Outcomes of Posterior Monteggia Variant Fractures Repaired Through a Trans-Olecranon Approach

Eileen Colliton, MD, * Jenna Lovett, PA-C, † Sonia Lee, MS, * Nicky Leung, MD †

* Department of Orthopaedic Surgery, Tufts Medical Center, Boston, MA
† Division of Hand and Upper Extremity Surgery, Newton-Wellesley Hospital, Newton, MA

ARTICLE INFO

Article history:
Received for publication March 7, 2022
Accepted in revised form July 18, 2022
Available online August 26, 2022

Key words:
Monteggia fracture
Elbow surgery
Trans-olecranon approach

Purpose: To evaluate the clinical and radiographic outcomes and complications following surgical treatment of adult posterior Monteggia fracture variants in which coexisting radial head and coronoid fractures were addressed through a single extensile posterior trans-olecranon approach.

Methods: We performed a retrospective review from January 1, 2010, to January 1, 2021, of all adult patients who underwent fixation of posterior Monteggia variant fractures with coexisting radial head and/or coronoid fractures through a trans-olecranon approach by a single surgeon. Patient records were reviewed for postoperative complications and radiographic outcomes. All patients were contacted to participate in a repeat clinical examination and functional assessment.

Results: Thirteen patients met the inclusion criteria, of which 7 agreed to participate. Final follow-up was conducted at an average of 49 months postoperatively. Six patients had a coexisting radial head fracture, 1 had a radial neck fracture, and all 7 patients had a coronoid fracture. All 7 coronoid fractures were repaired, 2 patients had internal fixation of the radial head, and 5 had radial head replacement. Four patients underwent reoperation. There were no cases of infection or heterotopic ossification, and all patients achieved radiographic bony union. The average final range of motion was 13°–133° flexion-extension (range: 0°–30° extension to 125°–145° flexion), 76° pronation (range: 70°–90°) and 72° supination (range: 60°–90°). The average Mayo Elbow Performance Score was 86 (range: 70–100), average Visual Analog Scale score was 1.4 (range: 0–3), and average Disabilities of the Arm, Shoulder, and Hand score was 9.8 (range: 0.83–35.83).

Conclusions: Use of a single extensile trans-olecranon exposure offers reliable visualization and access to all bony structures requiring repair while minimizing soft tissue disruption. Patients treated with this trans-olecranon surgical approach demonstrate satisfactory clinical and radiographic outcomes with low rates of heterotopic ossification, nonunion, and infection.

Level of Evidence: Therapeutic IV.

Copyright © 2022, THE AUTHORS. Published by Elsevier Inc. on behalf of The American Society for Surgery of the Hand. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
radiocapitellar or ulnohumeral subluxation if improperly reduced or inadequately fixed. Treatment of the primary proximal ulna fracture requires open reduction internal fixation through a posterior approach. Large coronoid fractures may require a separate medial approach for fixation, and coexisting radial head fractures may require a separate lateral approach to perform radial head excision, internal fixation, or radial head prosthetic arthroplasty. Historically, repairs in adults have been plagued by high rates of postoperative complications, such as arthrofibrosis, heterotopic ossification, implant failure, radial or posterior interosseous nerve palsy, nonunion, and persistent instability. Poor clinical outcomes have been associated with Jupiter IIA fractures and fractures with associated radial head or coronoid fractures.

Previous retrospective studies have reported complication rates from 27% to 41% in adults with Monteggia fractures. When compiling the data from case series published over the past decade, the revision surgery rate is approximately 20%, with the most common indications for revision surgery being ulna nonunion and removal of hardware. The investigators have previously described the use of a trans-olecranon posterior approach to repair these combined fractures, where fixation of the radial head, coronoid, and olecranon fractures is approached through the olecranon fracture, minimizing soft tissue disruption by eliminating the need for 3 separate fascial intervals.

Figure 1. Bado classification of Monteggia injuries.

Figure 2. Jupiter subclassification of Monteggia type II injuries.

Figure 3. Preoperative lateral radiograph of the right elbow demonstrating a type IIA Monteggia variant fracture-dislocation.

