Young Anorexics Starve Bones During Key Growth

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TAMPA — Anorexia nervosa reduces bone mass and puts young women at risk for early onset of osteoporosis, just at the time when they should be building peak bone mass, Dr. Steven Crawford said at the annual meeting of the International Society for Clinical Densitometry.

Health consequences of anorexia nervosa can be severe. In addition to loss of bone density, the patient can suffer cardiovascular problems, muscle loss and weakness, severe dehydration, anemia, and leukopenia. Female patients with anorexia nervosa are amenorrheic. Anorexia nervosa leads to a sevenfold increase in fracture risk. Of adult women with anorexia nervosa, 38% have osteoporosis, and 50% have a bone mineral density (BMD) level below the fracture threshold.

The extent of bone damage is directly affected by the severity of malnutrition and the disease duration. Consequences are more severe when disease onset occurs during the time of peak bone development. Approximately 60% of total bone mass is attained in the growth spurt that normally occurs in adolescence, and skeletal growth essentially is complete by age 18.

"Bone mineral density is lower when anorexia nervosa begins in adolescence than when it occurs in adult life, even when the duration of illness is comparable," said Dr. Crawford, a clinical psychiatrist at the Center for Eating Disorders, Sheppard Pratt Health System, Baltimore.

Pathophysiology of low bone density in anorexia nervosa results from multiple factors, including undernutrition, hypogonadism, altered levels of bone-essential hormones and growth factors, excessive exercise, and hypercortisolism, among others. Undernutrition in anorexia nervosa leads to decreased levels of the sex hormones critical for bone development.

Levels of insulinlike growth factor–I (IGF-I) and growth hormone normally increase during puberty, and stimulate bone anabolism. In anorexic patients, IGF-I levels decrease, and patients acquire growth hormone resistance. Lack of calcium may prevent bone remodeling normally stimulated by exercise, and hypogonadism may impair the function of osteocytes that normally are activated by exercise.

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DR. CRAWFORD

Low BMD occurs at all skeletal sites in patients with anorexia nervosa, affecting both trabecular and cortical bone.

In addition to decreased BMD, another factor that contributes to bone fragility in patients with anorexia nervosa is decreased bone size. Patients with anorexia nervosa develop smaller bones in the vertebral body and femoral neck, compared with normal patients.

Dr. Crawford recommends a routine bone density scan in all patients with anorexia nervosa at disease onset and at least every 2 years thereafter. Restoration of normal weight can improve BMD in anorexic patients, but bone loss may continue, with bone restoration taking at least 21 months. "One-third of women recovering weight continue to have BMD *z* scores more than two standard deviations below the mean," said Dr. Crawford. Bisphosphonates are not approved for treatment of premenopausal women. Although adequate calcium and vitamin D intake should be provided to patients with anorexia nervosa, supplementation with calcium and vitamin does not increase BMD in anorexic patients. Some evidence suggests that a combination of twice-daily IGF-I administration and estrogen-progesterone treatment may be effective in increasing BMD in anorexic women. Androgen replacement studies have shown conflicting results.

Normally, patients with osteoporosis are advised to engage in weight-bearing exercise such as walking, stair climbing, and weight lifting. However, for patients with anorexia nervosa, the potential benefits of exercise might be offset by the risk of fractures, delayed weight gain, and exercise-induced amenorrhea. "In our program, we recommend 6 months of abstinence from exercise. Then we reintroduce activity into their lifestyle," he said. ■