

PROLOTHERAPY FOR THE TREATMENT OF POSTOPERATIVE ELBOW JOINT STIFFNESS IN AN OLD UNREDUCED ELBOW DISLOCATION TREATED WITH AN OPEN REDUCTION SURGERY: A CASE REPORT

Rudy Lukman, MD¹, Alif Noeriyanto Rahman, MD², and Herry Herman, MD, PhD³

Background: The elbow is the conduit of upper extremity actions, delivered through the shoulders to the hand. Elbow problems greatly affect daily function and quality of life of the sufferers. Here we report the use of prolotherapy as an adjunct to physiotherapy to provide a speedy range of motion (ROM) recovery in an army officer affected by neglected old unreduced elbow dislocation, which was reduced with an open reduction surgery and internal fixation of his elbow. The patient provided HIPAA compliant consent for the inclusion of their clinical information in this report.

Methods: We used the Hackett-Hemwall technique as described in the literature. A total of 15 mL solution of 5% dextrose and 0.2% lidocaine is injected in the lateral epicondyle humerus and extensor carpi radialis brevis tendon proximally, also tender areas around the elbow about 0.5 mL to 1 mL per injection.

Results: Eight sessions of prolotherapy were administered; 2 months after the last session, ROM of the elbow was 500 to 1350 and the Visual Analog Scale score decreased from 7 to 1. Patient was satisfied with the result.

Conclusions: Treating postoperative stiffness is one of the utmost precautions for postsurgical management. Particularly for chronic elbow dislocation, prevention of stiffness needs to be more progressive to treat the condition. Our case presented one alternative management where prolotherapy may provide a satisfactory outcome for pain and assist to speed recovery in a subacute surgical patient.

Key words: Prolotherapy, post operative elbow stiffness, old unreduced elbow dislocation, case report

BACKGROUND

The elbow is the conduit of upper extremity actions, delivered through the shoulders to the hand. The right elbow facilitates self-care and work, while the left

elbow facilitates sanitary and hygiene control. Elbow problems greatly affect daily function and quality of life of the sufferers.

Elbow dislocation occurs at around 2.9 per 100,000

From: ¹Department of Surgery, Soepraoen Indonesian Army Hospital Malang, Indonesia; ²Department of Orthopaedic and Traumatology, Depok Orthopaedic Pain Intervention Center, Sentra Medika Hospital, Precursor Fellow Faculty of Medicine Padjadjaran University Bandung, West Java Barat, Indonesia; ³Department of Orthopaedic Surgery and Traumatology, Hasan Sadikin General Hospital, Faculty of Medicine Padjadjaran University Bandung, West Java, Indonesia

Corresponding Author: Rudy Lukman, MD, E-mail: rudy_medstud@yahoo.com

Disclaimer: There was no external funding in the preparation of this manuscript.

Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

Accepted: 2022-05-16, Published: 2022-07-31

populations per year in those over 16 years of age. Meanwhile, the incidence of simple elbow dislocation is about 5.21 per 100,000 persons each year in the United States according to Stoneback et al (1). Men are more predominant to suffer from an elbow dislocation.

Open reduction and internal fixation of the elbow are indicated for old unreduced dislocation of the elbow, as well as to reduce and fix accompanying fractures in order to provide an early return of range of motion (ROM) for daily activity routines and for work (4).

Prolotherapy has been used to alleviate pain, by aiding small vessel regeneration that supply sensory nerves (8). This temporary analgesia effect also aids in relieving patients suffering. Multiple applications increase the duration of analgesia, presumably due to the additive effect of improving the vascularization of the innervating nerves. Intraarticular prolotherapy has been used to provide an immediate increase in ROM of the shoulder, similar to the effect produced by hydrodilatation.

Here we report the use of prolotherapy as an adjunct to physiotherapy to provide a speedy ROM recovery in an army officer accompany with neglected old unreduced elbow dislocation, following an open reduction surgery and fixation of his elbow.

