

CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Monteggia fracture associated with olecranon fracture-dislocation Mayo IIB

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Introduction Monteggia fractures involving olecranon fractures and dislocations present complex challenges due to the need for simultaneous stabilization of multiple joint components. These injuries require precise surgical planning and execution to restore elbow function and minimize complications such as joint instability, nonunion, and reduced mobility. Modern surgical techniques, including the use of locking plates and careful anatomical reduction, have shown to significantly improve long-term outcomes.

Case outline This case report discusses the management of a 30-year-old female patient with a Monteggia fracture and olecranon fracture-dislocation following a cycling accident. The patient underwent delayed surgery due to severe soft tissue injuries. The procedure involved ulna fixation with an olecranon plate and radial head stabilization using a FiberTape® system (Arthrex, Naples, FL, USA). Despite incomplete rehabilitation, the patient showed satisfactory recovery with only minor limitations in elbow movement. This case emphasizes the importance of early intervention, precise reduction, and the use of modern fixation techniques in optimizing recovery for complex elbow injuries.

Conclusions Effective treatment of Monteggia fractures associated with olecranon dislocation requires early intervention, precise anatomical reduction, and the use of modern fixation techniques to ensure optimal functional outcomes and minimize long-term complications.

Keywords: Monteggia fracture; olecranon fracture-dislocation; locking plates

INTRODUCTION

Monteggia fractures, first described in 1814, involve the dislocation of the radial head with an ulna fracture. Although rare, these injuries require careful surgical planning due to the risk of complications like nonunion or limited elbow motion. Monteggia fractures account for only 1–5% of fractures in the elbow region. Today, the term “Monteggia” or “Monteggia-like” injury includes a wide range of different fracture patterns of the proximal ulna and radial head. The treatment of these injuries in modern traumatology remains a subject of debate regarding different treatment strategies [1, 2]. When combined with an olecranon fracture-dislocation, treatment becomes even more complex, as both joint parts must be stabilized to achieve the best functional outcome [2]. Various surgical techniques have been described to manage this type of injury. Locking compression plates are used for ulna fixation, helping to reduce the risk of nonunion and the need for revision surgery [1]. Proper anatomical alignment is also crucial for restoring elbow movement [2]. Monteggia fractures combined with olecranon dislocation are among the most challenging elbow injuries, requiring precise diagnosis and surgery to ensure stable fixation and maintain joint function. Studies show that treating such complex fractures often requires a combination of different surgical approaches,

including lateral and posterior techniques, to access the elbow joint fully [1]. The best surgical approach for this type of injury is the posterior approach due to the subcutaneous location of the ulna. Additionally, the posterior approach allows for extension because it provides access to the elbow joint from both the medial and lateral aspects. Successful outcomes depend heavily on accurate anatomical reduction, and incorrect implant placement can cause complications like joint instability and reduced movement [2, 3]. Despite improvements in surgical methods, long-term risks such as osteoarthritis and limited elbow mobility remain. This highlights the importance of using precise techniques during surgery [3].

The aim of this paper is to present a rare case of a Monteggia fracture combined with an olecranon fracture-dislocation and to analyze the surgical approach and postoperative outcome based on current studies.

CASE REPORT

A 30-year-old woman, injured in a cycling accident, was examined at the Banjica Institute of Orthopedics, on June 5, 2024. She had over 20 lacerations, likely from glass. X-rays and computed tomography scans confirmed a Monteggia-type fracture with an olecranon fracture-dislocation (Figure 1). Due to swelling

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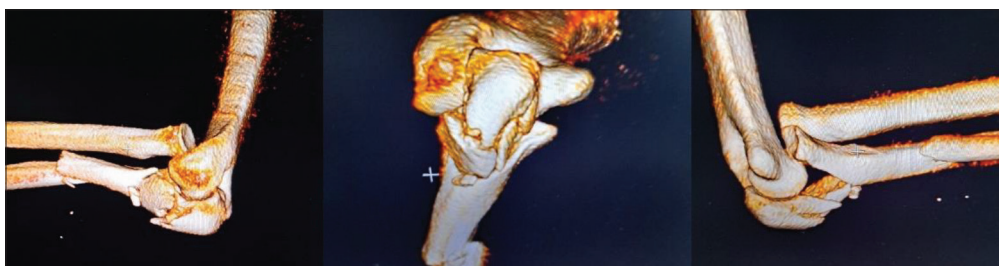


Figure 1. Preoperative computed tomography imaging revealed a Monteggia fracture associated with a comminuted fracture-dislocation of the olecranon



Figure 2. Postoperative radiological images demonstrate satisfactory fragment repositioning and preserved joint congruence

and the location of the wounds, we delayed the surgery for two weeks. The operation was done under nerve block anesthesia, with the arm positioned by the patient's side. A direct approach was made to the ulna, and after visualizing and mobilizing the fragments, proper alignment of the elbow was achieved. A long olecranon plate was used for fixation, aiming to restore the joint's anatomy. The radial head was repositioned through the Kocher approach, and the annular ligament was reconstructed using a FiberTape® system (Arthrex, Naples, FL, USA). For additional stability, the radial head was temporarily fixed with a K-wire, which was removed after two weeks (Figure 2). At the one-month follow-up, the patient reported feeling well, though there was a 20° loss of elbow extension, 10° loss of flexion, full supination, and about 25° reduced pronation, as well as the presence of radiographic signs of fracture consolidation.

