

Comparison of surgical complications of intertrochanteric hip fractures between non-osteoporotic and osteoporotic patients

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Abstract

Objective: To determine the role of bone quality in post-treatment complications among patients of intertrochanteric fracture.

Methods: The cross-sectional descriptive study was done on 61 patients who presented with intertrochanteric hip fractures to two affiliated hospitals of Mazandaran University of Medical Science, Sari, Iran between February 2009 and December 2010. All the patients went through open reduction and internal fixation using 4-hole dynamic hip screw. The patients were followed up from 2 to 60 months. Data was analysed using SPSS 18.

Results: The final rate of malunion, nail protrusion and mortality was 8.3% (n=3), 5.6% (n=2) and 8.4% (n=3) respectively. There was no significant difference between osteoporotic (n=36; 59%) and non-osteoporotic (n=25; 41%) groups regarding the surgical complications of intertrochanteric hip fracture.

Conclusion: The quality of bone made no significant difference among patients who were treated for intertrochanteric fracture.

Keywords: Osteoporosis, Wound infection, Intertrochanteric fracture. (JPMA 63: 752; 2013)

Introduction

Fracture is one of the unresolved dilemmas of the aging population with high rate of mortality and morbidity.^{1,2} The incidence of hip fractures was 1.3 million in 1990 and it is estimated to reach 6.2 million by 2050.³

Lifetime prevalence of hip fracture is 18% for women and 6% for men.^{1,3} Bone density has been described as a risk factor for this alongside falling and the quality of neuromuscular system.⁴

Hip fracture causes high economic burden on the community resources. Furthermore, it can cause social problems for patients. Mortality rate of this fracture is reportedly 6-44% which is equal to that of breast cancer.³

Osteoporosis, as the main risk factor for hip fracture, is a very common disorder among the elderly and in women after menopause. In this disease, simultaneous reduction of protein and mineral causes decrease in bone density. A low rate of post-operative complications should be expected when using Dynamic Hip Screw (DHS) for the fixation of intertrochanteric fracture regarding bone quality. Till fracture occurs, osteoporosis is a silent disease;

even two-thirds of vertebral fractures carry no clinical symptoms. Hip fractures, however, are often symptomatic and are usually result of falling.^{5,6}

Generally, hip fractures caused by osteoporosis are observed in females, whites, alcoholics and patients having low uptake of vitamin D, high weight, hyperthyroidism, tachycardia and a history of fractures in the patient's mother.⁵ Like other chronic diseases, patients don't pay attention to the prevention and treatment of osteoporosis until a fracture hits them, but in some developed countries, specific programmes reduced the rate of osteoporosis following fracture.^{5,7}

Hip fractures may be observed in young people usually from major trauma such as car accidents or falling but with the incidence of osteoporosis in elderly patients, these fracture may occur with minor trauma.⁸⁻¹⁰ This study was done to compare the side effects of intertrochanteric fracture surgery in osteoporotic and non-osteoporotic patients.

Patients and Methods

The cross-sectional descriptive study was conducted on 61 patients [37 (60.6%) men and 24 (39.4%) women] with intertrochanteric fracture operated with standard 4-hole DHS in two affiliated hospitals of Mazandaran University of Medical Science, Sari, Iran, from February 2009 to December 2010.

All patients with preoperative inability to walk, pathologic

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fracture were excluded from the study. In all patients, treatment and fixation of fracture was done with DHS. In younger patients with a better bone quality, the mechanism of fracture trended to be a higher energy trauma like car accident, while 36 (59%) osteoporotic patients were also treated and the results of the two groups were compared. We didn't have densitometry technique dual-energy X-ray absorpsitometry (DEXA) in our hospitals and it was not possible to transfer patients to some other centre for the determination of bone densitometry. As a result, we used Singh grades osteopenia as an index of osteoporosis.¹¹ We used Evans' classification of trochanteric fracture for categorising intertrochanteric fractures based on stability.¹²

Necessary data such as name, address, telephone number, age, gender, mechanism of trauma was recorded in pre-designed forms and those who agreed to participate were included in the study. All patients received anti-coagulant therapy. Then the rate of infection, non union, malunion, bedsores, thromboembolism, plaque breakdown, nail protrusion and mortality rate was compared and repeated radiography was done for the purpose. We followed up the patients for at least 2 months and 60 months at the most. The average duration of this followup was 13.8 ± 9.27 months. Data was analysed with SPSS 18. For comparing quantitative variable, we used T test and for qualitative variables we uses Chi-square test. If the frequency rate in each group was less than 5, we used Fisher extract test to analyse the data and $p < 0.05$ was considered significant. The study was approved by the ethical committee of Mazandara University of Medical Science.

Results

The non-osteoporotic group included 19 (76%) men and 6 (24%) women with age range of 23-65 years and mean age of 43 ± 3.6 years. In the osteoporotic group, there were 18 (50%) men and 18 (50%) women with age range of 66-88 years, and mean age of 78.3 ± 2.1 years. All the 61

Table-1: Variable.