Etiology and Epidemiology

There is a small publication (1) regarding the epidemiology of simple elbow dislocations. Adolescent men are at highest risk for dislocation in the US population. Nearly half of acute elbow dislocations occurred during sports, with men at highest risk with football, and women at risk with gymnastics and skating activities. (1)

Prolotherapy (growth factor or growth factor stimulation injection) raises growth factor levels or effectiveness to promote tissue repair or growth. Growth factors are complex proteins (polypeptides), and their beneficial effects on human ligament, tendon, cartilage, and bone are under intense investigation. Prolotherapy may utilize inflammatory or noninflammatory mechanisms (2,3).

There was a long history of prolotherapy for treating chronic elbow problems; however, reports for treating postoperative elbow stiffness with prolotherapy are still in shortage. Here we report the use of prolotherapy to achieve improvements of pain and ROM in postoperative elbow stiffness resulting from open reduction, soft tissue releases, and internal fixation of an old unreduced elbow dislocation.

Treatment

Nonsurgical

Most elbow dislocations are stable injuries unless associated with concomitant fractures and vascular compromise. The elbow dislocations are easily reduced under general anesthesia in cases of simple dislocations, except if soft tissue interposition or bony fracture fragments inside the joint is present. In most developing countries like Indonesia, the widespread presence and accessibility of a traditional healer in each community result in an improperly treated elbow dislocation developing into the persistence of dislocation, soft tissue contractures, and bony malunion (4).

Surgical

The aim of surgery for old unreduced fracture-dislocation is to provide adequate ROM and the return of weight-bearing capacity to facilitate daily routines and work. The procedures usually include the refreshing and reduction of the bones if fractures are present, as well as relatively extensive release of soft tissue contractures as well as various lengthening (5).

CASE REPORT

The Institutional Review Board of Soepraoen Indonesian Army Hospital Malang approved this case report. We also obtained and HIPAA compliant informed consent from the patient and their relatives.

A 45-years-old man sustained a fall on an outstretched hand and presented with pain, swelling, deformity, and inability to move his right elbow around 2 months prior to admission, with a history of management of traditional bonesetters. He works as an officer of the Indonesian Army. Open reduction and soft tissue releases, along with internal fixation with a Kirschner wire to stabilize the reduction, were prescribed followed by immobilization for 3 weeks, and thereafter range of movement exercises of the elbow joint. Neurovascular complications, associated fracture around the elbow joint, and instability of the joint were not present.

Three weeks postsurgery, the patient experienced difficulties to fully extend and flex his elbow (Fig. 1). ROM was between 400 to 700, with the Visual Analog Scale (VAS) score of 7 to 8. Dextrose 5% solution program was planned for about 8 weeks with the guide of ultrasound.

METHODS

The patient lies supine with 2 affected pillows on the examiner's side. An ultrasound long-axis view of

the olecranon and triceps tendon is obtained. Elbow was disinfected with povidone-iodine, then the lateral epicondyle humerus and extensor carpi radialis brevis (ECRB) tendon were imaged (Figs. 2 and 3) (6,7).

We used the Hackett-Hemwall technique as described in the literature (3). Briefly, a total of 15 mL solution of 5% dextrose and 0.2% lidocaine is injected into the lateral epicondyle humerus and ECRB tendon proximally, also tender areas around the elbow about 0.5 mL to 1 mL per injection. This injection can be seen in Figs. 4 and 5.

RESULTS

Eight sessions of prolotherapy were administered; 2 months after the last session, ROM of the elbow was 50 to 135° and VAS score decreased from 7 to 1.

Patient was satisfied with the improvement for his pain and movement.

DISCUSSION

Neglected or old unreduced dislocations of the elbow are quite common in developing countries like Indonesia. Old habit of initial management by traditional doctors is still pervasive and widely adopted by the public, among people in rural and even urban areas. This relates to their widespread presence and accessibility to those in villages. In our case, the patient went to see local traditional bone doctors following his fall and received management thereof for about a month.

A chronically dislocated elbow, posteriorwardly in particular, stretched and scarred the joint capsule, as well as changed the dimension of soft tissues surrounding it, necessitating extensive soft tissue releases upon open reductions and during the insertion of fixation devices. Postsurgical stiffness is hence more prevalent necessitating a more progressive rehabilitative approach; this approach includes shorter immobilization time, earlier passive and active ROM exercises, and any other modalities able to provide acceleration of ROM recovery.