Ethics: The authors affirm that the article adheres to the ethical guidelines established by the Serbian Archives of Medicine, as well as the ethical standards set by each author's respective institution. Written informed consent was secured from the patient participating in the study.

DISCUSSION

Monteggia fractures combined with olecranon fracture and dislocation require a well-thought-out surgical strategy. Ensuring elbow stability and proper anatomical reduction of the ulna, olecranon, and radial head are critical for functional recovery. Studies show that locking plates improve stability and reduce nonunion compared to older methods [1]. These types of injuries are complicated by the presence of fractures and dislocations within the elbow,

making surgery more challenging. If stable fixation is not achieved, long-term complications like chronic instability, pain, and limited movement can occur [1, 2]. Outcomes are influenced by the type of fracture and the timing of surgery. Early surgery generally leads to better results, while delayed intervention increases the risk of complications like arthrofibrosis and limited movement [2]. Surgical treatment of these complex fractures remains challenging due to the anatomical and functional importance of the elbow. Key elements of successful treatment include stable fixation of the ulna and olecranon, which in turn stabilizes the radial head and restores normal elbow function [1, 3]. Wong et al. [3] stress that anatomical reduction and mechanical stability are vital for long-term recovery. Failure to achieve these can result in chronic instability, pain, and reduced mobility. They also highlight that proper reduction of the ulna and olecranon helps stabilize the radial head, reducing the risk of postoperative instability and pain [3]. Long-term outcomes depend on quick diagnosis and efficient rehabilitation. Good results can be achieved if complete reduction and stable fixation of all elbow components are obtained, particularly if the contours and dimensions of the trochlear notch are restored. Post-traumatic arthritis and limited joint function remain potential risks [4–9]. Zeiders and Patel [10] emphasize the need for individualized surgical approaches, particularly for injuries involving the radial head and olecranon, which often require a combination of lateral and posterior techniques. In our case, early surgery was not possible due to significant swelling and wounds. We followed the principles of stabilizing the elbow, anatomical reduction, and using locking plates. However, the patient did not fully comply with early rehabilitation, affecting the final outcome. Despite this, our results were satisfactory. Lubberts et al. [11] stress the importance of analyzing fracture lines before surgery. This allows for the best choice of technique and implant, improving functional outcomes and reducing complications [11]. Das et al. [12] point out that choosing the right fixation technique is critical, especially when dealing with radial head dislocations. They suggest that combining posterior and lateral approaches provides better visibility and allows for more secure fixation [12]. Additionally, soft tissue and ligament damage often accompany these injuries, making surgery more difficult. Proper reconstruction of the ligamentous structures is essential to ensure long-term joint stability and prevent instability after surgery. The surgical treatment of Monteggia fractures with associated olecranon fracture-dislocation is highly challenging, but

modern techniques, including the use of locking plates and carefully planned procedures, significantly improve long-term outcomes for patients [1, 2, 13–17]. The complexity of treating Monteggia fractures associated with olecranon dislocation demands an individualized approach and careful

planning. Locking plates, accurate anatomical reduction, and timely intervention are key factors in achieving the best functional outcomes.

Conflict of interest: None declared.

