



Use of corticosteroids is not associated with repeated vertebroplasty or kyphoplasty within one year after the surgery in patient older than 50 years



Feng-Chen Kao^{a, b}, Yao-Chun Hsu^{c, d, *}, Chin-Hsien Wu^{a, b}, Chang-Bi Wang^e, Yuan-Kun Tu^{a, b}, Pao-Hsin Liu^f

^a Department of Orthopaedics, E-Da Hospital, Kaohsiung, Taiwan

^b School of Medicine, I-Shou University, Kaohsiung, Taiwan

^c Big Data Research Center and School of Medicine, Fu-Jen Catholic University, New Taipei, Taiwan

^d Department of Internal Medicine, E-Da Hospital, Kaohsiung, Taiwan

^e Department of Nursing, Central Taiwan University of Science and Technology, Taichung, Taiwan

^f Department of Biomedical Engineering, I-Shou University, Kaohsiung, Taiwan

ARTICLE INFO

Article history:

Received 7 February 2017

Received in revised form

5 July 2017

Accepted 12 October 2017

Available online 31 October 2017

Keywords:

Corticosteroid

Steroid

Vertebral compression fracture

Vertebroplasty

Kyphoplasty

ABSTRACT

Objective: The aim of this study was to investigate whether corticosteroid use increases the incidence of repeated PVP or kyphoplasty patients older than 50 years.

Methods: This study enrolled the data of 2,753 eligible patients from the Taiwan National Health Insurance Research Database who were exposed to systemic corticosteroids for at least 3 months during the first year preceding the first PVP or kyphoplasty. These steroid users were matched 1:1 in age, sex, and the index date of surgery with non-user controls during the enrollment period.

All patients were followed for 1 year after the first PVP or kyphoplasty. The incidence of repeated PVP or kyphoplasty was compared between the steroid users and controls. A Cox proportional hazards model was developed to account for multiple confounding factors.

Results: The number of patients receiving repeated PVP or kyphoplasty was 233 (8.46%) and 205 (7.45%) in the corticosteroid and control groups, respectively. The Cox proportional hazards model revealed no association between corticosteroid use and repeated PVP or kyphoplasty.

Conclusions: Systemic corticosteroid use for longer than 3 months is not associated with repeated PVP or kyphoplasty within one year of surgery in patient older than 50 years old.

Level of evidence: Level III, Therapeutic study.

© 2017 Turkish Association of Orthopaedics and Traumatology. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Vertebral compression fractures (VCFs) significantly deteriorate quality of life and increase mortality in elderly people.^{1,2} VCFs are estimated to affect 44 million Americans with an annual healthcare cost of 440 million dollars.^{3,4} The morbidities of VCFs include back pain, decreased ambulation, prolonged bed rest, decreased pulmonary function, and decreased ability to live independently.^{4,5} Percutaneous vertebroplasty (PVP) or kyphoplasty is effective and

safe for patients with painful osteoporotic VCFs and persistent pain. Pain relief after PVP or kyphoplasty is immediate, sustained for at least 1 year, and is significantly greater than that achieved using conservative treatment.⁶ However, previous studies have reported that patients receiving PVP or kyphoplasty have a greater risk of new-onset VCFs than that of patients with prior VCFs who did not undergo either procedure.^{7,8} Most new adjacent VCFs occur within 3 months following PVPs or kyphoplasties^{9,10} and new VCFs could occur repeatedly within a few years after PVP or kyphoplasties, if the steps for prevention of VCFs are not immediate and effective.^{8–11} The rate of new VCF occurrence was reported to reach 50% in patients with VCFs.^{12,13}

Patients with symptomatic new VCFs can benefit from PVP or kyphoplasty^{14,15} with respect to pain relief and functional improvement. PVP cannot prevent further fracture. Prevention of

* Corresponding author. Big Data Research Center and School of Medicine, Fu-Jen Catholic University, No.510, Zhongzheng Rd., Xinzhuang Dist., New Taipei City 24205, Taiwan.

E-mail address: holdenhsu@gmail.com (Y.-C. Hsu).

Peer review under responsibility of Turkish Association of Orthopaedics and Traumatology.

further fracture while treating severe osteoporotic VCFs is crucial. Therefore, recognizing and managing the risk factors for VCFs or new VCFs is critical. Risk factors for VCFs include steroid use, prior VCFs, smoking, the female sex, and local kyphosis.^{16–18} Possible risk factors for new VCFs after PVP or kyphoplasty include chronic oral steroid use, osteoporosis,¹⁹ and the treatment level being the thoracolumbar junction.²⁰

To clarify how corticosteroid use might increase the rate of new VCFs after PVP or kyphoplasty and cause the need for repeating these procedures, we determined the incidence of and calculated the multivariate-adjusted hazard ratio for repeated PVPs or kyphoplasties in a 1-year study period after the first PVP or kyphoplasty for patients with and without exposure to corticosteroids in this population-based cohort study.

Materials and methods

Study design and data source

This was a retrospective cohort study based on an analysis of the National Health Insurance Research Database (NHIRD). The Ministry of Health and Welfare has conducted the National Health Insurance (NHI) program since 1995 to cover the healthcare of 22.9 million residents in Taiwan. More than 99% of the national population is covered by this program. In the NHIRD, diseases are coded according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). Data acquisition for this study was approved by the Taiwan NHRI and the study protocol was approved by the institutional review board of E-Da Hospital.

