

## Medical Oncology/Hematology

### Bone Health in Cancer

Treatments for cancer have significant effects on bones. In premenopausal women, chemotherapy leads to early menopause, accelerating bone loss. In postmenopausal women with breast cancer and in men with prostate cancer, the hormone supplementary therapy can enhance osteoporosis. Bone metastasis is common in many cancers and leads to bone pain, fractures, immobility and blood clots.

Bone health is evaluated by bone mineral density (BMD). The World Health Organization (WHO) developed a risk assessment tool (FRAX), combining BMD with other risk factors for fracture, including age, to provide estimates of 10 year risk for fracture. Medicare guidelines recommend treatment for patients with 10-year FRAX risk of 3% for hip fracture and greater than 20% for all major fractures.

Initial strategies for prevention and treatment of bone loss include lifestyle modifications such as weight bearing strength training and balance exercises, smoking cessation and limiting alcohol intake, fall prevention and calcium supplements ( at least 1200 mgs daily) and vitamin D (800 - 1000 IU daily). Medications are strongly advised for people with T-score below -2. Estrogen replacement therapy, Raloxifene and terapatide (recombinant parathyroid hormone) are generally used for non-cancer patients. Pamidronate (Aredia) and Zoledronic (Zometa) are used for treatment of bone lesions in cancer patients for pain control and prevention of fractures.

Emerging evidence suggests that these bisphosphonates may have antitumor and antimetastatic properties in breast cancer patients. Oral clodronate combined with chemotherapy for recurrence prevention in early stage breast cancer patients showed promising results. Zoledronic acid (ZA) showed decrease in recurrence in early stage breast cancer patients when combined with endocrine therapy (ABSCG - 12 trial). In Z-FAST and ZO- FAST trials, ZA plus letrozole, up front showed significant benefit compared with ZA given in later years of treatment. Several other studies are ongoing to study this benefit. Denosumab is another promising agent in delaying SRE (skeletal related events).

For bone metastasis- localized therapies, such as radiation and surgery, offer palliation and prevention of impending fracture or cord or nerve compression. Radiation therapy provides response rates of 60% to 70% and complete pain relief in 20% to 30% of patients. Surgery can provide pain relief, provide stabilization and prevent impending fracture or cord compression in lytic lesions that are greater than 2.5 cm or encompass more than 50% of the bone diameter or avulsion of lesser tolerated lesions, or involvement of weight-bearing bones.

Comprehensive approach for bone health in cancer patients includes a multi-disciplinary approach, including systemic anti-cancer therapy, bisphosphonates, analgesics, surgery and radiation therapy, on a case by case basis.



Mohan Nuthakki, MD

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