



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Expert tibia nail for subtrochanteric femoral fracture to prevent thermal injury

Kyung-Jae Lee^{a,b,*}, Byung-Woo Min^a, Jae-Hoon Jung^a, Mi-Kyung Kang^a, Min-Ji Kim^a^a Department of Orthopaedic Surgery, School of Medicine, Keimyung University, Daegu, Republic of Korea^b Pain Research Center, School of Medicine, Keimyung University, Daegu, Republic of Korea

ARTICLE INFO

Article history:

Received 5 November 2014

Received in revised form 20 March 2015

Accepted 21 March 2015

Available online 28 March 2015

Keywords:

Subtrochanteric femoral fracture

Intramedullary nailing

Bone marrow

Expert tibia nail

ABSTRACT

INTRODUCTION: Subtrochanteric femoral fractures are relatively uncommon, accounting for 7–15% of all hip fractures and treatment of these fractures are considered challenge for orthopaedic surgeons. Although several treatment options are reported with up to 90% of satisfactory results, the choice of the appropriate implant is still a matter of debate. Some authors reported thermal injury after reaming for intramedullary nail fixation in patients with narrow medullary canal.

PRESENTATION OF CASE: A 21-year-old female patient was admitted to our hospital because of right subtrochanteric femoral fracture. The narrowest diameter of medullary canal of her femur was about 7 mm but she refused open reduction and internal fixation with plate due to large scar formation. We used expert tibia nail instead of femoral intramedullary nail to prevent thermal injury.

DISCUSSION: Subtrochanteric femoral fractures are difficult to treat because of their biomechanical and anatomical characteristics. Although several implants are reported for the surgical treatment of these fractures, intramedullary nails have been advocated due to their biological and biomechanical advantages. However, under certain circumstances with associated injury or anatomic difference we might consider another treatment options.

CONCLUSION: Expert tibia nail may be considered one of the treatment options for subtrochanteric femoral fracture with narrow medullary canal. We also emphasize the importance of preoperative evaluation of the medullary canal size for these risky fractures.

© 2015 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Subtrochanteric femoral fractures are relatively rare and their prevalence account for 7–15% of all hip fractures [1]. Anatomically, subtrochanteric area consists of hard cortical bones with poor vascularity and biomechanically, it is under high compressive and tensile stress [2]. These characteristics can cause high rate of nonunion, malunion, and fixation failure [3,4]. Several treatment options are reported with intramedullary or extramedullary implants and up to 90% of reported outcomes have been satisfactory [1,2,5–10]. Although plating techniques offer some advantages, intramedullary nail have been supported for the fixation of these fractures, because of their biological and biomechanical advantages [2].

There were concerns about thermal injury after reaming for intramedullary nail fixation [11–13]. Leunig and Hertel reported three cases of osteocutaneous necrosis induced by heat during

tibia intramedullary reaming [11]. All of three cases had a narrow medullary cavity. Giannoudis et al. [13], also reported that reaming smaller canals (8 mm) to a larger size may induce a significant heating effect. Now we report a patient with subtrochanteric femoral fracture with narrow medullary canal which was treated uneventfully by using expert tibia nail (ETN; Synthes®, Switzerland) instead of femoral intramedullary nail to prevent thermal injury.

2. Presentation of case

A 21-year-old female patient sustained right subtrochanteric femoral fracture after fall from a height injury (Fig. 1A). Her height was 160 cm, weight was 52 kg and body mass index was 20.3 kg/m². There was no further past or medical history except associated ipsilateral humeral fracture. We planned surgical treatment with cephalomedullary femoral nail but scanogram revealed that narrowest diameter of medullary canal was around 7 mm (Fig. 1B). If we tried to use cephalomedullary femoral nail, more than 3 mm of reaming was needed and the small size solid femoral nails that do not require reaming were not available at the time. We explained about the problem of using cephalomedullary femoral nail (thermal injury) and discussed about open reduction and inter-

* Corresponding author at: Department of Orthopaedic Surgery, School of Medicine, Keimyung University, Dongsan Hospital, 56 Dalsung-Ro, Joong-Gu, Daegu, Korea. Tel.: +82 53 250 8161.

E-mail address: oslee@dsmc.or.kr (K.-J. Lee).



Fig. 1. Anteroposterior view of right femur shows short transverse fracture with butterfly fragment around subtrochanteric area (A) scanogram of left femur shows relatively narrow medullary canal (B).

nal fixation with extramedullary implant or minimal invasive plate osteosynthesis with locking plate. However, she refused all the extramedullary implant because she worried about relatively large scar formation than intramedullary nail. Her job was a dancer.

