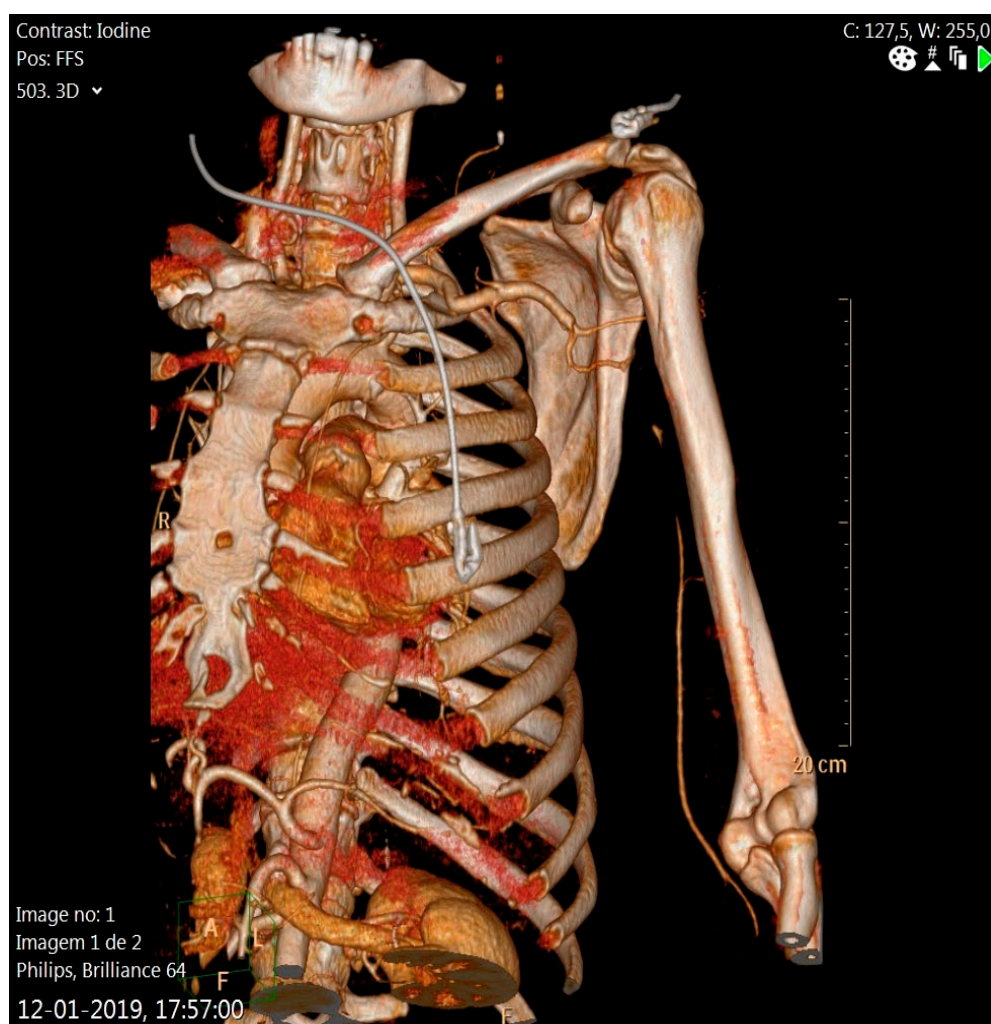
We proceeded with proximal and distal control, followed by resection of the damaged arterial segments



Figure 1 Open wound on the axillary fold.

and conducted an axillary artery repair with reverse saphenous vein interposition grafting (Fig. 3). The axillary vein was ligated and the wound closed.

The patient was discharged three days after with a patent graft and palpable radial and cubital pulse, with

**Figure 2**

Computed tomography angiogram of the chest and upper limb revealed a total axillary artery transection.

no interurrences registered and indication for single anti-aggregation with acetylsalicylic acid 100mg daily.

Early exploration four weeks after the event was conducted by Plastic Surgery to establish continuity of the previous transected nerves. The graft surveillance was done at three, six and twelve months with Doppler Ultrasound that attested graft patency (Fig. 4).

