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Bilateral Oophorectomy Associated With Higher Prevalence of Low Bone Mineral Density and Arthritis in Younger Women

- Women who had both ovaries removed before age 45 had lower bone mineral density, an important predictor of osteoporosis, than women with intact ovaries.
- These women were also more likely to report a diagnosis of arthritis.
- Few other studies have measured bone mineral density among women who underwent oophorectomy.

SAN ANTONIO — Women who underwent surgery to remove their ovaries before the age of 45 years were more likely to have arthritis and low bone mineral density compared with women with intact ovaries, researchers found.

Anne Marie McCarthy, Sc.M., a doctoral candidate in epidemiology at Johns Hopkins Bloomberg School of Public Health, presented the results at the 2011 CTRC-AACR San Antonio Breast Cancer Symposium, held Dec. 6-10, 2011.

“Our study suggests that some women with oophorectomy, particularly at a young age, can experience clinically relevant decreases in bone mineral density (BMD). Clinicians need to be aware of this so they can intervene early if required,” McCarthy said.

She and senior investigator Kala Visvanathan, M.D., MHS, associate professor at Johns Hopkins Sidney Kimmel Cancer Center and Bloomberg School of Public Health, examined associations of oophorectomy with arthritis and BMD in the Third National Health and Nutrition Examination Survey (NHANES III), a nationally representative survey conducted from 1988 to 1994.

The BMD analysis included 3,660 women, and the arthritis analysis included 4,039 women. Women aged 40 years and older who had no cancer history and reported a bilateral oophorectomy or intact ovaries were included for analysis.

Researchers used dual-energy X-ray to measure BMD in the femoral neck.

Women who had both ovaries removed before 45 years of age and who never used HRT had a lower BMD on average than women with intact ovaries (0.691 g/cm² vs. 0.729 g/cm², respectively). They were also twice as likely to have very low bone mineral density compared to women with intact ovaries.

Participants were also asked if they had been diagnosed with arthritis. Researchers found that 45.4 percent of women who had oophorectomy reported arthritis compared with 32.1 percent of women with intact ovaries. They found a higher prevalence of arthritis — 47.7 percent — among women who had undergone oophorectomy before 45 years of age.

“[The study] highlights the need for more research in this area to identify those women at risk and to determine appropriate screening and preventive strategies for these young women,” McCarthy said.

She added that NHANES III is a cross-sectional study, so “therefore, we cannot make statements on whether oophorectomy actually causes osteoporosis or arthritis at this time.”

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The mission of the CTRC-AACR San Antonio Breast Cancer Symposium is to produce a unique and comprehensive scientific meeting that encompasses the full spectrum of breast cancer research, facilitating the rapid translation of new knowledge into better care for patients with breast cancer. The Cancer Therapy & Research Center (CTRC) at The University of Texas Health Science Center at San Antonio, the American Association for Cancer Research (AACR) and Baylor College of Medicine are joint sponsors of the San Antonio Breast Cancer Symposium. This collaboration utilizes the clinical strengths of the CTRC and Baylor and the AACR’s scientific prestige in basic, translational and clinical cancer research to expedite the delivery of the latest scientific advances to the clinic. The 34th annual symposium is expected to draw nearly 8,000 participants from more than 90 countries.

Presenter: Anne Marie McCarthy, Sc.M.

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Title: Bilateral Oophorectomy Is Associated with a Higher Prevalence of Arthritis and Lower Bone Mineral Density in Women 40 Years and Older.

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Background: BRCA 1/2 mutation carriers are encouraged to have their ovaries removed by age 40 to reduce cancer risk and prolong survival. Given the recency of genetic testing, it will be some years before robust estimates are available of the long term adverse effects. In the meantime data from the general population can help inform women and providers about potential adverse effects so that preventive strategies can be implemented. Bone loss accelerates following natural menopause and oophorectomy before age 45 is a known risk factor for osteoporosis. However there is limited data quantifying the effects of bilateral oophorectomy on bone mineral density (BMD), an early sensitive marker of osteoporosis.

Methods: We evaluated the associations of oophorectomy with arthritis and BMD in NHANES III, a nationally representative survey conducted 1988-1994. For analysis we included women aged 40 years and older with no history of cancer who reported a bilateral oophorectomy or intact ovaries. Women were asked if a doctor told them they had arthritis. Femoral neck BMD was measured by dual energy x-ray (DXA). Osteoporosis was defined as BMD (g/m²) more than 2.5 standard deviations below the mean of white women aged 20-29 years. Survey weights were used to account for the complex survey design. Odds Ratios (OR) for arthritis and osteoporosis were estimated using logistic regression. Oophorectomy status was categorized intact ovaries, oophorectomy <45 years, and oophorectomy ≥45 years. Multivariate models were adjusted for age at interview, race, income, smoking status, education, alcohol, and BMI. Analyses were repeated excluding women who reported using hormone replacement therapy (HRT).

Results: The sample size was 4039 for the arthritis analysis and 3660 for the BMD analysis. Women with oophorectomy were more likely to report arthritis than women with intact ovaries (45.4% vs. 32.1% p<0.001). The prevalence was even higher in women with oophorectomy <45 years (47.7%). The age-standardized mean femoral neck BMD was lower for women reporting oophorectomy at <45 years than women with intact ovaries (0.711 vs. 0.743 g/m² p=0.017). In multivariate models women with oophorectomy had greater odds of arthritis than women with intact ovaries, particularly among women with oophorectomy <45 years (OR=1.78 95% CI 1.31-2.42). The odds of arthritis were even greater after excluding HRT users (OR=1.99 95% CI=1.25-3.18). Similarly, women who had a prior oophorectomy had greater odds of osteoporosis than women with intact ovaries, particularly among women with oophorectomy <45 years (OR=1.78 95% CI 1.07-2.97). The odds were increased further after excluding HRT users (OR=2.92 95% CI 1.32-6.44).

Conclusions: The prevalence of arthritis and osteoporosis were significantly greater in women who reported bilateral oophorectomy. Results were most profound among women whose oophorectomy was performed before age 45 and among women who never used HRT. These

results suggest that women who undergo oophorectomy for cancer prevention should be closely monitored for osteoporosis over the long term.