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Trans-Olecranon Fracture-Dislocation of the Elbow: A Retrospective Case Series of 13 Patients

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Abstract **Original Research Article**

Trans-olecranon fracture-dislocation (TOFD) of the elbow is an uncommon pattern of complex elbow trauma that is frequently misclassified as a Monteggia lesion. The purpose of this study was to describe the epidemiological profile, lesion pattern, surgical management, complications, and functional outcomes of patients treated for TOFD at a tertiary trauma center. We performed a retrospective case series of 13 patients managed between January 2020 and December 2024. Diagnosis was based on a very proximal metaphyseal ulna fracture associated with anterior displacement of the forearm on the lateral radiograph, with preservation of the proximal radioulnar relationship. All patients underwent surgical treatment and were followed clinically and radiographically for a mean of 18 months. Functional assessment was performed using the Broberg and Morrey score. The mean age was 26 years (range, 17-62 years), and 12 patients were male. The mechanisms of injury were falls in six cases, assaults in four, and road traffic accidents in three. Nine fractures were complex and four were simple. Associated injuries included three radial head fractures, one coronoid fracture, and five open fractures. Ten patients were treated by plate osteosynthesis and three by tension-band wiring. Physiotherapy was started 15 days after surgery. Complications included one case each of nonunion, secondary displacement, and elbow extension stiffness. According to the Broberg and Morrey score, outcomes were excellent in four patients, good in four, fair in three, and poor in two. TOFD remains a rare but severe injury. Favorable outcomes depend on early recognition, anatomical restoration of the trochlear notch, stable internal fixation, and timely rehabilitation.

Keywords: trans-olecranon fracture-dislocation, elbow instability, olecranon fracture, plate fixation, Broberg and Morrey score.

INTRODUCTION

Trans-olecranon fracture-dislocation (TOFD) is a rare pattern of complex elbow injury characterized by an olecranon fracture associated with anterior translation of the forearm relative to the distal humerus while the proximal radioulnar relationship remains intact. This injury was first described by Biga and Thomine and is frequently misclassified as a Monteggia lesion, which may contribute to under recognition in routine trauma practice (Biga & Thomine, 1974; Ring *et al*., 1997; Doornberg *et al*., 2004).

The essential lesion in TOFD is the disruption of the greater sigmoid notch, with consequent loss of ulnohumeral congruity. Diagnosis is usually established on standard anteroposterior and lateral radiographs, whereas computed tomography can be useful when comminution, coronoid involvement, or articular impaction needs further characterization. The principal therapeutic objective is anatomical reconstruction of the trochlear notch and restoration of a stable elbow that allows early mobilization (Doornberg *et al*., 2004; Mortazavi *et al*., 2006; Cho *et al*., 2020; Luengo-Alonso *et al*., 2021).

Most published evidence on TOFD comes from small retrospective series and reviews. These studies consistently emphasize stable internal fixation, especially with plates in comminuted patterns, careful assessment of associated radial head or coronoid injuries, and timely rehabilitation to reduce postoperative stiffness. Nevertheless, data from African trauma centers remain limited (Mortazavi *et al*., 2006; Mouhsine *et al*., 2007; Cho *et al*., 2020; Lemsanni *et al*., 2020; Luengo-Alonso *et al*., 2021).

The aim of the present study was to report a retrospective series of 13 patients treated for TOFD at our institution, with emphasis on epidemiological profile, lesion pattern, surgical management, complications, and functional outcomes.

Materials and Methods

We conducted a retrospective single-center case series of patients treated for trans-olecranon fracture-dislocation of the elbow between January 2020 and December 2024 in the Department of Traumatology and Orthopaedic Surgery B4, Hassan II University Hospital Center, Fez, Morocco.

The diagnosis was established when standard radiographs demonstrated a very proximal metaphyseal or intra-articular ulna fracture associated with anterior displacement of the forearm on the lateral view, without dissociation of the proximal radioulnar joint. Patients with injury patterns compatible with Monteggia lesions or other proximal ulna fracture-dislocations with radioulnar disruption were not included.

The following variables were extracted from medical records and operative reports: age, sex, mechanism of injury, fracture pattern (simple or complex), open or closed status, associated injuries, type of fixation, postoperative complications, and functional outcome at final follow-up. Daily activities and return to professional activity were assessed during follow-up when information was available in the outpatient records.

All patients underwent surgical treatment. The operative objective was anatomical reconstruction of the greater sigmoid notch, restoration of proximal ulna alignment, and recovery of ulnohumeral stability. Depending on fracture morphology and implant availability, fixation was achieved with an olecranon-specific plate, a one-third tubular plate, or tension-band wiring. Associated lesions were addressed during the same treatment sequence when necessary. Physiotherapy was initiated 15 days after surgery.

