

**Complex trauma: segmental surgical neck of humerus with supracondylar fracture extending to intercondylar area of elbow joint – A rare case.**

<sup>1</sup>Dr St Sanikop, Professor, KAHER, Department of Orthopaedics, J. N. Medical College, Belagavi 590010, Karnataka, India.

<sup>2</sup>Dr Ravikiran Reddy, Consultant Orthopaedic Surgeon, 86/338 Doctors Colony, near B Camp, Kurnool 518002, Andhra Pradesh, India.

<sup>3</sup>Dr Raunak Pareek, Consultant Orthopaedic Surgeon, 4/9-A Civil Lines, Bagh Farzana, Agra 282002, Uttar Pradesh, India.

**Corresponding Author:** Dr Raunak Pareek, Consultant Orthopaedic Surgeon, 4/9-A Civil Lines, Bagh Farzana, Agra 282002, Uttar Pradesh, India.

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**Abstract**

Humerus fractures account for 4 to 6 percent of all fractures in young patients and 1 to 3 percent of all fractures in elderly patients. In young men, these fractures are usually a result of high-energy trauma while in the older population, these fractures are typically seen in women after a ground-level fall.<sup>1</sup> Typically, these injuries cause temporary disability in the younger population whereas permanent disability can be seen in the elderly population. This activity describes the evaluation, diagnosis, and management of humerus fractures and stresses the role of team-based interprofessional care for affected patients.<sup>2</sup> Intercondylar fracture of humerus is one of the commonest fractures of young adult and counts for about 30% of all elbow fractures. The treatment of these fractures continues to present challenges despite advances in internal fixation.

**Keywords:** Humerus Fracture, Neck of Humerus, Intercondylar Fracture, Elbow.

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**Introduction**

PHFs most commonly occur in the elderly. The three most common osteoporotic (i.e., fragility) fractures include:

- Vertebral Compression Fractures
- Distal Radius Fractures
- Proximal Humerus Fractures

While high-energy mechanisms are more likely to result in associated soft tissue and/or neurovascular injuries, increasing age has been associated with more complex fracture types. The latter can include increasing degrees of comminution, displacement, and fracture/dislocation patterns. The overall incidence is reported at 4% to 6% with a 2:1 female to male ratio.<sup>2</sup>

Proximal humeral anatomy includes four potential "parts". These parts were originally described by Neer and have been incorporated into his traditional classification scheme for PHFs. Proximal humerus anatomy includes:

- Anatomic Neck
  - Represents the old epiphyseal plate.
- Surgical Neck
  - The anatomic region of the proximal humerus that is the weakest region of bone and located below the humeral head.
- Greater Tuberosity
  - Anatomic footprint and insertion site for three of the four rotator cuff muscles; working anterior to posterior these include:
    - Supraspinatus
    - Infraspinatus
    - Teres Minor
- Lesser Tuberosity
  - The insertion site for the subscapularis

The distal humerus intercondylar fracture can be classified using the Riseborough and Radin classification.

Riseborough and Radin classification:

- Type I: No displacement of the fragments.
- Type II: T-shaped intercondylar fractures with the trochlear and capitellar fragments separated but not appreciably rotated in the frontal plane.
- Type III: T-shaped intercondylar fractures with separation of the fragments and significant rotatory deformity.
- Type IV: T-shaped intercondylar fractures with severe comminution of the articular surface and wide separation of the humeral condyles.

### **Case Report**

A 36 years old male presented to Emergency medical services department of our hospital with complaints of pain and inability to lift the right upper limb after he met with an accident while riding a two-wheeler and got hit by a truck. On examination, he had multiple abrasion marks over his shoulder and elbow with tenderness over his shoulder and the elbow. The attitude of the upper limb was extended with deformity over the right shoulder and elbow. There was no numbness or paresthesia over the shoulder and no tingling numbness along the forearm. Active finger movements were present with peripheral sensations intact and distal pulses were well felt. Initial stabilization with slab was done and patient underwent routine investigation for the surgery. CRIF with IMIL nail for neck of humerus fracture was done along with ORIF with bi-columnar plating for distal humerus intercondylar fracture using was done in the same sitting using the trans-olecranon approach with bone graft harvested from the iliac crest which was followed by tension band wiring of the olecranon lastly. Post-operatively patient had active finger movements with intact peripheral sensations and well felt distal pulsations. The patient has been advised immobilization with slab and physiotherapy will started after 6 weeks.

### PRE-OP Xray



Fig. 1: Xray Right length humerus AP and Lateral views showing Ipsilateral neck of humerus fracture with intercondylar humerus fractures.

