A Novel Treatment For Severely Porotic Humerus Non Union With Plate And Rush Pin: A Report Of 2 Cases

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Abstract

The management of humerus non union in severely porotic bone mainly encountered in the elderly is challenging .The incidence of nonunion is higher in cases involving porotic bones. Non unions can result in significant patient morbidity by limiting activities of daily living due to pain and loss of function especially in the elderly. The literature is replete with studies outlining the various methods of treating humeral shaft non unions with severely porotic bones following primary operative management. However no study describes combining a plate and rush pin together with cancellous bone graft for severely porotic humerus non unions. We have applied this technique in 2 cases of previously plated porotic humerus non unions in the elderly with good results. This technique could be a very useful procedure in underdeveloped countries and rural hospitals where facilities like methylmethacrylate, a plate with a blade and spiked nuts that lock the screws to the plate are not available.

INTRODUCTION

The incidence of nonunion after operative treatment of humeral shaft fractures has been reported to range between 2.5 and 13 percent.[1,2,3].The incidence is higher in cases involving porotic bones. Non unions can result in significant patient morbidity by limiting activities of daily living due to pain and loss of function. Revision surgical management is indicated for treatment of non unions following an initial failed surgical procedure. The literature is replete with studies outlining the various methods of treating humeral shaft non unions with severely porotic bones following primary operative management [4,5, 6,7, 8].We hereby describe a technique of combining a plate and rush pin together with cancellous bone graft for severely porotic humerus non unions. We have applied this technique in 2 cases of previously plated porotic humerus non unions in the elderly.

MATERIALS AND METHODS

This prospective study was conducted at Presbyterian Church of East Africa (PCEA) Kikuyu Hospital, Orthopedic Unit from October 2007 to April 2008. Two consecutive patients with nonunion of the humeral diaphysis after plating with severe porosis were reviewed and evaluated. A plate and rush pin with cancellous iliac crest bone graft was used to treat the nonunion. The tool for data collection was a predesigned data sheet to collect information on the cases. The questionnaire contained information on age, sex, co-morbid conditions, mechanism of injury, fracture location, initial treatment of the fracture, time from injury to definitive treatment, definitive treatment, time taken to unite, function and complications.

In this study, nonunion was defined as absence of radiographic signs of union and persistent pain on clinical examination 6 months after injury [9]. A fracture between the superior border of the pectoralis major insertion and 2cm above the olecranon fossa was defined as a diaphyseal humerus fracture [10].

Records of patients were reviewed for history, physical examination, operative reports, and all radiographs. Laboratory studies included a hemoglobin level, urinalysis and random blood sugar where indicated.

SURGICAL TECHNIQUE

The patient was put under general anesthesia then prepared and draped in a standard manner as for humerus plating using the approach that was previously used. Prophylactic antibiotics were administered. The radial nerve was identified and protected for the duration of the procedure in posterior or lateral approaches. The previous implants were removed. The intramedullary canal was reconstituted with a drill and bone ends were contoured to provide adequate diaphyseal contact.

Once the fracture was reduced, the rush pin that had been cut preoperatively was inserted antegrade from the tip of greater tuberosity into the medullary canal of distal fragment through a 4 cm incision made over greater tuberosity ,lateral to acromion. Then a 4.5mm DCP plate was fixed based on the approach used. The screws were inserted slightly oblique to the plate so as to miss the rush pin in the intramedullary canal. A minimum of eight cortices of fixation above and below the fracture site was obtained.

Finally cancellous iliac crest bone graft was placed at the nonunion site. Full abduction of the shoulder was done intraoperatively to rule out subacromial impingement. Once satisfactory, the surgical incision was closed in a standard manner and antiseptic dressing was applied.

This was followed by postoperative radiographs. An arm sling was worn for two weeks. Physiotherapy was started in the first week as soon as pain subsided. It was in the form of pendulum movements towards abduction.

RESULTS

The table below summarises the patient information.

Figure 1

Table 1. Patient Information

Case	Age	Sex	Mechanism	Fracture Location	Co-morbidities	Time from injury to definitive procedure
1	M	64	Motor vehicle accident	midshaft	Nil	10 months
2	F	68	Fall	midshaft	Diabetes	13 months

At 6 weeks follow up, the patients had 60° and 80° abduction respectively. Clinical and radiological evidence of union of fracture was present at 6 weeks and 9 weeks.

Figure 2

Figure1. Preoperative AP and Lateral view of aseptic nonunion of a plated humerus

Figure 3

Figure1. Postoperative AP and Lateral view of humerus with plate and rush pin

DISCUSSION

The treatment of nonunions differs from that of acute fractures.Various techniques and devices have been used in the treatment of nonunion of the humeral diaphysis including open reduction and internal fixation with a dynamic compression plate and autogenous bone graft [3,4]. Exchange nailing following failed primary intramedullary nailing [4]. Rush rods in isolation and ring external fixators [5] have also been used. Compression plating with a 4.5mm plate and autogenous bone grafting has been considered the gold standard with a reported success rate greater that 90 percent [8, 9]. There is n literature to our knowledge on the use of a plate and rush pin in the management of humerus nonunion. The rush rod was meant to augment the fixation by reducing angular motion at the fracture site. This would ensure that the screws did not pull out. We have performed this technique in 2 cases of severely porotic previously plated humerus non unions and the results of this technique are satisfactory. We have not encountered any major or minor complications in the 2 cases operated so far

CONCLUSION

The purpose of this presentation is to introduce this technique which will be very useful in underdeveloped countries and rural hospitals where facilities like methylmethacrylate, a plate with a blade or spiked nuts (Schuhli nut; Synthes) that lock the screws to the plate are not available. This technique does not have a steep learning curve.

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