Figure 4. Intraoperative photograph demonstrating the posterior approach. The olecranon fragment (O) is retracted proximally with protection of the ulnar nerve (U) and visualization of fractures of the radial head (RH) and coronoid (C).
In this study, we retrospectively review a series of patients who underwent fixation of posterior Monteggia variant fractures through this trans-olecranon approach to evaluate complication rates, radiographic outcomes, and clinical and functional outcomes. We hypothesize that this approach will have a low rate of complications and satisfactory outcomes when treating adult posterior Monteggia fracture variants.

Materials and Methods

Inclusion and exclusion criteria

We performed a retrospective review of all cases completed by the senior author from January 1, 2010, to January 1, 2021, to identify patients who had undergone surgical treatment of Monteggia fractures with a proximal ulna fracture, posterior dislocation of the radiocapitellar joint, and concurrent fracture of either the coronoid or radial head (Bado type II fractures). Only adult patients 18 years of age or older who had fractures repaired through a previously described extensile posterior trans-olecranon approach were included.15 Patients were also excluded from this study if they had incomplete surgical or clinical records (n = 0), or if separate medial or lateral fascial intervals were used to approach their fractures (n = 1).

Medical records were reviewed retrospectively to determine which patients were eligible for participation in the study. All patients who met the inclusion criteria were invited to participate in a follow-up evaluation using an institutional review board-approved protocol. Fourteen patients were identified as having a Monteggia fracture with posterior dislocation of the radiocapitellar joint and concurrent fracture of either the coronoid or radial head. All patients were treated using the trans-olecranon approach. One patient was excluded from the study because of use of a separate lateral Kocher interval intraoperatively. Two patients declined to participate, and 4 patients were unable to be reached, leaving 7 patients who participated in the study.

Clinical evaluation

Patient demographics, including sex, age, and operative side, as well as mechanism of injury, were obtained from the patients’ medical records. Operative notes were reviewed to identify the patients’ injury pattern and method of surgical fixation. Retrospective chart review and review of postoperative radiographs were used to identify postoperative complications, including any reoperation (ie, for symptomatic hardware, hardware failure, infection, etc), acute complication (ie, wound healing problems, infection), or longer-term complication (ie, nonunion, malunion, heterotopic ossification). A member of the research team contacted all patients by telephone to complete functional assessments, including the Mayo Elbow Performance Score (MEPS), the Disabilities of the Arm, Shoulder, and Hand (DASH) Score, and the Visual Analog Scale (VAS) for pain assessment.

A physical examination limited to the involved upper extremity was also performed either in person or virtually through HIPAA-compliant telemedicine software (Zoom Video Communications) for formal assessment of range of motion and stability. Virtual evaluation for range of motion was performed using a goniometer to measure the patient’s arc of motion using standardized positioning through video. Virtual evaluation for stability was obtained by asking the patient whether they experienced apprehension.
Radiographic evaluation

Preoperative injury radiographs and operative reports were reviewed to classify the posterior Monteggia fractures according to the classification system described by Jupiter et al. Postoperative radiographs were evaluated for evidence of fracture healing, including callus formation and disappearance of fracture lines on X-ray, and heterotopic ossification.

Surgical technique

All fractures repaired during the above time period were performed by the senior author and attempted using a previously described extensile posterior approach. In this approach, the radial head and/or coronoid fractures were visualized and repaired by extending the traumatic soft tissue disruption around the displaced proximal ulna fragment, essentially converting it to an extended olecranon osteotomy (Figs. 3, 4). All radial head or neck fractures were repaired with screws and/or plates or replaced by prosthetic arthroplasty (Fig. 5). When coronoid fractures were present, they were either repaired by screw, suture, or buttress plate fixation, once again visualizing the articular surface of the fracture through the extended olecranon osteotomy. Buttress plate fixation was reserved for anteromedial facet coronoid fractures and was applied through the same posterior approach by securing the plate to the medial ulna and curving the proximal end of the plate around the anteromedial facet beneath the ulnar head of the flexor carpi ulnaris muscle belly. The proximal ulna/olecranon fragment was repaired using dorsal plate fixation, sometimes supplemented with 2.0 mm plate fixation when necessary to secure large critical fragments such as the supinator crest (Figs. 6, 7). All elbows were stable following osteosynthesis, without evidence of posterolateral instability. Postoperatively, all elbows were immobilized with the elbow in 90° flexion for 1 week. Active motion exercises were initiated if the wound was healed, and initial postoperative radiographs confirmed no fracture displacement. Strengthening exercises, including isometrics, were avoided until 1 month postoperatively. No collateral ligament protection protocols were prescribed. Radiographs were obtained at the first postoperative visit and thereafter at monthly intervals until union was achieved.

