



Case report

Open Reduction on very late-presenting unreduced posterior elbow dislocation: Still promising treatment option

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ABSTRACT

Background: Neglected dislocation of the elbow is associated with instability, pain, and limitation of elbow function. In developing countries, neglected dislocations of the elbow are quite common, and most patients initially go to local bonesetters, which only aggravates the problem.

Presentation of case: Two patients with a history of unreduced posterior elbow dislocation for more than 1 year and were treated by a traditional bonesetter were included in this case study. The first case was a 65-year-old female with a history of injury around her right elbow around 12 months before admission. The patient underwent open reduction with triceps lengthening and immobilization with plaster of paris for 3 weeks. The second case was a 53-year-old male with a history of injury caused by a fall on an outstretched hand around 18 months before admission. The patient underwent arthrolysis followed by triceps lengthening, internal fixation with transarticular k-wire, and immobilization with elbow slab for 3 weeks.

Discussion: To optimize treatment goals and patient function, various surgical approaches have been described for treating chronic elbow dislocations. The benefit of the V–Y triceps lengthening is to simplify the reduction procedure, especially in the elbow dislocations with greater chronicity. The downside of the V–Y lengthening is possible triceps weakness, delayed physiotherapy, and increased postsurgical pain. On the basis of this study, open reduction should remain a treatment option for patients regardless of age and chronicity of injury.

Conclusion: Operative treatment of late-presenting, unreduced elbow dislocation is effective in restoring the joint to a painless, stable, and functional limb.

1. Background

Neglected dislocations of elbow are quite a common phenomenon in developing countries with about 15 cases in 2 years [1]. Initially, individuals with elbow dislocations go to local bonesetters for massage and manipulation [2,3]. Neglected elbow dislocation is defined as dislocation that is left unreduced for more than 3 weeks [1,2]. The main reason for the delayed diagnosis is that patients initially seek treatment from bonesetters who immobilize the elbow in extension. This leads to retraction of the triceps muscles and collateral ligaments and results in non-functional elbow contracture [4].

Various treatment methods have been described such as closed reduction, open reduction, and internal fixation with Kirschner-wire (k-wire), open reduction with triceps lengthening with medial and lateral collateral ligament release, hinged external fixator, excisional arthroplasty, arthrodesis, and total elbow arthroplasty [5].

We treated two patients with neglected unreduced elbow dislocation

by open reduction and removal of fibrous tissue between the distal humerus and the ulna, medial, and lateral opening of the elbow, radio-capitellar reduction, k-wire fixation, lengthening of triceps with Speed V–Y plasty, and anterior transposition of the ulnar nerve.

2. Presentation of case

We presented two cases of old unreduced elbow dislocation. There were no specific preoperative intervention and comorbidities for both cases. Both patients were treated at a tertiary referral hospital in Bandung, Indonesia. The following cases are presented according to the PROCESS 2020 guideline [6].

2.1. Case 1

A 65-year-old female came to the outpatient orthopedic clinic with a history of injury around her right elbow around 12 months back. The

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mechanism of injury was a fall on an outstretched hand in a bathroom. Immediately after the injury, the patient underwent treatment with traditional bonesetters, wherein bandages were applied for a period of 1 month. She later continued to have pain and stiffness, which brought her to our hospital after 12 months post trauma.

On physical examination, there was a deformity with tenderness at the right elbow joint. Three-point bony relations between the tip of the olecranon and the lateral and medial epicondyle were altered. There was 15° of flexion deformity with further flexion up to 45°. Supination–pronation movements were 20° each. The neurovascular status was unremarkable.

The X-ray showed the dislocation of the right elbow. The distal humerus was prominent anteriorly, and the olecranon was prominent posteriorly (Fig. 1). The computed tomography (CT) scan showed there was an associated radial head fracture (Fig. 2).

The patient underwent surgery through the posterior elbow approach. With triceps sparing, the elbow joint was approached from the medial and lateral sides of the triceps. The ulnar nerve was isolated. The coronoid, radial, and olecranon fossae were filled up with fibrous tissues, which were removed (Fig. 3). There was no articular irregularities. We were able to achieve congruent open reduction with triceps lengthening.

