



Salvage for intramedullary nailing breakage after operative treatment of trochanteric fractures



Jordi Tomás-Hernández*, Jorge Núñez-Camarena, Jordi Teixidor-Serra, Ernesto Guerra-Farfan, Jordi Selga, Juan Antonio Porcel, José Vicente Andrés-Peiró, Vicente Molero

Trauma Unit of the Department of Traumatology and Orthopaedic Surgery of Vall d'Hebron University Hospital, Universitat Autònoma de Barcelona (UAB), Passeig de la Vall d'Hebron, 119-129, 08035, Barcelona, Spain

ARTICLE INFO

Article history:

Received 16 May 2018

Received in revised form 8 July 2018

Accepted 23 July 2018

Keywords:

Trochanteric fracture

Intramedullary nail breakage

Mechanical failure

Nonunion

Revision surgery

ABSTRACT

Background: Trochanteric fractures are one of the most common fractures in elderly people. The use of intramedullary nails is an option for their treatment, especially in unstable patterns. Nail breakage is a rarely reported complication. The aim of this study was to determine the prevalence of nail breakage in our center. Secondary objectives are to show the management of this complication in our institution as well as the technical problems, complications and final outcomes of these patients in our hands.

Material and Methods: In a retrospective case series review between 2010 and 2015, we analyzed 1481 patients with trochanteric and subtrochanteric fractures who had been treated by cephalomedullary nailing in our centre. 13 patients with nail breakage were identified.

Results: The percentage failure rate in our institution is 0.87%. 9 (69.2%) patients were women and 4 (3.8%) were men, with a mean age of 74.6 years (range 47–90). In all cases the mechanism of injury was a simple fall from standing height. Initial fracture types were: 1 case of AO/OTA 31A1, 6 cases of AO/OTA 31A2 and 6 cases of AO/OTA 31A3. Only 3 cases had a good overall reduction with a correct TAD, an optimal femoral neck-shaft angle and absence of fracture gaps >5 mm after surgery. The average time from the first surgery to the diagnosis of implant breakage was 333 days (range 70–1460), 11 months. Breakage occurred at the nail junction with the lag screw in 11 cases and in the distal nail aperture in 2 cases.

Conclusions: An insufficient reduction with varus and fracture gaps >5 mm, the use of short nails in unstable patterns with subtrochanteric involvement and patients with certain comorbidities are facts observed that can contribute to the development of delayed or nonunion with subsequent nail breakage. Different salvage treatments, conversion to hip arthroplasty or revision osteosynthesis, may be considered but we think that prevention has to be the best treatment.

© 2018 Elsevier Ltd. All rights reserved.

Background

Trochanteric fractures are one of the most common fractures in orthopaedic surgery with a high cost for the public health system in our country. They represent an important cause of hospitalization, morbidity and mortality for elderly patients [1]. Many devices have been developed to fix them, the most widely used being the dynamic hip screw (DHS) and the intramedullary nails [2]. In terms of load shearing, the biomechanical advantage of the nails with regard to the DHS is related to its position which is nearer to the weight-bearing axis. When the intramedullary system is compared with the extramedullary device, there is up to a 30% reduction of

bending stresses [3]. A decrease in the operation time and surgery blood loss, the periosteum preservation and the ability for an early weight-bearing due to its biomechanical properties are other advantages related to intramedullary nailing of trochanteric fractures. For the previous reasons, the use of intramedullary nails is increasing, and they are now the most commonly used fixation devices, especially in the treatment of unstable trochanteric fractures [4].

Excellent results have been reported with the use of intramedullary nails. However, a variety of complications have been reported [5] being the nail breakage an uncommon complication. The causes of breakage are usually related to variables depending on the surgery being a poor surgical technique and a malreduction the most common scenarios. Other causes are related to variables depending on the patient such as osteoporosis, tobacco use, corticoid treatments or alcoholism [6].

* Corresponding author.

E-mail address: jotomas@vhebron.net (J. Tomás-Hernández).

Implant failure usually occurs when the fracture does not achieve the consolidation and after excessive nail exposition to shear and bending forces the nail breaks from material fatigue. Management of this complication includes conversion to hip arthroplasty or revision with a new osteosynthesis [7]. The aim of this study was to determine the prevalence of nail breakage in our center. Secondary objectives are to show the management of this complication in our institution as well as the technical problems, complications and final outcomes of these patients in our hands.

Material and methods

We identified from the prospective database of surgical patients of our institution, all patients who have been treated with an IM nail for a trochanteric fracture between January 2010 and December 2015 (1481 patients) and, from those, we identified the ones who had a salvage surgery due to nail breakage (13 patients). Patients with trochanteric fractures treated with DHS and patients with breakage of intramedullary nailing that received this treatment because of oncological etiology were excluded from the analysis.

Retrospective revision of the computerized medical records was made for all thirteen patients included. In all cases we collected demographic data (age, sex, date of injury), injury data (mechanism, type of fracture and patient comorbidities), data from the surgery performed and postoperative x-ray analysis (Table 1). Also we collected data from the salvage procedure performed: time until implant breakage, location of breakage, reason of failure, type of salvage procedure and surgery complications (Table 2).

