

Intramedullary Fixation of Subtrochanteric Fractures with Long Gamma Nail

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Abstract

The objective of this study was to prospectively evaluate the clinical outcome of traumatic subtrochanteric fractures fixed with long gamma nail. We reviewed the results of 25 consecutive patients who had undergone intramedullary fixation specifically with long gamma nail for traumatic subtrochanteric fractures in our hospital during a 6-year period from January 2012 to December 2017. The average age of the patients was 49 years.

Results: All the 25 traumatic subtrochanteric fractures healed uneventfully except 1 case of infection. Walking and squatting ability was completely restored in every case at follow-up examination 6 months. The average operative time was 55 minutes (range, 40 to 120). static distal interlocking with 1 bolt was carried out in all cases. No complications such as cutout or breakage of the implants were encountered

Keywords: subtrochanteric fractures; long gamma nail

Introduction

Subtrochanteric fractures of the proximal femur have been defined as the fractures involving the area between the lesser trochanter and the isthmus of the femur [1]. Placement of long gamma nail is ideal for the treatment of femoral shaft fractures, with high union and low complication rates. However, treatment of subtrochanteric femur fractures with a long gamma nail has continued to be technically problematic. Reduction, fixation, and maintenance of alignment until healing are potential difficulties [2]. The purpose of this study was to evaluate the complications and successes in a consecutive series of patients with closed subtrochanteric femur fractures

Materials and Methods

A series of 25 consecutive patients with subtrochanteric fractures underwent intramedullary fixation specifically with a long gamma nail in our hospital during a 6-year period from January 2012 to December 2017. Among them, 24 patients were male and 1 was female. Their age averaged 49 years (range, 22 to 90). Twenty fractures were due to low-energy falls, while the remaining 5 were high-energy trauma from traffic accidents. *Implants* a long gamma nail for all fractures *Surgical Techniques*

The surgical operations were performed under general or spinal anaesthesia, with the patients set in the supine position on the fracture table. A lateral longitudinal incision of about 3 cm was made superior to the greater trochanter. The entry-hole on the top of the greater trochanter, usually at the junction of anterior third and posterior two thirds, was made with a trochar under fluoroscopic monitoring. A guide rod was inserted through this hole into the distal femoral canal, followed by reaming of the femoral isthmus and the proximal fragment. long gamma nail was accomplished manually by the

surgeon holding the aiming device. The cephalic lag screw was inserted into the femoral neck with the aid of the aiming device under fluoroscopic control. Distal locking of the nails was carried out under C-arm fluoroscopy by freehand technique;

Partial weight-bearing was initiated 6 weeks after operation, and full weight-bearing was begun 8 to 12 weeks postoperatively

Results:

The average operative time for all the 25 cases was 55 minutes. All fractures were successfully reduced with traction on a fracture table under fluoroscopy, all fractures were locked distally. Blood loss was minimal, and blood transfusion was necessary in two cases. early infection was noted in two cases but treated. Walking and squatting ability was completely restored in each case at follow-up examination 6 months postoperatively. All the 25 traumatic subtrochanteric fractures healed. No complications such as cutout or breakage of the implants, or peri-implant fractures were encountered. Removal of the distal locking bolt for dynamising the nails to improve bone union was not made as it was esteemed unnecessary in any case

Discussion

Operative management of subtrochanteric fractures intramedullary nails (IM) have become the gold standard [3,4]. The long medullary nail has a biomechanical advantage over a short nail as it provides better stability due to a longer lever arm and protects the remaining femoral shaft below the fracture site by preventing the appearance of peri-implant fractures [5]

Subtrochanteric fractures usually occur in elderly patients, due to bone frailty, age and comorbidities, or in young people following high-energy traumas, and in both cases, it is important to limit surgical time and limit blood loss during surgery [6]

Extramedullary fixation with plating has the potential disadvantages of extensive surgical exposure, severe soft tissue damage and blood loss, thus leading to problems of fracture union and implant failure. The recent development of reconstruction nail, which changes the direction of the proximal interlocking bolts, has greatly expanded the indication of intramedullary fixation for subtrochanteric fractures. [7,8]

long gamma nail has been increasingly accepted and recommended as the implant of choice for the fixation of subtrochanteric fractures. The advantages of long gamma nail for subtrochanteric fractures were well illustrated in our series of patients. In this study, all the 25 cases of traumatic subtrochanteric fractures healed. Walking and squatting ability was completely restored in each case at follow-up examination 6 months postoperatively. No complications such as cutout or breakage of the implants, or peri-implant fractures were encountered. Many authors believed that the long gamma nail must be distally interlocked in order to prevent rotational movement of the distal fragment, and some of them even recommended that 2 bolts be necessary for distal interlocking. [9,10] distal locking is mainly through freehand technique. It is this freehand distal locking that takes a lot of time in the operation and increases the X-ray exposure of the surgeons. We did distal interlocking with only 1 bolt for all fractures; We believe that delayed partial weight-bearing after surgical operation and the relative narrow canal of the femoral isthmus might decrease the complications such as rotational malalignment; We also realise that the key for the success of the operation depended on the correct determination of the entry point. Under fluoroscopic monitoring, the entry point must be on top of the greater trochanter in anteroposterior view and in line with the centre of the femoral canal in lateral view

The abundant muscles around the subtrochanteric region usually cause significant displacement of the fractured fragments, leading to great difficulties in close reduction under traction. Sometimes open reduction through a small incision at the fracture site is inevitable

The complication of cutout was often reported in the literature Boriani and colleagues reported only two nail breakages in 648 cases (0.3%). Alvarez et al. [11] reported no implant failure in 42 patients with unstable subtrochanteric fractures treated with a cephalomedullary nail. In this study there were no cases of nail breakage

The incidence of varus deformity was significantly less in patients treated with the long gamma nail compared with those treated with side plates. Park and Alvarez reported in their study that six of their 43 patients (13.9%) experienced varus malunion [11]

The incidence of postoperative infection with the cephalomedullary nailing is very low because of small wound and less surgical dissection. In our work, there was 2 cases of superficial infection settled with antibiotics Alvarez et al. [9,10] reported two out of 42 cases that developed infection The cephalomedullary nail has demonstrated superior strength

Conclusion

The long Gamma nail in the treatment of extensive proximal femoral fractures gave good functional results with acceptable rates of complications and union problems

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