

HOSTED BY



ELSEVIER

Contents lists available at ScienceDirect

## Chinese Journal of Traumatology

journal homepage: <http://www.elsevier.com/locate/CJTEE>

## Original article

# A comparative study of the therapeutic effect between long and short intramedullary nails in the treatment of intertrochanteric femur fractures in the elderly

Xue-Feng Guo<sup>a</sup>, Ke-Ming Zhang<sup>b</sup>, Hong-Bo Fu<sup>c</sup>, Wen Cao<sup>a</sup>, Qiang Dong<sup>a,\*</sup>

<sup>a</sup> Department of Traumatic Orthopaedics, Tianjin Hospital, Tianjin 300211, China

<sup>b</sup> Department of CT and MRI, The General Hospital of Jilin Chemical Group Corporation, Jihua City 132021, Jilin Province, China

<sup>c</sup> Department of Orthopaedics, People's Hospital of Wucheng County, Dezhou City 253300, Shandong Province, China

## ARTICLE INFO

## Article history:

Received 15 May 2015

Received in revised form

30 July 2015

Accepted 25 August 2015

Available online 12 December 2015

## Keywords:

Intertrochanteric fracture

Intramedullary long nail

Intramedullary short nail

Periprosthetic

## ABSTRACT

**Purpose:** To compare the clinical effects of long vs. short intramedullary nails in the treatment of intertrochanteric fractures in old patients more than 65 years old.

**Methods:** A retrospective analysis of 178 cases of intertrochanteric fractures of the femur (AO type A1 and A2) in the elderly was conducted from January 2008 to December 2013. There were 85 males (47.8%) and 93 females (52.2%) with the age of 65–89 ( $70.2 \pm 10.8$ ) years. The patients were treated by closed reduction and long or short intramedullary nail (Gamma 3) fixation. The length of short nail was 180 mm and that for long nail was 320–360 mm. The general data of patients, operation time, intraoperative blood loss, length of hospital stay, preoperative hemoglobin level, blood transfusion rate, postoperative periprosthetic fractures, infections, complications, etc were carefully recorded.

**Results:** There were 76 cases (42.7%) in the long intramedullary nail group and 102 cases (57.3%) in the short nail group. All the cases were followed up for 12–48 ( $21.3 \pm 6.8$ ) months, during which there were 21 deaths (11.8%), mean ( $13.8 \pm 6.9$ ) months after operation. The intraoperative blood loss was ( $90.7 \pm 50.6$ ) ml in short nail group, greatly less than that in long nail group ( $127.8 \pm 85.9$ ) ml ( $p = 0.004$ ). The short nail group also had a significantly shorter operation time ( $43.5 \text{ min} \pm 12.3 \text{ min}$  vs.  $58.5 \text{ min} \pm 20.3 \text{ min}$ ,  $p = 0.002$ ) and lower rate of postoperative transfusion (42.3% vs. 56.7%,  $p = 0.041$ ). But the length of hospital stay showed no big differences. After operation, in each group there was 1 case of periprosthetic fracture with a total incidence of 1.1%, 1.3% in long nail group and 0.9% in short nail group. At the end of the follow-up, all patients achieved bony union. The average healing time of the long nail group was ( $6.5 \pm 3.1$ ) months, and the short nail group was ( $6.8 \pm 3.7$ ) months, revealing no significant differences ( $p = 0.09$ ). Postoperative complications showed no great differences either.

**Conclusion:** Both the intramedullary long and short nail fixation has a good clinical effect in treating intertrochanteric femur fractures in the elderly. They showed no significant difference in terms of therapeutic effect, hospital stay and postoperative complications. The incidence of periprosthetic fractures treated by either length of nails was low. But short intramedullary nailing can obviously decrease the intraoperative blood loss, operation time and postoperative blood transfusion.

© 2015 Production and hosting by Elsevier B.V. on behalf of Daping Hospital and the Research Institute of Surgery of the Third Military Medical University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

With the aging of population and prolonged average life expectancy, the incidence of osteoporosis in the elderly sharply increased and hip fracture in this age group has become a focus of health problems. It is estimated that in 2050, there will be 6.3 million hip fractures in the elderly and about half of them are intertrochanteric fractures, which has a high morbidity and

\* Corresponding author. Tel.: +86 22 60910211.

E-mail address: [nirvana612@sina.com](mailto:nirvana612@sina.com) (Q. Dong).

Peer review under responsibility of Daping Hospital and the Research Institute of Surgery of the Third Military Medical University.

mortality and seriously affects patient's quality of life.<sup>1</sup> Moreover due to the increased life expectancy, the total number of intertrochanteric fractures in the distal femur is expected to keep increasing and what is worse, all of them will come from old people. It is reported that the intertrochanteric fracture-related mortality reaches as high as 20%–30% at the first 6–12 months after injury.<sup>2</sup> The femur has a rich blood supply at the proximal trochanteric part, thus intertrochanteric fractures rarely combine nonunion or femoral head necrosis. Conservative treatment is more often used in the past, but due to the long period of bedridden, the rates of complications, morbidity and mortality are high.