All patients were reviewed clinically and radiographically in the outpatient clinic. The mean follow-up period was 18 months. Functional results were evaluated using the Broberg and Morrey score and categorized as excellent, good, fair, or poor. Owing to the small sample size, the statistical analysis remained descriptive, with continuous variables reported as mean and range and categorical variables as counts and percentages.

Results

Thirteen patients met the inclusion criteria. The mean age was 26 years (range, 17-62 years). There were 12 men (92.3%) and one woman (7.7%). Falls were the most frequent mechanism of injury, accounting for six cases (46.2%), followed by assaults in four (30.8%) and road traffic accidents in three (23.1%).

Fracture morphology was complex in nine patients (69.2%) and simple in four (30.8%). Associated injuries included radial head fractures in three cases (23.1%), a coronoid process fracture in one case (7.7%), and open fractures in five cases (38.5%). No vascular or neurological injury was documented in the series.

Table 1: Patient demographics and injury characteristics

Variable	Value
Number of patients	13
Mean age (range)	26 years (17-62)
Sex	12 males; 1 female
Mechanism of injury	Falls 6; assaults 4; road traffic accidents 3
Fracture pattern	Complex 9; simple 4
Associated injuries	Radial head fracture 3; coronoid fracture 1
Open fractures	5 cases
Vascular/neurological injury	None documented

All patients were treated surgically. Plate osteosynthesis was used in 10 patients (76.9%) (Figure 1): eight with precontoured olecranon plates and two with one-third tubular plates. The remaining three patients (23.1%) were managed with tension-band wiring (Figure 2). Postoperative rehabilitation was begun after 15 days in all cases.

Complications were observed in three patients (23.1%) and consisted of one nonunion, one secondary displacement, and one case of elbow stiffness with extension deficit. At final review, the Broberg and Morrey score showed four excellent results (30.8%), four good results (30.8%), three fair results (23.1%), and two poor results (15.4%). Overall, eight patients (61.5%) achieved a good or excellent functional outcome.

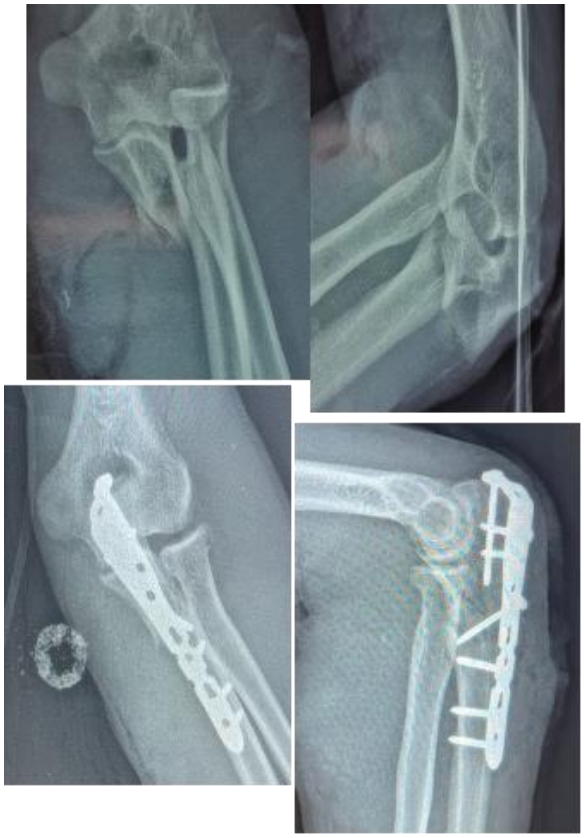

Figure 1: Elbow radiographs. (a) Preoperative anteroposterior view showing a trans-olecranon fracture-dislocation. (b) Preoperative lateral view confirming displacement of the forearm relative to the distal humerus. (c) Postoperative anteroposterior view after reduction and plate-and-screw fixation of the olecranon. (d) Postoperative lateral view demonstrating satisfactory restoration of ulnohumeral congruity with the fixation hardware in good position

Table 2: Surgical treatment, complications, and functional outcomes

Variable	Value
Fixation method	Olecranon plate 8; one-third tubular plate 2; tension-band wiring 3
Physiotherapy	Started on postoperative day 15
Complications	Nonunion 1; secondary displacement 1; extension stiffness 1
Broberg and Morrey score	Excellent 4; good 4; fair 3; poor 2
Good/excellent results	8/13 patients (61.5%)
Mean follow-up	18 months

