

Fracture Trochlea In Coronal Plane Associated With Floating Elbow: Rare Combinations Of Injuries

D Shrestha, G Singh

Citation

D Shrestha, G Singh. *Fracture Trochlea In Coronal Plane Associated With Floating Elbow: Rare Combinations Of Injuries*. The Internet Journal of Orthopedic Surgery. 2006 Volume 5 Number 2.

Abstract

We present a case of uncommon entity of fracture of trochlea in the coronal plane associated with a floating elbow of the ipsilateral extremity in a twenty years old male which is not reported in literature. Presence of bone fragment in front of the distal humerus but medial to medial epicondyle is suggestive of fracture of the trochlea in the coronal plane.

INTRODUCTION

Isolated fractures of trochlea in the coronal plane are a rare clinical entity because they are situated deep within the olecranon and forces transmitted through the coronoid process of the ulna are compressive rather than shearing.^{1, 2} Fracture of the trochlea is accomplished by the other elbow injuries like elbow dislocation, fracture of capitellum, fracture of ulna and extra articular condylar fracture with or without ulnar nerve injury.²

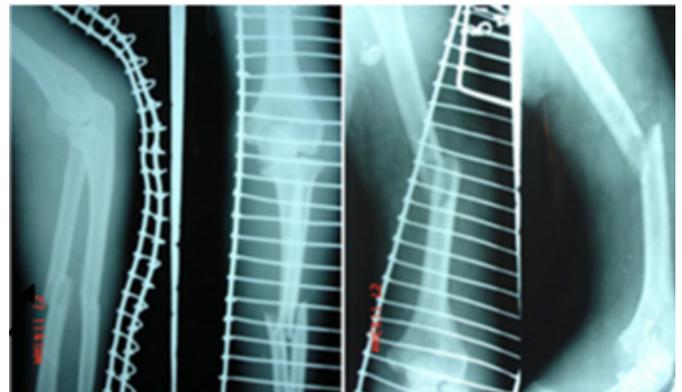
We present a case of combination of shear fracture of trochlea (AO/ASIF classification: 13 B 3.2) associated with floating elbow (12 A 2.2 and 22 A 3.2).³ Literature search revealed no previous reports of such combination of injuries.

MATERIAL AND METHOD

Twenty years old right handed sugar mill factory worker presented after two days of motor vehicle accident with pain and swelling of right upper extremity. Clinical examination revealed blisters over arm, swollen elbow and forearm with tenderness over medial aspect elbow, arm and forearm. Neuro-vascular functions were intact. Radiographs revealed bone fragment in front of distal humerus on lateral view and medial to midline but distal to medial epicondyle on antero-posterior view; suggestive of fracture trochlea in coronal plane and diaphyseal fracture of humerus and ipsilateral fracture of both bones forearm. (Fig.1)

Figure 1

Figure 1 : X- rays showing bone fragment in front of distal humerus (arrow)and distal but medial to medial epicondyle suggestive of fracture trochlea in coronal plane and fracture of ipsilateral both bone forearm and humerus.



Elbow was approached with Bryan and Morrey technique for fixation of shear fracture of trochlea with 4 mm cancellous bone screw to produce interfragmentary compression.⁴ (Fig. 2a) Open reduction and internal fixation of forearm bones fractures was performed with intramedullary square nails (Fig. 2b). Delayed fixation of humerus was performed with dynamic compression plate and cortical cancellous bone grafting once skin condition was favorable. (Fig. 2c)

Figure 2

Figure 2a: Open reduction and internal fixation of fracture trochlea with lag screw. Fig. 2b: Open reduction and internal fixation of fracture both bones forearm with intramedullary square nails. Fig. 2c: Open reduction, internal fixation with dynamic compression plate and cortico-cancellous bone grafting for fracture of humerus.



Post operative period was uneventful. Patient returned for follow up to only after 12 months with backing up square nail from ulna. Radiograph revealed union of fracture trochlea without evidence of avascular necrosis but delayed union of both forearm bones fracture. (Fig. 3a, 3b) Mayo Elbow Performance Index showed Fair outcome. ⁵

Figure 3

Figure 3a: Follow up at eight months showing union of fracture trochlea. Figure 3b: Follow up at eight months showing delayed union and backing up of ulnar intramedullary nail.



