

Blunt Trauma of Thorax with Subclavian and Axillary Artery Lesion – Case Report

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ABSTRACT

We report a rare case of blunt trauma of the axillary artery in a 20-year-old man who was injured as a motorcycle rider and received severe body injuries. Injuries included severe trauma of the left lower leg with contusion and extensive soft tissue and bone trauma of these regions with poor general condition and with the presence of clinical signs of traumatic shock. Upon arrival, we found that in addition to earlier clearly visible trauma to the leg, there was a hematoma of the medial side of the left supraclavicular region and the absence of the radial artery pulse with paralysis of the left arm. Given the clinical findings, emergency radiological examination was made to the patient (X-ray, US, CDFI, MSCT – angiography) and we found out that there was trauma of axillary artery with clear signs of thrombosis of extra thoracic part of subclavian artery due to its transition into the axillary artery. After hemodynamic stabilization, above knee amputation of the left leg was performed and emergency exploration of earlier mentioned arteries. Bypass of the damaged arteries with synthetic graft 6 mm in diameter was made. Control MSCT angiography showed normal flow in the arterial tree of the whole left hand and the MRI of the cervical spine and shoulder girdle did not found lesions of the brachial plexus. SSEP demonstrated the absence of pulses on the left hand. Patient on regular check-ups showed normal general condition, with adequate passable graft and pronounced paralysis on the left hand. In the process of rehabilitation physiotherapy was also included. Blunt trauma to the axillary artery is an extremely rare example of trauma of blood vessels which makes only 0.03% of all vascular injuries.

Key words: subclavian, artery, thrombosis, reconstruction

Introduction

Nonpenetrating blunt trauma of the subclavian artery are uncommon, accounting for less than 0.03 % of all vascular injuries^{1,2}. The subclavian vessels are well protected with surrounding soft tissues and bony structures of the thoracic inlet, so it is not surprising that blunt vascular injuries imply severe trauma. Blunt subclavian artery injuries are usually the result of rapid deceleration forces applied to the neck, chest, and upper extremities¹.

The findings on physical examination include arterial hypotension, unilateral absence of the radial pulse, brachial plexus palsy, and supraclavicular hematoma³. The chest roentgenograms include fracture of the first rib

and clavicle, pneumothorax, combined humerus and scapular fractures and widened superior mediastinal shadow⁴.

Hemodynamic monitoring of a patient's arteriography constitutes a golden standard for verifying injuries and deciding upon a clear preoperative plan. Operative exposure of injured subclavian artery depends on whether the injury is in proximal or in distal part. So, in the case of proximal injury the control of the vessel is achieved most conveniently through a median sternotomy. However, median sternotomy is not adequate for exposure of the left subclavian artery owing to its posterior position in the mediastinum. Proximal control is best obtained through

an anterior thoracotomy in the third intercostals space or through a book thoracotomy⁵. Distal portion of injured subclavian and proximal axillary artery can be obtained using supraclavicular approach⁵. Its reconstruction implies resection of proximal and distal ends of the vessel, with creating anastomosis with saphenous interposition graft or synthetic graft⁶. Also there is a case in which these injuries treated conservatively with anticoagulant remedies⁴. Other feasible alternative to open repair is endovascular stenting in properly selected patients with subclavian or axillary artery injury and resulting in shorter procedure time and less blood loss, while exposure of these vessels is associated with significant morbidity, and mortality ranging from 5 to 30%⁷.

The outcome of blunt subclavian artery trauma is largely determined by a associated injuries. While most patients who do not sustain nerve injuries can be expected to make full recoveries, more than 50% of individuals become permanently disabled after severe neural and vascular injuries of the upper extremity⁸.

Case Report

A 20-year male came to emergency room by ambulance with the injuries to the lower left leg and left part of upper side of the chest. He was in a severe pain and could not move his left hand. A dominant injury was a subamputation of a lower left leg, absent radial and brachial pulse of left arm with paralyzed left arm. Only physical sign visible on the chest was hematoma of left supraclavicular region. Vital signs were within normal limits. The head was normocephalic, pupils were reactive to light with full accommodation, ears canals and tympanic membranes were normal, no oral injury present. Neck was supple with no signs of deformity, contusion, bleeding etc. Supraclavicular left region was presented by hematoma with no clinical signs of clavicular fracture. Thorax and abdomen were clinically without any sign of