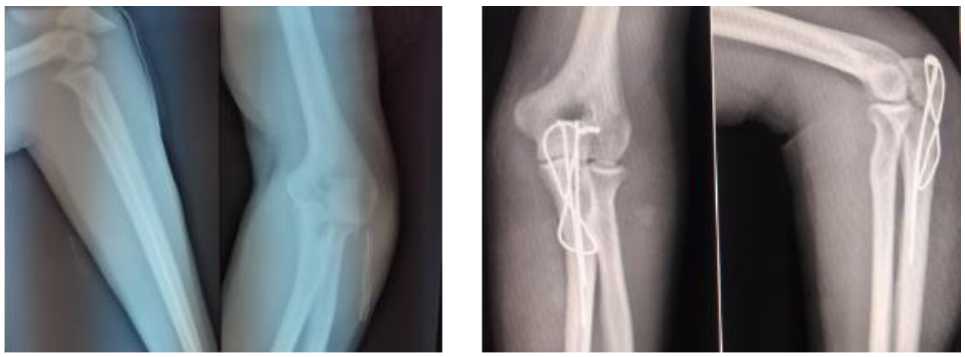

Figure 2. Elbow radiographs. (a) Preoperative anteroposterior view showing a trans-olecranon fracture-dislocation of the elbow. (b) Preoperative lateral view demonstrating displacement of the forearm relative to the distal humerus. (c) Postoperative anteroposterior view after open reduction and internal fixation using tension-band wiring with Kirschner wires. (d) Postoperative lateral view showing restoration of ulnohumeral congruity and satisfactory position of the fixation construct

DISCUSSION

The present series confirms that TOFD is an uncommon but severe injury seen predominantly in young men exposed to high-energy trauma. Although falls were the leading mechanism in our cohort, the frequencies of open fractures, comminution, and

associated lesions underline the violent nature of the injury. Similar epidemiological patterns have been reported in previous series, which also noted a predominance of male patients and a high proportion of complex fracture patterns (Ring *et al*., 1997; Mouhsine *et al*., 2007; Lemsanni *et al*., 2020; Luengo-Alonso *et al*., 2021).

Accurate recognition of TOFD is essential because the treatment priorities differ from those of Monteggia fractures. In TOFD, the proximal radioulnar relationship is preserved, whereas the key lesion is disruption of the trochlear notch and ulnohumeral congruity. Contemporary reviews continue to emphasize that failure to distinguish TOFD from other trans-ulnar fracture-dislocations may lead to suboptimal operative planning (Wong *et al*., 2015; Nieboer *et al*., 2024). In our series, no ligament repair was required and no vascular or neurological lesion was identified, supporting the concept that pure trans-olecranon injuries are primarily osseous instability patterns.

Surgical fixation remains the mainstay of treatment. Ring *et al*. (1997) and Doornberg *et al*. (2004) highlighted stable anatomical reconstruction of the trochlear notch as the cornerstone of successful management. More recent evidence suggests that precontoured 3.5-mm plates provide the most reliable fixation in adult TOFD, particularly for comminuted fractures (Cho *et al*., 2020). In our cohort, plates were used in more than three-quarters of patients, and the qualitative review of outcomes suggested better performance with olecranon-specific plates than with less rigid constructs. This observation is consistent with earlier reports in which fixation failure and revision were more likely after insufficiently rigid fixation, especially in complex patterns (Mortazavi *et al*., 2006; Mouhsine *et al*., 2007).

Overall functional results in our study were satisfactory, with 61.5% of patients achieving good or excellent Broberg and Morrey scores. This proportion is somewhat lower than the favorable outcomes reported in several series, where good or excellent results generally range from about 70% to 90% (Ring *et al*., 1997; Mortazavi *et al*., 2006; Mouhsine *et al*., 2007; Lemsanni *et al*., 2020). The difference may be related to the relatively high proportion of open fractures and complex lesions in our sample, as well as to the limited size of the cohort.

The complications observed in our series, namely nonunion, secondary displacement, and extension stiffness, are well recognized in the literature and usually reflect either the biological severity of the trauma or insufficient initial stability. Postoperative stiffness, arthrosis, heterotopic ossification, and hardware-related problems have also been reported as determinants of suboptimal outcomes (Mortazavi *et al*., 2006; Cho *et al*., 2020; Barros *et al*., 2025).

Early rehabilitation therefore remains crucial. Broberg and Morrey (1987) reported poorer functional results after prolonged immobilization, and more recent studies continue to support early assisted motion once fixation stability permits (Barros *et al*., 2025).

The main limitations of this study are its retrospective design, the small sample size, the lack of a control group, and the absence of subgroup statistical comparison between fixation methods. In addition, range-of-motion values, return-to-work timing, and patient-reported outcomes were not consistently available for formal quantitative analysis. Despite these limitations, the series contributes useful data from a relatively underreported setting and reinforces existing concepts regarding diagnosis and management of TOFD.

