CASE REPORT

POST-TRAUMATIC FRACTURE NON-UNION OF PROXIMAL HUMERUS WITH COMPROMISED ROTATOR CUFF TREATED WITH REVERSE SHOULDER ARTHROPLASTY: A CASE REPORT

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ABSTRACT: We here with present a case of post-traumatic fracture non-union of proximal humerus with compromised rotator cuff in a 50 yrs old retired BSF jawan, who presented to our OPD with a chief complaint of pain, decreased ROM of rt.shoulder. He had an h/o previous injury following RTA on 16/2/2012 & was treated with ORIF on 25/2/2012. X-ray shows fracture non-union of proximal humerus with migration of humeral head relative to glenoid in superior direction, also there is acetabularisation of acromion & femoralisation of proximal humerus. MRI shows compromised rotator cuff. Both x-ray & MRI are suggestive of rotator cuff arthropathy. After, thorough investigations &rulling out any other associated co-morbidities, pre-operative planning was done to maintain gothic arch, modularity (for reestablishing normal gleno-humeral anatomic relationship), Inferior tilting of glenoid component by 15. Implant was removed & reverse shoulder arthroplasty was done. Per-operative & post-operative periods were uneventful. Patient was relieved of the symptoms and is now under follow-up.
KEYWORDS: Post-traumatic, Rotator cuff arthropathy, Reverse shoulder arthroplasty .

INTRODUCTION: The primary mechanism responsible for stability of glenohumeral joint is the balance between the compressive force provided by the rotator cuff and proximal pull of the deltoid.[1-2] This balance is known as "Concavity-compression" mechanism of rotator cuff.[3-4] When this balance is disrupted or compressive force is insufficient to overcome the proximal pull of the deltoid, migration of the humeral head relative to glenoid occur in superior direction.[5-6] Neer et al[7] noted, persistence of this condition can lead to acetabularisation of the acromion and femoralisation of the proximal humerus due to contact with the intact coracoacromial arch. Further, weakness of the deltoid occurs secondary to this proximal migration, muscle shortening, and loss of the normal glenohumeral fulcrum. By reversing the orientation of shoulder girdle, that means glenoid fossa by glenoid base plate and glenosphere and humeral head by humeral shaft and concave cup, reverse shoulder arthroplasty increases deltoid moment arm to enhance the torque, enhanced mechanical advantage of deltoid, compensates for deficient rotator cuff and superior translational forces can be converted to rotational moments.

CASE REPORT: A 50 yrs old retired BSF jawan presented to our OPD with chief complaints of pain and decreased range of motion of right shoulder joint for last 2yrs. He had a h/o trauma following RTA on 16/2/2012 and was treated with PHILOS plating on 25/2/2012. Clinically there was signs of compromised rotator cuff but no neurological deficit. X-ray shows fracture non-union of proximal humerus with migration of humeral head relative to glenoid in superior direction, also

there is acetabularisation of acromion and femoralisation of proximal humerus. MRI shows compromised rotator cuff. Both x-ray and MRI are suggestive of rotator cuff arthropathy. Pre-operative planning was done to maintain gothic arch, modularity (for reestablishing normal gleno-humeral anatomic relationship), Inferior tilting of glenoid component by15.[8] Implant was removed and reverse shoulder arthroplasty was done through delto-pectoral approach in beach chair position. Cementless fixation of the base plate to the bony glenoid surface was done using a central compressive lag screw and 3 peripheral locking screws. Humeral stem (cemented) inserted while maintaining 20-30 degrees of retroversion (in-built). Then subscapularis repaired and tuberosities fixed around the implant bypreviously passed non-absorbable sutures.

DISCUSSION: The indications for reverse shoulder arthroplasty are evolving, as is the understanding of the pathophysiology of advanced rotator cuff disease that leads to functional deficits and pain. Currently, the most common indication for a RSA is pain and altered function due to glenohumeral arthritis with rotator cuff compromise.[9] These patients can be further subdivided into 3 groups: Those with true RCTA, those with primary glenohumeral osteoarthritis with rotator cuff compromise, and those with posttraumatic osteoarthritis with rotator cuff compromise, as it is in our case.If the pain is clearly generated from glenohumeral or humeroacromial bony abrasion, treatment with RSA should be considered. A functioning deltoid is the basic requirement, because the deltoid is primarily responsible for abduction and forward flexion after RSA.