Results

A total of 7 patients were included in the study; 1 man and 6 women. The mean patient age was 65 years (range: 58–73 years). One male patient sustained the fracture during a fall from a ladder. All remaining patients sustained their injuries in a mechanical fall from standing height. The average number of days from injury to operative fixation was 4.3 days (range: 0–11 days). Final follow-up was completed on an average of 49.4 months after surgery (range: 13–91 months). All 7 patients presented with a posterior Monteggia fracture dislocation, consistent with a Bado II Monteggia fracture. Five patients had a Jupiter IIA (71%) and 2 patients had a Jupiter IIB (29%) fracture. In 6 patients, there was a coexisting radial head fracture, 1 had a radial neck fracture, and all 7 patients had a coronoid fracture. One patient had an open proximal ulna fracture (Table 1). All 7 proximal ulna fractures were repaired by dorsal locked plate fixation. Two patients underwent additional mini-fragment fixation of a posterolateral ulna fragment containing the supinator crest and insertion of the lateral ulnar collateral ligament, which was not necessary to restore ulnohumeral stability. Two patients underwent internal fixation of the radial head and 5 underwent radial head replacement. All 7 coronoid fractures were repaired: 1 by anteromedial plate fixation, 1 by suture fixation, 1 by K-wire fixation with lasso suture fixation, and 4 by polyaxial locking screws applied through the dorsal ulna locking plate. These injuries and their treatments are summarized in Table 2.

Complications

Four patients underwent reoperation. One underwent revision fixation 10 days postoperatively because of early loss of fixation of an anterior cortical fragment of the proximal ulna (Fig. 8). The patient achieved stable fracture fixation after revision osteosynthesis (Fig. 9). One patient who sustained an open Monteggia fracture underwent flap coverage 6 weeks postoperatively because of skin necrosis over the olecranon tip, resulting in exposure of metallic hardware. One patient underwent arthroscopic capsulectomy 3 months postoperatively for treatment of a flexion contracture with concurrent removal of a screw that had threads partially exposed in the ulnohumeral joint. One additional patient returned after fracture union 1.5 years postoperatively for elective removal of the dorsal ulna plate. These complications are summarized in Table 3.

Radiographic results

There were no cases of nonunion, infection, or heterotopic ossification. Despite the presence of an initial posterior radial head subluxation or dislocation, no cases of elbow instability or collateral ligament instability were seen, including in the patient who underwent early revision internal fixation. At the time of latest follow-up, none of the patients demonstrated radiographic loosening of the radial head, overstuffing of the radial head, or capitellar erosion.

Clinical outcomes

The average time between surgery and follow-up functional assessment was 49.4 months. The average range of motion was 133° extension (range: 0–30°) to 133° flexion (range: 125–145°), 76° pronation (range: 70–90°) to 72° supination (range: 60–90°). The average MEPS was 86 (range: 70–100), average VAS score was 1.4
These findings are summarized in Table 4.

**Discussion**

Literature describing outcomes following fixation of Monteggia fracture variants in adults is sparse owing to the rarity of the injury. Multiple studies describe the fixation options for treating Monteggia fractures and their associated injuries, but few studies specify their surgical approach for fixation or to evaluate a subgroup of Monteggia fractures.

Jung et al., Jungbluth et al., Shore et al., and Strauss et al. have described outcomes of surgical treatment of Monteggia-like lesions of the proximal ulna with concurrent radial head and ulna fractures, but the surgical approach in these reports were not standardized nor described. Although Shore et al. specifically evaluated posterior Monteggia fractures (Bado type II), the remaining studies included multiple types of Monteggia fractures. We focused on evaluating the Bado type II Monteggia fractures as these were the most encountered in the senior author’s practice and seem to be more associated with multiple bony instability lesions. Additionally, poorer clinical outcomes have been associated with Jupiter IIA fractures and fractures with associated radial head or coronoid fractures, thereby demonstrating the

