



STUDY OF CLINICAL AND FUNCTIONAL OUTCOME OF TOTAL ELBOW ARTHROPLASTY IN A PATIENT WITH NEGLECTED CASE OF DISTAL HUMERUS FRACTURE WITH UNUSUAL FOLLOW-UP

Orthopaedics

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ABSTRACT

Background: Presenting a case of 50 year old female who presented with pain, swelling and deformity in left elbow with history of fall 2 months back. There was decreased range of movements of left elbow with normal neurovascular status. Radiological investigation showed distal humerus fracture with intraarticular extension. Patient underwent total elbow arthroplasty. After discharge of patient from hospital, patient had unusual follow up. After 1 year post operatively, patient presented with complaints of pain, squeaking sound in left elbow during regular household activity. Radiologically, a rare complication as Hinge Dislodgement seen. Patient underwent revision surgery for the same. On regular follow up of the patient, there was good clinical and functional outcome of the patient and achieved good range of motion of elbow.

KEYWORDS

Distal humerus fracture, complication, unusual follow up, hinge dislodgement, total elbow arthroplasty.

INTRODUCTION:

Distal humeral fractures constitute 2% of all adult fractures [1]. Most commonly, distal humerus fractures occur in elderly female patients [2]. Missed or mistreated bicondylar fractures of the distal humerus are even rarer, which leads to a more challenging treatment and a lack of standard protocols for guidance [3]. Total elbow arthroplasty (TEA) has emerged as a viable treatment option for managing complex elbow pathologies, particularly in patients with conditions such as rheumatoid arthritis, post-traumatic arthritis, and acute fractures. Among these, distal humerus fractures pose a significant challenge due to the complexity of the elbow joint anatomy and the necessity for precise restoration of joint function. Neglected cases of distal humerus fractures, where initial treatment is delayed or inadequate, present an even greater challenge. Such delays can lead to malunion, nonunion, stiffness, and functional impairment. In these situations, the surgical management becomes complicated, often requiring advanced techniques to achieve a satisfactory clinical and functional outcome. In total elbow arthroplasty (TEA), two types are used: the semi-constrained, indicated for trauma cases where bone stock is limited, and unconstrained, indicated when sufficient bone stock and soft tissue exist for soft tissue balancing [4]. This study aims to evaluate the clinical and functional outcomes of total elbow arthroplasty in a patient with neglected distal humerus fractures. The usual complications associated with total elbow include Infection, Implant Loosening, Periprosthetic Fractures, Nerve Injury, Heterotopic Ossification, Component Wear, Instability, Stiffness [5].

Here we report a case of neglected distal humerus fracture operated with total elbow arthroplasty with unusual follow up after that, presenting with rare complication of hinge dislodgement of the implant.

Case Presentation:

A 50 year old woman presented at our hospital complaining of pain during activities with decreased ROM on her left elbow and incapability of performing everyday tasks for the past two months. She gave history of a fall approximately two months ago when she went to the local hospital, treated conservatively and discharged with a posterior elbow splint. As she experienced major instability and incapability along with incapacitating pain during regular household activities, anteroposterior and lateral elbow X-rays were performed. She was diagnosed with distal humerus fracture with intraarticular extension (figure 1).



Figure 1: Pre-operative x ray.

Physical examination shows major instability and deformity of left elbow joint. Neurovascular status was normal. After a discussion with the patient and thoroughly explaining the potential benefits, the choice of surgical management with a posterior TEA approach was made. Typical semi-constrained total elbow arthroplasty was performed (figure 2&3). After the implantation of the prosthesis, the elbow joint was very stable and had a full range of movements.

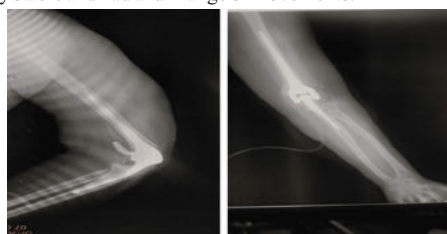


Figure 2: immediate post operative x rays.



