

DOI: <https://doi.org/10.33314/jnhrc.v18i3.3093>

# Outcome of Neglected Elbow Dislocation Treated with Open Reduction at Rural Tertiary Care Hospital in Nepal

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## ABSTRACT

**Background:** Chronic unreduced dislocation of elbow is a rare injury. Treatment options include open reduction internal fixation with K wire, replacement arthroplasty, excisional arthroplasty, arthrodesis, and hinged external fixator. The aim of this study is to determine the outcome of open reduction internal fixation with trans-olecranon K wire for neglected elbow dislocation.

**Methods:** This is a retrospective study done in three rural hospital of Karnali. Hospital records were reviewed from July 2015 to May 2018 to identify 11 cases who underwent open reduction internal fixation for neglected elbow dislocation. Pre and Postoperative outcome was assessed using range of motion and Mayo Elbow Performance Index. Data analysis was done using SPSS version 17.

**Results:** The average age of patient was 22.7 years (range 9-50 years). Non dominant hand was involved in 54.55%. The average preoperative elbow extension was 5.9 degree whereas postoperative extension was 15.9 degree. The average preoperative and postoperative elbow flexion was 24.5° and 113.6° respectively. Preoperative and postoperative Mayo elbow performance index was 18.6 and 86.3 respectively. Outcome was excellent in four patients, good in five patients and fair in two patients with one case having superficial infection.

**Conclusions:** Open reduction and internal fixation with trans-olecranon k wire is an effective treatment method for neglected elbow dislocation. Postoperatively, elbow function is better with minimal complications.

**Keywords:** Dislocation; elbow; neglected; open reduction

## INTRODUCTION

Chronic unreduced dislocation of an elbow is a very rare injury in the developed world.<sup>1</sup> However, this is frequent in developing countries due to lack of access to modern medicine.<sup>2</sup> The term chronic unreduced dislocation may interchangeably use with neglected dislocation and is defined as an injury more than 3 weeks old.<sup>3</sup> These elbows are usually fixed in extension with only a few degrees of flexion and supination and not useful for activity of daily living.<sup>4</sup> Time since injury and age are the major determining factors of treatment modality. Like many other neglected orthopaedic conditions, neglected elbow dislocation is a regular event in our setup. The likelihood of elbow function to recover is a meagre with more delay in treatment and very least after 3 months of injury. Treatment modality depends upon various factors like age, time since injury, and occupation. Most commonly used method to treat neglected elbow dislocation is open reduction internal fixation with K

wire. Some others include replacement arthroplasty, excisional arthroplasty, arthrodesis, and hinged external fixators.<sup>3</sup> There is controversy among the efficacy of treatment modalities, especially regarding repair and reconstruction of soft tissues. The purpose of the study is to assess the outcome of neglected elbow dislocation after open reduction and internal fixation with trans-olecranon K wire.

## METHODS

This is a retrospective study done on 11 neglected elbow dislocation cases treated at three different hospitals of the Karnali province; Karnali Academy of Health Sciences, Karnali Province Hospital, and Simikot District Hospital, by the same surgeon from July 2015 to May 2018. Ethical approval was taken from Institutional review committee of Karnali Academy of Health Sciences. Data were taken based on purposive sampling. All cases underwent open reduction and internal fixation with trans-olecranon K