The patient has now one year follow up and no interurrences registered mentioning first to third finger non disabling paresthesia

DISCUSSION

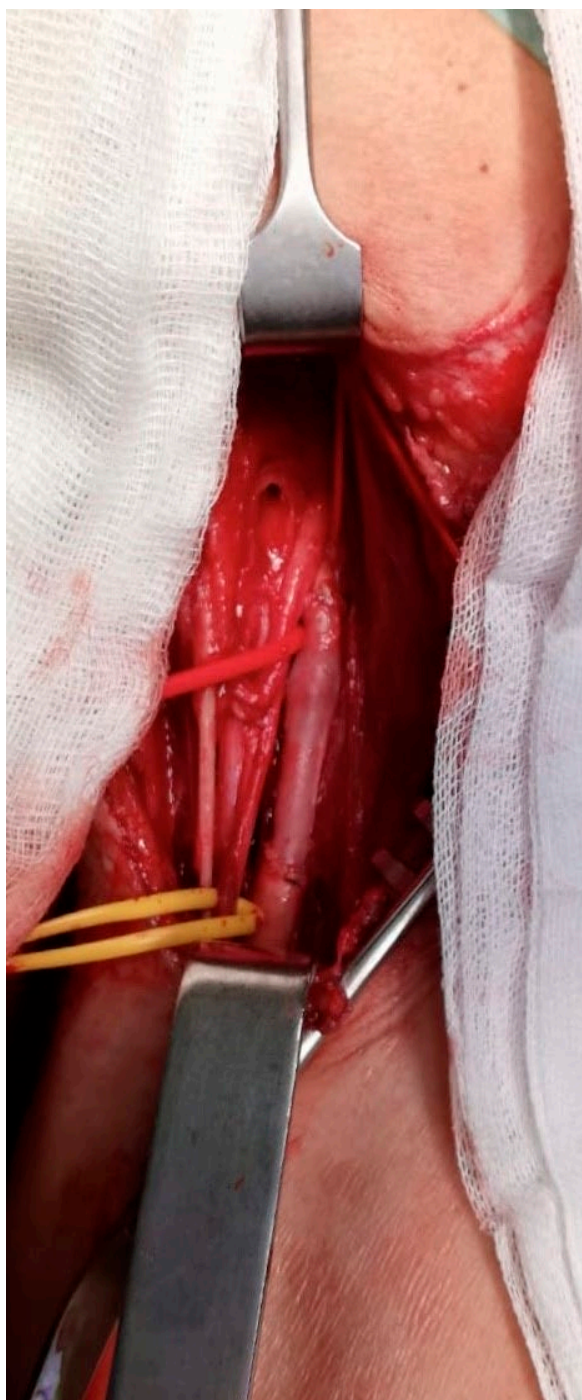
Penetrating trauma to the subclavian and proximal axillary arteries are challenging vascular injuries due to the difficulty from vessel exposure and its close proximity to important anatomic structures with mortality rates reported up to 30%.^{4,5}

Deciding to intervene should take into consideration distal poor perfusion with lack of pulses and presence of ischemia and existence of a compressive

hematoma, especially with pulsatile bleeding.

Subsequently, the best approach between open and endovascular repair should be individualized based on the nature of the vessel injury: intimal flap, pseudoaneurysm, transection, thrombosis or avulsion. Injuries such as intimal flaps, vessel narrowing, small false aneurysms, and arteriovenous fistulae in which the artery and its runoff remain intact may be amenable to endovascular repair. In this case we had a complete arterial transection of the third part (distal to the pectoralis minor muscle) of the axillary artery with proximal and distal stump thrombosis which made open surgery the best approach.

The incidence of associated venous and brachial plexus injury varies between 35 and 70% as reported in the literature.^{6,7} Considering venous, it is still debatable whether investing time correcting them is advantageous. Bearing in mind neurologic assessment, some reports in the literature advocate early exploration at three to six weeks to establish continuity of transected nerves and provide optimal conditions for axonal regrowth and re-innervation of distal musculature.⁶

**Figure 3**

Axillary artery repair with reverse saphenous vein interposition grafting.

**Figure 4**

Image from Doppler ultrasound that attested graft patency.

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