Conclusion

Trans-olecranon fracture-dislocation of the elbow is a rare but severe injury that requires prompt recognition and meticulous surgical management. The primary goal is anatomical restoration of the greater sigmoid notch and stable reconstruction of the ulnohumeral joint. In our experience, plate fixation provided the most reliable construct, particularly in complex fractures. When stable fixation is combined with appropriate treatment of associated injuries and early rehabilitation, satisfactory functional recovery can be achieved despite the severity of the trauma.

References

- Barros, E., Noboa, E., Penaherrera, C., Endara, F., Vaca Perez, P., Michilena, D., & Barros Castro, A. (2025). Outcomes and challenges in the surgical treatment of trans-olecranon fracture-dislocations: A case series study. International Journal of Surgery Case Reports, 130, 111254. https://doi.org/10.1016/j.ijscr.2025.111254
- Biga, N., & Thomine, J. M. (1974). La luxation trans-olecranienne du coude. Revue de Chirurgie Orthopedique et Reparatrice de l'Appareil Moteur, 60(7), 557-567.
- Broberg, M. A., & Morrey, B. F. (1987). Results of treatment of fracture-dislocations of the elbow. Clinical Orthopaedics and Related Research, 216, 109-119. https://doi.org/10.1097/00003086-198703000-00017
- Cho, C. H., Kim, D. H., Na, S. S., Choi, B. C., & Kim, B. S. (2020). Trans-olecranon fracture-dislocations of the elbow: A systematic review. Diagnostics, 10(12), 1058. https://doi.org/10.3390/diagnostics10121058
- Doornberg, J., Ring, D., & Jupiter, J. B. (2004). Effective treatment of fracture-dislocations of the olecranon requires a stable trochlear notch. Clinical Orthopaedics and Related Research, 429, 292-300. https://doi.org/10.1097/01.blo.0000142627.28396.cb

- Fahsi, M., Benameur, H., El Andaloussi, Y., Bennouna, D., Fadili, M., & Nechad, M. (2015). Les fracture-luxations transolecraniennes. Pan African Medical Journal, 22, 52. https://doi.org/10.11604/pamj.2015.22.52.7744
- Lemsanni, M., Najeb, Y., Chafik, R., Madhar, M., & El Haoury, H. (2020). Transolecranon fracture-dislocations of the elbow: A case series of 15 patients. International Journal of Research in Orthopaedics, 6(6), 1285-1290. https://doi.org/10.18203/issn.2455-4510.IntJResOrthop20204598
- Luengo-Alonso, G., Garcia Lamas, L., Jimenez Diaz, V., Ferrero Recasens, J., Porras Moreno, M. A., & Cecilia Lopez, D. (2021). Trans-olecranon fracture dislocations: How should we treat them? Injury, 52(Suppl 4), S131-S136. https://doi.org/10.1016/j.injury.2021.02.058
- Mortazavi, S. M. J., Asadollahi, S., & Tahririan, M. A. (2006). Functional outcome following treatment of transolecranon fracture-dislocation of the elbow. Injury, 37(3), 284-288. https://doi.org/10.1016/j.injury.2005.10.028
- Mouhsine, E., Akiki, A., Castagna, A., Cikes, A., Wettstein, M., Borens, O., *et al*. (2007). Transolecranon anterior fracture dislocation. Journal of Shoulder and Elbow Surgery, 16(3), 352-357. https://doi.org/10.1016/j.jse.2006.07.005
- Nieboer, M. J., Cancio-Bello, A., Mallett, K. E., Velasquez Garcia, A. R., Hidden, K. A., Yuan, B. J., *et al*. (2024). Trans-ulnar fracture dislocations of the elbow: A systematic review and clarification of classification systems. Journal of Shoulder and Elbow Surgery, 33(4), 975-983. https://doi.org/10.1016/j.jse.2023.10.014
- Ring, D., Jupiter, J. B., Sanders, R. W., Mast, J., & Simpson, N. S. (1997). Transolecranon fracture-dislocation of the elbow. Journal of Orthopaedic Trauma, 11(8), 545-550. https://doi.org/10.1097/00005131-199711000-00001
- Tao, F., Zhou, D., & Song, W. (2023). Trans-olecranon fracture posterior dislocation: A novel type of elbow injury. Journal of Orthopaedic Surgery and Research, 18(1), 228. https://doi.org/10.1186/s13018-023-03563-5
- Wong, J. C., Getz, C. L., & Abboud, J. A. (2015). Adult Monteggia and olecranon fracture dislocations of the elbow. Hand Clinics, 31(4), 565-580. https://doi.org/10.1016/j.hcl.2015.06.006