Prolotherapy, or proliferative therapy, is a mean or regenerative therapy modality, mainly utilizing dextrose as the therapeutic agent. Multiple applications of prolotherapy are usually needed to provide regenerative potentials. This is due to its ability to stimulate the remodeling and proliferation of the vessel through modulation of inflammation, where the time required to change M1 inflammatory macrophage type into M2 remodeler macrophage is shortened, also partially due to its ability to provide temporary analgesia up to 48 hours postprocedure, encouraging motion (8-10).

Here, we showed that following each session of prolotherapy, gradual increases in ROM are obtained along with the reduction in pain level. The total acquisition of range of elbow motion is 35 degrees for flexion, which is from 40° pretreatments to 50° post-prolotherapy treatments (Fig. 7). A total of 65 degrees of range motion in



Fig. 1. Patient unable to fully extend his elbow (4,5).



Fig. 2. Pre operative x-ray showed posterior elbow joint dislocation (4,5).



Fig. 3. Post operative x-ray showed elbow joint had been reduced with internal Kirschner wire (4,5).



Fig. 4. Identify and evaluate the elbow joint.



Fig. 5. Injecting Dextrose 5% to the affected site.



Fig. 6. Hyperechoic shadow of the ECRB tendon (6).



Fig. 7. Patient able to fully flexed his elbow (7).



Fig. 8. Patient able to extend his elbow (7).

elbow extension is also obtained, which is from pretreatment of 70 to 1350 (Fig. 8). Notable improvements in other aspects of quality of life, including the ability to exercise, perform work and duty, as well as reduction of medication usage were also seen.

CONCLUSIONS

Treating postoperative stiffness is one of the utmost postsurgical management to facilitate early return to work and minimize long-term disability, whatever the cause for the surgery may be. Particularly for chronic elbow dislocation, prevention of stiffness needs to be more progressive as more extensive releases were required to treat the condition. Our case presented one alternative management where prolotherapy may provide a satisfactory outcome for pain and for the recovery of ROM. Larger series of cases will provide further clues whether our result is reproducible in other types of postoperative elbow stiffness.

REFERENCES

1. Stoneback JW, Owens BD, Sykes J, Athwal GS, Pointer L, Wolf JM. Incidence of elbow dislocations in the United States population. *J Bone Joint Surg Am* 2012; 94:240-245.
2. Hackett G. Referral pain and sciatica in diagnosis of low back disability. *JAMA* 1957; 163:183-185.
3. Hackett G (ed). *Ligament and Tendon Relaxation Treated by Prolotherapy*, Third Edition, Charles C. Thomas, Springfield, IL 1958.
4. Kembhavi RS, James B, Sugirtharaj J, Singh N. Old un reduced posteromedial elbow dislocation: A rare case report. *Webmed-Central ORTHOPAEDICS* 2015; 6:WMC004823.
5. Donohue KW, Mehlhoff TL. Chronic elbow dislocation: Evaluation and management. *J Am Acad Orthop Surg* 2016; 24:413-423.
6. Bodor, M, Leshner JM, Colio S. Ultrasound-guided hand, wrist, and elbow injections. Narouze SN (ed). *Atlas of Ultrasound-Guided Procedures in Interventional Pain Management*, Second Edition, Springer, New York, NY, 2018, pp 274-276.
7. Jankovic D, Peng PWH. Elbow joint and tennis elbow injection Jankovic D, Peng P (eds). *Regional Nerve Blocks in Anesthesia and Pain Therapy*, Fourth Edition, Springer International Publishing, Switzerland, 2015, pp 438-440.
8. Hauser R, Hauser M. Polo your groin, hip and knee pain away! Hauser R, Hauser M (eds). *Prolo Your Pain Away!*, Third Edition, Beulah Land Press, Oak Park, IL, 2007, pp 126-138.
9. Scarpone M, Rabago D, Zgierska A, Arbogest J, Snell E. The efficacy of prolotherapy for epicondylitis: A pilot study. *Clinical J Sports Med* 2008; 18:248-254.
10. Liu Y. An in situ study of the influence of a sclerosing solution in rabbit medial collateral ligaments and its junction strength. *Connective Tissue Research* 1983; 2:95-102.

