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Original Article

Factors affect stability of intertrochanteric fractures when elderly patients fall

Po-Han Chen, Chi-Chuan Wu, Wen-Jer Chen*

Department of Orthopedic Surgery, Chang Gung Memorial Hospital at Linkou, Chang Gung University College of Medicine, Taoyuan, Taiwan

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ABSTRACT

Background: Factors affecting the stability of intertrochanteric fractures when elderly patients fall are few to be reported. In this retrospective study, possible factors were investigated.

Methods: Two hundred and twenty-three consecutive elderly patients (≥65 years) with intertrochanteric fractures due to low energy injuries were studied. Patient age, gender, body mass index (BMI), body weight and height were compared between fractures with stable (AO/OTA type A_1, intact lesser trochanter, 80 patients) and unstable (AO/OTA types A_2, A_3, displaced lesser trochanter or reverse obliquity fractures, 143 patients) types. Statistical approaches with univariate and multivariate analyses were performed.

Results: There was no statistical difference in patient gender, age, body weight or height between patients with stable and unstable fractures in both univariate and multivariate analysis. However, BMI was statistically higher in patients with unstable fractures (22.7 vs 21.4, $p = 0.01$) in univariate analysis, but without a difference in multivariate analysis ($p = 0.07$).

Conclusions: Stability of intertrochanteric fractures may be not associated with gender, age, body weight and height or BMI when elderly patients fall. Bone mineral density or impact direction may be other possible contributing factors but requires further proofs.

* *Corresponding author*. Department of Orthopedic Surgery, Chang Gung Memorial Hospital at Linkou, 5, Fusing St., Gueishan, Taoyuan, Taiwan. Tel.: +886 3 3281200 ext. 2423; fax: +886 3 3278113.
E-mail address: ccwu@mail.cgu.edu.tw (C.-C. Wu).

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At a glance commentary

Scientific background on the subject

Factors affecting the stability of intertrochanteric fractures when elderly patients fall are few to be reported. No statistical difference in patient gender, age, and body weight or height was found in this study. However, bone mineral density or impact direction may be suggested to be possible contributing factors.

What this study adds to the field

The stability of intertrochanteric fractures, when elderly patients fall, can deeply affect the treatment outcomes. This study tried to find various factors which can decide the stability establishment. If favorable situations can be created, a success rate of treatment may be greatly improved.

Intertrochanteric fractures in elderly patients are common and generally caused by low-energy injuries, such as falls. The mortality and morbidity rates with conservative treatment for such patients are high and the favored treatment method nowadays is a closed reduction of fractures with internal fixation using plate or nail systems [1–3]. However, despite operative treatment being aggressively pursued, a 1-year mortality rate may be as high as 10–20% [4,5].

The success of internal fixation of intertrochanteric fractures in elderly patients mainly depends on severity of the osteoporosis, fracture types, fixator position, and patient compliance [6–10]. In the literature, intertrochanteric fractures are usually divided into a stable or unstable type depending on without or with displacement of the lesser trochanter or reverse obliquity fractures (AO/OTA classification) [1,11]. An unstable intertrochanteric fracture with displaced lesser trochanter or reverse obliquity fractures (AO/OTA types A_2, A_3) has a much higher failure rate of fixation than that of a stable fracture (AO/OTA type A_1) [Fig. 1] [1,6–10]. Conceptually, an unstable intertrochanteric fracture should be treated more carefully in order to lower the rate of treatment failure. In the literature, factors affecting the stability of intertrochanteric fractures when elderly patients fall have not been definitely clarified. Theoretically, bone strength, fall forces, and protective effects may affect the stability of fractures [Table 1] [11–17]. Normally, bone strength may be represented by bone mineral density (BMD) [5,18,19]. Fall forces are represented by body weight, height, body mass index (BMI), and the direction of impact [13,16,20]. The protective

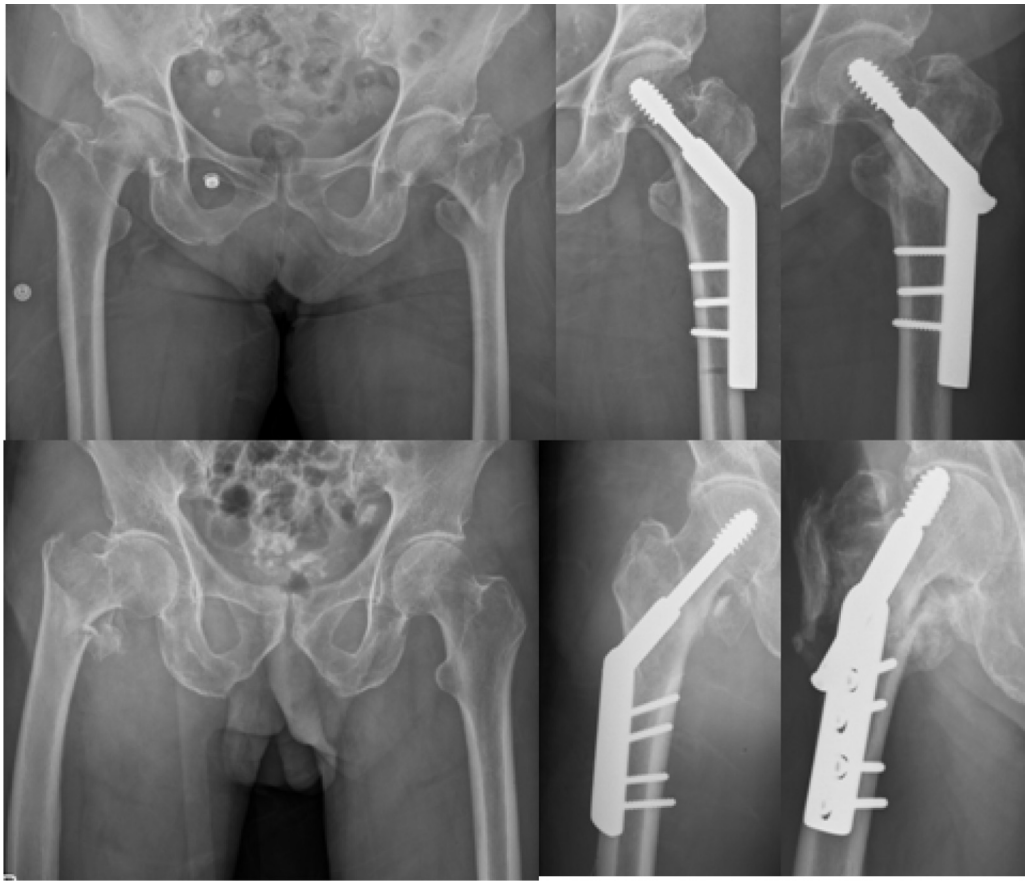

Fig. 1 – (Upper panels) A stable left intertrochanteric fracture with the intact lesser trochanter was treated with a sliding compression screw. The fracture healed uneventfully within 3 months. (Lower panels) An unstable right intertrochanteric fracture with the displaced lesser trochanter was treated with a sliding compression screw. A cutout of the lag screw with nonunion occurred at 3 months.