injury. A chest X-ray showed no rib fractures, ultrasound of abdomen excluded lesion of parenchimal and hollow organs. There was no presence of free liquid intraabdominally. A severe injury of left lower leg presented by subamputation in the proximal part with great avulsion of skin, exposed muscles. Hemodinamically the patient was stable. Emergency MSCT – angiography was performed with a goal of proofing absence of normal blood circulation and a localization of its lesion. In a picture we see that there is a segmental discontinuity of a subclavian towards axillary artery in a diameter of 2 cm (Figure 1). After preoperative protocol under a intensive care unit, operative procedure was performed under general anesthesia. We explore injured part of the artery using supraclavicular incision of the left side. Also we have seen the brachial nervous plexus which was macroscopic in continuity. Before opening the artery we ensured the artery with vascular non traumatic clamps and 5000 units of heparin was given intravenously. We then excised the damaged parts of injured artery and passed with Fogarty balloon catheter to remove any thrombotic and embolic material in the remaining artery and flushed edges with 0.1% heparin solution to prevent fresh thrombotic formations. End to end anastomosis (first distal and then proximal) was performed with synthetic graft 6 mm wide with Prolene 6–0 sutures. We established a normal blood circulation which we proofed with intraoperative color Doppler. Above knee amputation of the left leg was also made to the patient due to extensive damage to tissue. Two weeks after operation we performed MSCT angiography which confirmed normal circulation and blood supply of extremity (Figure 2). MRI of the cervical spine and shoulder girdle did not find any lesions of the brachial plexus. SSEP were made ambulatory and they demonstrated the absence of pulses on the left hand. Physical therapy was included in the process of rehabilitation and patient received lower limb prosthesis.

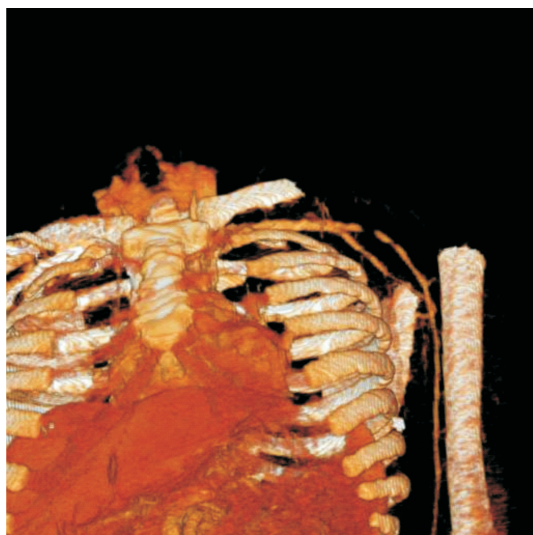


Fig. 1. MSCT angiography showing segmental discontinuity of a subclavian towards axillary artery.



Fig. 2. MSCT angiography two weeks after reconstruction.

Discussion

Our patient came to emergency room with severe trauma to the left lower leg and minor signs of trauma in left supraclavicular region with absence of radial pulse and paralysis of left arm. After emergency radiological examination, revascularization was made within four hours from the time of injury, and above the knee amputation of the left leg. Angiographic evaluation was performed on hemodynamically stable patient which localized the injury and helped in planning the optimal

incision (in this case supraclavicular approach) to obtain vascular control^{9–11}. Despite other possibilities of management with saphenous interposition graft we decided to make end to end anastomosis using synthetic graft dealing with lumen width and a diameter of discontinuity. Some authors, when there is a possibility of a dissection in greater range, and which is confirmed intraoperatively, as means of method repair perform a carotid-to-subclavian artery bypass obliterating the false lumen of the dissection with a running vascular anastomosis¹⁰.

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TUPE OZLJEDE PRSNOG KOŠA S LEZIJAMA POTKLJUČNE I AKSILARNE ARTERIJE – PRIKAZ SLUČAJA

SAŽETAK

Prikazujemo rijedak slučaj tupe traume aksilarne arterije u 20-godišnjeg muškarca koji je stradao kao vozač motocikla i pritom zadobio teške tjelesne ozljede. Ozljede su uključivale tešku povredu lijeve potkoljenice uz opsežno nagnječenje mekih tkiva kao i povredu koštanih struktura navedene regije uz loše opće stanje te prisustvo jasnih kliničkih znakova traumatskog šoka. Po dolasku, ustanovljeno je da osim ranije jasno vidljive traume na nozi postoji i hematoma medijalne strane lijeve supraklavikularne regije kao i odsustvo palpabilnog pulsa radijalne arterije te kljenut lijeve ruke. S obzirom na klinički nalaz učinjena je hitna radiološka obrada (RTG, UZV, CD, MSCCT angiografija) i ustanovljeno je da na navedenom segmentu aksilarne arterije postoji trauma stijenke kao i jasni radiološki znakovi tromboze ekstratorakalnog, distalnog segmenta lijeve arterije subklavije na prijelazu u aksilarnu arteriju u segmentu od 2 cm. Nakon hemodinamske stabilizacije učinjena je natkoljena amputacija lijeve noge kao i hitna eksploracija navedenih arterija. Učinjeno je premoštenje oštećene arterije sintetskim graftom promjera 6mm. Kontrolna MSCCT aniografija pokazala je uredan protok u arterijskom stablu cijele lijeve ruke, a na MR-u područja vratne kralježnice i ramenog obruča nisu nađene lezije brahijalnog pleksusa. SSEP su pokazale odsustvo impulsa na lijevoj ruci. Pacijent na kontrolnom pregledu urednog općeg stanja, kao i uredne prohodnosti grafta uz i dalje izraženu kljenut lijeve ruke. U proces rehabilitacije uključena fizikalna terapija. Tupa trauma u području aksilarne arterije izuzetno je rijedak primjer traume krvih žila koji čini svega 0,03% svih vaskularnih povreda.