



Full Length Article

Impact of radiographic vertebral fractures on inpatient healthcare utilization in older women[☆]

Jane A. Cauley^{a,*}, Li-Yung Lui^b, Misti L. Paudel^c, Brent C. Taylor^{c,d,e}, Peggy M. Cawthon^b, Teresa A. Hillier^f, John T. Schousboe^{g,h}, Charles E. McCullochⁱ, Kristine E. Ensrud^{c,d,e}

^a Department of Epidemiology, University of Pittsburgh, Pittsburgh, PA, United States

^b California Pacific Medical Center Research Institute, San Francisco, CA, United States

^c NORC at the University of Chicago, Health Care Department, Bethesda, MD, United States

^d Department of Medicine, University of Minnesota, Minneapolis, MN, United States

^e Center for Chronic Disease Outcomes Research, VA Health Care System, Minneapolis, MN, United States

^f Center for Health Research, Kaiser Permanente Northwest, Portland, OR, United States

^g Park Nicollet Clinic, St. Louis Park, MN, United States

^h Division of Health Policy & Management, University of Minnesota, Minneapolis, MN, United States

ⁱ University of California, San Francisco, San Francisco, CA, United States

ARTICLE INFO

Article history:

Received 4 February 2016

Revised 19 April 2016

Accepted 26 April 2016

Available online 27 April 2016

Keywords:

Osteoporosis

Epidemiology

Health services research

Health economics

Vertebral fractures

Healthcare utilization

ABSTRACT

Background: Vertebral fractures (VFX) are the most common osteoporotic fracture and are associated with higher risk of impaired function, additional fractures and death. The purpose of this analysis was to test the hypotheses that VFX are also associated with greater inpatient healthcare utilization.

Methods: We studied 4709 Caucasian women enrolled in the Study of Osteoporotic Fractures (SOF) and merged SOF cohort data with Medicare claims or Kaiser encounter data. To be included in this analysis, women had to be enrolled in Medicare Fee for Service or Kaiser as of 1/1/1991 and have radiographic information on VFX status at SOF Visit 3 (1991–92). VFX status was assessed using quantitative morphometry on lateral thoracic and lumbar spine radiographs. Prevalent VFX were defined as any height ratio > 3 standard deviations below normal. Women were considered to have a clinical VFX if they reported a new diagnosis of VFX and a clinical radiographic report that confirmed that a VFX was present. Any hospitalization and the number of annualized days of hospitalization were identified through inpatient claims or encounter data. Specific hospitalizations for 5 major common reasons for hospitalizations were also examined.

Results: Over 5-years, 2632 (55.9%) women were hospitalized. In multivariate adjusted models, women with a prevalent radiographic VFX were 21% (95% CI, 2–44%) more likely to be hospitalized for any reason. This association was independent of a number of risk factors including smoking. The annualized rate of inpatient day was, however, similar, 1.67 and 1.48 among women with and without a VFX, respectively, $p = 0.49$. Women with an incident clinical VFX were more likely to be hospitalized including women without evidence of a prevalent radiographic VFX (odds ratio (OR) = 5.33; 95% confidence interval (CI) = 1.81–15.71) and women with a prevalent radiographic VFX (OR = 2.13; 95% CI, 1.05–4.33). Women with a VFX were more likely to be hospitalized specifically for hip fracture or chronic obstructive pulmonary disease (COPD) but not stroke, myocardial infarction or congestive heart failure. The association with COPD was attenuated to non-significance after adjusting for smoking.

Conclusion: Our results extend the potential public health impact of radiographic and clinical VFX to include an increased risk of any hospitalization.

© 2016 Elsevier Inc. All rights reserved.

[☆] This work was supported by the National Institute on Aging (R01 AG005407, R01 AR35582, R01 AR35583, R01 AR35584, R01 AG005394, R01 AG02574, and R01 AG027576).

