# Children with Cancer Risk Fragile Bones

Atlanta 2007/02/26 -Physicians caring for children with cancer should be on the lookout for signs of bone fragility caused by disease and treatment, according to a new report. Published in the April 1, 2007 issue of CANCER, a peer-reviewed journal of the American Cancer Society, the review reveals that the combination of sedentary behaviors caused by the chronic illness and inhibition of bone growth and mineralization as side effects of treatments put these children at real risk for bone problems during their lifetime, including bone necrosis and fractures related to osteoporosis. The review says the risk can be mitigated through early management, including exercise and the judicious use of bisphosphonates.

Bone development is a dynamic process. One set of specialized cells lay down the materials that give bone its strength; and another set breaks it down, a process called resorption. In equilibrium, individual, normal bone shape and strength is maintained. At times of systemic or local bone growth – e.g., adolescence, response to increased physical activity, fracture repair – the process of bone formation “outpaces” resorption.

Skeletal formation in general is regulated by a complex hormonal signaling network. Alter any one of the pathways and bone mineral density (BMD) may be changed. For example, osteoporosis is a complication among post-menopausal women for whom estrogen, a potent stimulator of bone formation, has decreased. External factors also impact those pathways and include drugs, diet, and physical exercise.

Studies have shown that children with cancers have multiple risk factors for osteoporosis and fractures. In this new report, Alessandra Sala, M.D., Ph.D. of McMaster University in Hamilton, Ontario and Università di Milano Bicocca in Milan and Ronald D. Barr, M.B., Ch.B., M.D. also of McMaster University review the topic of pediatric cancer, bone loss and management.

According to the authors, there are two factors that negatively effect bone turnover in children with cancer. First, patients with cancer are less physically active. Second, chemotherapy and cranial radiotherapy are linked to decreased bone formation and abnormally low BMD.

This low BMD may persist for years after treatment and is associated with symptoms, which can be as benign as bone pain or as severe as fractures. The authors report that the risk of fractures in children with low BMD significantly increases several fold.

However, several treatments are available to stimulate mineralization and minimize the loss at such a critical bone development stage. These include physical exercise and dietary modification programs as well as drug treatment with a class of drugs used to treat osteoporosis in post-menopausal women called bisphosphonates.

Drs. Sala and Barr conclude that “loss of bone mineral is clearly a common consequence of the treatment of cancer in children and adolescents, fitting the paradigm of chronic disease often attended by therapy.” This requires, the authors add, “recognition that osteopenia in children with cancer is of multi-factorial origin requiring comprehensive strategies for amelioration and prevention.”

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