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Surgically treated talar fractures. A retrospective study of 50 patients

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ABSTRACT

Background: Talar fractures are associated with a high incidence of avascular necrosis (AVN), osteoarthritis (OA) and malunion. The aim of this study was to evaluate the complications, the functional outcome, and the need for secondary surgery following surgically treated talar fractures.
Methods: Fifty patients with 52 talar fractures were included in the study. The health related quality of life was evaluated using visual analogue scale (VAS). The ankle function was scored using the American Orthopaedic Foot and Ankle Society (AOFAS) ankle–hindfoot score. OA and AVN were evaluated on plain radiographs and computerized tomography (CT) scans.
Results: VAS score was 69 ± 18 (mean ± SD) and AOFAS ankle–hindfoot score was 73 ± 17 (mean ± SD). OA was seen in 98% and AVN in 65% of the talar bones. Secondary surgery had been performed in 38% of the feet.
Conclusion: Long-term complications were commonly seen after talar fractures and had a significant impact on daily life activities and quality of life. The need for secondary surgery was high. Prolonged follow-up is necessary to detect long-term complications, and the patients should be offered a low threshold for recontact.

1. Introduction

Talar fractures account for approximately 3% of the fractures in the foot [1,2]. In literature, high weight pressure, vulnerable blood supply and the fact that most fractures are intra-articular, are described as factors that make talar fractures in high risk of long-term complications [3,4]. The surgical treatment, mainly consisting of open reduction and internal fixation, may be complex due to devascularisation after extensive dissection, screw interference with joint articulation, and difficulties in achieving anatomic reduction [1,3–7]. The most frequent long-term complications are osteoarthritis (OA), avascular necrosis (AVN) and malunions [1–3,5,7–10]. These may affect overall function, cause chronic pain and stiffness, and result in need for secondary surgery [10].

We conducted a retrospective study to investigate the incidence of long-term complications, the functional outcome and the need for secondary surgery after operatively treated talar fractures at Oslo University Hospital (OUH), Ullevaal. Our hypothesis was that long-term complications are commonly seen after talar fractures, but they do not influence daily life activities or life quality, and the need for secondary procedures is not as high as previously reported.

2. Material and methods

Patients with talar fractures treated with primary fracture surgery between January 2001 and January 2011 were identified. The fracture register of the Orthopaedic Department and the Control-data report of the hospital were searched for patients with talar fractures by using the AO-classification of foot fractures and ICD-10 classification.

Data from the time of accident were obtained from the medical records. Initial radiographs and CT scans from the time of accident were evaluated; the neck fractures according to the Hawkins classification [11,12], the body fractures according to the Boyd and Knight classification [13], and all fractures were additionally classified according to the Marti-Weber classification [14–16].

VAS score was obtained to evaluate the health related quality of life. The patients indicated, on a visual scale from 0 to 100, how good or bad the health condition was at the time of follow-up.

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100 was best imaginable health state and 0 was worst imaginable health state. An outpatient interview and clinical examination were performed, including determination of ankle function using the AOFAS ankle–hindfoot score [17]. A score between 90 and 100 was considered excellent, 75–89 good, 50–74 fair and <50 poor [1]. Also, the pain values from the AOFAS ankle–hindfoot scores were extracted and evaluated separately.

Radiographs and CT scans were obtained to evaluate OA, AVN, malunions and nonunions. OA was evaluated in the talocrural (TC), subtalar (ST) and talonavicular (TN) joints and classified according to the Kellgren and Lawrence grading scale [18] (Table 1). "None" and "doubtful" were defined as absence of OA. AVN was classified according to the Ficat and Arlet grading scale modified for the ankle [19,20] (Table 2). The distribution of OA and AVN was evaluated by dividing the talus into four zones in the sagittal and coronal views (Fig. 1a and b) [21]. Malunion was defined as unanatomic healing of the talus, and nonunion as lack of bony healing within 1 year.

All radiographs and CT scans were evaluated by a radiologist specialized in musculoskeletal radiology.

2.1. Statistics

Statistical analyzes were performed using the Statistical Package for Social Science (SPSS) software, version 20 (SPSS Inc., Chicago, IL, USA). Normally distributed data are presented as group means and standard deviations (SD). Median levels with range are presented when there was non-normal distribution of the data. Independent-samples *T*-test and one-way ANOVA were used to compare mean scores for different groups. Chi-square test was used to evaluate the relationship between categorical variables. Standard multiple regression or logistic regression was used to evaluate the influence of independent variables on a dependent variable. Differences were considered significant at *p*-levels ≤0.05.

