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Case Report

Axillary Artery Injury in Closed Proximal Humerus Fracture

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ABSTRACT

The incidence of vascular injury in proximal humerus fracture is uncommon. Such vascular insult in a closed proximal humerus fracture is rarely reported in the literature. This is a case report of a 60 yr old female who presented after a road traffic accident and sustained closed injury to her right shoulder. Clinically and radiologically, investigations showed proximal humeral fracture with axillary artery compromise. Patient was managed with ORIF and vascular repair.

Keywords: Proximal humerus, Axillary artery, Locking plate, Synthetic graft

INTRODUCTION

Proximal humerus fractures are common injuries accounting for 5% of all fractures. [1] They are usually the result of high energy trauma in young patients and low energy in old patients. Brachial plexus and axillary artery are near to the proximal humerus and can be damaged during closed shoulder injuries, although this is not common. Diagnosing an axillary artery injury following a low energy trauma may be difficult. We are reporting a case of axillary artery injury following a low velocity closed proximal humerus fracture, who presented to us in the casualty after 5 hrs of the injury.

CASE REPORT

This 60 years old female presented to the casualty with alleged history of RTA and sustained injury to her right shoulder. She presented to the casualty 5 hrs after the injury. The patient complains of pain, swelling, inability to move the Right UL. The patient is a known case of end stage renal failure on regular dialysis. On examination, there was gross swelling present in the right upper arm with severe tenderness and deformity with absent radial pulsation, No gross motor weakness but altered sensation was present. Initially on arrival the saturation was 85% and on reassessing the saturation did not pick up. Immediate x ray was taken without any further manipulation of the attitude of the limb. X ray Right shoulder AP & Lateral shows *proximal humerus fracture* (Neer's 3 part fracture) (Fig 1).

Vascular surgeon's opinion was sought and a Doppler study was done.

Doppler study showed *Complete block in axillary artery.* The patient was mobilized to the OT within 2 hours. Through standard Delto–pectoral approach, the fracture was fixed by open reduction and internal fixation with a locking plate (Fig 4).

Though a separate incision, the axillary artery was explored and Intra operative finding was a complete tear in the axillary artery with transection.

Since the patient was a known case of DIABETES MELLITUS and END STAGE RENAL FAILURE, synthetic grafting was preferred. (Fig 3)

On table, after the surgery distal pulsation was well felt. Post operative day 1, patient was found to have a median nerve palsy and normal distal pulsation (Fig 5)

Patient was put on a shoulder immobiliser and early mobilisation was started after 2 wks with the consultation of the vascular surgeon. Pendulum exercises, forward flexion and abduction upto 40 deg was initiated. At the end of six weeks patient had abduction upto 100 degrees, forward flexion of 70 degrees and rotations each of 35 degrees. Pt failed to review for further follow-up as she succumbed due to multiple medical co morbidities.

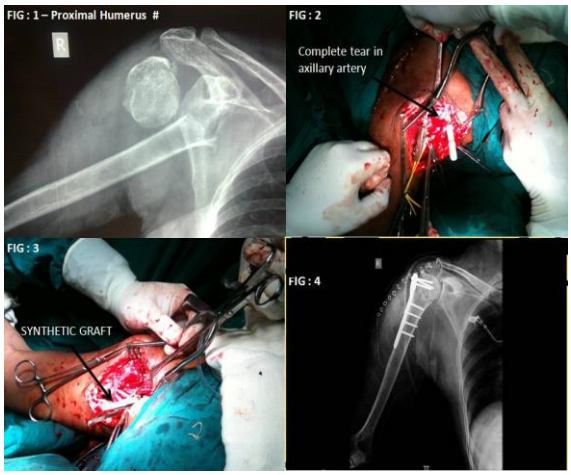

Figure1: Plain X-ray right shoulder with proximal humerus shows 3 part fracture of proximal humerus (Neer's classification)
Figure2: Intra-operative picture showing complete tear in the axillary artery (Black arrow) with bulldog clamps applied on either side of the torn vessels.
Figure3: Final intra operative picture showing the synthetic graft (black arrow) being used to replace the resected segment of the torn vessel.
Figure4: Post operative check X-Ray of right proximal humerus showing proximal humerus locking plate in situ.