Definition of the study cohorts and outcomes

In this study, we analyzed the NHIRD to identify study cohorts. Patients with osteoporosis receiving antiresorptive agents, such as bisphosphonate, hormone therapy, and teriparatide, who had received PVP or kyphoplasty for the first time were enrolled in this study (Fig. 1). PVP or kyphoplasty surgeries were done by either unilateral or bilateral approach. Patients exposed to systemic corticosteroid therapy for at least 3 months during the previous year before receiving PVP or kyphoplasty for the first time were enrolled in the corticosteroid group. Patients who did not receive any steroid treatment in the previous year before receiving PVP or kyphoplasty for the first time were enrolled in the control group. The index date for baseline matching and outcome observation was assigned as the date when PVP or kyphoplasty was performed for the first time. The steroid users were then matched 1:1 according to age, sex, and the index date with controls who were not exposed to any dosage of a corticosteroid during the study period. Patients aged <50 years and those who used steroids for less than 3 months were excluded from the study. All patients were followed for 1 year after the first PVP or kyphoplasty was performed. Comorbidities were classified as those existing prior to the first PVP or kyphoplasty, according to Charlson's score.²¹ Repeated PVP or kyphoplasty was recorded in both groups and used for calculation.

Statistical analysis

Continuous variables were summarized as the mean and standard deviation, and categorical variables as the number and proportion. To determine whether corticosteroids were an independent factor predicting repeated PVP or kyphoplasty, multivariate-adjusted hazard ratios (HRs) were calculated using a Cox proportional hazards model. All data management and HR calculations were performed using the SAS system (version 9.4; SAS

Institute, Cary, NC). The calculated results were expressed as a ratio along with 95% confidence intervals (CIs). P values lower than 0.05 were defined as significant in all statistical tests.

Results

Baseline characteristics of the study population

In total, we screened 28,448 patients received PVP or kyphoplasty. Among those patients, 494 cases with age younger than 50 year old and 14,757 cases with systemic corticosteroid therapy for less than 3 months were excluded. There were 4668 patients with systemic corticosteroid therapy for more than 3 months and 8529 patients without steroid therapy. After 1:1 matching in this study, 5506 patients who were eligible for the study (Fig. 1). The corticosteroid and control groups contained 2753 patients each. The study included 1714 male and 3792 female patients. The baseline characteristics and comorbidities of the 5506 patients are listed in Table 1.

Repeated PVP or kyphoplasty between the study cohorts

The number of patients receiving repeated PVP or kyphoplasty was 233 (8.46%) and 205 (7.45%) in the corticosteroid group and control group, respectively (Table 1). A Cox proportional hazards model revealed no association between corticosteroid use and repeated PVP or kyphoplasty.

The multivariate-adjusted model demonstrated that diabetes and malignant tumors were associated with an increased rate of repeated PVP or kyphoplasty (adjusted HR, 0.77; 95% CI, 0.61–0.96 and 0.39; 95% CI, 0.19–0.82, respectively; $P < 0.05$) (Table 2). In the unadjusted analysis, dementia, connective tissue disease, and diabetes with end organ damage were associated with repeated PVP or kyphoplasty (HR, 0.64; 95% CI, 0.43–0.95, 1.34; 95% CI, 1.03–1.75, and 0.61; 95% CI, 0.40–0.91, respectively); however, this association was nonsignificant in the multivariate-adjusted Cox proportional hazard model (Table 2). The relationships between comorbidities and repeated PVP or kyphoplasty are shown in a forest plot (Fig. 2).

Discussion

Corticosteroids can cause adverse effects after long-term use. One possible adverse effect of the usage of corticosteroids is bone mass loss, especially of the trabecular bone (the predominant bone type in the vertebrae).²² Bone mass loss is more pronounced in the first month after therapy and 10%–20% trabecular bone loss occurs in the first 6 months after therapy. Annual bone mass loss of 2% occurs in the subsequent years. In addition, the loss of cortical bone (at a greater proportion in long bones) occurs at a rate of 2%–3% in the first year. Subsequently, slow and continuous loss of cortical bone persists.²³ The bone mineral density (BMD) decreases significantly after the receipt of a dose of prednisone ≥ 7.5 mg for 3 months.²³ Therefore, the fracture risk is expected to increase after glucocorticoid administration for 3–6 months.²⁴ In addition, a clinical study reported that the incidence of vertebral and non-vertebral fractures increases by approximately 30%–50% in patients using corticosteroids for >3 months.²³ Furthermore, the risk of fracture for the same BMD is higher in glucocorticoid-induced osteoporosis than in postmenopausal or senile osteoporosis.²⁵

Approximately 33% of patients on glucocorticoids have fractures, mainly in the vertebrae, and only 30% of such fractures are symptomatic.²⁶ A previous population database study in the United Kingdom showed that the risk of fractures, mainly vertebral fractures,²⁷ significantly increased in patients using glucocorticoids. Some studies have reported that risk factors for VCFs include

Download English Version:

<https://daneshyari.com/en/article/8795481>

Download Persian Version:

<https://daneshyari.com/article/8795481>

[Daneshyari.com](https://daneshyari.com)