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Good functional outcome but not regained health related quality of life in the majority of 20–69 years old patients with femoral neck fracture treated with internal fixation
A prospective 2-year follow-up study of 182 patients

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ABSTRACT

Background and purpose: Prospective studies on patient related outcome in patients <70 years with a femoral neck fracture (FNF) are few. We aimed to investigate functional outcome and health-related quality of life (HRQoL) in 20–69 years old patients with a FNF treated with internal fixation.
Patients and methods: 182 patients, 20–69 years with a FNF treated with internal fixation were prospectively included in a multicenter study. Follow up included radiographic and clinical examination at 4, 12 and 24 months. Collected data were hip function using Harris Hip Score (HHS), HRQoL (EQ-5D and SF-36), fracture healing and re-operations.
Results: At 24 months, HHS was good or excellent in 73% of the patients with a displaced fracture and 85% of the patients with a non-displaced fracture ($p = 0.15$). Of the patients with displaced fracture ($n = 120$), 23% had a non-union (NU) and 15% had an avascular necrosis (AVN) with a 28% re-operation rate. None of the patients with non-displaced fracture ($n = 50$) had an NU, 12% had a radiographic AVN and 8% needed a re-operation. The mean EQ-$5D_{index}$ in patients with displaced fracture decreased from 0.81 to 0.59 at 4 months, 0.63 at 12 months and 0.65 at 24 months ($p < 0.001$). The corresponding values for patients with non-displaced fracture were 0.88, 0.69, 0.75 and 0.74 respectively ($p < 0.001$). The mean SF-total score in patients with displaced fracture decreased from 76 to 55 at 4 months, 63 at 12 months and 65 at 24 months ($p < 0.001$). The corresponding values for patients with non-displaced fracture were 80, 67, 74 and 76 respectively ($p < 0.001$).
Interpretation: Two thirds of the patients with displaced femoral neck fracture healed after one operation and three quarters reported good or excellent functional outcome at 24 months. However, they did not regain their pre-fracture level of HRQoL.

Introduction

Femoral neck fractures in younger patients are uncommon but may result in lifetime disability. The recommended treatment for patients <70 years with a femoral neck fracture is anatomic fracture reduction and internal fixation regardless of the degree of displacement [1]. The rationale behind this recommendation is the desire to preserve the native hip joint, which may facilitate the patients' future functional demand. Furthermore, the longer life expectancy in these patients might increase the risk of surgical revisions if treated with a hip arthroplasty. However, there is currently a growing trend in Sweden to treat patients with a displaced femoral neck fracture in the age range of 60–69 years with a total hip replacement (THR) [2]. A similar trend has been reported in the USA and in other countries [3,4], yet, studies supporting this approach are missing.

There is a lack of prospective studies on younger patients. A majority of the studies are retrospective, have a low sample size and are not conducted on western population. Moreover, the national registers as well as most previously published studies on

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younger patients with femoral neck fracture focus on re-operation rates [1,5–7]. Studies analysing functional outcome and health related quality of life (HRQoL) after a femoral neck fracture in younger patients are needed [8]. The aim of this study was to investigate functional outcome, HRQoL and fracture healing complications in patients aged 20–69 with a femoral neck fracture treated with internal fixation.

Materials and methods

This was a prospective multicenter study with a 24 months follow-up. Patients aged 20-69 with a femoral neck fracture admitted to any of the four university hospitals in Stockholm, Sweden during a period of 3.5 years were included. Patients living independently and who were able to walk before the fracture were included in the study. Patients with psychotic disease or severe cognitive impairment according to Short Portable Mental Status Questionnaire (SPMSQ <3) [9] were excluded. Subjects with risk factors for secondary osteoporosis (chronic renal failure and hyperparathyroidism) and those with simultaneous fracture of the lower extremity were excluded. Similarly, a fracture older than 48 h before admission and patients with previous pathology in the fractured hip were not included in the study.

At inclusion

All assessments, except the American Society of Anaesthesiologists (ASA) classification [10] and fracture classifications were carried out by specially trained research nurses. The following variables were recorded at inclusion: age, gender, pre-fracture living conditions, walking ability, alcohol consumption, current smoking, ASA score, fracture type and mechanism of injury. Living conditions were registered as independent (i.e. own home or block of serviced flats) or as institutionalized. Walking ability was recorded as walking outdoors, walking indoors or unable to walk. Use of walking aids was recorded.