CONCLUSION: Reverse shoulder arthroplasty has shown great promise in post-traumatic fracture non-union of proximal humerus with compromised rotator cuff. As clinical and biomechanical research seeks to refine reverse shoulder arthroplasty, its use might one day surpass total shoulder arthroplasty.

REFERENCES:

1. Parsons IM, Apreleva M, Fu FH, Woo SL: The effect of rotator cuff tears on reaction forces at glenohumeral joint. J Ortho Res 2002; 20 (3): 439-446.
2. Gagey O, Hue E: Mechanics of the deltoid muscle: A new approach. ClinOrthopRelat Res 2000 (375): 250-257.
3. Lee SB, Kim KJ, O'Driscoll SW, Morrey BF, An KN: Dynamic glenohumeral stability provided by the rotator cuff muscles in the mid-range & end-range of motion: A study in cadaver.JBJS Am 2000; 82 (6): 849-857.
4. Halder AM, Kuhl SG, Zobitz ME, Larson D, An KN: Effects of the glenoid labrum &glenohumeral abduction on stability of the shoulder joint through concavity compression: An in vitro study.J Bone Joint Surg Am 2001; 83-A (7); 1062-1069.
5. Hsu HC, Luo ZP, Cofield RH, An KN: Influence of rotator cuff tearing on glenohumeralstability.J Shoulder Elbow Surg 1997; 6 (5): 413-422.
6. Bezer M, Yildirim Y, Akgun U, Erol B, Guven O: Superior excursion of the humeral head: A diagnostic tool in rotator cuff tear surgery.J Shoulder Elbow Surg 2005; 14 (4): 375-379.

7. Neer CS II, Craig EV, Fukuda H: Cuff-tear arthropathy.J Bone Joint Surg Am 1983; 65 (9): 1232-1244.
8. Guterrez S, Walker MH, Willis M, Pupello D, Frankle MA: Effect of tilt &glenosphere eccentricity in a reverse shoulder model.
9. Wall B, Nove-Josserand L, O'Connor DP, Edwards TB, Walch G: Reverse total shoulder arthroplasty: A review of results according to etiology.J Bone Joint Surg Am 2007; 89 (7): 1476-1485.

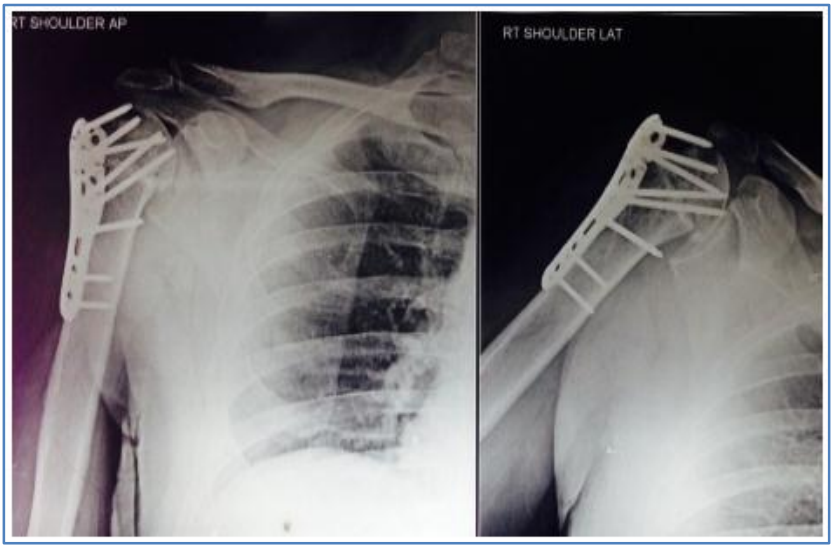

Fig. 1: (X-ray rt. Shoulder ap& lat. View)

