

Functional Outcomes and Survival Rates of Fragility Fractures of the Pelvis: A Multicenter Retrospective Analysis of 588 Patients

Yasuhiko Takegami, Yusuke Osawa¹, Hiroki Iida², Masanori Okamoto³, Yuto Ozawa, Hiroto Funahashi⁴, Hiroaki Ido, Asamoto Takamune¹, Shiro Imagama⁴

¹Nagoya University, ²Nagoya University Graduate School of Medicine Facu, ³Yokkaichi Municipal Hospital, ⁴Department of Orthopaedic Surgery, Nagoya University

INTRODUCTION:

Fragility fractures of the pelvis (FFP) are a subset of fractures caused by minimal trauma, also known as osteoporotic or insufficiency fractures. The incidence of these fractures is increasing in the aging population. Treatment for FFP involves both surgical and nonsurgical approaches, determined at the discretion of the surgeon, regardless of radiographic similarities. Older individuals often face challenges due to underlying health conditions and disabilities, and invasive medical procedures can further impact their overall health.

A study by Omichi et al. reported that conservative treatment for FFP showed reduced life expectancy and diminished walking ability in patients with type III FFP. Additionally, type III/IV FFP was associated with higher complication rates during hospitalization. However, the complete influence of variables such as the Charlson Comorbidity Index and Pre-New Mobility Score on these outcomes remains unclear. Treatment protocols based on fracture type may introduce bias, especially in patients with type III/IV FFP, where full weight-bearing is delayed until pain relief and bone union are confirmed, resulting in longer hospital stays. Thus, there is insufficient understanding of factors affecting life expectancy and mobility reduction in FFP.

METHODS:

The objective of this multicenter retrospective study was to investigate the determinants related to mortality and decreased ambulatory capacity following FFP injuries. The study followed ethical guidelines and obtained approval from the participating hospitals. Data were collected from the TRON database, which included patient information such as age, gender, body mass index (BMI), Charlson Comorbidity Index (CCI), Numeric Rating Scale for pain assessment, and New Mobility Score (NMS) for walking ability. The study included 867 patients aged 65 and older hospitalized for pelvic fractures, excluding cases of high-energy trauma, acetabular fractures, pathological fractures, and unclassifiable FFP types. Demographic data, comorbidities, and complications during hospitalization were recorded. Radiographs and CT scans were performed, and the fractures were classified according to the Rommens and Hoffmann classification system. Primary outcome measure was survival rate, while secondary outcomes included functional outcomes as loss of walking ability was defined as a decrease in walking ability of 3 points or more between pre-hospitalization and the last follow-up visit. Multivariate logistic regression analysis was employed to adjust for potential confounders. We used the Cox regression analysis to identify the factors related to the mortality. A p-value of less than 0.05 was defined statistically significant.

RESULTS:

A total of 588 cases (100 males and 488 females) were examined in this retrospective multicenter study. The patient demographics were as follows: the average age of the patients was 82.8 ± 7.3 years, with the majority being female (81.1%). The mean pre-New Mobility Score was 6.6 ± 2.3 .

The distribution of fractures according to the Rommens and Hoffmann classification was as follows: Type 1 fractures represented 221 (37.6%) of the cases, Type 2 made up 209 cases (35.6%), Type 3 accounted for 117 (14.8%) of the cases, and Type 4 fractures represented 71 cases (12.1%), respectively.

The overall survival rate for the cohort was 91.6% at one year.

Upon examining the influence of different variables on survival, multivariate analysis showed that lower BMI (Odd ratio 0.85:95% confidence interval (CI):0.78-0.92, $p=0.0001$) and higher Charlson comorbidity index (Odds ratio 1.28:95%CI:1.03-1.57, $p=0.002$) are significantly associated with the mortality in the FFP patients.

In terms of treatment approach, whether patients received surgical or conservative treatment did not significantly impact the 1-year survival rate. Patients who underwent surgery had a survival rate of 94.1%, while those who received conservative treatment had a slightly higher survival rate of 90.4% ($p = 0.33$).

Preoperative walking ability and fracture type, particularly Type 3a fractures, emerged as significant prognostic factors for loss of walking ability in patients with fragility fractures of the pelvis. However, the choice between surgical and conservative treatment did not significantly influence the loss of walking ability.

DISCUSSION AND CONCLUSION:

We found that the lower BMI and the higher Charlson comorbidity index are significant associated with the mortality in the FFP patients.

We also identify that the type of fragility fracture and preoperative walking ability play crucial roles in determining the walking ability for patients suffering from fragility fractures of the pelvis. Our analysis underscored that Type 3a fractures, as classified by Rommens and Hoffmann, and compromised preoperative ambulatory ability served as indicators of a loss of walking ability.

Interestingly, the dichotomy between surgical and conservative treatment modalities did not yield significant disparities in survival rates and loss of walking ability.