Figure 3: Intraoperative Pictures.

The patient was discharged after suture removal. She was instructed to start active movement immediately and given advices to restrict heavy lifting. Patient did not come to follow up after the discharge. After 1 year, Patient presented with pain and deformity on the operated elbow site. She gave history that since past 2 weeks, on regular household activity, she had some squeaking sound in left elbow accompanied with incapacitating pain. She did not give any history of lifting any heavy objects. On radiography, A rare complication as Hinge Dislodgement demonstrated (figure 4).



Patient underwent revision surgery as hinge replacement done (figure 5)



At three, six, and twelve months of follow-up, the patient showed excellent results. Patient now has good clinical and functional outcome (figure 6). She did not complain of any pain and returned successfully to her daily activities.

**FIGURE 6:** clinical outcome after 12 months follow up.

DISCUSSION:

Total elbow arthroplasty seems to be a valuable alternative, particularly when addressing complications such as non-union, malunion, post-traumatic arthritis, and post-traumatic instability (mostly occurring in the elderly population), with the literature describing good results in 85% to 90% of patients at 5 to 10 years post-surgery, respectively [6,7]. Several studies suggest that primary total elbow arthroplasty provides better results than open reduction and internal fixation in the elderly population based on functional outcome scores and range of movements. Usual complications after total elbow arthroplasty are loosening of the implant, periprosthetic fracture, ulnar nerve palsy, triceps insufficiency and infection. After total elbow arthroplasty, most important advice is restriction of heavy weight. But just a usual household activity can result in hinge dislodgement [8]. Implant wear and osteolysis can result in failure of the total elbow arthroplasty. By following kinematics of the elbow, dissipation of the stress and energy at the bone-implant interface can be minimized [9]. Along the centers of capitellum and the trochlea, the flexion-extension axis is located. The flexion-extension axis is internally rotated 3-8° with respect to the epicondylar plane [9]. Prosthesis implantation can lead to 4-6mm of anterior and distal translation in the axis of rotation though optimal positioning of the implant. Proximal placement of

humeral component results in reduction of the flexion strength due to shortening of the muscle. Again, the distal fixation can result into complications such as nerve palsy and damage to soft tissue. The flexion-extension arc again affected by rotation of ulnar prosthesis. On Cadaveric studies, It has been founded that the normal elbows are semi-constrained with 2-3° varus valgus laxity [10]. On implantation, varus-valgus laxity was 4-5° without stress and 11°-13° with stress. Both the native and implanted elbow shows that the mean flexion arc remained relatively centered, but the elbow prosthesis was closer to the structural limit which has tendency toward valgus [11]. Again, On Internal and external rotation of the humeral component greater than 10°, it results into excessive valgus and varus angulation at the hinge respectively [11]. The destruction of joint in post-traumatic cases results in obliteration of anatomic reference points and the disruption of musculoligamentous balance result in change in the normal elbow kinematics.

In semi constrained linked elbow implants, bushing wear has been identified [12]. Excessive bushing wear may cause pain and instability. The inflammatory response with osteolysis may predisposes the patient to implant loosening. semi constrained elbow implants can be unstable secondary to the aseptic loosening and loss of the hinge mechanism.

CONCLUSIONS:

Total elbow arthroplasty is a becoming the best option for complicated fractures of the elbow. Among the various implant designs, a semi-constrained linked prosthesis is the most viable one. Though very good clinical and functional outcomes can be expected in majority of patients, the rate of complications and revisions stays high. the postoperative complications include periprosthetic fracture, implant failure, triceps insufficiency and ulnar neuropathy. In this case, we found out one of the rare complication as hinge dislodgement. This complication gets revised by hinge replacement. Generally in post operative and follow up period, Restriction of lifting heavy weight advised to patient. But in this case, A usual household activity can result in such a rare complication. Elbow revisions can result into favorable outcome. But some patients might need multiple surgeries and some might be left with a flail elbow.

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