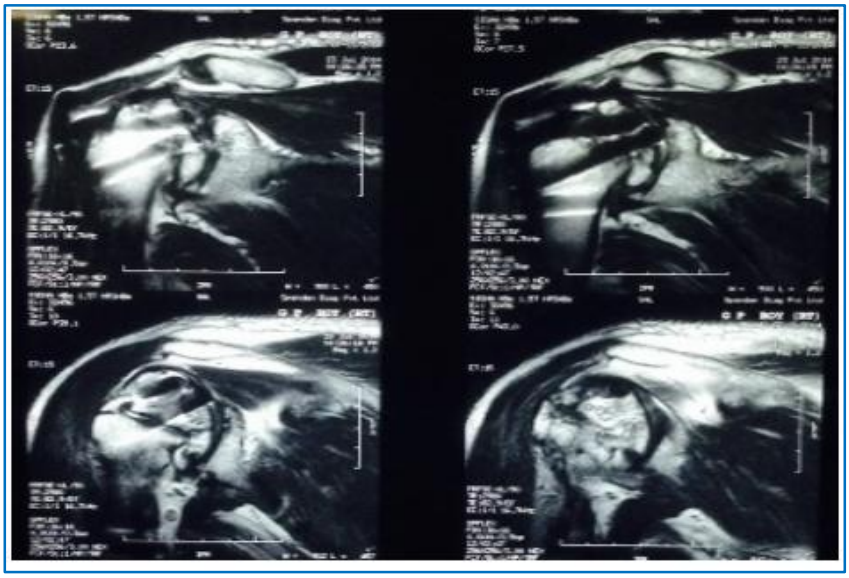

Fig. 2: (MRI showing compromised rotator cuff)

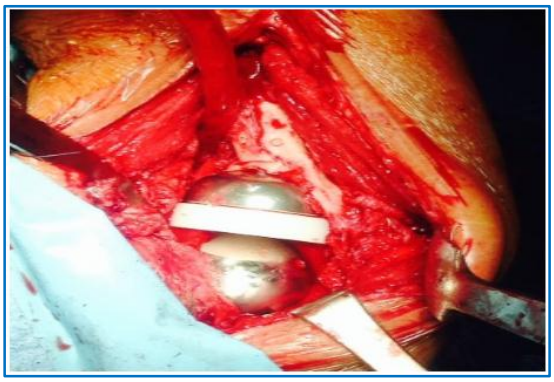

Fig. 3: (Implant insitu)

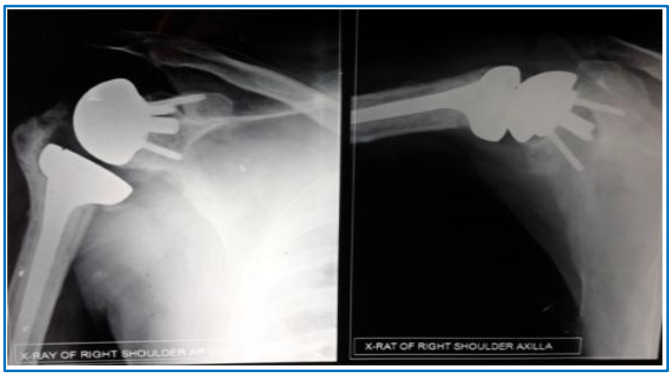

Fig. 4: (Post-op x-ray showing implant in situ)

Fig. 5: (Follow-up)

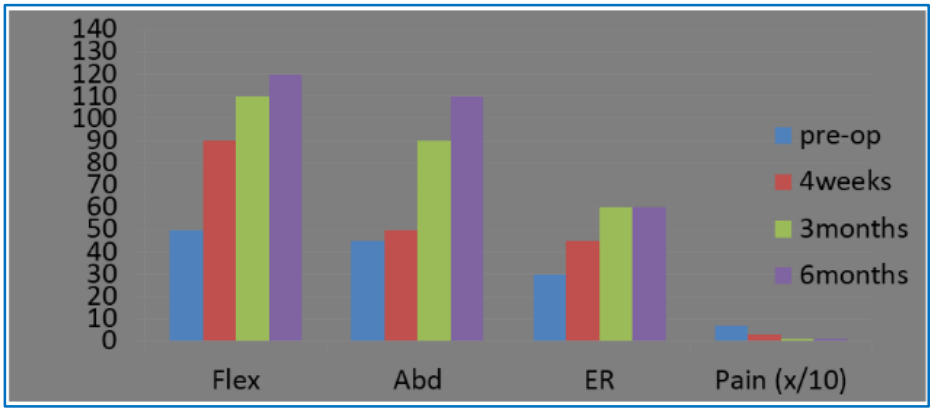

Fig. 6: (Outcomes : ROM & pain)

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