| Patient | Sex | Age (y) | Mechanism       | Fracture Classification | Additional Injuries                                      |
|---------|-----|---------|-----------------|-------------------------|----------------------------------------------------------|
| 1       | M   | 58      | Fall from ladder| Jupiter IIA             | Coronoid, radial head                                    |
| 2       | F   | 69      | Ground level fall| Jupiter IIA             | Coronoid, radial head                                    |
| 3       | F   | 60      | Ground level fall| Jupiter IIA             | Coronoid, radial head                                    |
| 4       | F   | 61      | Ground level fall| Jupiter IIB             | Coronoid, radial head                                    |
| 5       | F   | 67      | Ground level fall| Jupiter IIB             | Coronoid, radial head                                    |
| 6       | F   | 73      | Ground level fall| Jupiter IIA             | Coronoid, radial neck, open fracture                     |
| 7       | F   | 70      | Ground level fall| Jupiter IIA             | Coronoid, radial head                                    |

**Table 2**

| Injury                  | Number (% of Patients) | Treatment                                                                 |
|-------------------------|------------------------|---------------------------------------------------------------------------|
| Radial head fracture    | 6 (86%)                | 4 arthroplasty                                                            |
| Radial neck fracture    | 1 (14%)                | 2 internal fixation                                                       |
| Coronoid fracture       | 7 (100%)               | 1 arthroplasty                                                            |
| Ulnohumeral dislocation | 2 (14%)                | 4 ORIF screw fixation through plate                                       |
|                         |                        | 1 ORIF K-wires with lasso suture                                          |
|                         |                        | 1 ORIF buttress plate for anteromedial facet                               |
|                         |                        | 1 suture fixation                                                         |
|                         |                        | 2 mini-plate fixation of supinator crest fragment (lateral ulna cortex)   |

ORIF, open reduction internal fixation

Figure 8. Early loss of fixation of the anterior ulnar cortex, including coronoid.

Figure 9. Patient in Figure 8 after revision of internal fixation to include an increased number of locking screws engaging the anterior ulna cortex.
importance of appropriate surgical management in this patient population.\(^1\) Both Shore et al.\(^1\) and Strauss et al.\(^1\) conducted retrospective reviews of 49 and 23 patients with posterior Monteggia fractures, respectively. However, Strauss et al.\(^1\) also focused on posterior Monteggia fractures with associated radial head or neck fracture. Patients on average in both studies achieved a functional arc of motion. In the study by Shore et al.\(^1\), 71% of patients had 1 or more additional surgeries, including 5 for hardware removal, 4 for deep infection, 1 for nonunion, 1 for recurrent dislocation, and 1 for heterotopic ossification.

In the study by Strauss et al.\(^1\) complications were only discussed for the 6 patients with associated ulnohumeral dislocation and included 3 patients with nonunion, 4 with degenerative changes, and 2 with heterotopic ossification. The authors also evaluated clinical outcomes and found a mean DASH score of 23.\(^1\) Although both studies provide useful information regarding outcomes following treatment of posterior Monteggia fractures, neither discusses the surgical approach that was utilized.

The possibility of fracture fixation of the radial head and/or coronoid through the proximal ulna fracture site was discussed by Ring et al.\(^1\) but the authors did not offer further details regarding the surgical approach. A previously published video case presentation by Egol et al.\(^1\) demonstrated fixation of a Bado II Monteggia fracture using a trans-olecranon posterior approach. The authors of this study also described the technical steps in detail required to achieve visualization of the radial head and coronoid fractures through the olecranon fracture site.\(^1\) The benefit of this approach is that it eliminates the need to separate incisions and fascial planes to address multiple fractures. In the literature, there are limited studies discussing the outcomes of Monteggia fracture variants fracture treated through this trans-olecranon approach.

In a retrospective review by Beigessner et al.\(^1\) Monteggia type II fractures-dislocations were described for 16 patients at an average follow-up period of 37 weeks. There were 14 associated coronoid fractures and 15 associated radial head fractures; all fractures were addressed through a single extensile posterior incision with exposure through the proximal ulna fracture site, similar to our study. Their average range of motion was 18° to 119° flexion, 69° pronation and 70° supination. They reported a complication rate of 37.5%, with 3 cases of heterotopic ossification, 1 case of radial head collapse, and 1 patient who required hardware removal. Functional outcomes were not discussed.

