Injury, Int. J. Care Injured (2006) **37**, 974—978

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INJURY
INTERNATIONAL JOURNAL OF THE CARE OF THE INJURED

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Outcome of non-operative management in Garden I femoral neck fractures

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Accepted 12 April 2006

KEYWORDS
Femoral neck fracture;
Displacement;
Operation;
Conservative treatment

Summary

Background: We studied the operation rate for secondary displacement in Garden type 1 femoral neck fracture when treated primarily conservatively.
Methods: We reviewed the records of 115 patients with Garden type 1 femoral neck fractures primarily treated conservatively.
Results: Operation for secondary displacement was required in 48 cases (41%); the displacement rate was highest at age 60—80 years. There was significant difference between age and secondary displacement, but none between gender, ASA classification or Pauwels angle and secondary displacement.
Conclusion: Garden type 1 femoral neck fractures deserve special attention because of the high rate of secondary displacement when they are conservatively treated, and surgery should therefore considered.

Introduction

Femoral neck fracture is commonly encountered in clinical practice. The incidence of this fracture will increase significantly in the next decade with increasing life expectancy. Garden classified intracapsular fractures of the hip joint as four radiographic types, depending on the proximal femoral trabeculae. Garden type I femoral neck fracture has also been named impacted or valgus fracture, in which there is impaction of the fracture laterally and the medial cortex remains intact. The femoral head trabeculae are tilted into a valgus position. Inappropriate treatment results in substantial loss of quality of life.

There has been controversy about the treatment of Garden type 1 femoral neck fracture. Some authors recommend primary operative stabilisation[2,13,14]; some have reported satisfactory results after conservative treatment[10,11]; others have stated that internal fixation should be considered for

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0020-1383/$ — see front matter
doi:10.1016/j.injury.2006.04.136

some patients.[6] The main complication of conservative treatment is secondary displacement, and that of surgical treatment of undisplaced fractures is re-operation for non-union, malunion or avascular necrosis.[6,16] We carried out a retrospective study of 115 patients with Garden type 1 femoral neck fracture treated primarily conservatively. Our aim was to establish the operative rate for secondary displacement, to explore the correlation of secondary displacement with age, ASA classification and Pauwels angle and to determine best treatment.

Patients and methods

From March 1998 to October 2003, 129 patients with impacted femoral neck fracture classed as Garden type 1 were treated primarily conservatively in two hospitals (Second Hospital of Xi'an Jiaotong University and Xi'an Red Cross Hospital). Data were obtained by reviewing the standardised and structured hip fracture case notes which were used for all persons admitted to our institution. The information included age, gender, fracture side, number of comorbidities at admission, ASA classification, application protocol and secondary displacement.

The group consisted of 88 women and 27 men, who were primarily treated conservatively. In 52 individuals the left hip was involved and in 63 the right. The mean age at the time of injury was 71 years (range 18–90 years). In 65 cases the cause of the fracture was a fall indoors, and in 39 a fall outdoors or a traffic accident. In 11 cases the cause could not be established from the case notes. A total of 65 patients agreed to conservative treatment from the day of admission, and 50 were undecided at first but signed the protocol 3–7 days after fracture.

When an operation was carried out, the time from fracture and the operative type were documented. A consultant radiologist reviewed all radiographs with us. The radiographs were scored for Pauwels angle and Garden type and were separated into two groups: impacted femoral neck fractures with primary union, and fractures with operation for secondary displacement.

All patients had primary conservative treatment, skin traction in the neutral position and daily radiography. When on plain radiograph the fracture line became unclear and bony callus formation was displayed, traction was removed. Management included the prevention of bedsores, lung infection, thromboembolism and muscular atrophy. The primary union criterion was weight-bearing walking without a brace.

Statistical analysis was performed using two-sided tests: Mann–Whitney for age and Pauwels angle, χ^2 for ASA classification. Differences were considered significant when the p-value was less than 0.05.

Results

In all, 115 cases were classified as Garden type 1 with non-pathological fractures, 10 were rated as Garden type 2 and 4 patients died of comorbidities. No non-union was excluded from this study. In 67 patients (59%) fractures healed with conservative treatment and without malunion; 48 patients (41%) required operation for secondary displacement, including 30 treated with a hemiarthoplasty, 10 with total hip replacement and 8 with internal fixation. There were no wound infections or other immediate postoperative complications.

The mean interval to secondary displacement was 23 days (range 2–68 days). There was a significant difference ($p < 0.05$) between primary union and secondary displacement for age by Mann–Whitney testing. No significant differences ($p > 0.05$) were found between the operated and the non-operated groups for ASA classification and Pauwels angle (Table 1). We found the secondary displacement rate was highest in the subgroup aged from 60 to 80 years; in the other subgroups displacement rates were much lower and roughly identical (Table 2).

Table 1 Characteristics of 115 Garden type 1 femoral neck fractures initially treated conservatively

Characteristic	Primary union	Secondary displacement	p-Value
Gender, n (M/F)	16/51	11/37	
Mean age in years (range)	62 (18–85)	73 (22–90)	0.03
ASA classification			
1	13	9	
2	29	23	0.68
3	19	14	
4	6	2	
Mean Pauwels angle (range)	29 (17–47)	31 (18–52)	0.11

Age and Pauwels angle (°) by Mann–Whitney test; ASA by χ^2-test.