

# Interventions to Prevent Loss of Bone Mineral Density in Women Receiving Chemotherapy for Breast Cancer

Karen K. Swenson, RN, PhD(c), AOCN®, Susan J. Henly, PhD, RN, Alice C. Shapiro, PhD, RD, LN, and Lynne M. Schroeder, RN, MS, OCN®

**B**reast cancer is the most common cancer diagnosed among women in the United States, with an estimated incidence of 211,240 cases per year (Jemal et al., 2005). The age-adjusted incidence rate of breast cancer continues to rise in the United States, whereas mortality rates decrease (National Cancer Institute, 2003). From 1992–1999, the five-year survival rate in the United States improved to 87% overall, representing a 10% increase in survivors over previous time periods.

Although cancer in general is considered a disease of the older population, approximately 25% of patients with breast cancer are premenopausal at diagnosis (Ries, Kosary, Hankey, & Miller, 1999). Breast cancer is the leading cause of cancer-related death in women aged 20–59 (Jemal et al., 2005). Therefore, breast cancer is an important health issue for younger women because of the pervasiveness of the disease and the associated mortality.

## Treatment

According to the most recent consensus conference recommendations from the National Institutes of Health (NIH, 2000a), adjuvant chemotherapy should be given if the breast cancer is more than 1 cm in

Loss of bone mineral density (BMD) is a significant problem for women receiving breast cancer treatment. The purpose of this article is to present the state of the knowledge on BMD loss and analyze interventions to prevent BMD loss in women receiving breast cancer treatment. The data sources include primary research reports, review articles, and book chapters. With increased numbers of breast cancer survivors, BMD loss experienced with treatment is a significant health concern because of risks of osteoporosis and bone fractures. These long-term treatment effects may significantly impact patients' long-term morbidity and mortality. BMD screening as well as an assessment of physical activity and dietary history should be conducted with women undergoing breast cancer treatment. Bisphosphonates are effective in preventing BMD loss, and other interventions such as physical activity and dietary interventions need further testing. Oncology nurses are ideal candidates for implementing interventions to prevent BMD loss because of their understanding of cancer treatments, knowledge of health-related behaviors, and ability to teach patients about the positive health benefits of lifestyle changes.

diameter. In addition, for patients who have estrogen and progesterone receptor-positive cancer, five years of antiestrogen therapy is recommended.

Chemotherapy treatments for breast cancer cause acute side effects such as nausea and fatigue. However, long-term side effects are also important to increas-

ing numbers of cancer survivors. A common side effect for younger women undergoing chemotherapy for breast cancer is early-onset menopause. Cyclophosphamide, the most common chemotherapy given for breast cancer, causes progressive destruction of oocytes and is associated with amenorrhea in women receiving breast cancer treatment (Bines, Oleske, & Cobleigh, 1996). Among premenopausal women undergoing chemotherapy (with a mean age of 43.7 years at diagnosis), nearly 40% experienced menopause by age 40, and 80% experienced menopause by age 45, compared to a mean age of 52 for natural menopause (Goodwin, Ennis, Pritchard, Trudeau, & Hood, 1999). Early-onset menopause associated with breast cancer chemotherapy leads to accelerated bone mineral density (BMD) loss (Shapiro, Manola, & Leboff, 2001).

The purpose of this article is to summarize the knowledge about mechanisms of bone loss in patients with breast cancer and evaluate interventions to prevent bone loss in women receiving

*Submitted October 2003. Accepted for publication December 14, 2004.*

Digital Object Identifier: 10.1188/05.CJON.177-184