On this patient, we did radial head resection. To maintain stability further, the radiocapitellar k-wire was passed (Fig. 4). The wound was closed in layers over a suction drain. The limb was immobilized for 3 weeks postoperatively with plaster of paris. Mobilization was started at 3 weeks after k-wire removal (after 2 weeks postoperatively).

At 2 weeks postoperatively, supination and pronation were started. At 4 weeks postoperatively, we started flexion and extension of the elbow. The patient was put on vigorously active and active assisted range of movement exercises and also muscle strengthening exercises at 6 weeks postoperatively. Functional assessment using Mayo Elbow Performance Score was conducted at the time of visit, at 6 weeks postoperatively.

2.2. Case 2

A 53-year-old male with a history of injury around his right elbow caused by having fallen on an outstretched hand 18 months back came

to our hospital. He did not seek medical treatment for his complaint and came to traditional bonesetters. Later, he complained about joint stiffness and pain.

On examination, there was deformity with tenderness at his right elbow joint. There was 10° of flexion deformity with further flexion up to 40°. Supination–pronation movements were 10° each. The skin condition around the elbow appeared good, and there was no distal neurovascular deficit. The X-ray showed the dislocation of the right elbow. The distal humerus was prominent anteriorly, the olecranon was prominent posteriorly, and there was disruption of the anterior humeral line.

The posterior approach was applied with the paratricipital technique from the medial and lateral sides of the triceps. The ulnar nerve was exposed, released, and prepared for anterior transposition at the end of the procedure (Fig. 5–3). The contracted capsule were released from the distal humerus. Arthrolysis was performed, and any fibrotic tissue and osteophytes were resected (Fig. 5–4). Reduction was obtained with slow, gentle, progressive maneuvers to avoid sudden movements. After reduction, the elbow was stabilized in 90° of flexion with a transarticular k-wire (Fig. 5–5), and a posterior above-elbow slab was applied. The Mayo Elbow Performance Index was used to assess the function of the elbow at preoperatively and 6 weeks postoperatively.

2.3. Surgical technique

The surgery was performed by an orthopedic surgeon consultant at a tertiary referral hospital. The surgical technique was modified from the standard posterior approach to the elbow for neglected cases of old unreduced elbow dislocation. Under general anesthesia, the patient was placed in the lateral position with the affected limb supported at the arm so as to allow full elbow flexion. Through a longitudinal posterior skin incision, the ulnar nerve was exposed, released, and prepared for anterior transposition at the end of the procedure.

Dense fibrous tissue filled up the olecranon fossa, coronoid fossa, and trochlear groove of the olecranon, while the collateral ligaments were contracted. The contracted capsule were released from the distal humerus. Arthrofibrosis was performed in all cases, and any fibrotic tissue and osteophytes were resected. Reduction was obtained slowly and gently, to avoid sudden movements that could result in cartilage

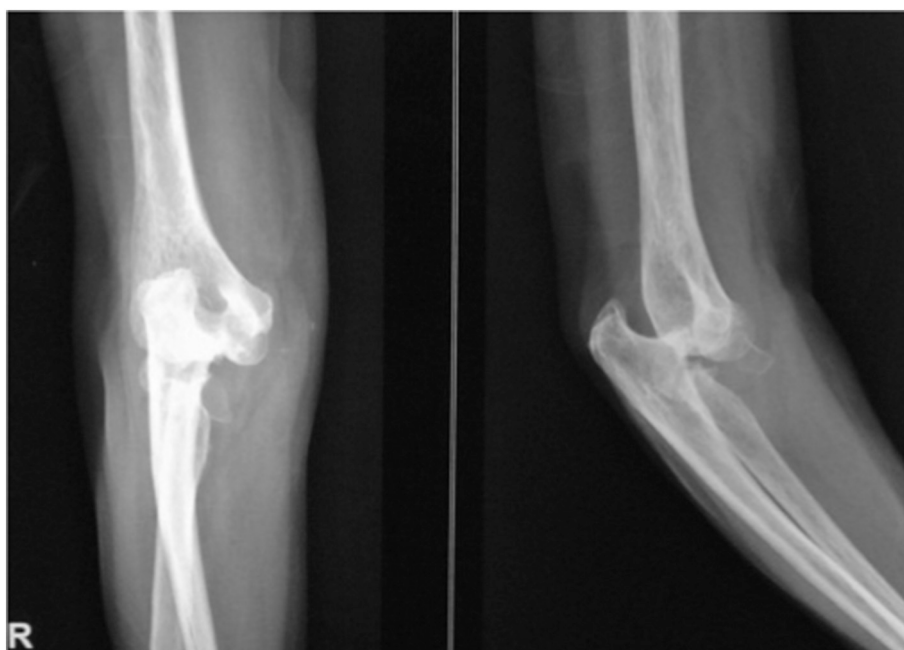


Fig. 1. The preoperative X-ray of the dislocation of the left elbow. The distal humerus was prominent anteriorly, and the olecranon was prominent posteriorly.