### POST-OP Xray

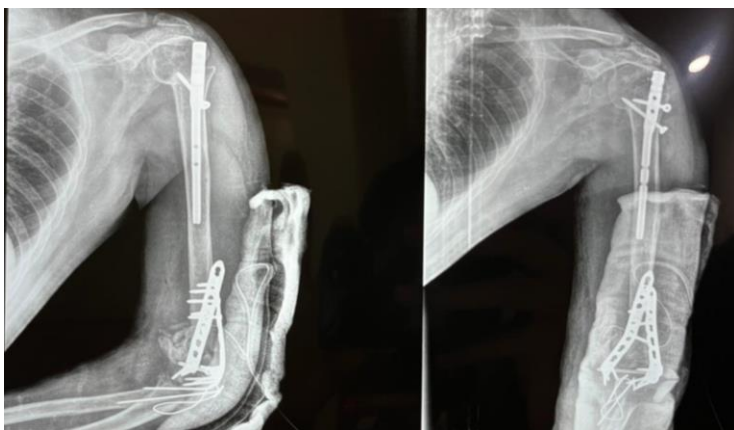


Fig. 2: Xray Right Humerus with IMIL for proximal humerus fracture and bi-columnar plating for intercondylar humerus fracture.

### Discussion

Proximal humerus fracture with distal humerus intercondylar fracture is a result of high velocity injury in the young but can also happen as a result of pathological fracture or osteoporotic bones. Incidences of both occurring individually higher than together. Necrosis of the humeral head, infections and non-unions are among the most dangerous and difficult-to-treat complications of proximal humeral fractures. Injury to axillary nerve is also a dreaded risk which can lead to a loss of movement or sensation in the shoulder. Proximal humerus fractures are the third most common fracture in the elderly. Although most fractures can be treated conservatively with acceptable outcomes, certain fracture patterns are at high risk for progression to humeral malunions, non-unions, stiffness, and post-traumatic arthrosis. The goal of antegrade humeral nailing of proximal humerus fractures is to provide stability to a reduced fracture that allows early motion to optimize patient outcomes. The management of distal humerus fractures is considered challenging and technically demanding, because of the complexity of the regional anatomy and the multi-fragmentary pattern of injury. Open reduction and

internal fixation (ORIF) is the treatment of choice for these fractures.<sup>3,4</sup> Achieving rigid internal fixation and anatomical reconstruction by restoring the two columns and the articular surface is essential for allowing early motion, adequate bone healing and avoiding future cartilage degeneration.<sup>5</sup> In young patients, open reduction and internal fixation with plate fixation of both columns is the gold standard. The decision regarding the choice of implants and fixation techniques is dictated by the fracture pattern and degree of comminution. Pre-contoured anatomical locking plates, orthogonal plates (90°:90°), or parallel plates (medial and lateral supracondylar ridges) are currently the most popular choices of treatment for distal humerus fractures.<sup>6</sup> However, despite evolution of ORIF techniques for distal humerus fractures, an overall complication rate up to 35% has been reported.<sup>3,7</sup>

### **Conclusion**

Segmental neck of humerus with supracondylar fracture with intercondylar extension is a rare injury. Early open reduction and internal fixation is necessary for intra articular fracture to get full range of movements of shoulder and elbow joint and to achieve full functional recovery. In our case patient got full range of movements of shoulder and elbow joints and went for work with functional right upper extremity.

### **References**

1. Court-Brown CM, Caesar B. Epidemiology of adult fractures: A review. *Injury*. 2006 Aug;37(8):691-7.
2. Donnally III CJ, DiPompeo CM, Varacallo M. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Nov 21, 2021. Vertebral Compression Fractures.
3. Korner J, Lill H, Muller LP, et al. Distal humerus fractures in elderly patients: results after open reduction and internal fixation. *Osteoporos Int* 2005;16:S73–79.
4. Pajarinen J, Bjorkenheim JM. Operative treatment of type C intercondylar fractures of the distal humerus: results after a mean follow-up of 2 years in a series of 18 patients. *J Shoulder Elbow Surg* 2002;11:48–52.
5. Lee SK, Kim KJ, Park KH, Choy WS. A comparison between orthogonal and parallel plating methods for distal humerus fractures: a prospective randomized trial. *Eur J Orthop Surg Traumatol* 2014;24:1123–1131.
6. Galano GJ, Ahmad CS, Levine WN. Current treatment strategies for bicolunar distal humerus fractures. *J Am Acad Orthop Surg* 2010;18:20–30.
7. Henley MB, Bone LB, Parker B. Operative management of intra-articular fractures of the distal humerus. *J Orthop Trauma* 1987;1:24–35.