Our study is unique in that it provides mid-term follow-up, including standardized functional assessment at an average of 49 months postoperatively for patients with posterior Monteggia fractures treated by a single surgeon using a single trans-olecranon operative approach. In contrast to the series described by Beigessner et al.\(^1\) our patients had an improved mean arc of motion. Our reported reoperation rate was higher, with 4 of 7 patients having an additional surgery; however, 1 of these surgeries was for elective removal of hardware, occurring more than 17 months postoperatively, which would have been outside the previous study’s follow-up time period. A major complication was early postoperative loss of fixation of an anterior cortical fragment that contained the coronoid fixation, resulting in subluxation of the ulnohumeral joint and need for revision fixation. The patient recovered well following revision fixation, with no further instability or loss of fixation. In retrospect, this complication could have been prevented by inserting more locking screws through the plate engaging the anterior ulna cortex. There was 1 case of wound necrosis resulting in exposed hardware approximately 6 weeks postoperatively in a patient with an open fracture and no additional relevant comorbidities. This was managed with partial hardware removal, advancement flap, and skin grafting. The patient healed well following surgery. There were no cases of postoperative infection.

Our study also provides important findings, when compared to the study by Beigessner et al.\(^1\) in that we report standardized functional outcome scores, with results demonstrating good function, with an average MEPS of 86.4; minimal pain, with an average VAS score of 1.4; and low disability, with an average DASH score of 9.8.

When evaluating our radiographic outcomes, there were no cases of nonunion or heterotopic ossification, or complications such as those seen in the studies by Beigessner et al.\(^1\) Shore et al.\(^1\) and Strauss et al.\(^1\) Additionally, none of the patients demonstrated radiographic loosening of the radial head, overstuffing of the radial head, or capitellar erosion.

Our study had a higher reoperation rate: 4 out of 7 patients compared with the compiled revision surgery rate of 20% from case series published over the past decade.\(^1\) This increased reoperation rate is likely related, in part, to our studies’ extended follow-up.

Table 3

| Indication              | Number (%) | Treatment                  |
|------------------------|------------|----------------------------|
| Early loss of fixation | 1 (14%)    | Revision internal fixation |
| Wound necrosis         | 1 (14%)    | Local flap with skin graft |
| Painful hardware       | 1 (14%)    | Hardware removal           |
| Flexion contracture    | 1 (14%)    | Arthroscopic capsulectomy, screw removal |

Table 4

| Patient | Months Since Surgery | Extension Deficit (Degrees) | Flexion (Degrees) | Pronation (Degrees) | Supination (Degrees) | MEPS (Out of 100) | DASH (Out of 100) | VAS (Out of 10) |
|---------|----------------------|-----------------------------|------------------|---------------------|---------------------|-----------------|----------------|----------------|
| 1       | 91                   | 10                          | 130              | 80                  | 70                  | 85              | 5              | 1              |
| 2       | 70                   | 10                          | 125              | 80                  | 60                  | 70              | 13.3           | 3              |
| 3       | 54                   | 10                          | 140              | 60                  | 90                  | 100             | 0.83           | 0              |
| 4       | 52                   | 0                           | 125              | 70                  | 90                  | 100             | 1.25           | 0              |
| 5       | 45                   | 25                          | 145              | 90                  | 80                  | 85              | 7.5            | 2              |
| 6       | 13                   | 30                          | 140              | 80                  | 55                  | 80              | 35.83          | 2              |
| 7       | 21                   | 5                           | 130              | 75                  | 60                  | 85              | 5              | 2              |
| Average |                      | 12.9                        | 133.6            | 76.4                | 72.1                | 80              | 9.8            | 1.4            |
| Range   | 13–91                | 0–30                        | 70–90            | 60–90               | 70–100              | 0.83–35.83      | 0–3            |
length that allows for more reoperations, such as hardware removals that generally occur later in the postoperative course, to be captured in our analysis. Interestingly, other studies experienced complications such as heterotopic ossification, infection and nonunion.\(^\text{2,17,18}\)

Fortunately, our study did not have any of these complications, which may partially be related to the rigid fixation and minimal soft tissue stripping made possible by the trans-olecranon approach. However, our study sample size was small, making it difficult to accurately interpret and generalize the reported complication rate. A future study with a larger sample size would provide a better assessment for the true complication rate and types of complications associated with the trans-olecranon approach.

The current study has limitations. This is a small case series that contains data from both retrospective chart review and prospective data collection. Because of the rarity of the injury, the study population was limited and not all patients could be contacted for clinical follow-up. There was no control arm in which outcomes were compared to patients who underwent medial/lateral fascial approaches to treat the radial head or coronoid fractures.