Fig. 2. The preoperative CT scan of the elbow.

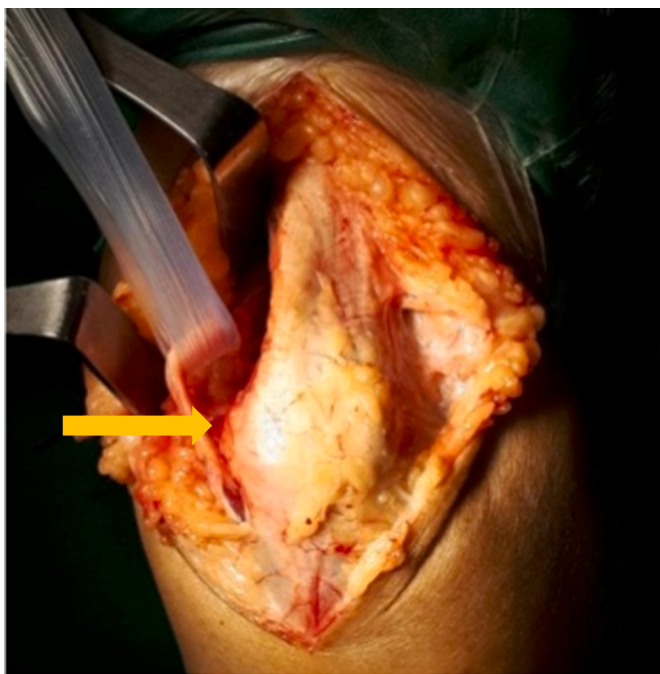


Fig. 3. Operative picture of distal humerus with fibrous tissue in the olecranon fossa.

injury. As the triceps and ligaments were progressively released, reduction was possible in all cases.

The elbow of all patients was unstable after reduction owing to extensive circumferential release of the capsule. The medial and lateral collateral ligaments were preserved as much as possible. After reduction, the elbow was stabilized in 90° of flexion with a transarticular k-wire inserted from the olecranon into the distal humerus. One of the patients had radial head fracture, and we did radial head resection. The fascia was closed over the radial head. The triceps was lengthened using a Speed V–Y plasty technique. A posterior above-elbow plaster of paris support was applied.

2.4. Outcome and follow-up

The follow-up data of patients are summarized in Table 1. On the basis of the Mayo Elbow Performance Index, at the final follow-up 6 weeks postoperatively, the two patients had satisfactory outcomes (two “good” results), with the mean score being 77.5. Of the two patients, one had no pain but the other one had mild pain during weightlifting. At the final follow-up, no patient had any sign of instability. The mean VAS score postoperatively was 0.5 (range, 0–1). The mean DASH score postoperatively was 30.8. The mean arc of flexion was 113° (range, 100°–122°). All patients regained functional range of movements with most activities of daily living possible. There are no complications in all patients.

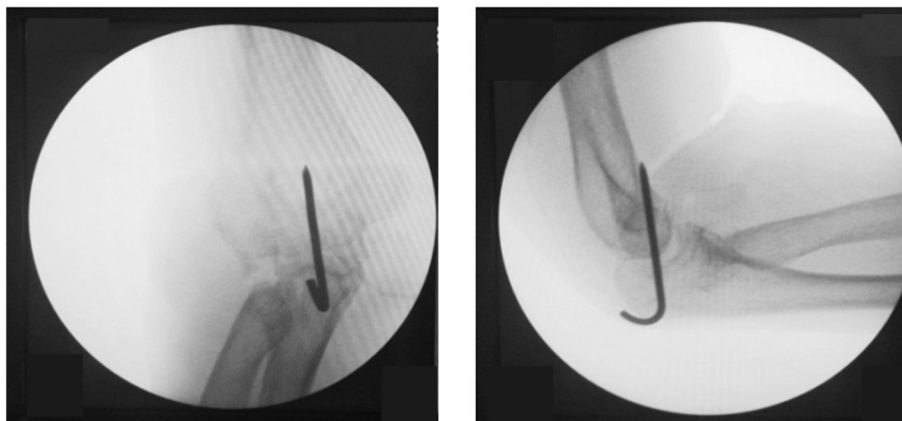


Fig. 4. Postoperative C-arm.