DISCUSSION

Osteochondral shearing fracture of distal end of humerus is uncommon. ^{1, 6} Compressive wedging or shearing forces are usually involved in producing these fractures. Because of lack of muscular or ligamentous attachment, avulsion force does not play a role in these fracture and free fragments remain free within joint cavity. ¹ Trochlea fracture is usually caused by a fall on olecranon or out stretched arm or direct injury. ⁷

As forces strong enough to create trochlea fracture also disrupt ulna and capitellum; dislocate elbow and result bicolumnar condylar fracture, careful examination to rule out these injuries is mandatory. ⁶ Elbow effusion, pain, restriction of movements, crepitation and radiographic evidence of semi-circled or moon shaped bony fragment

lying in front of distal humerus on lateral view and medial to midline but distal to medial epicondyle on AP view should arise suspicion of trochlea fracture in coronal plane. ^{1, 8} In our patient, trochlea fracture in coronal plane was associated with ipsilateral diaphyseal fracture of humerus and forearm both bones fracture, floating elbow: a combination previously not reported.

Osteochondral shear fracture of distal humerus is not obvious in antero-posterior radiographs. Typically described “double arc sign” on lateral view suggests shear fracture of capitellum extending to lateral trochlea ridge. ⁹ Osteochondral fragment of trochlea is less apparent in plane radiographs and may need CT scan in axial or transverse plane which provides details of fracture pattern. ⁶

Smith recommended a posterior splint for three weeks followed by physiotherapy for fracture trochlea that can not be replaced or anatomically secured. Large fragment like in our patient should be replaced and fixed with either by Herbert screw or bio-absorbable pins or inter fragmentary AO lag screws to prevent elbow incongruity or instability. ^{10, 11}

Very few outcome reports of trochlea fracture are available. When it is associated with other elbow injury, outcome has been found poor. ¹⁰ In our patient outcome was fair according to Mayo Elbow Performance Index.

CORRESPONDENCE TO

Dipak Shrestha. (MS) Lecturer Dhulikhel Hospital, Kathmandu University, School Medical Sciences Dhulikhel, Nepal GPO Box: 11008 Kathmandu, Fax +977 11 490707, E- mail: dsmsortho@yahoo.com

References

1. Hotchkiss RN: Fracture and dislocations of elbow. In: Rockwood CA, Green DP, Bucholz RW, Heckman JD, eds. Fracture in Adult. Vol. 1, Fourth ed. Philadelphia, Lippincott - Raven, 1996: 929-1024.
2. Mehdian H, Michael D, McKee MD. Fracture of Capitellum and Trochlea. Orthop Clin North Am. 2000; 31:115-127.
3. Muller ME, Nazarian S, Koch P, Schatzker J. The comprehensive classification of fracture of long bones. New York: Springer; 1990
4. Morrey BF. Surgical exposure of the elbow. In: Morrey BF, ed. The elbow and its disorders. Second ed. Philadelphia: WB Saunders, 1993: 136-166.
5. Morrey BP, An KN, Chao EYS. Functional evaluation of the elbow. In: Morrey BF, ed. The elbow and its disorders. Second ed. Philadelphia: WB Saunders, 1993: 56-97.
6. Jupiter JB, Morrey BF. Fracture of distal humerus in Adult. In: Morrey BF, ed. The elbow and its disorders. Second ed. Philadelphia: WB Saunders, 1993: 328-366.
7. Grant IR, Miller JH. Osteochondral fracture of the

Fracture Trochlea In Coronal Plane Associated With Floating Elbow: Rare Combinations Of Injuries

trochlea associated with fracture-dislocation of the elbow. Injury. 1975; 6: 257-260.

8. AV oberstein A , Kreitner KF, Lowe A, Michiels I. Isolated fracture of trochlea humeri following direct elbow trauma. Aktuelle Radiologie 1994 Sept; 4(5): 271-3.

9. McKee MD, Jupiter JB, Bamberger HB. Coronal Shear

fracture of the distal end of the humerus. J Bone Joint Surg. [Am] 1996; 78-A: 49-54.

10. Smith FM.

Surgery of elbow. Philadelphia, WB Saunders 1972.

11. David G. Keintz JR, Baratz ME. Fracture of elbow. Orthop Clin. North Am. 1999; 30:37-61.

Author Information

Dipak Shrestha, M.S.

Lecturer, Dhulikhel Hospital, School Medical Sciences, Kathmandu University

Girish Kumar Singh, M.S.

Professor, Department of Orthopaedics, B. P. Koirala Institute of Health Sciences