

MINIMALLY INVASIVE TREATMENT OF TROCHANTERIC FRACTURES WITH INTRAMEDULLARY NAILS. TECHNIQUE AND RESULTS

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Abstract

The aim of the study was to evaluate the results of minimally invasive treatment of trochanteric fractures with the use of intramedullary nails.

***Patients and methods.** From September 2010 to September 2012 we treated 21 patients with pertrochanteric fractures by a minimally invasive technique using the Gamma 3 (Stryker, Howmedica) nail. There were 13 females and 8 men with a mean age of 74.1 years, ranging from 58 to 88 years. Fractures were classified as being stable (AO type 31-A1) in 5 cases and unstable (AO type 31-A2 and A3) in the rest of 16 cases. Patients were reviewed at 6 weeks and 3 months postoperatively.*

***Results.** Mean surgery time was 46.8 minutes and mean hospital stay was 14.9 days. No patients required blood transfusions. During the hospital stay all the patients were mobilized with weight bearing as tolerated. All patients were available for review at 6 weeks, and 2 were lost to the 3 months follow up. 16 patients regained the previous level of activity.*

***Conclusions.** This minimally invasive technique using a gamma nail device for pertrochanteric fractures gives reliable good results with excellent preservation of hip function.*

Keywords: trochanteric fractures, minimally invasive, gamma nail.

Introduction

Trochanteric fractures are very common injuries in the elderly population due to osteoporosis and their propensity to falls [1]. The incidence of these fractures is increasing, in part due to constant aging of the population and increasing life span.

Intramedullary nail fixation for pertrochanteric fractures is a well recognized method of treatment leading to good results due to the fact that it produces stable fixation especially for unstable fractures [2,3]. The use of these intramedullary devices over the years has been constantly increasing, for example in the USA between 2000 and 2007, the use of intramedullary fixation in pertrochanteric fractures doubled [4,5]. Besides being mechanically superior, intramedullary fixation offers theoretical advantages over plates, such as minimally invasive application with reduced damage to the soft tissues and reduced likelihood of infection and possibly less operative time [5]. Minimally invasive surgery has gained

popularity in modern orthopaedic and traumatology, as it is associated with decreased postoperative pain, reduced bleeding, faster recovery of function and lower risk of postoperative morbidity [6]. This is especially important for the old, fragile patient with trochanteric fracture.

The Gamma Nail was developed for the treatment of trochanteric hip fractures in the mid 1980's and was first brought into clinical use in 1988 [7]. Gamma 3 (Stryker-Howmedica) nail is the latest evolution of Gamma device and offers its use in stable and unstable fractures with a mini-incision [8].

The aim of this study is to present the surgical technique of minimally invasive fixation of trochanteric fractures with the use of Gamma 3 nail and report our results after two years of clinical use.

Patients and methods

Between September 2010 to September 2012, 21 patients with pertrochanteric fractures were treated by a minimally invasive procedure with the use of Gamma 3 (Stryker-Howmedica) nail. There were 13 females and 8 men with a mean age of 74.1 years, ranging from 58 to 88 years. Fractures were classified as being stable (AO

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type 31-A1) in 5 cases and unstable (AO type 31-A2 and A3) in the rest of 16 cases. Patients were reviewed at 6 weeks and 3 months postoperatively. After anesthesia clearance, patients were operated using the same technique. All surgeries were performed under spinal anesthesia, on the traction table. After closed reduction, skin preparation and draping, landmarks are marked with a pen to outline the greater trochanter (fig. 1). A 2 cm skin incision is made proximal to the tip of the greater trochanter and the cortex is penetrated at the level of the greater trochanter (fig. 2). After proper preparation of the medullary canal to accommodate the nail, this is introduced and fixed proximally through the neck and head, and distally with a screw (fig. 3). This minimally invasive procedure involves three "stab" incisions up to a maximum of 2 cm each (fig. 4).

Postoperatively the patients were allowed to walk with weight-bearing as tolerated with the supervision of a physical therapist. All patients received the same protocol with regard to anticoagulation and antibiotic prophylaxis.



Fig. 1. Landmarks outlining the greater trochanter.



Fig. 2. Cortex penetrated at the level of the greater trochanter.



Fig. 3. AP x-ray showing the Gamma 3 nail inserted.



Fig. 4. Intraoperative photo showing the skin incisions.

Results

Mean surgery time was 46.8 minutes, ranging from 34 to 68 minutes and the mean hospital stay was 14.9 days ranging from 6 to 41 days. The intraoperative blood loss was difficult to assess but no patients required blood transfusions. No infections or hardware failure were recorded in this study group. Three patients (14.2%) developed a symptomatic deep vein thrombosis and were treated accordingly.



Fig. 5. AP x-ray 6 weeks postoperatively.



Fig. 6. Lateral x-ray 6 weeks postoperatively.



Fig. 7. Hip mobility at 6 weeks postoperatively.

All patients were available for the 6 week follow up visit. An AP and axial view was obtained and patients were evaluated for mobility (fig. 5, 6 and 7). Two patients were lost to the 3 months follow up visit. At this time all the fractures were either united or with evident callus formation without loss of reduction. 16 patients (84.2% from the total of 19 patients available) affirmatively regained their pre injury level of activity.

Discussion

High incidence of hip fractures among the elderly is a worldwide major health problem with severe medical consequences affecting quality and mortality of life among the aging population [6,9]. The goal of the surgery is to return prefracture condition as quickly as possible with low incidence of complications. Elderly patients may not support an important surgical trauma associated with a major operation. Minimally invasive techniques are thought to improve surgical outcomes by reducing soft-tissue damage, blood loss, postoperative pain, and morbidity. Therefore, the development of minimally invasive technique of fracture fixation would likely help patients avoid the hazards of long anesthesia times, tissue trauma, and return to prefracture function [6]. Several authors have described that modern intramedullary systems (e.g., Gamma 3 device) can accommodate minimally invasive techniques, thus producing lower surgical time, decreased bleeding, and lower transfusion rates [8,11,12]. In our group there was no transfusion recorded, and a high percentage of patients regained preactivity levels by three months postoperatively.

Conclusions

The Gamma 3 device is suitable for minimally invasive fixation of both stable and unstable pertrochanteric fractures producing excellent clinical results with early mobilization and fast recovery of function. Appropriate surgical technique allows insertion of this intramedullary nail percutaneous through „stab” incisions up to 2 cm long minimizing injury to soft tissues and minimal blood loss.

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