* Corresponding author at: University of Pittsburgh, Graduate School of Public Health, Department of Epidemiology, 130 DeSoto Street, Crabtree A510, Pittsburgh, PA 15261, United States.

E-mail addresses: jcauley@edc.pitt.edu (J.A. Cauley), LLui@psg.ucsf.edu (L.-Y. Lui), ames0047@umn.edu (M.L. Paudel), taylorbc@umn.edu (B.C. Taylor), PCawthon@sfcc-cpmc.net (P.M. Cawthon), Teresa.Hillier@kpchr.org (T.A. Hillier), John.Schousboe@ParkNicollet.com (J.T. Schousboe), Charles.McCulloch@ucsf.edu (C.E. McCulloch), Kristine.Ensrud@va.gov (K.E. Ensrud).

1. Introduction

Vertebral fractures (Vfx) are the hallmark of osteoporosis [1]. They are the most common osteoporotic fracture with prevalence estimates of 21% of men to 23.5% of women older than 50 years [2]. Only about one-third to one-fourth of Vfx are clinically recognized in women [3, 4]. In men, the proportion of radiographic Vfx that were also clinically diagnosed was much lower, about 14% [5]. This sex differences may reflect different methods for defining Vfx but may also reflect a greater difficulty in distinguishing radiographic Vfx from other non-osteoporotic vertebral deformities in men [6]. Women with Vfx, even those not clinically recognized, experience decreased survival [7] and an increased risk of future fractures [8]. Vfx also cause chronic back pain, limitations with common activities of daily living, and reduced quality of life [9,10]. Data from The National (Nationwide) Inpatient Sample for years 2003–2007 showed a 17% increase in hospitalization for clinical lumbar spine fractures which was accompanied by a 27% increase in hospital charges. These numbers likely underestimate the costs since they included only clinically recognized Vfx [11].

To examine the long-term inpatient healthcare utilization of radiographic and clinical Vfx in a population based sample of women, we linked data from the Study of Osteoporotic Fractures (SOF) to Medicare Fee-For-Service (FFS) Claims data and Kaiser encounter data. We tested the hypothesis that women with either a radiographic or clinical Vfx or both will experience greater inpatient healthcare utilization than women without a Vfx.

2. Methods

SOF is a prospective cohort study designed to identify risk factors for fractures [12]. We recruited 9704 Caucasian women age 65 years and older at 4 US clinical sites from 1986 to 88. Women were excluded from SOF if they were unable to walk unassisted or had bilateral hip replacement. Follow-up visits occurred approximately every 2 years. The study was approved by the appropriate committees on human research, and all the women gave written informed consent.

The analytic sample for this report includes 4709 women who had at least 5-years of FFS/Kaiser data (either full 5-years or deceased within 5-years) and information on Vfx status at SOF Visit 3 (1991–92).

2.1. Clinic measures

Bone mineral density (BMD) was measured at the femoral neck using DXA (Hologic QDR 1000 scanners). Women walked at their usual pace over a 6 m course; the average speed of two trials in meters/second was calculated. Participants self-reported functional limitations (any difficulty with activities of daily living or instrumental activities of daily living (IADL): walking 2–3 blocks, climbing 10 steps, preparing meals, heavy housework, shopping); smoking status (current vs. past/never); physician diagnosis of medical conditions (diabetes, chronic obstructive pulmonary disease (COPD), hypertension, congestive heart failure (CHF), heart attack and stroke) and self-reported health status. Height was measured with stadiometers and weight, balance beam scales. Information on covariates was collected at Visit 2 (1988–1990), Visit 3 (1991–92) or Visit 4 (1992–94) as noted.

