

RESEARCH ARTICLE

Comparison of Outcome of Femoral Shaft Fracture Fixation with Intramedullary Nail in Elderly Patient and Patients Younger than 60 Years Old

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Abstract

Background: Although intramedullary nailing (IMN) is an established and accepted operative treatment for femoral shaft fracture in patients younger than 60, there is a lack of data on the results of this treatment on those over 60. The purpose of this study was to determine if the outcome of IMN for femoral shaft fracture in elderly patients is also acceptable. Particular challenges in this group of patients included osteopenia and other associated multiple medical problems frequently observed.

Methods: The outcome of 84 patients who had IMN for femoral shaft fracture was reviewed and the results were compared between two groups of patients (younger than 60 and over 60 year old patients). Complications and mortality was analyzed for each group, and then compared between the two groups by testing the null hypothesis that the outcome of treatment in the two groups are similar ($P > 0.05$).

Results: The mean duration of follow up was 57.3 months (range: 10-94 months). Incidence of malunion, nonunion, infection, DVT, and dependence on walker/crutch in the groups were similar and differences were not significant ($P > 0.05$). However, incidence of mortality ($P < 0.05$), knee pain, loss of motion, and dependence on cane were significantly higher in elderly patients ($P < 0.05$).

Conclusions: There is no significant difference between the outcomes of femoral shaft fracture treatment with IMN fixation in younger patients when compared with elderly patients. However, elderly patients with IMN have more symptoms when compared with younger patients.

Key words: Elderly, Femoral shaft fracture, Intermedullary nail

Introduction

As our population ages, the incidence of femoral shaft fractures is likely to increase. However, there are only a few reports about this injury in elderly patients (1-3). Particular challenges in elderly patients include fixation in moderate osteopenia and management of associated multiple medical problems frequently observed. In elderly patients, cortical thinning and decreased bone mineral density occur and are more commonly observed in females (2). As a result, fixation becomes particularly difficult. In addition, preexisting arthritic conditions frequently limit the excursion of the knee and hip joints, prohibiting specific fixation options. Of particular importance is the identification

and treatment of preexisting medical diseases that occur frequently in this patient population (2,3). In a cohort of 102 elderly patients (average age: 81 years) who sustained a femur fracture, 244 commonly observed comorbid conditions that included cardiovascular (80%), musculoskeletal (75%), gastrointestinal (67%), psychiatric (61%), and urologic diseases (55%). (2, 3) The postoperative mortality was 11%, and mean hospitalization was 30 days (1). Although intramedullary nailing (IMN) is an established and accepted operative treatment for femoral shaft fracture in patients younger than 60, there is a lack of data on the results of this treatment on those over 60 (1-3). Hence, the purpose of this study was to determine if the outcome of IMN

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Table 1. Comparison of patients' recovery between the two groups

Group	Elderly (>60 year) N=27	Younger (<60 year) N=51	P Value
Limping	5 (18.1%)	2 (3.9%)	0.02
Cane	10 (37%)	0	0.01
Crutch	2 (7.4%)	0	0.2
Bed ridden	1 (3.7%)	0	0.3
Walker	1 (3.7%)	0	0.1
Infection	1 (3.7%)	2 (3.9%)	0.1

for femoral shaft fracture in elderly patients is also acceptable. We are aware of a few studies on the outcome of femoral shaft fracture treatment in elderly patients. In New Mexico, a review was performed on patients over the age of 60, who were treated with a locked IMN to treat a femoral shaft fracture (3). There were 15 patients with 16 femoral shaft fractures. Four patients died preoperatively and of the surviving 11 patients with 12 fractures, union occurred in 100% of the cases. Knee range of motion was greater than 100 degrees in 11 of the 12 knees and nine of the 11 patients returned to their preoperative level of ambulation. They concluded that IMN of femoral shaft fractures in patients over the age of 60 years is an effective method of treatment (3).

Materials and Methods

In a retrospective study we reviewed the registry system of Shohada Hospital of Tabriz University and searched for patients who were treated with IMN for femoral shaft fracture between (2005-2010). There were more than 250 cases, but 84 patients fulfilled our inclusion criteria and so they were entered into the study. Inclusion criteria of the study were: 1- No history of another fracture on the same limb. 2- No history of other operations on the same limb. 3- No neuromuscular disease on the same limb. 4- No pathologic fracture. Patients who did not have regular follow up visits or had systemic disorders were excluded. The study was approved by the Research Committee of the Tabriz University of Medical Sciences.

