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Original Article

Risk factors and quality of life for the occurrence of hip fracture in postmenopausal women



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ABSTRACT

Background: To identify the risk factors and changes of quality of life in the first occurrence of hip fracture in Taiwanese postmenopausal women.

Methods: In this case-control study, we enrolled 100 postmenopausal women with accidental first-incident hip fracture and 100 women without hip fracture. The control group was matched to the study group according to age. Evaluation consisted of a questionnaire, an interview to both assess quality of life via a 36-item Short Form Health Survey and document risk factors, a physical examination to record height and body weight, and bone mineral density (BMD) of the hip and spine using dual-energy X-ray absorptiometry (DXA). **Results:** The mean age of the patients was 77.9 years old. Compared with the controls, the patients with first-incident hip fracture had a lower level of education, increased body height, higher parity, no experience of estrogen therapy, prior history of diabetes mellitus and rheumatoid arthritis, walking aid use, less weight-bearing exercise, and steroid use. Total hip BMD was a stronger predictor than BMD at different sites. Quality of life was significantly higher in the control group at the baseline and 4-month follow-up.

Conclusions: Quality of life was related to the first-incident hip fracture. The increased risk of falls, lower level of education, and total hip BMD are the strongest predictors of first-incident hip fracture in Asian elderly postmenopausal women.

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At a glance commentary

Scientific background on the subject

Because hip fracture prevalence in Asian postmenopausal women is higher than that of their Western counterparts, Asian postmenopausal women may have certain risk factors for first-incident hip fractures that differ from those of Caucasian women. However, current knowledge regarding these risk factors for hip fractures among Asian women is limited.

What this study adds to the field

Besides risk factors related to fall and lower hip bone mineral density which are similar to those reported in Western women, awareness on osteoporosis prevention and quality of life should be the most important factor affecting the first-incident hip fracture in Asian elderly postmenopausal women.

It has been clearly established that because of estrogen deficiency, postmenopausal women have a higher incidence of osteoporosis and fracture than men. In postmenopausal women, the hip, spine and wrist are the areas most susceptible to fracture. Among these osteoporotic fractures, hip fractures are of greater concern, because they may result in personal disability and mortality and therefore, contribute a higher burden on family and society expenditure.

Although a declined age-adjusted hip fracture rate in most Western countries has been demonstrated over the past decades [1,2], the incidence of hip fracture has increased twofold to threefold in most Asian countries over the past 30 years [3]. Therefore, it is projected that by 2050, more than 50% of all osteoporotic hip fractures will occur in Asia [4]. In addition, patients with hip fracture have a two-fold relative risk of recurrent hip fracture [5]. Thus, preventing first-incident hip fracture should be the most critical issue, particularly in Asian countries.

Risk factor identification is critical for preventing first-incident hip fracture, averting subsequent fractures, and improving both outcome and quality of life after hip fracture. The potential risk factors for hip fracture have been evaluated in the white women and include low bone density, lower body weight, cigarette smoking, caffeine intake, use of long-acting sedatives, and inactivity etc. [6,7]. Because the prevalence of hip fracture in Asian postmenopausal women is higher than that in their Western counterparts, except for Northern Europe, Asian postmenopausal women may have some risk factors for first-incident hip fracture that are different from those of white women. However, current knowledge about the risk factors for hip fracture among Asian women is limited.

According to the recent systemic review, Taiwan not only represents the high-risk area for hip fracture worldwide, but also has the highest incidence of hip fracture as compared with other Asia countries [8]. Thus, determining the risk factors for hip fracture in Taiwanese postmenopausal women is crucial for identifying high-risk individuals in Asian countries,

as well as for developing effective strategies for prevention. Therefore, the present study was designed as a case-control study to investigate the risk factors for hip fracture among postmenopausal women with first-incident hip fracture.

Materials and methods

Study design and subjects

In this case-control study, women with hip fracture (study group) were compared with women without hip fracture (control group) to determine whether the potential risk factors and bone mass differed between the two groups. This study was approved by the Medical Ethics Committee of Chang Gung Memorial Hospital. All participants provided an informed consent form.

This study enrolled patients who were admitted to Keelung Chang Gung Memorial Hospital for an accidental first-incident hip fracture from March 2014 to April 2016. Patients were excluded if they were (1) severely cognitively impaired and completely unable to follow orders, (2) terminally ill, or (3) refused to participate. A total of 100 postmenopausal women were included in the study group.

To obtain a control group with a similar background as the study group, 100 postmenopausal women (without hip fracture) undergoing general health evaluation were recruited from the Gynecology Outpatient Clinic of Keelung Chang Gung Memorial Hospital from March 2014 to April 2016. The control group was matched to the study group according to age.

Assessment of risk factors

Questionnaire and interview

All participants underwent in-person interviews: the study group during admission and the control group at the outpatient clinic. We determined their level of education, body height and weight, age at menopause, parity, history of fracture, parental history of fractures, current or previous therapy with estrogen within the past year, smoking habits, alcohol and coffee intake, calcium supplement, sun exposure more than 30 min per day, and weight-bearing exercise three or more times per week, as well as whether they underwent bilateral oophorectomy before the age of 45. We also examined whether the participants had physician-diagnosed fractures, hyperthyroidism, diabetes mellitus, chronic disease (including coronary heart disease, renal disease, epilepsy, parkinsonism, and cancer), rheumatoid arthritis, stroke, cataracts or glaucoma, and visual impairment or using walking aids. Furthermore, we evaluated their current medication, including hormone therapy, steroid, psychological medication (such as tranquilizers, anti-anxiety medication, and anti-psychological medication), osteoporosis medication, and diuretics (including thiazide diuretic, and behyd).

Assessment of quality of life by using 36-item Short Form Health Survey (SF-36)

The 36-Item Short Form Health Survey (SF-36) is a general health-based survey of quality of life [9], which contains 36

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