A new study from the UK shows what patients with hypothyroidism have long suspected. A TSH as low as .04mu/L does not increase morbidity.

After years of hearing patients complain of persistent hypothyroid symptoms despite having thyroid stimulating hormone (TSH or thyrotropin) levels within the recommended range, a group of UK researchers conducted a study of TSH levels and morbidity. Past concerns have suggested that abnormal TSH levels might be injurious to health. While high TSH levels have long been associated with cardiovascular disease and elevated lipid levels, the risk for a low TSH had been suspected but never confirmed.

Brokken’s Study [http://jcem.endojournals.org/cgi/content/full/86/10/4814](http://jcem.endojournals.org/cgi/content/full/86/10/4814) on Falsely Decreased TSH Levels

In 2001 Brokken and his team showed that the pituitary gland had receptors for TSH. Like the TSH receptors on thyroid cells, these pituitary receptors recognized TSH receptor antibodies as if they were TSH molecules. Thinking that blood levels of TSH were adequate when TSH receptor antibodies were present, the pituitary gland failed to secrete TSH. Blocking, stimulating, and binding TSH receptor antibodies can all cause this suppression of TSH. These antibodies are seen in high levels in patients with Radioiodine(RAI)-induced hyperthyroidism and in lower levels in Graves’ disease patients who have achieved remission naturally or medically. In addition, these antibodies are seen in patients with atrophic hypothyroidism and in Hashitoxicosis.

This line of research prompted the UK researchers to realize that the TSH level might be falsely low in patients who were indeed on adequate thyroid replacement hormone. Normally, the pituitary secretes TSH at a constant rate throughout the day. These pulses of TSH secretion increase during the night when the body is at rest. Normally, when thyroid hormone levels start to rise, the pituitary gland slows down on its secretion of TSH and levels fall. For most people, a low TSH suggests that thyroid hormone levels are too high. However, as patients have realized and Brokken’s research confirmed, TSH can be low because of thyroid antibodies even when thyroid hormone levels are low. In addition, in endogenous depression and in individuals on many medications, including corticosteroids, TSH levels fall.

The New Study

The UK research team led by Dr. Graham Leese at the University of Dundee followed 16,426 patients taking thyroxine (T4) replacement hormone. 86 percent of the patients were female and the mean age was 60 years. The study showed that patients with low TSH levels (between .04 and 0.4 mu/L) did not have an increased risk of cardiovascular disease, bone fractures, abnormal heartbeat patterns or overall morbidity. The study showed that an increased risk of these conditions occurred in patients with very low or with elevated TSH levels.

This study did not make a distinction, however, between patients who had radioiodine-induced hypothyroidism (as treatment for Graves’ disease or cancer) and patients with
other forms of hypothyroidism. Because patients who have RAI and patients with autoimmune atrophic hypothyroidism typically have high levels of TSH receptor antibodies, very low levels of TSH (below .04 mu/L) are not necessarily associated with a higher risk of cardiovascular and bone diseases. The authors of the new study did however emphasize the need to correlate thyroid hormone levels with TSH. This would help in determining a TSH level that’s truly low (accompanied by high thyroid hormone levels) as opposed to a TSH level that’s falsely decreased.

Resources:


AARD InFocus Bulletin. 2010. Patients taking thyroxine may be safe with lower TSH levels than currently recommended. June: 7.