Patients

We reviewed the outcome treatment of 84 patients, 63 males (75%) and 21 females (25%). Patients were divided into two groups according to age and there were 57 patients younger than 60 years (67.9%) and 27 elderly patients over 60 (32.1%). The two groups were matched according to sex, cause of trauma, and fracture type. Mean age was 46.9 years (range: 20-81) and mean duration of follow up was 57.3 months (range: 10-94 months), six patients were lost during follow up. Patients were initially followed up at the first two weeks after surgery and then every month for six months. The last follow up was at 5 years. Parenteral anticoagulation

Table 2. Comparison of symptoms between the two groups

Group	Elderly (>60 year) N=27	Younger (<60 year) N=51	P Value
Knee pain	27 (100%)	7 (13.7%)	0.001
Hip pain	4 (14.8%)	0	0.04
Malunion	0	1 (1.9%)	0.8
Nonunion	1 (3.7%)	0	0.9
DVT	1 (3.7%)	1 (1.9%)	0.7
Reoperation	1 (3.7%)	3 (5.9%)	0.1
Limitation of knee motion	9 (33.3%)	1 (1.9%)	0.03
Death	4 (14.8%)	0	0.02

(Clexane 60 mg daily subcutaneous) was used for all patients as the anticoagulant of choice for a week and then aspirin was continued. Particular attention was given to survival and healing rate, the amount of knee motion, and the level of ambulation attained.

During the operation all of the patients were placed in the lateral position, general anesthesia was performed, and reamed antegrade intramedullary nails were placed in all of the patients. The surgery was performed the first week of the injury.

Statistical analysis

Data obtained from the study were analyzed using descriptive statistical methods (frequency-percent, mean \pm standard deviation). The chi square test was used to study qualitative variables and the independent t test was used to compare parametric quantitative variables. SPSS software (Statistical Package for the Social Sciences, version 17.0, SPSS Inc., Chicago, Ill, USA) was used for data analyses and a *P* value less than 0.05 was considered significant.

Results

According to our data, there was significant difference in limping and cane use between the two groups; however, other findings such as walker and crutch use, and infection rate and bed ridden time was not different between the two groups. (Table 1) Incidence of malunion, nonunion, infection, DVT, and dependence on a walker/crutch in the two groups were similar and differences were not significant ($P>0.05$). Incidence of mortality ($P<0.05$), knee pain, hip pain, loss of motion, and dependence on a cane were significantly higher in elderly patients ($P<0.05$). Results of symptoms comparison between the two age groups are showed in Table 2.

Discussion

Femoral shaft fractures are usually the result of high velocity trauma and are more common in the younger

population (1). Although the clinical results using current techniques and implants for IMN are uniformly positive, there continues to be numerous unanswered questions in the management of patients with femoral shaft fractures (1-4). Very few studies have been done on femoral shaft fractures in the elderly and one treatment concern of femoral shaft fractures in this age group is concurrent osteoporosis. Complications in elderly patients were more than others patients after femoral shaft fractures (5). More recently, Moran et al. reviewed the results of 24 patients who were over the age of 60 treated with IMN (6). They found this method of treatment to be effective in managing femoral shaft fractures, yet there was a 54% perioperative complication rate (6). Because of the general expectation of success in every patient treated with IMN, the management of complications must be met with knowledge and planning. (1) Local and systemic problems may compromise the results of fracture treatment in the elderly leading to increased morbidity and mortality (4). This has been well documented in the treatment of femoral neck fractures (7, 8). In addition, advanced age has a negative influence on the survival of trauma victims with similar injury severity scores (9-12). In our series, there was a 14.8% mortality rate. De Coster et al. reported a 26.6% mortality rate in their series of 15 elderly patients with femoral shaft fractures (3, 7). The rate of nonunion and malunion were similar in our series of elderly patients as in younger patients. The rate of the loss of knee motion

in our series of elderly patients was significantly more than the younger patients. However, the rate of infection and DVT were similar in our series of elderly patients and in younger patients and this is related to the routine use of prophylactic Clexane and antibiotics in our center. The rate of dependent walking was similar in our series of elderly patients as in younger patients. Retrospective series have reported low complication rates with immediate weight bearing following intramedullary nailing of femoral shaft fractures and following surgical management of femoral neck and intertrochanteric femur fractures in elderly patients(13).

Based on our review, IMN is a valid and acceptable method for fixation of femoral shaft fracture in the elderly and it offers many of the advantages seen in the younger population. In addition, there is no significant difference between outcome of femoral shaft fracture treatment with IMN fixation in patients younger than 60 and elderly patients over 60, although more symptoms were observed in the elderly than the younger group.

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