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wire. Outcome was evaluated on the basis of Mayo Elbow Performance Index score and elbow range of motion. All patients presenting with elbow dislocation of more than 3 weeks duration were included. Patient who didn't give informed written consent, patient who didn't agreed for follow-up, patient with ipsilateral limb fractures were excluded from study. Data collected during preoperative examination and during postoperative follow-up were available from in-patient and outpatient file which was reviewed and analysed. In each follow-up visit elbow range of motion, arc of motion and Mayo Elbow Performance index were measured. After careful evaluation, open reduction was performed using a posterior approach with triceps tongue and V-Y plasty. The contracture was released with triceps lengthening. Complete removal of fibrous tissue was achieved, thorough joint cleaning was done with normal saline, and the joint reduction was performed. Stability was achieved using trans-olecranon K wire. Drain was placed and the skin was closed with 2-0 prolene. Above elbow posterior slab was applied and the elbow was positioned with 90 degrees of flexion. Suture removal was performed on day 10 post-op and the K wire was removed on day 14. The slab was removed three weeks post-op and physiotherapy was started thereafter. Follow up was scheduled at two weeks, four weeks, four months, and 6 months, then as needed. During each follow up visit, elbow range of motion and Mayo Elbow Performance Index was recorded. The results were analysed with consideration the age of the patient, the duration of dislocation, elbow range of motion, Mayo Elbow Performance Index (MEPI) and postoperative arc of motion. MEPI is based on pain, range of motion, stability and function. Outcome has been categorised as an excellent (MEPI more than 90), good (MEPI 75-90), fair (MEPI 50-74) and poor (MEPI less than 50) according to the score. Data were collected and entered into Microsoft excel. SPSS Version 17 was used for statistical analysis of variables.

## RESULTS

The average age of our patients was 22.7(range 9-50 years). The most commonly involved age group was from 10-19 years which comprise of 54.5%. The left elbow (54.55%) was more commonly involved than right elbow. Highest number of patients (46%) presented to our hospital within 3-6 month of dislocation. Thirty six percentage of our patient presented within three month of dislocation. Percentage of patients presented in between 6-24 month and that after 2 years was 9% of each respectively (Table 1 and 2). Average preoperative extension of the elbow was 5.9 degree (5-20 degree). Average postoperative extension is 15.9 degree (5-40

degrees). Preoperative flexion of the elbow was 5-70 degree (average 24.5 degree) and postoperative flexion is 95-130 degree (113.6 degree). Arc of motion was also evaluated. Preoperative arc of motion was 5-70 degree (average 18.6 degree) whereas postoperative arc of motion is 45 degree to 130 degree (average 86.3. Average correction in flexion, extension and arc of motion was 89.1 degree, 10 degree and 67.7 degree respectively. Mayo elbow performance index was assessed as well. Preoperative score was 10-25 (mean 18.6) while postoperative score has significantly increased up to 95 (average 86.3). Out of 11 cases, four obtained excellent results, five obtained good results, and the remaining two obtained fair results. K wire removed on second postoperative weeks and range of motion exercise was started then after as tolerated. We didn't notice any complication except superficial pin tract infection in one of our case which was successfully treated with topical antibiotics and wound care.

Table 1.

	Mean and standard deviation
Age(Gender)	22.2±14.2
Gender(M:F)	8:3
Duration of surgery	1.10±1.9

Table 2. Duration of neglected below.

Duration of neglected elbow	Frequency (%)
3 month	36
3-6 month	46
>6 month	18

Table 3. Flexion, extension, Arc of motion and MEPI Score before and after surgery

Parameters	Preoperative (Average in degree)	Postoperative (Average in degree)
flexion	24.5	113.6
extension	5.9	15.9
Arc of motion	18.6	96.3
MEPI Score	17.2	86.3

## DISCUSSION

Neglected elbow dislocation is still not an uncommon injury in rural part of the world, but the frequency of such injuries has dramatically decreased due to increasing access to modern medical care. The most common reasons reported for delayed presentation is lack of access to health care facilities particularly in low to middle income countries and the patient

invariably land with the local healers with treatment modality not evidence based. In our part of the world in hilly areas, difficult mobility for patients and low income status make the injury more severe with delayed presentation. It is obvious that the majority of reports on neglected elbow dislocation are from developing countries.<sup>5</sup> Elbow dislocation is the second most common type of dislocation after shoulder.<sup>6,7</sup> Elbow dislocation can be classified as simple and complex depending upon associated fractures. It can also be classified into anterior, posterior, medial, lateral, and divergent according to the ulnar relation to distal humerus.<sup>8</sup> Clinical examination and plain radiograph is enough to diagnose neglected elbow dislocation in most cases. CT scan is helpful to identify minute fractures, malunited fractures, and articular irregularities.<sup>9</sup>

