



Traumatic Subclavian Artery Injury Causing Large Extrapleural Haematoma Managed Nonoperatively- A Case Report

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ABSTRACT

Subclavian artery injuries represent an uncommon complication of blunt chest trauma. Arterial rupture may cause life-threatening hemorrhages or pseudo-aneurysm formation. Haematoma caused by the injury may also compress the brachial plexus. Rarely the haematoma may compress the lung parenchyma causing respiratory compromise. These clinical eveniences must be carefully worked out by accurate physical examination of the upper limb: skin color, temperature, sensation as well as radial pulse and hand motility represent the key points of physical examination in this setting. Surgical exploration and repair with or without graft and recently developed endovascular stenting are the mode of treatment for such injury. We report a case of traumatic subclavian arterial rupture due to blunt chest trauma following machine belt injury in which arterial injury and hematoma was managed non operatively.

KEYWORDS

Subclavian artery rupture; Blunt chest trauma; Non operative management.

Introduction

Traumatic subclavian arterial rupture represents an uncommon complication of blunt chest trauma. As it is well protected by subclavius muscle, the clavicle, the first rib, and the deep cervical fascia, as well as the costo-coracoid ligament, and portion of clavi-coraco-axillary fascia. Arterial rupture usually causes life-threatening hemorrhage, and must be carefully ruled out by physical examination as well as diagnostic imaging.. The presence of large hematomas and pulsatile palpable mass in supraclavicular region should raise the suspicion of serious vascular injury. Contrast-CT represents a key diagnostic exam, while arteriography offers both a diagnostic a therapeutic approach.

Traditionally surgical exploration and repair with or without graft is the standard of care, but it is associated with high morbidity. In recent years endovascular stent grafting, thank to technical evolution and growing operators' experience, has become an attractive therapeutic approach to such kind of injuries, provided with less invasiveness and morbidity .

We report a case of traumatic subclavian arterial rupture after blunt chest trauma causing large extrapleural haematoma which was treated non-operatively with good outcome.

Case report

A 18 year old male presented to our trauma centre with a history of entanglement of right upper limb in a machines belt. His airway, breathing, circulation, disability all were normal .He had degloving injury of right upper limb with compound comminuted fracture of lower end of humerus, fracture lower 1/3rd of radius, dislocation of radio ulnar joint and fracture medial third of clavicle. His brachial artery was exposed so he taken to the OT for vascular repair. Plan for repair was abandoned because of presence of ischaemic crushed muscles, crushed bone and severe intimal injury to vessel. Above elbow amputation was done. During the ligation of brachial artery decreased flow was noticed. Preoperative Chest X- RAY was suggestive of rt. large upper zone extrapleural haematoma(fig-1). Postoperatively CT was done which revealed non visualization of 6 cm segment

of subclavian with distal reformation(fig-2) . Extrapleural haematoma was seen extending upto anterior mediastinum. The haematoma was 15 x 15 cm in size. It was planned to monitor the haematoma serially for expansion or infection with USG and chest x-ray. Subsequent x-rays on day five (fig -3),cect on day five (fig-4) and USG did not reveal any expansion and patient's vital remained stable. He had no fever. The patient was kept in hospital for one week then discharged. The patient was followed up for a month . Follow up chest xray done on day fifteen (fig-5) and day fourtyfive (fig-6), The haematoma resolved completely. Total counts , bilirubin all were within normal limits.\

Figure -1 (chest x-ray on day of injury)



Figure-2 (CT Angiography on day of injury)

Figure-3 (Chest X-Ray on 5th day of injury)



Figure-4(CECT Chest on 5th day of injury)



Figure-4(CECT Chest on 5th day of injury)



Figure-5(Chest x-ray on 15th day post injury)



Figure-6(Chest x-ray on day 45th of injury)

Discussion

Subclavian artery injuries occurs from either elongation (stretching) or laceration mechanisms. Elongation is characteristically associated with a blunt force applied to the anterior shoulder or clavicle, as in motor vehicle crashes. This force is transmitted to fixed points along the vessel, typically the origin of the vertebral and internal thoracic artery where the vessel is then pulled apart. Laceration to the subclavian artery ensues from bony fragments produced by a fractured first rib or clavicle. The fracture is displaced into the vessel by the traction of associated chest wall muscles. Fractured clavicle has been cited as the cause of 50% of traumatic subclavian arterial injuries(1-2).

Subclavian arterial rupture is an uncommon complication of blunt thoracic trauma, and must be carefully ruled out because of its poor prognosis; in 1983 Sturm and Cicero have devised five criteria that should lead the examining physician to confirm the suspicion of arterial injury with arch aortography(3). These criteria include first rib fracture, diminished or absent radial pulses, palpable supraclavicular hematoma, chest roentgenogram demonstrating a widened mediastinum or hematoma over the area of the subclavian artery, and brachial plexus palsy. Physical examination of the upper limb must focus on skin color, temperature, sensation, hand motility as well as radial pulse(4).

CT represents a key diagnostic exam, while selective arteriography offers both diagnostic accuracy and an operative approach.

Once identified, these injuries have historically been managed with a conventional surgical approach, associated with its own morbidity. Open repair is technically challenging and associated with significant morbidity and mortality for a variety of reasons. Exposure to obtain proximal control requires either a median sternotomy for the innominate and proximal right subclavian artery or a high anterolateral thoracotomy with potential clavicular resection for the proximal left subclavian artery. Such extensive incisions require lengthy healing and rehabilitation and carry significant morbidities(5).

Endovascular treatment represents a less invasive approach to these vascular injuries; furthermore, it offers less blood loss and a lesser invasive approach to an anatomically challenging problem. Foremost is the benefit of approaching the lesion from a remote access site, which avoids major operative

dissection in the traumatised area, and decrease the risk of injuring important surrounding structures, such as the subclavian vein or brachial plexus, which may be difficult to identify because of haemorrhage or involvement in the original injury. High success rates can be achieved if the lesion is focal and can be traversed safely with a guidewire. Complete vessel transection has been reported as a common cause for failure of an endovascular approach, primarily due to difficulty with crossing the complete transection and its associated hematoma. As such, vessel transection has traditionally been approached with open vascular reconstruction(6-9).

In our case the patient was followed up with serial x- ray chest, USG chest and repeat CECT. Patient was monitored for haemodynamic stability and localized or generalized complication of haematoma. Patient does well and discharged. Follow up x-rays shows clearance of large haematoma.

Conclusions

Our case report and subsequent other case managed similiarly reveals the fact that in selected cases of subclavian artery injury in whom patient is haemodynamically stable and haematoma is not expanding it can be monitored and followed up with good result without going for operative intervention or endovascular stenting. Limb survives with distal reformation of collaterals.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests

The authors declare that they have no competing interests.

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