



Short Communication

Olecranon Bone Grafts As an Alternative to Iliac Bone Grafts In the Treatment of Neglected Humerus Fractures - A Prospective Study

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ABSTRACT

Iliac bone grafts are commonly used to augment union in various fractures along with open reduction and fixation, when warranted in appropriate situation. There are very few reports on the use of olecranon bone grafts for the fractures of the upper extremity. We in our study used olecranon bone grafts for the neglected, diaphyseal fractures of humerus, with open reduction and internal fixation and studied the patients for clinical and radiological outcome. Between November 2011 and October 2013, 25 patients of neglected humerus fractures were treated in our institute. All these patients underwent open reduction and internal fixation with LCP and olecranon bone grafting. The patients were followed up for average of 18 months (9-30 months). All the patients had union at average of 3 months (2-5 months). The cortical window at olecranon bone site reformed at 6 months (5-9 months). There was no fracture, pain, infection, or bursitis at the bone graft donor site.

Key Words: Humerus fracture, olecranon bone graft.

INTRODUCTION

Traditionally autogenous cancellous bone grafts are used commonly to augment union in various fractures of upper and lower extremities. The source of cancellous bone grafts are iliac crest, greater trochanter of the femur, femoral condyle, proximal tibial metaphysis, medial malleolus of the tibia, olecranon and distal radius. With the use of bone substitutes and the donor site morbidity associated with the iliac crest site, the enthusiasm in autogenous iliac cancellous bone graft as an augment is dwindling. ^[1,2] However, in upper extremity fractures olecranon cancellous grafts can be used as it can be advantageous compared to

other donor sites and bone substitutes. Only few reports are available regarding the use of olecranon cancellous bone grafting in upper extremity fracture. We prospectively studied the use of olecranon bone grafts in neglected fractures of humerus in terms of clinical and radiological outcome and also the complications associated with the harvesting and use of olecranon bone grafts.

MATERIALS AND METHODS

During the period from November 2011 to October 2013, our institute received 25 patients with neglected fracture humerus (Fig.1). For the purpose of the study, the fractures are classified as neglected if the

duration is more than 4 weeks after the injury. The reason for delay in seeking treatment was indigenous treatment by native bone setters, which is common in our part of the country. All the patients were treated with open reduction and internal fixation with 3.5 mm locking compression plate with augmentation by olecranon bone grafting (Fig.2).



Figure 1: Fracture humerus (Pre-operative).



Figure 2: Open reduction and internal fixation with 3.5 mm locking compression plate and augmentation by olecranon bone grafting (Immediate post operative).

Of the 25 patients, 19 were males and 6 were females with 11 injuring their right side and 14 injuring their left side. The mechanism of injury was motor vehicle

accident in 19 patients, fall from height in 5 patients and work related injury in 1 patient. All the patients were operated using posterior approach (Fig.3).



Figure 3: Healed surgical scar – Posterior approach to humerus.

Shoulder pendulum exercises and elbow range of motion was started from the next day of surgery. The patients were given intravenous antibiotics for 24 hours postoperatively and discharged on the third day. All the patients were serially followed up at 6 weeks, 3 months, 6 months and 1 year.

The patients were allowed light activities once the callus formation was noticed in the radiograph and slowly progressed to their pre-occupation level at approximately 4 months (Fig.4), when complete union of fracture was noticed (Fig.5).



Figure 4: Pre occupation level of activity at 4 months post-op.



Figure 5: Complete fracture union at 4 months post-op.

Surgical technique

The patients were given regional block, either interscalene or supra-clavicular. The humerus was approached by posterior approach. The fracture was identified, the ends debrided, reduction achieved and fixed with LCP. Then the olecranon graft was harvested from the ipsilateral upper extremity. The olecranon was approached by a 4 cm incision posteriorly and the bone was exposed directly. An oval window was made in the posterior cortex of the olecranon and the graft was harvested. The graft thus harvested was applied at the fracture site. The quantity of graft was found to be adequate in all the patients. The periosteum was sutured back to prevent irregular callus formation.

RESULTS

All the patients were followed up regularly. All had complete union at an average of 4 months (3-6 months). All regained complete range of motion at 2 months (1-3 months). No patient complained of bone graft donor site pain. No infections were encountered in any of these patients either in fracture site or graft donor site. 4

patients had radial nerve palsy, which recovered at approximately at 3 months. There was no fracture or bursitis at the graft donor site.

DISCUSSION

Autogenous cancellous bone grafts are used commonly for various fractures and nonunion as an augmentation along with open reduction and internal fixation. The source of cancellous bone grafts are iliac crest, greater trochanter of the femur, femoral condyle, proximal tibial metaphysis, medial malleolus of the tibia, olecranon and distal radius. The advantages of the iliac cancellous bone grafting include abundant quantity of cancellous grafts with maximum osteogenic potential and availability of cortico-cancellous bone graft. The disadvantages are many such as pain at the donor site, infection, cosmetic deformity, discomfort in wearing the lower garments, injury to ilio-inguinal nerve and lateral femoral cutaneous nerve, arterial injury, hernia due to incomplete closure and altered gait in some patients. The olecranon bone grafts are advantageous in that they have no pain at the donor site and can be harvested from the same upper extremity. Thus the whole procedure can be done with a single anesthetic block in the upper extremity. The limitations being paucity of graft and theoretical possibility of the fracture. They also have the benefit of rapid revascularization. [3] There are very few reports about the use of olecranon bone grafts. [4,5] We prospectively studied the patients with neglected fracture of humerus treated with open reduction and internal fixation with olecranon cancellous bone grafts. We had excellent outcome in all the patients and encountered no donor site morbidity.

CONCLUSION

The olecranon as a bone graft donor site is an excellent option for neglected fractures of humerus as it avoids the complications like donor site pain and infection .It also can be done under one regional anesthetic procedure such as interscalene or axillary block.

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