3. Results

In the period January 2001 to January 2011, 78 patients with displaced talar fractures were operated acutely with screw, wire and/or plate fixation of which 50 patients with 52 fractures were included in the study (4 patients/5 fractures with incomplete data sets). An overview of the patients is shown in Fig. 2.

The patients' median age was 27 (range 14–63) years of age at time of injury. The injury mechanisms included motor vehicle accidents (33%), fall from heights (35%) and sporting accidents (31%). Thirty-five patients sustained an isolated talar fracture of the leg, and two patients had bilateral talar fracture. Eight patients had an injury severity score (ISS) of 16 points or more. Twenty-five fractures occurred in the left and 27 in the right foot. Four fractures were open.

Table 1
Kellgren and Lawrence grading scale.

None	No features
Doubtful	Minute osteophyte, doubtful significance
Minimal	Definite osteophyte, unimpaired joint space
Moderate	Moderate diminution of joint space
Severe	Joint space greatly impaired with sclerosis of subchondral bone

Table 2
Ficat and Arlet grading scale.

I.	Normal
II.	Cystic and/or osteosclerotic lesions, normal contour of talus, no subchondral fracture
III.	Crescent sign or subchondral collapse
IV.	Joint-space narrowing, secondary distal tibial changes (cysts, marginal osteophytes and destruction of the cartilage)

The anatomic locations of the fractures are described in Table 3. More than one part of the talus was affected in 50% of the fractures. 62% (n = 32) of the fractures involved the talar neck, 54% (n = 28) involved the body, and 31% (n = 16) involved both the neck and the body. The fractures were further classified as described in Table 4.

The mean time from injury to initial operative fracture treatment was 10 ± 8 days. Fifteen fractures needed one or two temporary surgeries before the final reduction and stabilization, including external fixation (11) and K-wires (4), screws (1), and screws and plates (1). The median time from injury to final fracture reduction and fixation was 14 (range 0–70) days. One patient had a primary ST and TC fusion, 2 patients had their fractures stabilized with K-wires only, and the rest of the fractures were fixed with screws alone (40), or with screws and additional K-wires and/or plates (9). A bone graft was used in 6 of the fractures. The temporary surgeries and the final fracture reduction and fixation all constitute primary surgeries.

Forty-nine fractures had restricted weight bearing for less than 3 months. Early complications (within 30 days) were observed in 6 fractures (2 had more than one complication) including infection (3), Schanz screw loosening (1), misplaced screw (1), nerve damage (1), compartment syndrome of the foot (1), fracture re-displacement (1), and skin necrosis (1). Twenty-seven fractures were affected by long-term complications, not including OA or AVN (5 fractures with more than one complication); complaints related to implants (20), malalignment (4), compartment syndrome/claw toe/nerve pain (4), equinus contracture (1), exostosis (1), ankle instability (1), and nonunion (1).

Nineteen fractures were exposed to secondary surgery with the procedures described in Fig. 3 (in some patients more than one procedure was performed).

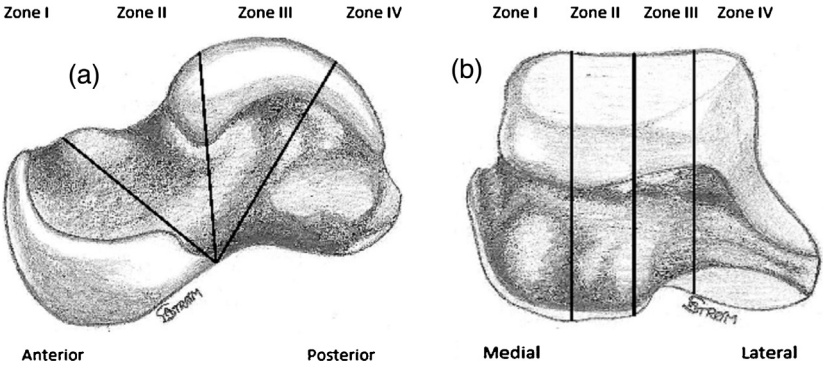

Fig. 1. (a) Sagittal view of talus. (b) Coronal view of talus.