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Case Report

A rare presentation of mid shaft humerus fracture with axillary artery & brachial artery traumatic thrombus with brachial plexus palsy

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ABSTRACT

Humerus fractures account for 3% of all orthopaedic injuries and are common among adult population following trauma. With high velocity trauma we witness associated injury to nearby vessels, nerves or both. We present a rare case of mid shaft humerus fracture associated with brachial artery, axillary artery and brachial plexus injury, sustained at work place while operating the heavy hydraulic door of a lorry. Emergency CT-angio was done and site of vascular injury was identified, following which patient was taken up for surgery. Fracture was first fixed by open reduction and internal fixation (ORIF) through anterolateral approach with locking plate and it was followed by vascular reverse saphenous vein bypass graft from axillary artery to distal brachial artery through a median approach.

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1. Introduction

Humerus fractures account for 3% of all orthopaedic injuries and are common among adult population following trauma.¹ Treatment modalities have evolved over a long period of time since first described by ancient Egypt (circa 1600 BC).¹ With increase in high velocity trauma, we have been witnessing associated injury to vessels, nerves or both along with fractures. In fractures associated with vascular injury timing of surgery is very important. With increase in duration of revascularization procedure there is an increase in chance of limb amputation (9). A study has shown that revascularization procedure done within 3 hours of injury carries an high chance of survival, than compared to procedure done after 9 hours which carries 50% chance of going for limb amputation.² Axillary artery and brachial artery injury have been reported along with proximal humerus fracture.³ Axillary artery and brachial plexus injury has

been reported in the past along with proximal humerus fracture.⁴ In our case report we present a rare case of midshaft fracture humerus with a combination of both axillary artery and brachial artery traumatic thrombus with brachial plexus palsy.

2. Case Report

A 20 years old male patient referred to our tertiary care centre from another hospital with an alleged history of accidental injury to right dominant arm at the work place, while operating a hydraulic door of the lorry. On arrival his vital parameters were found to be stable, he was conscious, he complained of pain in the right arm, inability to lift right upper limb, and paresthesia. On clinical examination patient had deformity at right arm, wrist drop and radial artery pulsation was not felt. Roentgenogram of right arm was done and had mid shaft comminuted humerus fracture (Figures 1 and 2). Emergency CT-angio of right upper limb was done (Figures 3 and 4). The CT-angio showed

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axillary artery traumatic thrombus measuring around 17 mm with brachial artery traumatic thrombus measuring 45 mm along its long mid segment (Figure 5). Patient was prepared for surgery after counselling the patient and the relatives regarding the guarded outcome of the surgery. Preoperatively patient was given intravenous (I.V) antibiotics, intravenous fluids and transfused 1 unit of packed red blood cell. Emergency fracture fixation was done followed by axillary- brachial artery reverse saphenous vein bypass graft was done (Figure 6). After revascularization surgery the blood flow to the limb was re-established, radial artery pulsation was felt well, but the paralysis and paresthesia of the limb did not improve.



Figure 1: Pre op X-ray humerus-L at view



Figure 2: Pre op X-ray -AP view



Figure 3: Pre op CT-angio showing Brachial artery filling defect)

3. Discussion

Traumatic injuries to the brachial artery are rare, but can be serious especially in the case of ruptures involving its proximal segment above the level of deep brachial artery origin.⁵ Among all the vascular injury in the upper limb, brachial artery injury is relatively frequent (40-66.5%). The initial management of the patient was carried out as per the guidelines layed down by the advance trauma and life support(ATLS) for trauma patients.⁶

The timing of the vascular surgery with respect to fracture management is always been a matter of controversy.⁶ Since prevention of prolonged ischaemia to the tissue is the prime goal, some authors recommend vascular repair to be priotised followed by fracture fixation.⁷ In an another study, Hunt et al. (had recommended skeletal fixation to be preceded before undertaking vascular re-vascularization procedure.⁸ The unstable and comminuted fractured bone fragment can endanger the

