



## THYROID AND CHOLESTEROL

### Does thyroid stimulating hormone (TSH) affect cholesterol levels?

#### BACKGROUND

The thyroid gland is regulated by thyroid stimulating hormone (TSH), which is produced by the pituitary gland at the base of the brain. TSH stimulates the thyroid gland to make thyroid hormones and secrete them into the blood. The thyroid hormones control the body's metabolism and can affect cholesterol levels. There are several types of cholesterol, including LDL-cholesterol (bad cholesterol, associated with heart disease) and HDL-cholesterol (good cholesterol, thought to protect against heart disease). When thyroid hormone levels are low and TSH levels are increased (hypothyroidism), cholesterol levels are increased. A mild decrease in cholesterol levels is seen with treatment of hypothyroidism with thyroid hormone. What is not known is whether TSH has any effect on cholesterol levels on its own in the presence of normal thyroid hormone levels. Recently, two separate studies in China looked at whether TSH levels are related to cholesterol levels independent of thyroid hormone levels.

#### THE FULL ARTICLES' TITLES

Wanjia X et al. A high normal TSH level is associated with an atherogenic lipid profile in euthyroid non-smokers with newly diagnosed asymptomatic coronary heart disease. *Lipids Health Dis* 2012;11:44.

Wang F et al. Thyroid-stimulating hormone levels within the reference range are associated with serum lipid profiles independent of thyroid hormones. *J Clin Endocrinol Metab* 2012;97:2724-31. Epub June 22, 2012.

#### SUMMARY OF THE STUDY

Both studies were done at two Chinese hospitals from

2004–2010 in adult patients who previously had TSH, thyroid hormone and cholesterol blood tests done. The study by Wanjia and colleagues looked at 521 patients recently diagnosed with heart disease, while the study by Wang and colleagues looked at 3709 patients who were seen for a routine medical visit. Both studies consisted only of patients who were not taking any medications nor had health problems that could impact the TSH, thyroid hormone or cholesterol tests. Both studies reported that patients with TSH levels at the upper limit of the normal range (thus with normal thyroid hormone levels) were more likely to have higher cholesterol levels as compared with those with lower TSH levels.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

It was previously known that thyroid hormone levels affect cholesterol levels. This study suggests that TSH (which produces thyroid hormone) may also affect lipid levels in a way that is independent of the thyroid hormone levels. This may be important in helping clinicians decide if patients with TSH levels at the upper limit of the normal range may be more likely to have high cholesterol levels. However, the findings from these studies are only suggestive and need to be repeated in other studies.

— Angela Leung, MD

#### ATA THYROID BROCHURE LINKS

Thyroid Function Tests: <http://www.thyroid.org/blood-test-for-thyroid>

Hypothyroidism: <http://www.thyroid.org/what-is-hypothyroidism>

#### 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.

**Cholesterol:** fat molecules in the blood that are associated with heart disease. There are several

types of cholesterol, including LDL-cholesterol (bad cholesterol, associated with heart disease) and HDL-cholesterol (good cholesterol, thought to protect against heart disease).

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