The mechanism of injury was classified as low-energy trauma (fall at the same level), sport injury (mainly cycling or ice skating) and high-energy trauma (traffic accident, riding accident and fall from a height). Alcohol consumption was evaluated with Alcohol Use Disorder Identification Test (AUDIT), which is a validated instrument that identifies hazardous and harmful alcohol use, as well as possible dependence [11]. Current smokers were coded as smokers.

The ASA score was assessed by the attending anaesthesiologist. The ASA score [10] describes the physical status of the patients and classifies them according to 6 scores (ASA 1–6).

The health-related quality of life was rated using the EQ-5D [12] and SF-36 [13]. In order to acquire baseline values of EQ-5D and SF-36, patients were asked to report their pre-fracture quality of life from the week before the fracture. The EQ-5D has five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension is divided into three degrees of severity: no problem, some problems, and major problems. Dolan et al. [14] used the time trade-off (TTO) method to rate these different states of health in a large UK population (UK EQ-5D Index Tariff). We used the preference scores generated from this population when calculating the scores for our study population. A value of 0 indicated the worst possible state of health and a value of 1 the best possible.

SF-36 is a questionnaire used to measure HRQoL originally developed by RAND corporation [13]. It contains 36 items on 8 different domain scales. The scales are; physical functioning (PF), role-physical (RF), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH). By adding the scores from the first 4 scales and dividing by 4 a SF-36 physical score is calculated with a range of 0–100. The mental score is calculated in a similar fashion, by adding the scores from the last 4 scales and dividing by 4. The total score is calculated by adding the 8 scales and diving by 8. The changed score between baseline and 24-month follow up was compared to minimally important difference (MID) to evaluate whether the change was of

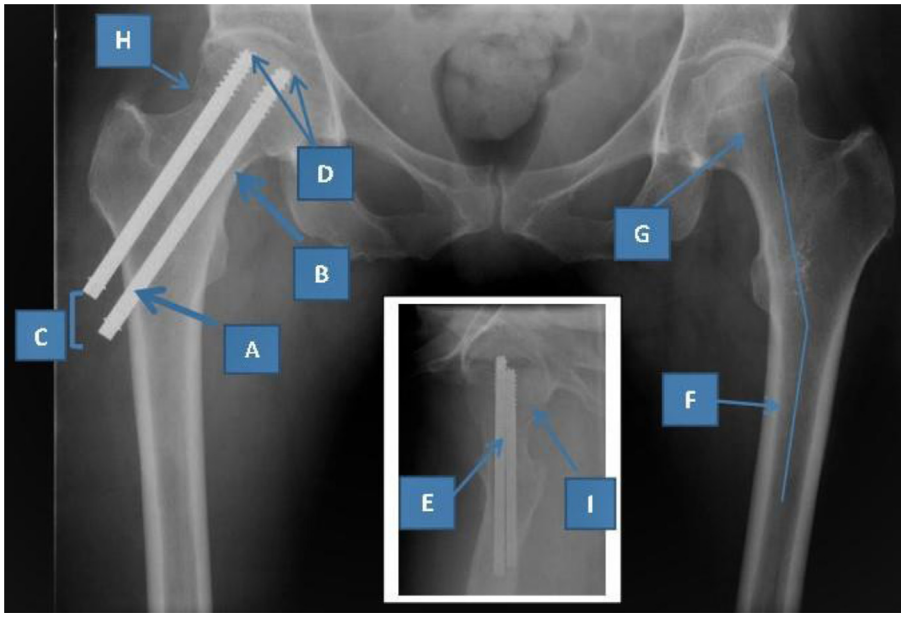

Fig. 1. X-ray showing the position of the screws. It was considered as good when the distal screw was introduced at the level of the lesser trochanter (A) and positioned on the inferior calcar (B). The proximal one should be parallel and at least 2 cm away from the distal one (<10°) (C). Both screw tips should be less than 5 mm from the subchondral bone (D). On the lateral projection the screws should be parallel and lie on the central or posterior third of the femoral head and neck (E). The Garden angle is the angle formed between the shaft of the femur (F) and medial trabeculae in the neck-head of the femur (G).The reduction was categorised depending on degree of fracture displacement (H), Garden angle 16-0175° and posterior head angulation (I).

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