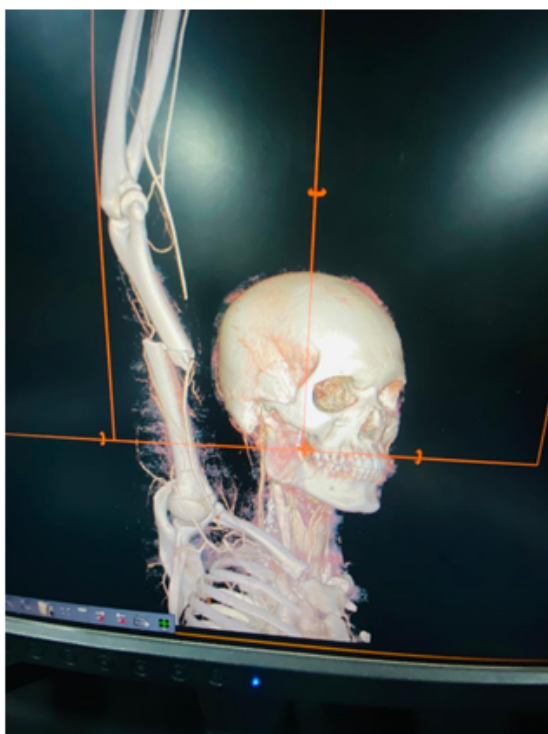


Figure 4: Pre op CT-angio showing Brachial artery filling defect

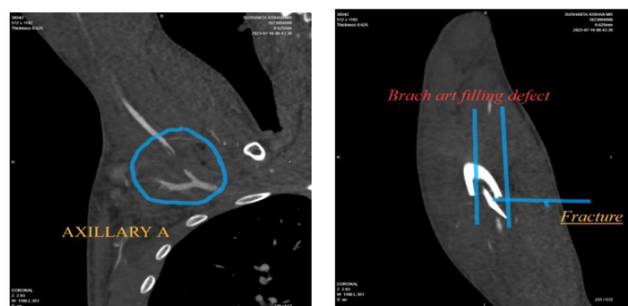


Figure 5: Pre op CT-angio showing axillary artery Filling defect

repaired arterial graft more commonly in the upper limb than in the lower limb because of minimum soft tissue coverage.⁹ Therefore, we perform bone fixation prior to vessel repair, to maintain vessel patency.

Traumatic Amputation or near traumatic amputation always poses a real challenge for the surgeon as it is for the patient. A very high index of suspicion is needed to identify axillary artery injury at a very early stage of examination. Even though the success rate after axillary and brachial artery repair is good, caution should be taken for neurological morbidity.¹⁰ Neurological injury often poses a poor functional outcome in upper extremity, even after a successful vascular repair.¹¹ In our institution we adopt a multispeciality approach for treating such cases, the team involves a vascular surgeon to repair the vessel,



Figure 6: Post op check X-ray

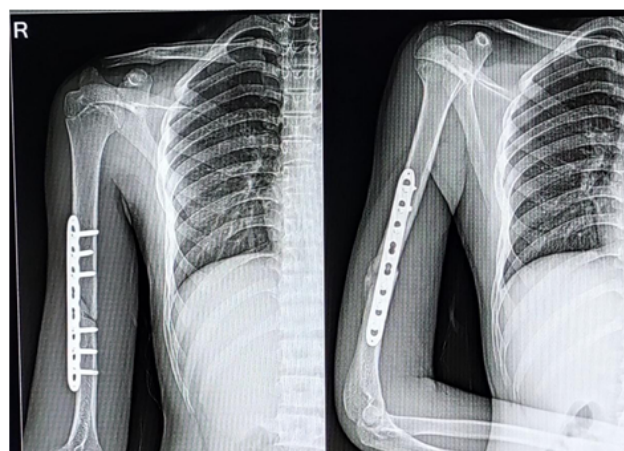


Figure 7: 2 month follow up

orthopaedic surgeon to stabilize skeletal discontinuity and plastic surgeon to repair tendon and nerve injury and if needed flap cover. Skeletal stabilization is first to be done, to facilitate the revascularizing procedure. Fracture can be stabilized either by internal fixation or with external fixator. In our institution we do primary stable internal fixation. In this case we did a locking plate for humerus fracture through a standard anterolateral approach and followed by axillo-brachial reverse saphenous vein bypass graft through a median approach. Post operative period was uneventful. Radial artery flow was re-established and patient was put on oral anticoagulants. The paralysis of the affected upper limb did not recover. A potential devastating sequel of brachial artery injury is development of compartmental

syndrome.¹² The chances of ischaemia-reperfusion injury is proportionally more with respect to the extend and duration of ischaemia to the skeletal muscles. Beyond the golden hour of 6-8 hours the chances of ischaemia-reperfusion injury may jeopardise the viability of the limb and often to the patients life.[10,15]⁶ The indication for fasciotomy was clinically evident or impending compartmental syndrome, excessive swelling of the upper limb, ischaemia of over 6 hours and any loss of sensory and motor function.¹³

During the second month of follow up the radial artery pulse were felt. Fracture showed signs of callus formation (Figure 7). Patients did not show any neurological improvement, hence MRI of brachial plexus was advised. MRI suggested cord contusion -axonotmesis. Patient is advised physiotherapy.

4. Conclusion

Humerus fracture with associated vascular and nerve injury always poses a challenge to the operating team. The procedure should be taken up before the golden hours of 6-8 hours to get a good functional outcome. The vascular repair should be preceded by the skeletal fixation.

5. Patient Consent

The authors have obtained written informed consent from the patient for publication of the case report details and related images.

6. Source of Funding

None

7. Conflict of Interest

There's no conflict of interest with regards to the submitted article.


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