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What Are the Determinants of Mortality After Cemented Bipolar Hemiarthroplasty for Unstable Intertrochanteric Fractures in Elderly Patients?

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ABSTRACT

Background: Primary hemiarthroplasty is proposed for the treatment of unstable intertrochanteric fractures in elderly patients with the advantages of early mobilization, acceptable functional results, and lower failure rates. The 1-year mortality rates demonstrated high variance in the literature, whereas, the factors related to 1-year mortality were not widely investigated. The main purpose of the present study was to determine predictive factors related to 1-year mortality after primary cemented calcar-replacement bipolar hemiarthroplasty performed for unstable intertrochanteric fracture.

Methods: One hundred six patients with the mean age of 80.7 years were included in this retrospective study. Age, gender, body mass index, comorbid diseases, American Society of Anesthesiologists score, total hospitalization time, time from injury to surgery, operation time, estimated blood loss, postoperative mobilization time, and decrease in Koval ambulatory categories were evaluated. Univariate and multivariate analyses were performed to determine major predictors of 1-year mortality. The Kaplan-Meier survival analysis was used to construct the cumulative survival rate.

Results: Three or more American Society of Anesthesiologists scores, presence of $\geq$3 comorbid diseases, and postoperative mobilization time of $\geq$2 days were significantly correlated with 1-year mortality. Presence of $\geq$3 comorbid systemic diseases was identified as the major predictive factor for 1-year mortality. The overall 5-year cumulative survival rate was 5.6%.

Conclusion: Having three or more comorbid systemic diseases has been detected as the major determinant of 1-year mortality after primary cemented calcar-replacement bipolar hemiarthroplasty performed for unstable intertrochanteric fracture in elderly patients.

Intertrochanteric fractures are common in the elderly population, and most of them are treated successfully using internal fixation devices [1]. However, the optimal treatment of unstable intertrochanteric fractures remains controversial because nonunion and loss of fixation can occur in elderly patients with severe osteoporosis [2,3]. Arthroplasty is usually performed after failed fixation of intertrochanteric fractures, which is associated with additional mortality, morbidity, and costs [4]. Therefore, with the advantages of early mobilization, acceptable functional results, and lower failure rates, primary hemiarthroplasty is proposed for the treatment of unstable intertrochanteric fractures in elderly patients [5–8].

Intertrochanteric fractures generally occur in patients with poorer health status when compared with femoral neck fractures [9]. Cemented hemiarthroplasty is usually preferred in low-demand patients with high risk of mortality. In the literature, the 1-year mortality rates demonstrated variation from 9.1% to 32.6% in patients who underwent either primary hemiarthroplasty or total hip arthroplasty (THA) with the diagnosis of unstable intertrochanteric fracture [10–15]. On the other hand, factors related to 1-year mortality have not been widely investigated in the literature.

