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Monteggia fracture associated with olecranon fracture-dislocation

Майо ПИБ

Монтеџи прелом удружен са фрактуром дислокацијом-олекранона

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Monteggia fracture associated with olecranon fracture-dislocation Mayo IIIB

Монтеџи прелом удружен са фрактуром дислокацијом-олекранона *Mayo IIIB*

SUMMARY

Introduction Monteggia fractures involving olecranon fracture-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 fiber tape system. 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

САЖЕТАК

Увод Монтеџи преломи удружени са преломом-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 закључавајућих плоча и пажљиве анатомске репозиције, показале су значајна побољшања дугорочних резултата.

Приказ болесника Овај приказ болесника разматра третман повреде код 30-годишње пацијенткиње са Монтеџи преломом и преломом-дислокацијом олекранона након бициклистичке несреће. Пацијенткиња је подвргнута одложеној операцији због озбиљних повреда меких ткива. Процедура је обухватила фиксацију улне са дугачком олекранон плочом и стабилизацију радијалне главе помоћу фибер тапе система. Упркос непотпуној рехабилитацији, пацијенткиња је показала задовољавајући опоравак са само мањим ограничењима у покретима лакта. Овај случај наглашава важност раног захватања, прецизне редукције и употребе модерних техника фиксације у оптимизацији опоравка код сложених повреда лакта.

Закључак Ефективно лечење Монтеџи прелома повезаних 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: Монтеџи прелом; фрактура-дислокација олекранона; закључавајућа плоча

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 (LCP) 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 CT scans confirmed a Monteggia-type fracture with an olecranon fracture-dislocation (Figure 1). Due to swelling 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 fiber tape system. 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-degree loss of elbow extension, 10-degree loss of flexion, full supination, and about 25-degree reduced pronation, as well as the presence of radiographic signs of fracture consolidation. Written informed consent was obtained from the patient for the publication of this case report.

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. Informed consent was secured from the patient participating in the study.

DISCUSSION

Monteggia fractures combined with olecranon fracture-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.

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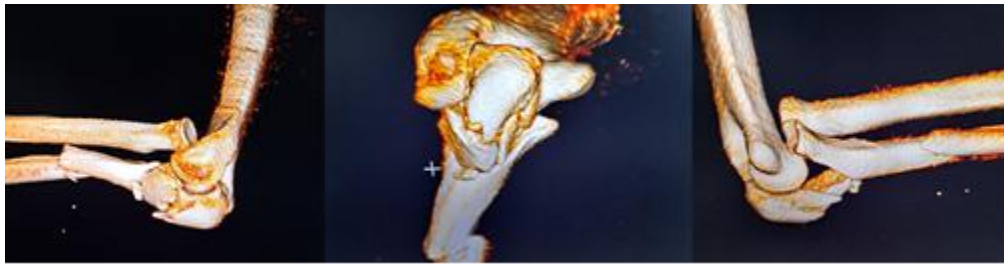


Figure 1. Preoperative computed tomography imaging revealed a Monteggia fracture associated with a comminuted fracture-dislocation of the olecranon



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