REFERENCES

- Weber MM, Rosteius T, Schildhauer TA, Königshausen M, Rausch V. Monteggia fractures and Monteggia-like-lesions: a systematic review. *Arch Orthop Trauma Surg.* 2023;143(7):4085–93. [DOI: 10.1007/s00402-022-04576-1] [PMID: 36056930]
- Öztürkmen Y, Şükür E, Akman YE, Şenel A, Gürpınar T. Clinical and radiological evaluation of surgical management in olecranon fracture-dislocations. *Musculoskelet Surg.* 2020;104(3):321–8. [DOI: 10.1007/s12306-019-00623-0] [PMID: 31583519]
- Wong JC, Getz CL, Abboud JA. Adult Monteggia and Olecranon Fracture Dislocations of the Elbow. *Hand Clin.* 2015;31(4):565–80. [DOI: 10.1016/j.hcl.2015.06.006] [PMID: 26498546]
- Ring DM, Jupiter JB, Simpson NS. Monteggia fractures in adults. *J Bone Joint Surg Am.* 1998;80(12):1733–44. [DOI: 10.2106/00004623-199812000-00003] [PMID: 9875931]
- Konrad GG, Kundel K, Kreuz PC, Oberst M, Südkamp NP. Monteggia fractures in adults: long-term results and prognostic factors. *J Bone Joint Surg Br.* 2007;89(3):354–60. [DOI: 10.1302/0301-620X.89B3.18199] [PMID: 17356149]
- Shashank S, Shetty SK, Ks D. Neglected Monteggia fracture-dislocation in a child: A case report. *Int J Orthop Sci.* 2024;10(3):1–6. [DOI: 10.22271/ortho.2024.v10.i3a.3569]
- Veillette CJH, Steinmann SP. Olecranon fractures. *Orthop Clin North Am.* 2008;39(2):229–36. [DOI: 10.1016/j.ocl.2008.01.002] [PMID: 18374813]
- Bae DS, Waters PM. Surgical treatment of acute and chronic Monteggia fracture-dislocations. *Oper Tech Orthop.* 2005;15(4):308–14. [DOI: 10.1053/j.oto.2005.08.001]
- Siebenlist S, Buchholz A, Braun KF. Fractures of the proximal ulna: current concepts in surgical management. *EFORT Open Rev.* 2019;4(1):1–9. [DOI: 10.1302/2058-5241.4.180022] [PMID: 30800474]
- Zeiders GJ, Patel MK. Management of unstable elbows following complex fracture-dislocations: the “terrible triad” injury. *J Bone Joint Surg Am.* 2008;90(1):75–84. [DOI: 10.2106/BJJS.H.00893] [PMID: 18984720]
- Lubberts B, Mellema JJ, Janssen SJ, Ring D. Fracture line distribution of olecranon fractures. *Arch Orthop Trauma Surg.* 2017;137(1):37–42. [DOI: 10.1007/s00402-016-2593-7] [PMID: 27832347]
- Das SP, Vj G, R P, Sondur S, Naik A, Gulia A, et al. Outcomes of the Posterior Approach for the Treatment of Radial Head Fractures and Associated Elbow Injuries: A Retrospective Observational Study. *Cureus.* 2023;15(1):e34041. [DOI: 10.7759/cureus.34041] [PMID: 36824544]
- Tille E, Seidel L, Schlüßler A, Beyer F, Kasten P, Bota O, et al. Monteggia fractures: analysis of patient-reported outcome measurements in correlation with ulnar fracture localization. *J Orthop Surg Res.* 2022;17(1):303. [DOI: 10.1186/s13018-022-03195-1] [PMID: 35672754]
- Wang W, Xiong Z, Huang D, Li Y, Huang Y, Guo Y, et al. Risk factors for unsuccessful reduction of chronic Monteggia fractures in children treated surgically: a review of 209 cases. *Bone Jt Open.* 2024;5(7):581–91. [DOI: 10.1302/2633-1462.57.BJO-2024-0004.R2] [PMID: 38991554]
- De Maio F, Gorgolini G, Caterini A, Luciano C, Covino D, Farsetti P. Treatment of olecranon fractures in childhood: A systematic review. *Front Pediatr.* 2022;10:1046243. [DOI: 10.3389/fped.2022.1046243] [PMID: 36467486]
- Zhang R, Wang X, Xu J, Kang Q, Hamdy RC. Neglected Monteggia fracture: a review. *EFORT Open Rev.* 2022;7(4):287–94. [DOI: 10.1530/EOR-21-0087] [PMID: 35446261]
- Xiao RC, Chan JJ, Cirino CM, Kim JM. Surgical management of complex adult Monteggia fractures. *J Hand Surg Am.* 2021;46(11):1006–15. [DOI: 10.1016/j.jhsa.2021.07.023]

Монтеџијев прелом удружен са преломом и дислокацијом олекранона, тип Мајо IIIb

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САЖЕТАК

Увод Монтеџијеви преломи удружени са преломом и дислокацијом олекранона представљају сложене изазове због потребе за истовременом стабилизацијом више компоненти зглоба. Ове повреде захтевају прецизно планирање и извођење хируршке интервенције како би се повратила функција лакта и минимизовале компликације као што су нестабилност зглоба, несрастање и смањен опсег покрета. Савремене хируршке технике, укључујући употребу заклавајућих плоча и пажљиве анатомске репозиције, показале су значајна побољшања дугорочних резултата.

Приказ болесника Овај рад разматра третман повреде код 30-годишње пацијенткиње са Монтеџијевим преломом удруженим са преломом и дислокацијом олекранона након бициклистичке несреће. Пацијенткиња је подвргнута одложеној операцији због озбиљних повреда меких ткива. Про-

цедура је обухватила фиксацију улне са дугачком плочом за олекрanon и стабилизацију радијалне главе помоћу система *FiberTape®* (Arthrex, Напуљ, ФЛ, САД). Упркос непотпуној рехабилитацији, пацијенткиња је показала задовољавајући опоравак са само мањим ограничењима у покретима лакта. Овај случај наглашава важност раног захвата, прецизне редукције и употребе модерних техника фиксације у оптимизацији опоравка код сложених повреда лакта.

Закључак Ефективно лечење Монтеџијевог прелома повезаног са дислокацијом олекранона захтева рану интервенцију, прецизну анатомску редукцију и употребу савремених техника фиксације како би се обезбедили оптимални функционални резултати и минимизовале дугорочне компликације.

Кључне речи: Монтеџијев прелом; прелом и дислокација олекранона; заклавајућа плоча