

Treatment of Stiff Elbow in Young Patients with Interpositional Arthroplasty for Mobility: Case Series

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What to Learn from this Article?

Interpositional arthroplasty is a very good treatment option for elbow mobility in young arthritic elbow proscripting the future total elbow arthroplasty.

Abstract

Introduction: The elbow is a complex joint involving many articulations and complex biomechanics come into play. Elbow motion is crucial to upper limb movement that loss of 50% of elbow function equals to loss of 80% of upper extremity global function. Restoring movement and stability is challenging to the surgeon while treating a stiff elbow. Unlike other arthroplasties of hip and knee, total elbow arthroplasty (TEA) may not be a primary treatment. Interpositional arthroplasty (IPA) can be considered a viable option in posttraumatic arthritis of elbow in young patients.

Case Report: We report two cases of interpositional arthroplasties done in young patients secondary to posttraumatic event. The first case is 22-year-old female with a history of stiff elbow following a posttraumatic event 3 years back and the second case is 24-year-old male laborer with stiff elbow following trauma more the 10 years back for which he took native treatment. In both the cases through posterior approach to the elbow, we did osteolysis and prepared fascia lata grafts are interpositioned over the recreated articular surfaces. Both the patients in the follow-up have a good range of motion, stability and are satisfied.

Conclusion: IPA is a good treatment option in young patients with posttraumatic arthritis. Elbow instability, fascia rupture, thigh pain, and hernia are the problems of IPA. IPA to TEA transition is possible.

Keywords: Posttraumatic arthritis, interpositional arthroplasty, elbow mobility, fascial resurfacing arthroplasty.

Introduction

The elbow is a complex joint involving many articulations and complex biomechanics come into play. It has basically hinge joint between ulna and humerus with pivot articulations between radius and ulna [1]. Elbow has flexion range of 0-145° and supination - pronation of 80°. Elbow motion is

crucial to upper limb motion that loss of 50% of elbow function equals to loss of 80% of upper extremity global function (Sjöberg *et al.*, 1996). So loss of motion due to trauma, inflammatory pathology or any other reason is not acceptable by the patient's functional point of view. Restoring motion and stability is challenging to the surgeon while treating a stiff elbow.

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Elbow arthroplasty is a viable option secondarily in the cases of failed fixation, bone loss in distal humerus fractures, stiff elbow and primarily in rheumatoid arthritis, and ankylosis. Unlike other arthroplasties of hip and knee, it may not be considered as primary treatment in the elbow. There are many arthroplasties such as resection arthroplasty, interpositional arthroplasty (IPA), and total elbow arthroplasty (TEA) available with its own pros and cons [2].

Case Reports

We report two cases of IPA done in young patients with stiff elbow secondary to posttraumatic event.

Case 1

A 22-year-old female came with a history of stiff elbow following a posttraumatic event 3 years back. She had taken native treatment with no benefit. On examination, she found to have an elbow fixed at 90° with no movements (Fig. 1). However, supination and pronation were in near complete range. Considering the patient's age, high functional demand, and time-related longevity of TEA, we planned for IPA.

Surgical consideration

After routine evaluation for surgery, with patient in lateral position (Fig. 2) through posterior inverted V-shaped triceps reflecting approach the elbow joint was exposed [3]. The lateral collateral ligament was reflected from humeral attachment approaching the joint from lateral aspect. Ulnohumeral joint was fused and arthritic changes seen over radial head. The joint was levered out with osteotome and osteolysis completed (Fig. 3). The recreated articular surfaces were prepared with burr to give a smooth surface and near complete range of movement. Meanwhile, through lateral incision over Mid-Thigh, tensor fascia lata graft of 15 cm × 6 cm was harvested (Fig. 4). The graft was folded onto itself and placed over the distal humeral surface. The graft was secured with vicryl through the drill holes made over the humerus (Fig. 5). Radial head was excised and lateral collateral ligament complex repaired. Intraoperatively we obtained a range of motion 15-110° wound closed in layers over drain. Postoperatively elbow immobilized in 90° with a splint (Fig. 6).

Splint was removed intermittently with elbow range of motion exercises advised up to pain tolerated by the patient. Strengthening exercises were delayed. At the end of 24 weeks, the patient had elbow range of 30-100° with good elbow stability. She is under rehabilitation with improving range of motion and Mayo Elbow Performance Scores of 75 (Fig. 7 and 8).

Case 2

A 24-year-old male laborer came with complaints of stiff elbow. He gives history of trauma more than the 10 years back for which he took native treatment. On examination, the elbow was fixed at 80° of flexion with no further range of motion (Fig. 9). He underwent IPA, similar to above procedure with preservation of radial head. Intraoperatively we obtained range of motion 20-110°. At the end of 24 weeks, the patient has elbow flexion of 40-100° with reasonable stable elbow. He is under rehabilitation program with Mayo Elbow Performance Score of 65 (Fig. 10).

Discussion

Elbow arthroplasty is a relatively specialized procedure with few surgeons carrying out the operation frequently [4]. Prologue 1947, resection and



Figure 1: Case 1 patient elbow fixed at 90°.



Figure 2: Surgical position and draping (Case 1).

interposition arthroplasty was the common surgical treatment for severe post-traumatic deformity, trauma, and rheumatoid arthritis [5]. Constrained, partial, and total hinge arthroplasties were in vogue between 1947 and 1970 [5].

