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ORIGINAL ARTICLE

Garden I femoral neck fractures in patients 65 years old and older: Is conservative functional treatment a viable option?

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KEYWORDS
Functional treatment/non-surgical treatment;
Femoral neck fracture/hip fracture;
Non-displaced fracture;
Elderly subject

Summary
Introduction: Internal fixation is the preferred treatment of Garden I femoral neck fractures in the elderly. High re-operation rates have however been reported, and the results of arthroplasty performed following internal fixation failure are not as good as those of primary arthroplasty. This is why we are advocating functional treatment. Our hypothesis is that this treatment leads to fewer decubitus complications than strict orthopaedic treatment and no more mechanical complications than internal fixation in a selected population sample. Therefore, the objective of our prospective work was: (1) to assess the results of functional treatment of Garden I femoral neck fractures in elderly subjects, and (2) to investigate predictive factors of secondary displacement.
Patients and methods: All patients over age 65 years, admitted for a Garden I femoral neck fracture between January 2006 and May 2008, were included in this prospective study representing 56 cases (57 fractures) with an average age of 82 years. Functional treatment was performed, including early weight-bearing mobilisation, followed by radiographic evaluation at days 2, 7, 21 and 45, then at 3, 6 and 12 months. In the absence of displacement, discharge was planned at day 5 (Non-Displaced [ND] group). Otherwise, arthroplasty was performed (Displaced [D] group). Parker score and Harris Hip Score (HHS) were used for functional evaluation.

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Results: The observed displacement rate was 33.3% (19 patients) within an average period of 10 days. In the ND group, one case of osteonecrosis was observed and treated by arthroplasty. The average Parker score was 6.9 and the HHS 82 in the ND group, and 7 and 85, respectively, in the D group. None of the factors studied (age, gender, side, fracture type, inclination angle, degree of outward displacement, sagittal displacement, general status) was statistically predictive of final displacement.
Discussion: The medical complication rate was only 7% in our series, which seems to be lower than that resulting from orthopaedic treatment. The observed secondary displacement rate seemed to be higher than the rate found in the literature on surgical treatment (5.4 to 20%), but the osteonecrosis rate appeared to be lower (11 to 25%). In addition, surgical treatment was the purveyor of specific complications in over 10% of cases.
Conclusions: The present prospective study with minimum 1-year follow-up shows that functional treatment results in fewer decubitus complications than orthopaedic treatment and a rate of revision surgery comparable to internal fixation since 70% of included patients could have been successfully treated without surgical intervention. However, the investigation of a larger cohort would be necessary to identify predictive factors for the treatment's failure.
Level of evidence: Level III prospective non-comparative cohort study.

Introduction

Femoral neck fractures, as a consequence of osteoporosis, are becoming a real public health problem with ageing of the population in industrialized countries. These fractures are predicted to double by 2050 [1,2], reaching a worldwide incidence of over six million a year [3]. Though arthroplasty has proven superiority for displaced fractures [4,5] and osteosynthesis has become essential for non-displaced fractures in young subjects [6], the treatment of non-displaced or impacted fractures in the elderly remains without consensus. Historically, the treatment of Garden I femoral neck fractures [7] in the elderly pits orthopaedic treatment [8] against classic osteosynthesis using triple screwing or the compression plate and screw method [9—16]. Nonetheless, high rates of mechanical complications, mainly osteonecrosis and secondary displacement or pseudoarthrosis, have been observed in the literature with a frequency ranging from 24 to 50% [17,18]. In addition, in this context, arthroplasty results after osteosynthesis failure appear to be clearly not as good as first-line arthroplasty in terms of survival, complications and functional results [19,20], leading some authors to consider first-line arthroplasty for these fractures [21,22]. Functional treatment with early mobilisation and protected weight-bearing is another option, but seems to increase the risk of secondary displacement. This modality has already been the subject of a study by SOFCOT [15], but follow-up lasted only 3 months, and no predictive factor of secondary displacement was indicated. Our hypothesis is that functional treatment leads to fewer decubitus complications than orthopaedic treatment and a rate of mechanical complications comparable to that of osteosynthesis. The purpose of our prospective study was therefore:

- to evaluate the results of managing Garden I femoral neck fractures in subjects over age 65 years with a minimum 1-year follow-up;
- to investigate predictive factors of secondary displacement.

Patients and methods

Patients

A prospective monocentric cohort study, aiming to assess the functional treatment of impacted femoral neck fractures in elderly subjects, was conducted over a continuous 30-month period.

The inclusion criteria were:

- Garden I femoral neck fracture [7];
- recent injury (< 24 hours);
- age 65 years or over;
- follow-up longer than 12 months.

The exclusion criteria were:

- age under 65 years;
- pathological fracture;
- a history of fracture in the studied hip.

The variables assessed included age, sex, general state (ASA score [23], chronic diseases, dementia if MMS < 24), functional state (Parker score [24], Harris Hip Score (HHS) [25]) and the side injured. Initial X-rays were analyzed by two different observers, including a senior department surgeon, noting (1) fracture type; (2) subcapital or transcervical location; (3) inclination angle of the fracture line based on Pauwels classification [26]; (4) valgisation degree (Fig. 1); and (5) inclination angle on lateral X-rays (Fig. 2).

Therapeutic method

Unique, original functional treatment was administered to patients admitted to emergency with an impacted femoral