We finally decided to use ETN for the fixation of her subtrochanteric femoral fracture with closed reduction. Patient was placed on the fracture table and closed reduction was tried under guidance of image intensifier. Greater trochanter could be used as an entry point because this nail had 10 degree angulation on its

proximal part. We also put a diameter 5.0 mm locking screw into the femoral head because five locking options in four planes are allowed in proximal part of this nail. Finally, diameter 8 mm and length 330 mm expert tibia nail was inserted (Fig. 2A and B). The patient was allowed to mobilize on the first postoperative day and to weight bear as tolerated with crutches until postoperative 12 weeks. The postoperative rehabilitation was uneventful and radiographic union was obtained after 8 months of operation (Fig. 2C). Removal of implant was done two years after surgery (Fig. 3).

3. Discussion

Treatment of subtrochanteric femoral fractures constitutes a considerable challenge for orthopaedic surgeon. Anatomically, this area consists of hard cortical bones with a slower healing rate than metaphyseal bones. Biomechanically, the proximal femoral shaft is under high stress (compressive force on medial side and tensile force on lateral side). Furthermore, extensive comminution and fragment devitalisation can compromise bone healing biologically [1]. These characteristics can cause high rate of nonunion, malunion, and fixation failure [3,4]. Although traditional open plating achieves anatomical reduction and rigid fixation, extensive surgical exposure increases delayed union, nonunion, and infection. Open reduction of subtrochanteric femoral fracture is associated with up to 23% of nonunion and with 29% of patients needing bone grafting [1,2]. Accordingly, in case of subtrochanteric femoral fractures, focus should be shift from the mechanical aspects toward the biological aspects [14]. Several authors reported superior results of mini-incision or biologic plating than open plating [1,2,7]. More recently, minimal invasive plate osteosynthesis with locking plate technique was introduced for the treatment of subtrochanteric femoral fractures. Oh et al. [2], reported twenty cases of subtrochanteric femoral fractures treated with minimal invasive plate osteosynthesis with locking plate (LCP-DF, Synthes®, Switzerland). They achieved 100% of bony union without bone graft at an average of 20.1 weeks. They also reported that their technique can be used in patients with narrow medullary canal (7 of 20 patients). We also considered minimal invasive plate osteosynthesis with locking plate for the alternative treatment of our patient, but she refused it because of relatively large scar formation than nail. Compared with extramedullary implant, the advantages of intramedullary

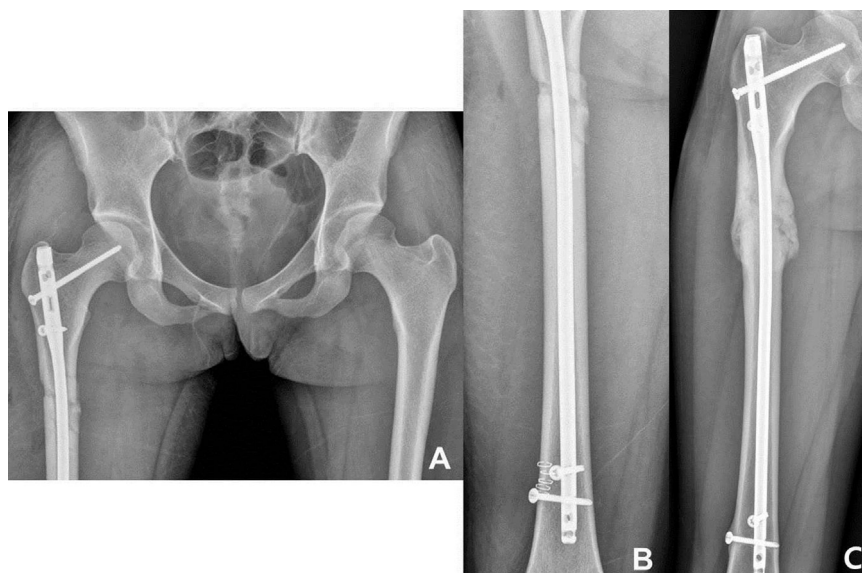


Fig. 2. Postoperative radiographs show well-positioned expert tibia nail greater trochanter was used as an entry point and one locking screw was inserted into the femoral head (A and B). After 8 months of operation, radiographic union was obtained (C).

Download English Version:

<https://daneshyari.com/en/article/4288978>

Download Persian Version:

<https://daneshyari.com/article/4288978>

[Daneshyari.com](https://daneshyari.com)