IPA is a type of resurfacing surgery which is viable option in young posttraumatic stiff elbow with intact bony anatomy [6]. In their original study by Cheng and Morrey [7] where they had a series of 13 patients who underwent IPA found 70% patients had relief from pain. They concluded IPA is a useful option in young high demand patients with arthritis of elbow. Furthermore, it may not be useful in generalized inflammatory arthritis. However, it has its own drawbacks of elbow instability, fascia rupture, thigh pain, and neuropraxia.

There are instances where IPA can be a treatment option in posttraumatic stiffness with osteomyelitis and loss of soft tissue cover. All the three problems were treated in single stage by Vancabeke *et al.* [8]. TEA may be fascinating because of implant design and increased range of motion. However, it has its limitations of longevity, revision (22%) for post-traumatic arthritis in young patients [9].

Arthrodesis may still be an alternative in the manual laborer or individual who can compensate for loss of movement. However,

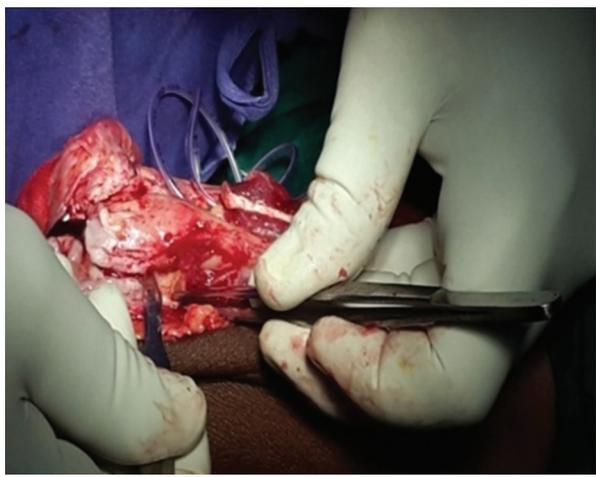


Figure 3: Exposure and preparation of joint surfaces (Case 1).

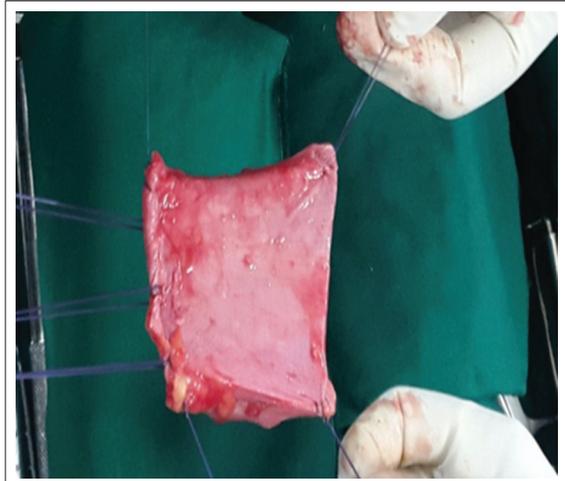


Figure 4: Tensor fasciae latae graft (10 cm x 6 cm) folded onto itself and prepared (Case 1).

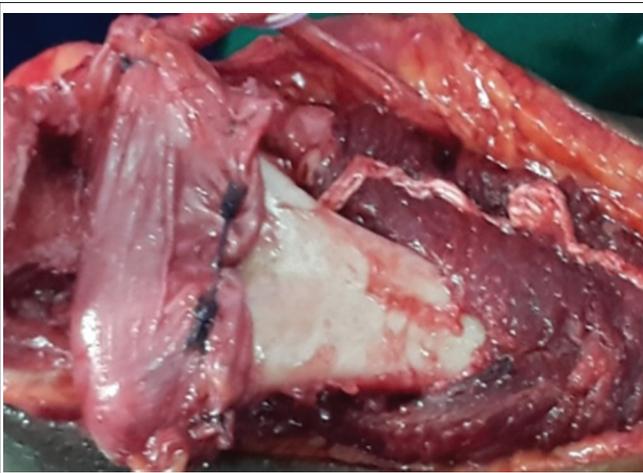


Figure 5: Graft fixation onto distal humerus articular surface (Case 1).



Figure 6: Pre and post-operative elbow radiograph (Case 1).



Figure 7: Post-operative clinical follow-up – extension (Case 1).



Figure 8: Post-operative clinical follow-up – flexion (Case 1).

arthrodesis is seldom now considered to be acceptable by high demanding young [10].

When the indications are correct in young patients' interposition arthroplasty can relieve severe pain, affording a functional elbow with reasonable range of motion and bone stock is preserved [11]. Furthermore, the patient can be easily translated to semiconstrained TEA who had prior IPA [12]. One of our patients complained donor site related thigh pain.

In our patients, in addition to interposition of fascia latae graft the lateral collateral complex of the elbow is repaired adequately and elbow is immobilized in appropriate position and time with intermittent exercise thereby bringing good stability to the joint, which is a major concern in the previous studies. Hence, IPA serves as a buy back for future TEA.



Figure 9: Pre and post-operative X-ray radiography (Case 2).

Conclusion

- In our study, both the patients achieved good range of motion and stability thereby patients had high satisfactory scores
- IPA is good treatment option in young patients with posttraumatic arthritis
- Fascia rupture, thigh pain, and hernia are the problems of IPA

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Figure 10: Post-operative clinical picture (Case 2).

- IPA to TEA transition is possible.

Clinical Message

IPA is a very good treatment option for elbow mobility in young arthritic elbow proscripting the future TEA.

How to Cite this Article

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