

Lower Urinary Tract Symptoms and Risk of Nonspine Fractures among Older Community Dwelling U.S. Men



Lynn M. Marshall^{*,†}, Jodi A. Lapidus, Jack Wiedrick, Elizabeth Barrett-Connor,[‡] Douglas C. Bauer, Eric S. Orwoll and J. Kellogg Parsonst for the Osteoporotic Fractures in Men (MrOS) Research Group

From the Department of Orthopaedics and Rehabilitation (LMM), Department of Public Health and Preventive Medicine, Division of Biostatistics (JAL, JW), and Department of Medicine, Bone and Mineral Unit (ESO), Oregon Health and Science University, Portland, Oregon, Department of Family and Preventive Medicine (EB-C), and Division of Urologic Oncology, Moores Comprehensive Cancer Center (JKP), University of California San Diego, and Division of Urology, San Diego Veterans Affairs Medical Center (JKP), La Jolla, and Department of Medicine and Department of Epidemiology and Biostatistics, University of California San Francisco, San Francisco (DCB), California

Abbreviations and Acronyms

AUA-SI = American Urological Association Symptom Index
BMD = bone mineral density
BPH = benign prostatic hyperplasia
CNS = central nervous system
LUTS = lower urinary tract symptoms

Purpose: Among older men, moderate and severe lower urinary tract symptoms are associated with increased fall risk compared to mild lower urinary tract symptoms. Falls are a major risk factor for fractures. Therefore, we assessed associations of lower urinary tract symptoms with fracture risk in community dwelling U.S. men age 65 years or older.

Materials and Methods: We conducted a prospective study in the MrOS (Osteoporotic Fractures in Men Study) cohort. Men were enrolled at 6 U.S. sites. The AUA-SI, lower urinary tract symptoms medication use, fracture risk factors and potential confounders were recorded at baseline and every 2 years thereafter for 4 assessments. Lower urinary tract symptom severity was categorized from the AUA-SI as mild (0 to 7 points), moderate (8 to 19 points) or severe (20 or more points). Associations of lower urinary tract symptom severity with fracture rate were estimated with HRs and 95% CIs from extended proportional hazards regression.

Results: Among 5,989 men with baseline AUA-SI score and hip bone mineral density measures, 745 incident nonspine fractures occurred during 43,807 person-years of followup. In a multivariable model adjusted for age, enrollment site, baseline hip bone mineral density, falls in the last year and prevalent fracture before baseline, there were no significant associations of moderate (HR 0.9, 95% CI 0.8–1.1) or severe (HR 1.0, 95% CI 0.8–1.3) lower urinary tract

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* Correspondence: marshaly@ohsu.edu.

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symptoms with fracture risk. None of the individual lower urinary tract symptoms assessed on the AUA-SI, including nocturia and urgency, was associated with increased fracture risk.

Conclusions: In this cohort of older U.S. men, lower urinary tract symptoms were not independently associated with fracture risk.

Key Words: lower urinary tract symptoms; male; aged; fractures, bone

MODERATE to severe lower urinary tract symptoms occur among 1 in 3 men older than 40 years in the United States.¹ LUTS prevalence increases with age, to at least 25% of men age 60 years or older and to 70% of men age 80 years or older having moderate or severe symptoms.^{1–3} In addition to their well characterized urological morbidities, moderate and severe LUTS exert a substantial negative impact on nonurological aspects of health including quality of life, instrumental activities of daily living, depression and mortality.^{2,4–7} Given the expected increase in the size of the elderly male population,⁸ further elucidating the negative consequences of LUTS on overall health may substantially improve health care delivery in this population.

LUTS also are associated with increased risk of falls in older men.^{9–11} Bone fractures are one of the most serious injuries resulting from a fall.¹² Therefore, we reasoned that LUTS may be positively associated with fracture risk in this population as well. Adaptive behaviors to symptoms that prompt potentially risky physical reactions and could cause a fall would be the most likely mechanism by which LUTS would increase fracture risk. For example, urinary urgency may provoke sudden, impulsive movements to avoid social embarrassment, and nocturia may disrupt sleep patterns and compel affected individuals to rise repeatedly from a recumbent position to navigate darkened environments.¹³

The possible association of LUTS with fracture risk has received limited attention. Two small prospective studies have suggested positive associations of nocturia with the risk of hip fracture.^{14,15} However, in the absence of larger studies assessing other urinary symptoms and controlling for confounding effects of age, comorbidities and established risk factors for fractures, associations of LUTS with fracture risk in older men remain unclear. Therefore, we investigated the association of LUTS severity with the risk of incident fractures in a large cohort of older U.S. men. LUTS information was obtained with the AUA-SI, a validated instrument widely used in clinical practice and epidemiological studies to assess the severity and bother of LUTS.¹⁶ We hypothesized that moderate or severe LUTS would be associated with increased fracture risk compared to mild LUTS, independently of established fracture risk factors.

MATERIALS AND METHODS

The MrOS is a prospective cohort study designed to identify risk factors for falls, fractures and prostate disease among community dwelling older U.S. men. As previously described,¹⁷ men age 65 years or older, able to walk unassisted by another person and possessing at least 1 natural hip (for bone density measurement) were eligible. From March 2000 through April 2002, 5,994 participants completed the baseline questionnaire and in-person visit at 1 of 6 academic medical centers in Birmingham, Alabama; Minneapolis, Minnesota; Palo Alto, California; Pittsburgh, Pennsylvania; Portland, Oregon and San Diego, California. Participants alive and active in the MrOS were contacted about every 2 years to update their information in 2002 to 2004, 2005 to 2006, 2007 to 2009 and 2009 to 2011 (fig. 1). At each assessment 96% or more participated. Institutional review boards at each institution approved the study. All participants gave written informed consent.

Self-reported items obtained only at baseline were race, education, history of problem drinking,¹⁸ history of fracture after age 50 years, history of prostate cancer as well as daily average dietary intake of vitamin D (IU), calcium (mg) and caffeine (mg) estimated from a food frequency questionnaire.¹⁹

The AUA-SI,¹⁶ prostatitis history, BPH history, medications, health history and most other self-report measures were obtained at all 4 assessments from baseline through 2007 to 2009 (fig. 1). LUTS were defined from the AUA-SI score as mild (0 to 7 points), moderate (8 to 19 points) or severe (20 to 35 points).¹⁶ Urinary bother was categorized as 0 to 2 (low), 3 and 4 to 6 (high).¹⁶ BPH

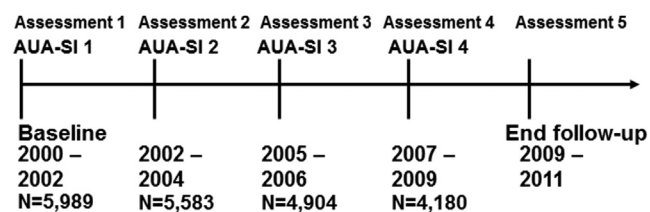


Figure 1. Timeline of MrOS assessments used in this analysis. Repeated AUA-SI points are shown along with numbers of cohort members alive and free from fracture at start of each assessment interval. During followup 13% of men in analytic cohort had first fracture, 20% died with no fracture and 2% voluntarily withdrew before death or fracture. Refusal to participate in assessment ranged from 1% to 2%. However, men who refused returned to analysis cohort if they participated in subsequent assessment.

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