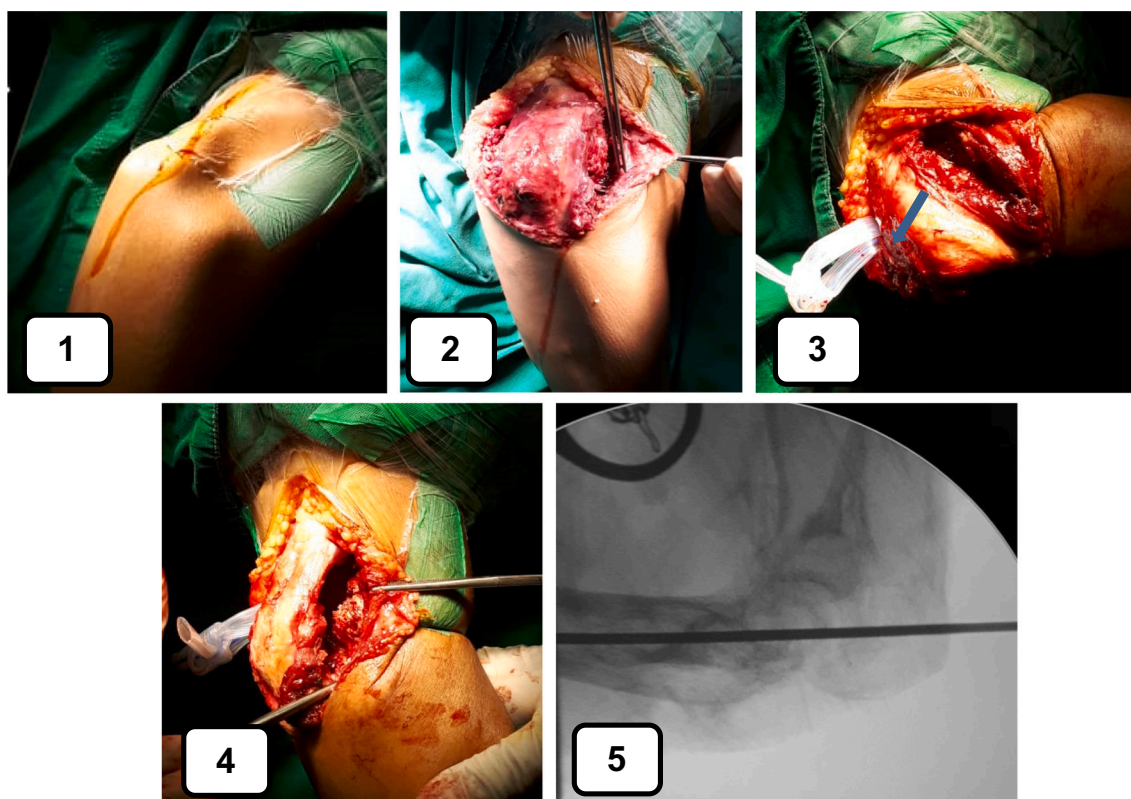


Fig. 5. Intraoperative findings. 1. The patient was positioned laterally with the affected limb supported at the arm so as to allow full elbow flexion. 2. Operative picture of the distal humerus with fibrous tissue in the olecranon fossa. 3. Ulnar nerve isolated and protected. 4. After resection of fibrous tissue. 5. Radiocapitellar and ulnotrochlear reduction was achieved by manipulation. The elbow was stabilized in 90° of flexion with a transarticular k-wire inserted from the olecranon into the distal humerus.

Table 1

Summary of final outcome and follow-up data of the two patients.

