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Association of Selective Serotonin Reuptake Inhibitors and Bone Mineral Density in Elderly Women

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Abstract

Depression and osteoporosis are 2 common comorbidities in geriatric patients. There are concerns about the deleterious effects of selective serotonin reuptake inhibitor (SSRI) antidepressant use on bone mineral density (BMD). We examined the association between SSRI use and BMD in elderly women (≥65 yr) referred to a geriatric osteoporosis clinic for bone health evaluation. Cross-sectional analyses using the general linear model were performed on data collected retrospectively from August 2010 to April 2015. A total of 250 women were seen during the study period. Of these, 140 women had complete data on BMD measurements: 22 (15.7%) used an SSRI and 118 (84.3%) did not. The 2 groups, SSRI users and SSRI nonusers, did not differ significantly across any of the covariates tested (age, ethnicity, body mass index, and past and present osteoporosis treatment medications). After adjusting for covariates, there was no difference in the BMDs at the femoral neck ($p = 0.887$) or the spine ($p = 0.275$) between the 2 groups. Similarly, no difference was seen in the *T*-scores between SSRI users and nonusers at the femoral neck ($p = 0.924$) or at the spine level ($p = 0.393$). Our study did not show an association between SSRI use and BMD among elderly women referred for bone health evaluation. Other studies in the literature have been inconclusive, and therefore, robust longitudinal studies are needed to further assess the interaction between SSRI use and predictors of fracture such as BMD, bone turnover markers, and genes involved in bone turnover. Until then, clinicians should closely monitor the bone health of long-term SSRI users.

Key Words: Bone mineral density; depression; elderly; osteoporosis; selective serotonin reuptake inhibitors.

Introduction

Treating multiple comorbidities in the elderly becomes challenging, specifically when side effects of a medication for one worsens conditions of other coexisting diseases. Osteoporosis and depression are 2 such diseases because a more pronounced bone loss (evidenced by low bone mineral density [BMD]) is thought to be a concern in patients who take a specific antidepressant, for example, selective serotonin reuptake inhibitor (SSRI) *(1)*. The dramatic increase in life expectancy has significantly contributed to the rise of the elderly population, who often suffer from combined diagnoses of osteoporosis and depression. In the United States, about 11.9% of adults aged 60 and over suffer from depression *(2)* and about 53 million people either have osteoporosis

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or low bone mass (3), both causing significant morbidity and mortality, thereby contributing to the rising cost of health care (3). One in seven community-dwelling older adults and up to half of nursing home residents are prescribed antidepressants (4). SSRIs are the most commonly prescribed antidepressants and are preferred over other antidepressants for their favorable side-effect profile (5).

Current literature is inconclusive about the association between the use of SSRIs and osteoporosis (6–9). Except for the Study of Osteoporosis Fracture, which reported associations between SSRI use and faster rate of bone loss in elderly women (age ≥65 yr) (7), most of the contradictory studies (Geelong Osteoporosis Study, The Study of Osteoporotic Fractures study, and Study of Women's Health Across the Nation study) investigated associations between SSRI use and BMD in women of younger age, including both pre- and postmenopausal ages (6,8,9). A clear need of further research to confirm the controversial questions of the deleterious effects of SSRI use on bone loss in older women (>60 yr old) was thus reported in a systematic review (1). In addition to the conflicting results, the published studies reporting associations between SSRI use and BMD investigated this question among community-dwelling individuals who are at no more than the expected risk of age-related bone loss. Thus, it is unclear if the conflicting reports of the deleterious effects of SSRI on BMD are due to variances in bone health status of the patient populations tested. We evaluated the relationship between the use of SSRI and BMD in the femoral neck and the lumbar spine in a cohort of elderly women (≥60 yr old), who were deemed at very high risk of fragility fracture by their primary care physicians because of low BMD and were referred to a geriatric osteoporosis clinic for further evaluation and management of low bone mass or osteoporosis or fragility fracture. The contribution from the present study is important to the existing pool of literature because the effect of SSRI use on BMD needs to be carefully examined in various patient populations, and until then, primary care physicians, psychiatrists, or geriatricians should be vigilant while prescribing SSRI on a long-term basis to their elderly patients.

Methods

Setting

In the present study, we included patients who were deemed at high risk of fragility fracture. These patients were referred to the geriatric osteoporosis clinic, a specialty clinic established to improve the skeletal health in the elderly, where they are evaluated and treated by a geriatric bone expert. Data on these patients were abstracted from a database generated through a quality improvement study approved by the Institutional Review Board of the University of Texas Health Science Center at Houston. Because of the limited number of male subjects meeting the inclusion criteria, only women were included in this analysis.

Design

The present study is a cross-sectional analysis of retrospectively collected data on all patients seen at the geriatric osteoporosis clinic from August 2010 to April 2015. Electronic medical records were reviewed to extract data on the variables of interest: age, gender, race/ethnicity, body mass index (BMI), height, weight, use of SSRI, BMD measurements, and other comorbid illnesses. Clinical records of BMD as reported by radiology reports in patients' charts were used to collect data on femoral neck and spine BMDs and bone mass. We defined SSRI by the Food and Drug Administration-approved list of medications that are in clinical use for depression, for example, citalopram, escitalopram, fluoxetine, paroxetine, and sertraline.

Analysis

All analyses were performed using the software IBM SPSS version 21 (Taylor & Francis, 2013, Columbia, MO). The Shapiro-Wilk test was performed on continuous variables to test for normal distribution. Independent sample *t* tests were performed on continuous variables and chi-square tests on categorical variables to test for differences between SSRI users and SSRI nonusers across different variables, including age, gender, race, etc. The effect of SSRIs on BMD was estimated using the general linear model, with age, gender, race, osteoporosis treatment medications (past and present), and BMI as the covariates. Age, gender, race, and BMI were chosen as covariates because these are known to affect BMD. A p value that is smaller than 0.05 was considered significant.

Results

A total of 250 women were seen in the Center for Healthy Aging during the period August 2010 to April 2015. Out of the total sample, 140 women had complete data on BMD measurements. Of the total 140 women, 22 (15.7%) used SSRI and 118 (84.3%) did not use SSRI. Table 1 shows the baseline characteristics of this population. There were no significant differences in age ($p = 0.750$) or ethnicity (0.559). BMI was available for all the patients and was not significantly different between the 2 groups ($p = 0.506$). There was a significant difference between the 2 groups for depression ($p = 0.011$). Other comorbid conditions such as diabetes, hypertension, hypothyroidism, cancer, osteoporosis, and dementia were similar between the 2 groups. The 2 groups, SSRI users and SSRI nonusers, did not differ significantly for present treatment with osteoporosis medications ($p = 0.823$), past treatment with osteoporosis medications ($p = 0.170$), use of calcium ($p = 0.898$), or use of vitamin D ($p = 0.143$). There was no significant difference in the indicators of functional decline in the elderly, such as living alone ($p = 0.552$), activities of daily living ($p = 0.358$), history of fall ($p = 0.635$), dizziness ($p = 0.181$), and gait abnormality ($p = 0.369$). There was no significant