

Necessity of osteosynthesis in elderly patients with osteoporotic proximal femur fractures

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Description

The incidence rate of femoral proximal fractures accounts for 50% of hip fractures [1,2]. Most intertrochanteric fractures are fragmented and unstable in elderly people due to low bone strength, and most occur with low-energy trauma [1,2].

A 90-year-old female patient was admitted to the emergency department following a fall from standing height. Her medical history included hypertension, dementia, and a solitary kidney. Radiographic evaluation revealed an intertrochanteric femoral fracture, a type of injury commonly seen in the elderly population and typically associated with low-energy trauma.

Given the patient's advanced age and comorbidities, she was classified as high risk for postoperative complications. The patient's American Society of Anesthesiologists (ASA) score was 3. Therefore, closed reduction and internal fixation were performed using a proximal femoral nail (PFN) the day after admission. PFN systems are commonly preferred for treating unstable intertrochanteric fractures due to their biomechanical stability [1,2]. It has demonstrated favorable outcomes and reduced complication rates, including a lower frequency of cut-outs, supporting the routine use of PFN in elderly patients [1-4].

The early postoperative period was uneventful, and the patient was discharged on postoperative day six. However, seven months later, she returned with complaints of increased pain and restricted range of motion in the operated hip. Radiographs showed migration of the cephalic lag screw through the femoral head and into the acetabulum, consistent with a "cut-out" complication—a condition typically resulting from poor bone quality or suboptimal implant positioning [1-4]. However, our patient's fracture reduction was good, and the tip-apex distance (TAD) was within acceptable limits. A strong relationship has been shown between TAD values and fixation failure [3,4].

According to a newly developed stability score, TAD > 29.45 mm, calcar-referenced TAD (Cal-TAD) > 31.75 mm, inadequate fracture reduction, and female gender are independent predictors of cut-out risk [4]. Our patient also had many of these risk factors, including female gender, advanced age, comorbidities, and presumed osteoporosis.

Afterwards, the PFN implant was removed and a total hip arthroplasty (THA) was performed. Unfortunately, this time THA failure occurred one month later. Finally, in the third operation, it was decided to remove all prosthetic components of the patient and leave the hip joint without reconstruction (Girdlestone procedure) (Figure 1).

As a classical method for the treatment of unstable femoral trochanteric fractures, PFNs have been widely accepted in clinical practice [1-4]. PFNs have been associated with better limb function after stabilization of fracture healing with longer follow-up [1-4]. There are always disadvantages of having to lie in bed for a longer period after surgery [1]. Therefore, in recent years, some researchers have tried to find evidence from clinical trials aiming to use arthroplasty to replace PFNs in the treatment of unstable femoral trochanteric fractures [1].

However, although there are differences in the results reported in the literature, no conclusion has been reached so far [1-4]. Compared with PFNs, although arthroplasty can shorten the bedtime and hospital stay, it cannot reduce postoperative complications and mortality in elderly patients with unstable femoral trochanteric fractures; moreover, the operation time and blood loss are significantly increased [1-4]. Compared with the PFN group, the arthroplasty group has earlier weight-bearing time, shorter hospital stay, more intraoperative bleeding, and longer operation time [1].

