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THYROID AND BONE

Thyroid Hormone Levels and Bone Density in Men

WHAT IS THE STUDY ABOUT?

It is well established that thyroid hormones affect bone metabolism. Bone turnover is increased in hyperthyroidism and decreased in hypothyroidism. This suggests that individuals with hyperthyroidism have a lower bone mineral density than people whose thyroid hormones are normal. This lower bone mineral density probably places hyperthyroid patients at a greater risk for osteoporotic fractures of the spine, hips and wrists. Conversely, individuals with hypothyroidism may have a higher bone density and thus be at lower risk for osteoporotic fractures. While these relationships are established in patients with thyroid hormone levels outside of the normal range, it is unclear if the relationship remains in patients whose thyroid hormone levels are in the normal range. This study looked at the relationship between bone mineral density and the levels of thyroid hormone in patients whose TSH levels were within the normal range to see if individuals whose thyroid hormones were in the upper part of the normal range might have lower bone mineral density than those in the lower part of the normal range.

THE FULL ARTICLE TITLE:

Kim et al. The association between serum thyrotropin (TSH) levels and bone mineral density in healthy euthyroid men. Clin Endocrinol (Oxf) 2010;73:396-403. doi.1111/j.1365-2265.2010.03818.x

WHAT WAS THE AIM OF THE STUDY?

The aim of the study was to determine if there is a relationship between thyroid hormone levels and bone mineral density in individuals without thyroid disease.

WHO WAS STUDIED?

The study group was selected from a study population of 2000 Korean men undergoing a routine health screening program. A total of 1478 men were eligible for the study because they had normal thyroid stimulating hormone (TSH) levels, were not taking medications that affected the thyroid gland and did not have illnesses that could affect bone metabolism.

HOW WAS THE STUDY DONE?

The patients had an extensive history and physical examination, underwent a panel of blood tests and had bone mineral density measurements made of their lumbar spine and the hip. The serum TSH level was used as the primary measure of thyroid function. The analysis took into account several of the other variables that can affect bone metabolism such as body mass index, smoking and drinking history and age.

WHAT WERE THE RESULTS OF THE STUDY?

After adjusting for smoking and drinking habits, there was a significant association between bone mineral density in the spine and the serum TSH. A low normal TSH was associated with a lower bone mineral density than did a high normal TSH. This association was not statistically significant for the hip after the results were adjusted for the independent effects of smoking and drinking on the bone. More individuals in the lowest 20% of normal TSH levels had osteopenia or osteoporosis of the spine than individuals in the highest 20% of normal TSH levels. Thus, there is an increased likelihood of lower bone mineral density in the spine of men with low normal TSH levels.

HOW DOES THIS COMPARE WITH OTHER STUDIES?

This is consistent with two similar studies carried out in women. One prior study that included men failed to show a relationship between TSH levels within the normal range and bone mineral density levels.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study suggests that a low normal TSH level in men is associated with a lower bone mineral density in the spine than men with high normal TSH levels. Despite these findings, it is unknown whether these findings translate into an increased risk for spinal fractures. As a result of this study, it is reasonable to counsel men with low normal TSH values about maintaining bone health with adequate calcium and Vitamin D intake.

— Glenn Braunstein, MD

ATA THYROID BROCHURE LINKS

Thyroid Function Tests: http://thyroid.org/patients/patient_brochures/function_tests.html

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ABBREVIATIONS & DEFINITIONS

TSH — Thyroid stimulating hormone – produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

Hypothyroidism — a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

Hyperthyroidism — a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

Bone Mineral Density (BMD) — this is usually measured in the lumbar (lower) spine and the hip and the results give information as to the strength of the bone and the risk of fractures. The results are expressed as T scores, which as standard deviations from the average bone density in a person in their 20s, when bone mass is the highest. A T score of -1 to -2.5 is termed Osteopenia and a T score >2.5 is termed Osteoporosis.

Osteoporosis — a decrease in bone mineral density in which the individual is at a significantly increased risk for fractures with little or no trauma or force. This occurs with a bone mineral density T score of >-2.5. The areas at highest risk for osteoporotic fractures are the wrist, spine and hip.

Osteopenia — a decrease in bone mineral density in which the individual is at a slightly increased risk for fractures with little or no trauma or force. This occurs with a bone mineral density T score between -1 and -2.5. The areas at highest risk for osteoporotic fractures are the wrist, spine and hip.