The strengths of this study include the uniformity of the surgical exposure and postoperative rehabilitation protocol and the fact that all surgeries were performed by a single surgeon. An additional strength includes the long follow-up time frame for standardized functional assessment.

In conclusion, the trans-olecranon approach to Monteggia fracture variants offers reliable visualization and access to all bony structures requiring repair while minimizing soft tissue disruption. Although this is a small case series, it demonstrates that patients treated through this approach can have satisfactory clinical and radiographic outcomes with low rates of heterotopic ossification, nonunion, and infection. This approach should be considered when treating adult Monteggia fracture variants, and future studies with a larger sample size would be beneficial to validate our results, clinical and radiographic outcomes, as well as the complications associated with this treatment approach.

References

1. Monteggia GB. Lussazioni delle ossa delle estremità superiori In: Monteggia GB, Ed. Instituzioni Chirurgiche 2nd ed. Vol. S. Milan: Maspero; 1814:131–133.
2. Bado JL. The Monteggia lesion. Clin Orthop. 1967;50:71–76.
3. Jupiter JB, Lebovic SJ, Ribbens W, Wilk RM. The posterior Monteggia lesion. J Orthop Trauma. 1991;5(4):395–402.
4. Pavel A, Pitman JM, Lance EM, Wade PA. The posterior Monteggia fracture. A clinical study. J Trauma. 1965;5:185–199.
5. Penrose JH. The Monteggia fracture with posterior dislocation of the radial head. J Bone Joint Surg. 1951;33:65–73.
6. Eathiraju S, Mudgal CS, Jupiter JB. Monteggia fracture-dislocations. Hand Clin. 2007;23(2):165–177.
7. Ring D. Monteggia fractures. Orthop Clin North Am. 2013;44(1):59–66.
8. Rehim SA, Maynard MA, Sebasain SJ, Chung KC. Monteggia fracture dislocations: A historical review. J Hand Surg Am. 2014;39(7):1384–1394.
9. Jung M, Groetzner-Schmidt C, Porsche F, Grützner PA, Guehring T, Schneetzke M. Monteggia-like lesions in adults treated with radial head arthroplasty-mid-term follow-up of 27 cases. J Orthop Surg Res. 2020;15(1):5–5.
10. Amirfeyz R, Ali A, Stanley D. The Treatment of Adult Monteggia Fracture-Dislocation in Operative elbow surgery. Elsevier; 2012;347–356.
11. Konrad GG, Kundel K, Kreuz PC, Oberst M, Sudkamp NP. Monteggia fractures in adults: long-term results and prognostic factors. J Bone Joint Surg. 2007;89–B(3):354–360.
12. Beinigesser DM, Nork SE, Age J, Viskontas D. A fragment-specific approach to type IID Monteggia elbow fracture-dislocations. J Orthop Trauma. 2011;25(7):414–419.
13. Matar HE, Akimau PI, Stanley D, Ali AA. Surgical treatment of Monteggia variant fracture dislocations of the elbow in adults: surgical technique and clinical outcomes. Eur J Orthop Surg Traumatol. 2017;27:599–605.
14. Kim JM, London DA. Complex Monteggia fractures in the adult cohort: injury and management. J Am Acad Orthop Surg. 2020;28(1):839–848.
15. Colliton E, Leung NL. Transolecranon exposure of Monteggia variant fracture-dislocations of the elbow. Tech Hand Up Extrem Surg. 2020;25(2):111–115.
16. Jungbluth P, Tanner S, Scheppenfeld J, et al. The challenge of Monteggia-like lesions of the elbow: mid-term results of 46 cases. J Bone Joint Surg Br. 2018;100-B:212–218.
17. Shore BL, Guitton TC, Ring D. Posterior Monteggia fractures in adults with and without concomitant dislocation of the elbow. Shoulder Elbow. 2012;4:204–208.
18. Strauss EJ, Tejwani NC, Preston CF, Egol KA. The posterior Monteggia lesion with associated ulnohumeral instability. J Bone Joint Surg Br. 2006;88:84–89.
19. Egol KA, Bianco I, Milone M, Konda S. Repair of Bado II Monteggia fracture: case presentation and surgical technique. J Orthop Trauma. 2019;33(8):513–14.