2.2. Vertebral morphometry

Lateral radiographs of the thoracic and lumbar spine were taken in accordance with current guidelines. Quantitative vertebral morphometry was performed as previously described [12] to calculate the anterior (H_a), middle (H_m), and posterior (H_p) height for each vertebral body from T4 to L4. Radiographs were first screened for probable fractures to reduce the number of morphometric measurements [12]. Briefly, highly trained technicians separated sets of radiographs into 3 groups termed *normal*, *uncertain*, and *probably fractured*, using a binary

semiquantitative grading scheme that classified women by the most abnormal vertebral level on her films. The performance of the technician triage was evaluated in a random sample of 503 women, all of whose radiographs were triaged and underwent morphometry. The sensitivity of triage for prevalent and incident fractures was 97% and 100%, respectively [13,14]. Morphometry was performed for all women classified as probably fractured. A vertebra was classified as having a prevalent fracture if any of the following ratios were more than 3 SDs below the trimmed normal mean for that vertebral level: (H_a/H_p), (H_m/H_p), or a combination of ($H_{pi}/H_{pi\pm 1}$) [13].

2.3. Ascertainment of incident clinical vertebral fractures

Participants were contacted by mail or phone every 4 months after baseline (>99% of follow-up contacts were completed) and queried about fractures. Women were considered to have a clinical Vfx if they reported a new diagnosis of Vfx and a clinical radiographic report confirmed that a Vfx was present. The follow-up period for incident clinical Vfx was 5 years after visit 3.

2.4. Medicare linkage

Linkage of the SOF cohort to Medicare claims data has previously been described [15]. Medicare data was purchased from 1/1/1991 (earliest available) until 12/31/2010 and successfully linked to 9228 SOF participants. Linkage was performed by matching social security numbers/HIC numbers and verifying agreements on date of birth, date of death, gender, race and state of residence. A large proportion (90%) of Portland OR participants were enrolled in a Kaiser Medicare Advantage plan. We successfully linked these women to Kaiser encounters to obtain inpatient healthcare utilization.

Days of hospitalization were derived for participants enrolled in Medicare FFS using their MEDPAR inpatient claims. For women in Kaiser, we used Kaiser Encounter data to determine any hospitalization and cumulative inpatient days. The follow-up time was limited to 5-years after the Visit 3 X-ray. We identified hospitalization for any cause. We also identified hospitalizations with a primary diagnosis codes for major disease events including myocardial infarction (MI) (ICD-9 4.10), stroke (ICD-9 430, 431, 434, 436), hip fracture (ICD-9 820), CHF (ICD-9 428) and COPD (ICD-9 466, 490–496).

2.5. Statistical analyses

We used two-part models (“hurdle” models) to estimate the likelihood of any hospitalization, the rate ratio of inpatient hospital days

Table 1
Characteristics by prevalent vertebral fracture status (N = 4709).

	Prevalent vertebral fracture status		p-Value
	No (n = 3612)	Yes (n = 1097)	
Age (year)	74.4 ± 4.7	76.3 ± 5.4	<0.0001
Weight (kg)	67.2 ± 12.6	64.8 ± 12.8	<0.0001
Height (cm)	159.0 ± 5.9	157.1 ± 6.1	<0.0001
Self-reported health status (excellent/good)	86.0%	81.7%	0.0009
Myocardial infarction ^a	8.2%	7.2%	0.28
Chronic obstructive pulmonary disease ^a	10.7%	11.6%	0.39
Comorbidity (number) ^b	0.8 ± 0.9	0.8 ± 0.9	0.53
Current smoker ^a	5.5%	8.2%	0.002
Walking speed (m/s)	0.96 ± 0.22	0.90 ± 0.23	<0.0001
IADL impairments (number)	0.7 ± 1.2	0.9 ± 1.4	<0.0001
Femoral neck bone mineral density (g/cm ²) ^c	0.66 ± 0.11	0.60 ± 0.10	<0.0001

^a Measurements from Visit 4.

^b Comorbidity included diabetes, stroke, hypertension, congestive heart failure, myocardial infarction, and chronic obstructive pulmonary disease.

^c Measurement from Visit 2.

Download English Version:

<https://daneshyari.com/en/article/5889036>

Download Persian Version:

<https://daneshyari.com/article/5889036>

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