

Reproductive history and fracture risk in postmenopausal women in a US national survey

Estrogen promotes bone health, long-term replacement delaying osteoporosis,¹ while sex steroids given for menstrual irregularity to premenopausal women increase bone mass.² We therefore assessed the relation between reproductive health and fracture risk in postmenopausal women (≥ 50 years) in the US National Health and Nutrition Examination Survey (NHANES).³

In the 2013–2014 survey, fracture risk as FRAX scores⁴ was reported in an osteoporosis questionnaire with calculation of the 10-year risk of major hip fracture. We collected data on the age at last menstrual period, last live birth, and first live birth as continuous variables, and documented history of pregnancy and infertility as categorical variables. We divided the population into two groups according to the 10-year risk of a major osteoporotic fracture as recommended by the International Society of Clinical Densitometry. The first group was considered to be at increased risk ($\geq 20\%$ risk of a major fracture in 10 years), and the second at normal risk ($< 20\%$ in 10 years). We used SPSS Version 18 for statistical analysis, assuming non-Gaussian distribution of the variables with the non-parametric Wilcoxon rank sum test, and using Spearman correlation (ρ) to assess the relation between duration of estrogen use (in months) and fracture risk.

The study population was 1442 women [mean age 64.9 (SD 9.5) years]. Age at first live birth was not different between those at increased and normal risk of osteoporotic fracture [21.8 (4.4) vs 21.6 (3.0) years, $p=0.8$]. However, women at increased risk were older when they last gave birth [35.6 (5.5) vs 29.3 (6.3) years, $p=0.029$]. There was no difference in 10-year risk of hip or major osteoporotic fracture between women with a history of treatment for infertility and those without ($p=0.85$ and $p=0.87$, respectively). There was no correlation between estimated FRAX scores and duration of estrogen treatment (in months) ($p=0.3$).

The limitations of our study were the inability to adjust for all

covariates, such as medication history, and having to rely on the FRAX tool, which may not represent the true fracture risk in all women. However, our findings show that being older when a woman last gives birth may be associated with increased risk of fracture. Hormonal contraception and lactation influence bone mass, although in different and conflicting ways.⁵ Another study found that femoral neck bone mineral density decreased by 1.1% for each live birth while lumbar spine density increased by 1.5% for each breastfed infant.⁶ Age at menopause had no effect on lumbar spine or femoral bone mineral density at the age of 75 years.⁷

We conclude that a woman's reproductive history may affect her long-term risk of osteoporotic fractures. Further studies are warranted to characterise which aspects of reproductive history have the greatest impact.

Prasanna Santhanam

Division of Nuclear Medicine and Molecular Imaging, The Russell H Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine, Baltimore, MD, USA; psantha1@jhmi.edu

Steven P Rowe*

Division of Nuclear Medicine and Molecular Imaging, The Russell H Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA; srowe8@jhmi.edu

Lilja B Solnes

Division of Nuclear Medicine and Molecular Imaging, The Russell H Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA; lsolnes1@jhmi.edu

*Corresponding author

Contributors PS was involved in the literature search. SR and LS were involved in significant design inputs. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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