Variable	Case 1	Case 2
Age	65	53
Sex	F	M
Mode of injury	Fall	Fall
Associated fracture	Radial head	No
Duration of dislocation (months)	12	18
Pre-op ROM	15°–45°	10°–40°
Post-op ROM	30°–100°	15°–122°
DASH pre-op	58.7	63.9
DASH post-op (3 weeks post-op)	32.5	29.2
VAS pre-op	2/10.	2/10.
VAS post-op	1/10.	0/10.
Mayo Elbow Performance Score pre-op	40	45
Mayo Elbow Performance Score post-op (6 weeks post-op)	80	75
Grade result	Good	Good
Complications	None	None

3. Discussion

Old unreduced posterior dislocation of the elbow is not uncommon in developing countries. Kachnerkar et al. reported there were 15 cases in 2 years in rural areas of the developing country, and owing to illiteracy and lack of awareness, most cases present often several weeks to months after injury [7–9]. Such patients are often neglected and incorrectly treated before being seen by a specialist in a city hospital. Most of these dislocations are caused by a fall on the outstretched hand with the elbow incompletely extended and the forearm pronated—the best posture to absorb the shock [10,11]. Any intervention must address these soft tissue abnormalities.

The goals of surgical treatment of chronic simple elbow dislocations include improving patient outcome through obtaining a concentric reduction and restoring functional elbow joint range of motion (ROM) while preserving elbow stability. As surgical techniques have evolved, surgeons have become more aggressive in treating chronic elbow dislocations operatively [8]. Old unreduced dislocation of the elbow was diagnosed with history taking related to the chronicity of the disease, physical examination (measure the ROM of the elbow and the stiffness), and X-ray examination (coronal and sagittal views of the elbow).

Open reduction is the treatment option in these patients [1–3,12]. The ROM achieved after open reduction at 4–6 week's postoperative follow-up is usually much better than the preoperative range [4,5,7]. The time since injury and patient age determine the mode of treatment. Authors who recommended open reduction implied that its benefit was limited to dislocations of less than 3 months old [8].

There are several older studies that report poor outcomes in patients with an elbow dislocation that is older than 3 months and suggest treating these patients either nonoperatively or surgically with elbow arthroplasty [12]. Naidoo reported functional elbow ROM (greater than or equal to 100°) in 39% of patients (9/23) who underwent open reduction more than 3 months (range, 4 months to 4.5 years) after initial injury [13]. In our series, two patients had satisfactory outcomes (two “good” results), with the mean Mayo Elbow Performance Score being 77.5 and the mean duration of injury being 15 months (12–18).

To optimize treatment goals and patient function, various surgical approaches have been described for treating chronic elbow dislocations. Speed described a posterior approach with an associated triceps V–Y lengthening for open reduction of the chronically dislocated elbow. The benefits of the V–Y lengthening is to simplify the reduction procedure, especially in the elbow dislocations with greater chronicity. The downside of the V–Y lengthening is possible triceps weakness, delayed

physiotherapy, and increased postsurgical pain [8,14,15].

In our observation, a functional range of movement was obtained in patients with dislocations of more than 12 months old and in patients over 40 years of age. However, the limitation of this study was the small number of patients, and so more subjects are needed.

4. Conclusion

On the basis of our study results, open reduction still remains a treatment option for patients regardless of age and chronicity of injury with a good clinical outcome if regular follow-up and adequate rehabilitation protocol are followed. Further cohort study with more sample size and more homogenous data is needed to be done to reduce the bias and provide more accurate data.

Additional information

This paper has been reported in line with the PROCESS criteria and compliant with the PROCESS guidelines [6].

Provenance and peer review

Not commissioned, externally peer reviewed.

Consent

The patient received an explanation of the procedures and possible risks of the surgery and gave written informed consent.

Ethical approval

The patients received explanation of the procedures and possible risks of surgery and gave written informed consent.

Ethical approval has been granted in this study.

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The authors declare that there is no sponsors involved in this paper.

Author contribution

Renaldi Prasetya: Surgeon, Conceptualization, Visualization, Methodology. Supervision.

Mahyudin: Writing, assistant surgeon.

Hermawan Nagar Rasyid: Supervision.

Guarantor

Guarantor in this study is Renaldi Prasetya.

Research registration number

1. Name of the registry: Research Registry.
2. Unique identifying number or registration ID: researchregistry6833.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/register-now#userresearchregistry/registerresearchdetails/60a4018914c309001c3b0153>.

Declaration of competing interest

The authors declare there is no conflict of interests regarding the publication of this paper.

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