Variable	Group 1 (non-osteoporotic patients)	Group 2 (osteoporotic patients)	Statistical view
Infection	2 (8%)	0	$\chi^2=1$ $p < 0.084$ $df=1$
Non union	0	0	$\chi^2=1$ $p < 3.18$ $df=1$
Thromboembolism	0	0	$\chi^2=1$ $p < 0.186$ $df=1$
Plaque breakdown	0	0	$\chi^2=1$ $p < 0.78$ $df=1$
Mal union	0	3 (8.3%)	$\chi^2=1$ $p < 0.186$ $df=1$
Bedsores	1 (4%)	1 (2.7%)	$\chi^2=0.001$ $p < 0.61$ $df=1$
Nail protrusion	5 (20%)	2 (5.6%)	$\chi^2=1.20$ $p < 0.46$ $df=1$
Mortality rate	1 (4%)	3 (8.3%)	$\chi^2=0.50$ $p < 0.086$ $df=1$



Figure-1: Loss of fixation and use of wire.

patients underwent surgery with nail DHS which was done by 5 orthopaedic experts in 2 orthopaedic centres.

Among the non-osteoporotic patients, 10 (40%) had fractures on the right side and the remaining on the left side. In the other group, 17 (47.3%) had the fracture on the right side ($p < 0.324$).

In the non-osteoporotic patients, the most common mechanism of hip fracture was domestic fall ($n=8$; 32%), followed by accident ($n=16$; 64%) and seizure ($n=1$; 4%).

In the osteoporotic group, domestic fall was the leading



Figure-2: latrogenic nail protrusion.

cause (n=30; 83.3%), followed by road accident (n=6; 16.7%) ($p < 0.0001$).

According to the EVANS classification, there were 21 (84%) stable intertrochanteric fractures and 4 (16%) unstable fractures in the non-osteoporotic patients, and 33 (92%) stable and 3 (8%) unstable fractures in osteoporotic patients. Quality of reduction, as judged by post-operative X-ray, was good and the reduction was done under the control of C-arm before fixation. Quality of

fixation was good in all cases, except 1 (2.77%) osteoporotic patient. He was managed with the use of wire (Figure-1).

Four (16%) cases of cutout in the late X-ray and 1 (4%) case of nail protrusion in the immediate X-ray were noted in the non-osteoporotic group (Figure-2). In osteoporotic patients, 2 (5.55%) cases of cutout were seen after operation. Other complications were not seen in our patients such as medial migration of distal fragment, implant breakage, medial penetration and failure of the sliding screw to back out.

Using Chi-square statistical test, no significant difference was observed in the incidence of post-operative complications such as infection, non-union, malunion, thromboembolism, bedsores, plaque breakdown and nail protrusion between young and osteoporotic patients (Table-1). According to Singh grades of osteopenia, there were 3 (8.33%) osteoporotic patients in grade 1; 5 (13.88%) in grade 2; 12 (33.33%) in grade 3; and 16 (44.44%) in grade 4. In the non-osteoporotic group, there were 6 (24%) in grade 5; and 19 (76%) in grade 6.

Discussion

DHS is still the most commonly used instrument for fixation of intertrochanteric fracture. The most common complication of DHS is cut out and varus deformity of the fracture despite early successful fixation.^{10,13} In the recent years many attempts were done in the hope of obtaining better fixation and eliminating the catastrophic cut out including a proximal femoral nailing system and anatomic locking cortical plate. However the final results of Gama nail and other proximal femoral nailing system has not shown any superior results compared to the DHS despite higher cost and technical difficulties and it is too soon to judge about the final outcome of the anatomic LCP plate fixation of the intertrochanteric fracture however the higher cost which is so much higher than DHS hinders their usages specially in the developing countries. The theoretical advantages of this plate is their ability to provide secure purchase in severely osteoporotic bone.¹³⁻¹⁵ Our question was whether there were significant differences in the result of the fixation of the intertrochanteric fracture with DHS in the osteoporotic and non osteoporotic patients. Surprisingly we didn't find any statistically meaningful difference in the final results and complication rates among our patients whether they had relatively good quality of bone or suffered from severe osteoporosis of bone according to the Singh classification. We are aware of the shortcomings and pitfalls of this study specially when it comes to finding osteoporosis with a radiologic method but considering

our inability to perform bone densitometry in the immediate post operative period and considerable sensitivity of x-ray in distinguishing the severe type of osteoporosis. We think this study is valuable to give a preliminary insight in this field. It is generally a silent problem basically by screening with Dual-energy x-ray absorptiometry (DEXA). In 1970 Singh et al described a radiologic classification,¹¹ although it is not a very sensitive and specific classification system and it is not useful for screening osteoporosis, but it can be regarded as a way for distinguishing severe osteoporosis patients who suffer from a hip fracture.^{11,16-19}

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