Recently intramedullary nails have been widely used in the internal fixation of intertrochanteric fractures. And then comes along the controversy about the effect of nail length. Short intramedullary nail has a good biomechanical stability and acceptable clinical effects. However, there is evidence that the use of short intramedullary nail can increase the stress at the nail tip and makes patient vulnerable to peripheral fractures of the internal fixators. It is certain that intertrochanteric fractures among the elderly can cause pathological osteoporosis. From this aspect the use of long intramedullary nail can utmost protect the fractured bones.<sup>3–5</sup> In China there has not been comparisons of the therapeutic effect between long and short intramedullary nails yet. This study aims to investigate this issue by comparing blood loss, operation time, postoperative complications and patient outcomes.

## 2. Materials and methods

### 2.1. General data

This study retrospectively analyzed related data of 178 patients with femoral intertrochanteric fractures treated in our hospital from January 2008 to December 2013. The inclusion criteria were: (1) AO type 31-A1 or 31-A2 intertrochanteric fractures; (2) injury mechanisms of low-energy falling or sprain; (3) patients older than 65 years old; (4) internal fixation by Stryker Gamma 3 intramedullary nailing; and (5) postoperative follow-up longer than one year. The radiological films were assessed and recorded by the same physician. While the exclusion criteria were: (1) young patients; (2) high energy fractures or combination of fractures at other regions; (3) fractures fixed by other fixation systems like DHS; and (4) patients combined with other metabolic diseases or history of tumor.

### 2.2. Treatment strategy

After admission, routine examination was done. If the fracture location is unsatisfactory, skin or bone traction was performed. Multiply discipline cooperation was actively conducted to control other diseases and rule out surgical contraindications. Under epidural anesthesia or general anesthesia, patients received traction on the fracture bed in supine position. Closed reduction was done under C-arm fluoroscopy until anatomic reduction, followed by intramedullary internal fixation. Manual reaming, introduction of guide wire, intramedullary nailing with long (320–360 mm) or short (180 mm) nails according to the surgeon's experience and judgment, insertion of lag screws, and director-assisted distal locking were sequentially performed. No complication occurred during surgery and 5–7 days later, weight-bearing walking was allowed (Fig. 1).

### 2.3. Assessed parameters

The medical and surgical records of all the patients were checked and analyzed. General data including sex, age, mechanism of injury, surgery time from injury, fracture type, length of hospital

stay, preoperative hemoglobin level, postoperative infusion reactions, periprosthetic fractures and other complications were recorded. Intraoperative information including estimated blood loss, operation time, intraoperative complications, blood transfusions, etc was also analyzed.

### 2.4. Statistic analysis

Data were processed using SPSS 19.0 software package. Shapiro–Wilk test and chi-square test were adopted to compare related data between long and short intramedullary nails.  $p < 0.05$  was considered statistically significant.

## 3. Results

### 3.1. General data

Altogether 178 patients, 85 males (47.8%) and 93 females (52.2%) aged from 65 to 89 years, ( $70.2 \pm 10.8$ ) years on average, were included in this retrospective study. The fracture type was AO 31-A1 in 98 cases (55.1%) and 31-A2 in 80 cases (44.9%). Among them, 99 intertrochanteric fractures (55.7%) were on the left side and 79 (44.3%) on the right side. All patients were followed up for 12–48 months, mean ( $21.3 \pm 6.8$ ) months. During the follow-up period, there were 21 deaths (11.8%) and the average time of death after surgery was ( $13.8 \pm 6.9$ ) months. Short intramedullary nail group had 102 patients (57.3%) for whom 180-mm long nails were used; long nail group had 76 patients (42.7%), for whom three different length of nails were used, i.e. 320-mm nail in 52 patients, 340-mm nail in 14 patients and 360-mm nail in 10 patients.

Gender showed no significant difference between two groups ( $p = 0.322$ ), but the mean age in short nail group was much higher ( $p = 0.003$ ), suggesting that in the selection of nail length, surgeons may consider that short intramedullary nail is easier to process and can reduce the operation time as well as incidence of intraoperative complications. As for fracture type, A2 fractures were much more often treated by short intramedullary nails in our study ( $p = 0.037$ ). A reasonable explanation may be that the more unstable the fracture was, the longer the intramedullary nail was needed. Preoperative hemoglobin levels in two groups were similar, revealing no significant difference ( $p = 0.413$ , Table 1).

### 3.2. Intraoperative and postoperative condition

During operation, the blood loss in short nail group ( $90.7 \text{ ml} \pm 50.6 \text{ ml}$ ) was quite lower than that in long nail group ( $127.8 \text{ ml} \pm 85.9 \text{ ml}$ ,  $p = 0.004$ ); besides the operation time ( $p = 0.002$ ) and postoperative transfusion rate ( $p = 0.041$ ) was also significantly lower in short nail group (Table 2). The total length of hospital stay revealed no significant difference between two groups ( $12.7 \text{ d} \pm 6.2 \text{ d}$  for long nail vs.  $12.9 \text{ d} \pm 6.5 \text{ d}$  for short nail,  $p = 0.42$ ). If we ignore the effect of nail length, there were no significant difference between type A1 and A2 intertrochanteric fractures in terms of blood loss, operation time, transfusion rate and hospital stay.

### 3.3. Complications

Neither group had intraoperative complications. After operation both groups had a case of periprosthetic fracture without osteonecrosis. There were two cases of postoperative infection, one nonunion, one malunion, and one screw cut-out (Table 3).

Download English Version:

<https://daneshyari.com/en/article/3107127>

Download Persian Version:

<https://daneshyari.com/article/3107127>

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