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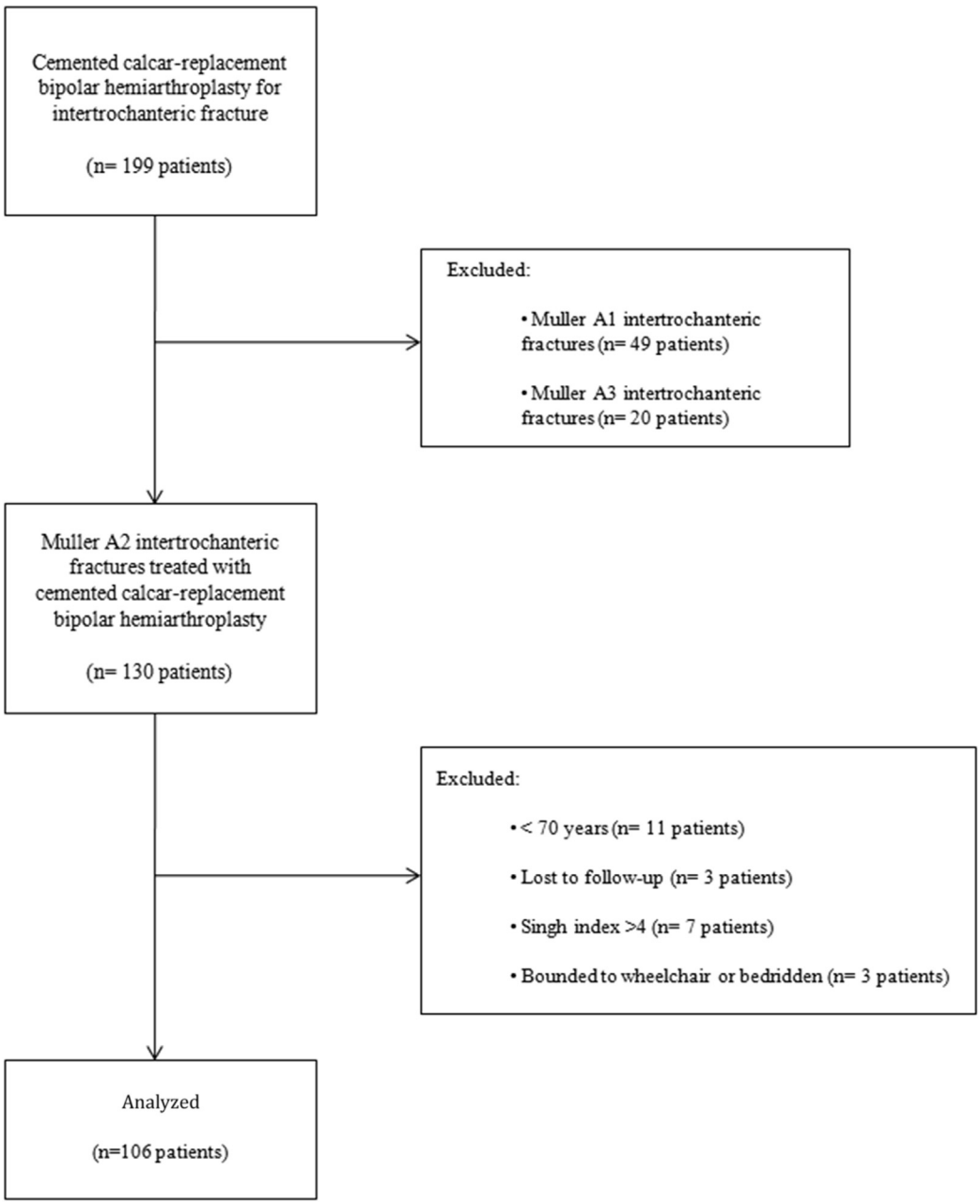

Fig. 1. Flow chart demonstrating the excluded patients.

The main purpose of the present study was to determine predictive factors related to 1-year mortality after primary cemented calcar-replacement bipolar hemiarthroplasty performed for unstable intertrochanteric fracture.

Materials and Methods

This retrospective study was conducted after having approval from the institutional review board. Between 2010 and 2014, 199 patients with intertrochanteric fracture were surgically treated using a primary cemented calcar-replacement bipolar hemiarthroplasty. Patients with unstable (Muller type A2.2 or A2.3) intertrochanteric fracture, ≥70 years of age, and severe osteoporosis (Singh index ≤4) were included in the study. Muller type A1 or A3 intertrochanteric fractures, being wheelchair bounded or bedridden before the fracture, and incomplete medical records were the exclusion criteria. Besides, the patients lost to follow-up were also excluded from the study. One hundred six patients including 59 females and 47 males who met the inclusion criteria were enrolled in the study (Fig. 1). The mean age of the study group was 80.7 ± 5.7 years (range, 70-95 years). The mean body mass index (BMI) of the patients was 26.2 ± 3.7 kg/m^2 (range, 19.3-33.3 kg/m^2). The median Singh index was 3 (range, 2-4). The median American Society of Anesthesiologists (ASA) score was 2 (range, 1-4). Table 1 demonstrates the list of preoperative comorbid systemic diseases noted in our study group.

The mean time of hospitalization from injury to surgery was 2.4 ± 1.9 days (range, 1-10 days). All the surgical interventions were performed under spinal anesthesia with the standard posterolateral hip approach. Two different designs of cemented