DISCUSSION

Axillary artery injury following closed trauma to the shoulder is an uncommon complication, with an incidence in a supra regional center of 20 cases over 20 years.[2] It is recommended that all patients with proximal humerus fracture with severe medial displacement of the distal fragment should be routinely investigated for a vascular injury.[2] Although axillary artery injury occurs frequently with dislocation of shoulder and fracture of clavicle, it is very rare with closed proximal humeral fractures.[3] Fractures of proximal humerus accounts to 4 - 5% of all fractures in general population, common in 6^{th} and 7^{th} decade of life. One study of 117 cases of closed proximal humerus displaced fractures documented no vascular injury. [4] Vascular injury associated with proximal humerus fracture takes place in combination with osteoporosis and atherosclerosis as pathogenesis. [5,6] Proximal humerus fracture with axillary artery injury remains low in incidence with respect to close anteromedial relationship of

the artery with proximal humerus. [7] Relatively brachial plexus injury is more common in these fractures. [7] In a proximal humerus fracture the axillary artery can get injured in various modes. [8] Direct injury to the artery by a sharp bony fragment can cause laceration and rupture. [8] Violent outstretching of the artery in hyperabduction can cause avulsion or rupture of a branch at its origin. [8] When the artery stretches across a bony fragment, the adventitia remains intact and the fragile intima tears leading to thrombus. [9] Acute injuries involve total or partial rupture of all arterial layers or intimal damage only producing occlusion of the lumen. Delayed injuries include false aneurysms, AV fistula or thrombosis. Early diagnosis and treatment is the best outcome. [10] There has been one fatality caused by an axillary artery tear in which the blood extravasated into the neck and mediastinum causing tracheal compression. [11] Diagnosing an axillary artery injury maybe difficult as peripheral pulses may remain intact initially and disappear later. It has been well documented about the existence of circulating anastomosis between the subclavian artery and 3rd part of the axillary artery and hence rich collateral circulation around the scapular region. Hence typical signs of any vascular insult may not be revealed immediately. [12] As a result vascular injury can occasionally manifest several days after fracture. Paraesthesia is probably the most reliable symptom of inadequate distal circulation and should always be taken seriously. Only 16 cases have been reported with axillary artery injury till 1998. [13] Of this 10 due to fall and 6 following RTA. [13] Most cases that developed delayed block, were found to have thrombosis with or without intimal tear. [14] Only one patient had complete axillary artery tear. [14] Repair of damaged axillary artery may require arthrectomy with thrombectomy, primary repair of a puncture or laceration by sutures with venous patch or resection of a portion of the artery with end to end anastomosis, vein grafting or synthetic grafting. However patient with chronic DM, PVD etc., in whom the vessels have atherosclerotic changes, awaiting for the collateral circulation to develop may endanger the viability of the limb. In such cases detection and intervention with vascular grafts should be considered. [12] In our case since the patient is a known case of Diabetes mellitus and End Stage Renal Failure, venous graft was not recommended due to in view of atherosclerosis and hence synthetic graft was used. More over in our case we could not have a further follow up as she succumbed due to multiple co-morbid conditions. This case being discussed because of its relative rarity and to stress for higher investigations/opinions as per the situation warrants.

CONCLUSION

Proximal humerus fracture with axillary artery injury can be easily missed. Every axillary artery injury with closed proximal humerus fracture should be handled with care, immediately without further manipulation of limb and proper investigations should be done. Once vascular injury is suspected Doppler examination is necessary to establish the magnitude and quality of the arterial signal. Angiography should be done without any delay if suspected arterial injury after Doppler. Circulation must be restored in 6 – 8 hours if the limb is to be salvaged. Vascular surgeon's opinion should be sought for further management of the patient.

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