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Original Research

Hip fractures in patients admitted to emergency departments may increase the risk of acute affective disorders: A national population-based study

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Abstract

Background: Hip fractures are commonly experienced by the elderly, and their impact has increased as society has aged. The symptoms of hip fractures (e.g., severe pain and limited daily functions) are thought to cause acute stress to patients; however, the association between fractures and affective disorders is not fully understood.
Aim: This nationwide population-based study aimed to analyze the risk of affective disorders in patients diagnosed with a hip fracture.
Methods: We used data from the Taiwan Longitudinal Health Insurance Database. Patients who had a history of hip fracture and affective disorders prior to the study period were excluded. A total of 3865 patients who came to emergency departments for treatment of hip fractures between 2004 and 2009 were compared to 11,595 matched control individuals (without hip fracture). Each patient was followed for 1 year to identify episodes of affective disorders. Cox proportional hazards models, adjusted for residence and sociodemographic characteristics, were used to compare the risk of affective disorders in the study and control groups, and affective disorder-free survival curves were generated.
Results: A total of 53 (1.4%) patients with hip fractures and 32 (0.3%) controls experienced incident affective disorders during the follow-up period. The stratified Cox proportional analysis indicated that the crude hazard ratio comparing the risk of affective disorders in patients with a hip fracture and in controls was 5.1 (95% confidence interval, 3.27–7.86). Most affective disorders (20.8%) presented during the first 60 days following the fracture.
Conclusion: Individuals who experience a hip fracture are at a higher risk of developing affective disorders, and these disorders primarily occur during the first 60 days after the fracture.

Keywords: affective disorders; database; hip fracture

1. Introduction

Hip fractures are common emergency medical problems in patients aged > 60 years; the incidence of this type of fracture is reported to be as high as 10%.[1–5] Regional investigations have demonstrated that the annual numbers of incident hip fractures have surpassed 125,000, 90,000, and 25,000 in the United States, Japan, and Germany, respectively.[6–9] As the average life expectancy of the population increases, the number of hip fractures increases

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annually, and this number is predicted to double by 2050.[9,10] The impact of hip fractures has increased in many developed and developing countries, especially those with large populations of elderly individuals.[11,12] Physical complications following hip fractures include increased comorbidities (infections and cardiovascular diseases; 50%), a limited ability to care for oneself and perform daily activities (40%), and acute or chronic pain (60%).[13–17] Most patients who have experienced hip fractures experience acute stress and a diminished quality of life. Indeed, one study reported that 50–75% of patients with hip fractures never return to their previous functional level.[14]

Depressive disorder is an affective disorder that disturbs mood, psychomotor activity, cognition, or vegetative function. Specific risk factors for affective disorders include female sex, social isolation, low socioeconomic status, comorbid medical conditions, uncontrolled pain, and functional impairment.[18–22] Therefore, we suspect that patients with hip fractures may experience affective disorders following their injury due to risk factors during the postfracture period. However, this relationship has not been well established. In this study, we used a national Taiwanese-population database to examine the relationship between hip fractures and the risk of affective disorders during a 1-year follow-up period in an Asian society. In our study, diagnosis of hip fracture was associated with an increased risk of affective disorder.

2. Methods

2.1. Database

We used the Longitudinal Health Insurance Database (LHID) for this study. The LHID contains medical claim data that are available to the Bureau of National Health Insurance (NHI) and are provided to scientists in Taiwan for research purposes. The government of Taiwan launched its NHI program in 1995 to provide affordable health care for all residents of Taiwan. As of 2007, over 98% of Taiwan's population was enrolled in this program. The LHID includes original data of one million people who were selected at random. Furthermore, the LHID data used in this study were also randomly sampled from the period 2004–2009. There were no significant differences in sex, age distribution, or average payroll-related insurance premium rates between the patients in the LHID and all NHI enrollees. The LHID has provided a valuable opportunity for researchers to evaluate medical service since 1995. Details on the construction of the database are available online from the Taiwanese National Health Research Institutes.

2.2. Ethics statement

This study was exempt from a full review by the Institutional Review Board of Changhua Christian Hospital (permission code: 121007) because the dataset consisted of anonymized secondary data that were released for research purposes without restrictions.

2.3. Study setting and population

This was a retrospective cohort study. From January 1, 2004, to December 31, 2009, patients were classified into two LHID patient groups: the study group (patients with hip fractures who were admitted to emergency departments) and the control group (patients without hip fractures). The first hospitalization for treatment of a hip fracture during this period was coded as the index hospitalization. The index hospitalization of a control individual occurred during the same month as that of the matched study patient. For the control individuals, index hospitalization was the date on which they were extracted. In this study, all participants were followed for 1 year after their index hospitalization. The likelihood of experiencing an incident affective disorder during the 1-year follow-up period was analyzed for the two groups.

2.4. Inclusion criteria

2.4.1. Definition of patients with hip fractures

Patients with hip fractures were those who were hospitalized (or admitted to an emergency department) with a principal diagnosis of hip fracture according to the criteria established by the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM; code 820-821).[23]

2.4.2. Definition of patients with affective disorders

Patients with affective disorders were defined as having a principal diagnosis with an ICD-9-CM code for major depressive disorder (ICD-9-CM codes 296.2 and 296.3), bipolar disorder (ICD-9-CM codes 296.0, 296.1, and 296.4-296.8), or an unspecified episodic mood disorder (ICD-9-CM code 296.9).[24] The diagnoses of these diseases adhered to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DMS)-IV published by the American Psychiatric Association.

2.5. Exclusion criteria for the study and control groups

All individuals aged < 18 years were excluded from this study. All patients who were previously diagnosed with a hip fracture or affective disorder prior to their index hospitalization date were excluded from this study.

2.6. Quality control for potential ICD-9 overcoding and treatments

To ensure that the medical resources provided by the government-supported NHI program are not overused by the treating hospitals or patients, the diagnoses, treatments, and medications for each patient are randomly and routinely inspected by specialists. Overtreatment or overcoding in ICD-9 is not permitted and can result in fines.

2.7. Study protocol

Our study group included 3865 patients with hip fractures. The control group was selected from the remaining NHI