Initial fractures were classified according to the AO/OTA classification of proximal femoral fractures based on their X-rays: Simple trochanteric fractures (31A1), multifragmentary trochanteric fractures with subtrochanteric extension (31A2), intertrochanteric fractures (31 A3) [8]. Initial operative treatment with IM nailing was conducted with all patients under preoperative prophylactic antibiotics and with a postoperative anticoagulation therapy with low molecular weight heparin (LMWH). In all cases spinal anesthesia was used. The surgical technique used in all patients was with the patient placed on a traction table to obtain the fracture reduction under fluoroscopic control. In eleven cases that was possible by closed methods but in 2 cases a mini-open technique on the fracture site was used for reduction and cerclage

as we described in previous articles [9]. All nails were implanted percutaneously through a 5 cm wound incision proximal to the trochanter. The decision of using a cervical-diaphyseal angle of 125° or 130°, short or long nails and to use 1 or 2 distal locking screws depended on the surgeon criteria based on each particular fracture pattern. All patients included in our study were treated using a Trigen Intertan (Smith and Nephew©, Memphis, Tennessee), TFN (Synthes, Solothurn, Switzerland), Gamma nail (Stryker Trauma, Germany) or IMHS CP (Smith and Nephew©, Memphis, Tennessee). The thirteen patients were included for postoperative rehabilitation with early weight-bearing at 48 h after surgery. Patients were followed up in our outpatient office for at least 12 months after being discharged (range 12–48).

A postoperative X-ray analysis was done after the first procedure. On the anteroposterior and lateral view, the tip apex-distance (TAD) was evaluated [10]. The quality of reduction was also reported, considering a suboptimal reduction the presence of fracture diastasis greater than 5 mm in any plane. The postoperative neck-shaft angle was also analyzed.

Regarding the salvage procedures, a variety of different methods were used depending on the type of previous fracture, quality of the remaining bone, patient function, ability to remove broken implants as well as the surgeon criteria. Before any revision surgery was performed, all patients were studied to rule out a hidden infection with standard serum biomarkers: white blood-cell count (WBC), c-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) [11]. In one case, with a high index of suspicion for infection and elevated markers, an open biopsy was performed isolating a *S. Epidermidis* and a *P. Acnes*. Patients were all reoperated in lateral decubitus because the broken material extraction is easier on our hands. Intraoperative cultures were also obtained for all cases. Patients were followed up, clinically and radiologically, after revision surgery at 4 weeks, 3, 6 and 12 months. The presence of postoperative complications such infection or hip arthroplasty dislocation, the ability to recover ambulation, and consolidation of the fracture in the reosteosynthesis group were reported.

Results

Between January 2010 and December 2015 a total of 1481 trochanteric fractures underwent surgery in our institution using an intramedullary nail. Thirteen cases that underwent surgery had

Table 1
Demographics, fracture type, initial treatment and postoperative x-ray analysis.

	Age	Gender	AO/OTA Classification	Comorbidities	Initial treatment	Post-op neck-shaft angle	Fracture gaps >5 mm	TAD
CASE 1	77	Female	31 A3	Hypertesion, Diabetes	Short TFN	120,54	YES	15
CASE 2	80	Female	31 A2	Osteoporosis	Short Gamma	121,66	YES	13
CASE 3	78	Male	31 A3	Hypertension, Osteoporosis	Long Intertan + cerclage	131,53	YES	15
CASE 4	72	Female	31 A3	Chronic Bronchitis, Hypertension	Short Gamma + cerclage	122,37	YES	20
CASE 5	78	Female	31 A2	Hypertension, Raynaud disease	Short Intertan	127,98	NO	17
CASE 6	90	Female	31 A3	Hypertension, Diabetes, Auricular fibrillation	Long Intertan	130,24	NO	12
CASE 7	71	Female	31 A2	AF, Hyperthyroidism	Short IMHS	120,32	NO	7
CASE 8	81	Female	31 A3	Obesity, Hypertension, Hypothyroidism	Long Intertan	131,64	YES	16
CASE 9	73	Male	31 A2	Obesity, Diabetes, Hypertension	Short Intertan	127,96	YES	13
CASE 10	47	Male	31 A1	Smoker, Liver transplant, Diabetes, Hypertension	Short Intertan	130,72	NO	9
CASE 11	56	Male	31 A2	Smoker, Alcohol abuse	Short Intertan	131,24	YES	7
CASE 12	87	Female	31 A3	AF, Hypertension, Osteoporosis	Long Intertan	126,3	YES	11
CASE 13	81	Female	31 A2	Obesity, Diabetes, Hypertension	Long TFN	129,2	YES	15

Download English Version:

<https://daneshyari.com/en/article/10217690>

Download Persian Version:

<https://daneshyari.com/article/10217690>

[Daneshyari.com](https://daneshyari.com)