Humeral shaft fractures in the elderly

Intramedullary nailing and distal locking: a survey of practice

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INTRODUCTION

Humerus fractures are common fractures in the elderly. Most of these fractures can be treated conservatively with satisfactory outcome. Surgery can be the preferred treatment for a subgroup of elderly patients with dementia or other comorbidities when non-operative treatment may result in poor compliance and an unsatisfactory outcome.

Therefore, we wanted to evaluate the outcome and complication rate of this group of patients treated with intramedullary nailing for their humerus fracture and compared our results with current literature. Intramedullary nailing is a minimally invasive, relatively quick and simple procedure that provides fracture stability and early pain relief.

BACKGROUND

Non-operative management involves multiple plaster or brace applications, where good results can be achieved. It has a great impact on the quality of life of elderly patients. Comorbidities, osteoporosis, obesity and non-compliance due to dementia affect the outcome of non-operative treatment.^(1,2,3)

The choice of treatment for elderly patients remains controversial.⁽⁴⁾ Plating provides good results but requires extensive dissection with the risk of increased blood loss, radial nerve injury, infection and disruption of the periosteal blood supply. Intramedullary techniques can, in theory, avoid these problems. Different locked and unlocked flexible nails have been used with mixed results.^(5,6,7)

Insertion of distal locking screws of intramedullary nailing may be the challenging part of this procedure. Free-hand technique, nail-mounted guides and use of an image intensifier are the most commonly used techniques.⁽⁸⁾ The locking procedure can be time consuming, involve high levels of radiation and the risk of neurovascular injuries. Several studies have demonstrated that proximal locking screws may endanger the axillary nerve. Further anatomical studies have shown that the same risks exist with distal interlocking. Radial, ulnar and median nerves, as well as the brachial artery, are at high risk with the application of distal locking screws. Even non-union can occur as a complication of distal locking.^(9,10)

METHODOLOGY

We carried out a retrospective review of all intramedullary nailings in Furness General Hospital performed between June 2001 and August 2008 and compared this with recommendations published in current literature. All operations were carried out by single orthopaedic surgeon.

We identified 19 patients: six male patients (range: 44-80 years; mean: 62 years) and 13 female patients (range: 49-82 years; mean: 65 years). An extensive review of the pre-operative clinical findings, mechanism of injury, pattern and type of fracture, X-ray films and operative notes was done. Outcomes were assessed using postoperative clinical findings.

All intramedullary nail insertions were performed in antegrade technique using Biomet or DePuy nail system (see figure 1). Reaming was carried out only for the top part of the humerus. Proximal locking screws were inserted in all cases.

To reduce the risk of complications distal locking screws were not inserted (see figure 2). To overcome the problem of poor rotatory stability, during insertion the nail was jammed distally into the curved part of the medullary cavity. Rotatory movements were discouraged for three weeks but early movements were commenced as soon as pain allowed (2-3 days).

RESULTS

The cause of injury in the majority of patients was due to a fall or a road traffic accident. Two patients underwent intramedullary nailing following pathological fracture; two patients had prophylactic nailing due to underlying malignancy.

On analysing the X-ray films, it was found that ten patients had a mid shaft, four patients a proximal shaft, one a distal shaft and two segmental fractures. Two patients underwent the operation prophylactically. (See figure 3.)

In 67% of the cases the fracture was displaced, in 41% angulated and 32% comminuted.

Forty-two per cent (n=8) of patients underwent a trial of unsatisfactory conservative treatment with immobilisation using hanging cast, which resulted in non-union prior to nailing. In 58% (n=11) of the cases the patient underwent primary intramedullary nailing.

Complications included pulmonary embolism in one patient, fat embolism in one patient and one case of non-union, which was treated with bone grafting and dynamic compression plate.

Significant swelling of the operated limb occurred in three cases. One patient developed radial nerve palsy; however, this injury was present pre-operatively and responded well to conservative treatment.

We analysed the function of the operated shoulder joint in the follow-up period. It revealed that 11 patients achieved a full range of movement (ROM), four patients had good ROM with an active abduction of 100-130 degrees and four patients had a satisfactory ROM with active abduction between 90-100 degrees (see figure 4).

DISCUSSION AND CONCLUSION

We were interested in knowing the outcome and complication rate of intramedullary nailing of humerus fractures in a selected group of elderly patients and the effect of applying only proximal locking screws.

Distal locking screws were not used in our patients in order to avoid the risk of injury to the neurovascular structures and also to reduce the operating time. Rotatory stability of the fracture was achieved through special operation technique and management; the proximal part of the intramedullary nail was secured with locking screws, the nail was wedged distally into the curved part of medullary cavity and rotatory movements were discouraged for three weeks. Most of the operations were done under light anaesthetic with interscalene block and there were no intra-operative problems either with anaesthesia or surgery.

Discussion suggests that antegrade nailing with proximal locking can be the preferred treatment for a subgroup of elderly patients with dementia, obesity or comorbidities when non-operative treatment may result in poor compliance. The main advantages are that it is a reproducible, simple and time-saving technique, with a low complication rate and a minimum requirement for analgesia. These operations will also enable the patients to use their crutches so that they regain their independence relatively quickly, which leads to a short hospital stay. In addition, nursing care becomes easy. We feel that it is a cost-effective technique and would improve the quality of care of this selected group of patients.

Early mobilisation of the elderly is possible with this technique

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