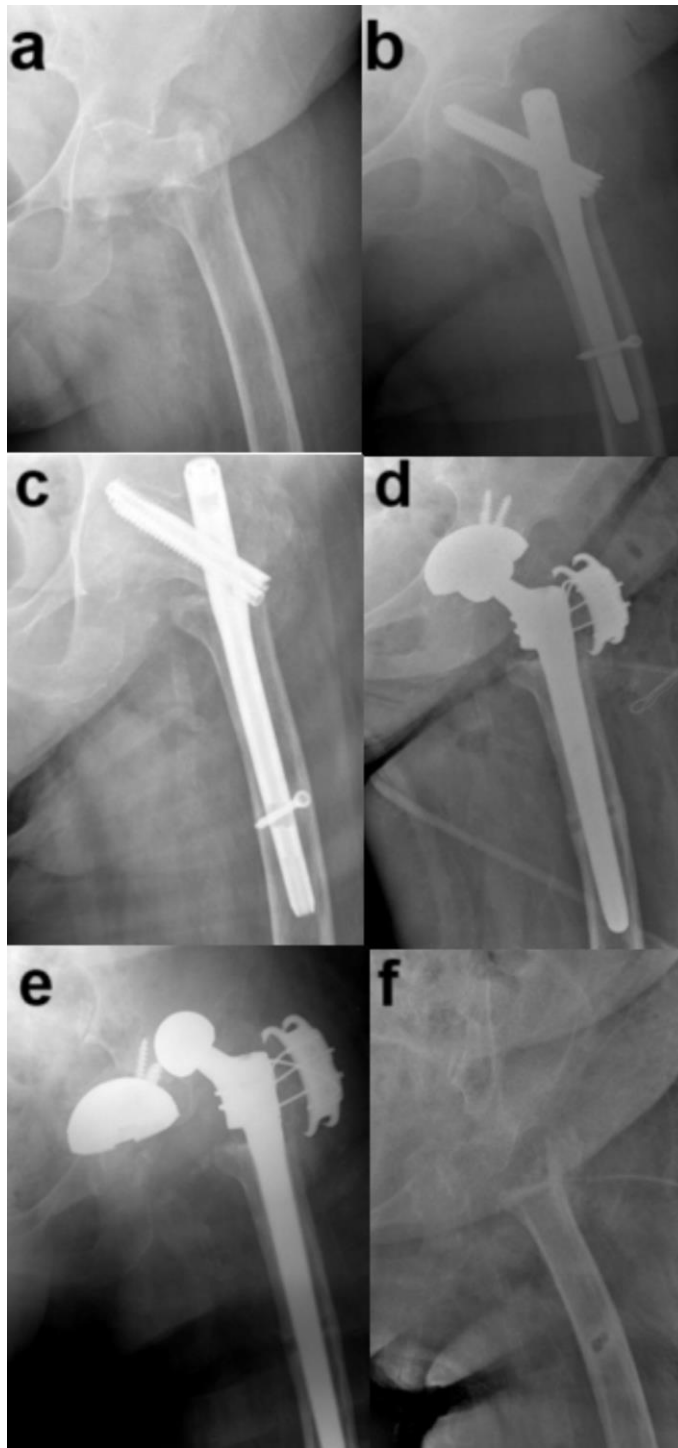


Figure 1. **a)** Appearance of AO/OTA type 31-A1.2 fracture on the left hip radiograph of a 90-year-old female patient. **b)** Early radiographic appearance of the hip after fixation with proximal femoral nail (PFN). **c)** In the patient's 7-month follow-up radiograph, it was determined that the lag screw was cut-out superiorly. **d)** Radiographic appearance of the patient after removal of the PFN implant and total hip arthroplasty (THA). **e)** Appearance of the patient's left hip dislocated and the acetabular cup migrated to the pelvis at 1 month after THA. **f)** Finally, all components of the patient's hip were removed and the Girdlestone procedure was performed.

Learning points

- In order to avoid repeated surgical interventions and complications in the decision of whether osteosynthesis or arthroplasty is the surgical option for older patients, the patient's preoperative condition must be well analyzed.
- Proper fracture reduction and accurate placement of the cephalic screw are essential in PFN applications to minimize mechanical failure.
- TAD (<29.45mm) and Cal-TAD (<31.75mm) are critical radiographic parameters and should be routinely measured intraoperatively.
- In complex failure scenarios, the Girdlestone procedure remains a viable salvage option for pain control and limited mobility in non-ambulatory elderly patients.
- Elderly patients with poor bone quality are particularly vulnerable to fixation failure and require meticulous surgical planning.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by HSD, FD and SB. The first draft of the manuscript was written by HSD, FD and SB and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical statement

The authors confirm that this retrospective study was conducted in accordance with the ethical standards set forth in the Declaration of Helsinki and its later amendments.

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