Treatment options for neglected elbow dislocation mainly depends upon the duration of dislocation, range of movement of elbow, and articular condition which is likely to be exploited in our local scenario of healthcare. Disease being more prevalent in low income, rural setup, and rare presentation in well-developed set-ups, it is likely that the treatment modality of neglected elbow dislocation will not be adequately discussed and is a matter of controversy till date. Various authors have given their own method of treatment with varying results.<sup>2,10</sup> Treatment of neglected elbow dislocation is a matter of controversy till date. Various authors have given their own method of treatment. Various treatment methods have been described: closed reduction, open reduction and internal fixation with K-wire, open reduction with triceps lengthening and medial and lateral collateral ligament release, creation of an intra-articular "cruciate" ligament to stabilize the joint, hinged external fixator, excisional arthroplasty, arthrodesis, and total elbow replacement. Most authors suggest open reduction of such elbows up to three months after dislocation and recommend other methods like arthroplasty after that period. However, some authors have suggested open reduction as far out as two years after dislocation.<sup>11-13</sup> Arthrodesis is better for those people who are engaged in heavy work. Arthroplasty provides a reasonable range of motion of joint, but it is costly and not routinely done in rural areas. We did open reduction and internal fixation with trans olecranon K wire in all cases as many authors got satisfactory results after doing the same.<sup>14-16</sup> The posterior approach was used in all cases for open reduction. Triceps lengthening was achieved by V-Y plasty of triceps as described by various authors.<sup>17,18</sup> An elbow with 100 degrees of flexion and 100 degrees of supination can be termed as a useful elbow as activities of daily living can be done with that much of range of motion.<sup>19</sup>

In our study, all cases presented with non-functional range of motion with average preoperative flexion of 24.5 degree and arc of motion of 18.6. Average flexion of elbow at final follow up in our case was 113.6 degree which is 53 degree in a study done by Essi et al<sup>20</sup>, 112 degree in a study done by Fowels et al<sup>21</sup> and 115 degree in a study done by Metha et al.<sup>22</sup> Average arc of motion at final follow up is 41.5 degree, 67 degree, 75.8 degree and 102 degree in a study done by Essi et al,<sup>20</sup> Fowels et al,<sup>21</sup> Naiddo et al and Metha et al,<sup>22</sup> respectively. Average arc of motion in our study is 97.1 degree which is almost comparable to a study done by Mehta et al. We have operated on dislocations up to 24 months old, but most of our cases presented within 3 month of injury (36%). Dislocation was posterior in all cases with clear predominance of posterolateral variety (9 cases). We achieved an average postoperative flexion of 113.6 degrees and an average postoperative Mayo elbow score of 86.36 with minimal complications associated with the surgical procedure, which denotes good outcome of our study and is comparable to various publications. The greatest strength of our study is that all patients were treated using the same procedure and obtained positive results. It will always be difficult to make evidence based conclusions based on small sample size. The inherent nature of observation study also limit the outcome findings however well designed trial for these cases still seems to be technically difficult prospect given the area of presentation, patient type and expertise required

## CONCLUSIONS

Open reduction and internal fixation of neglected elbow dislocation with trans-olecranon K wire gives good functional results in comparison to its preoperative status. This procedure can achieve greatly improved elbow function with minimal complications. It improves the range of motion of elbow and Mayo Elbow performance index with minimal complications.

Large scale study with longer follow up is needed to validate this technique of open reduction and internal fixation of neglected elbow dislocation.

## ACKNOWLEDGEMENTS

We'd like to thank Taylor Aldrige from USA for her English editing and Dr. Smritee Mahat for her continuous support.

## CONFLICT OF INTEREST

All the authors involved in the study have no any conflict of interest.

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