



HYPOTHYROIDISM

Hypothyroidism reduces the volume of the hippocampus, a critical site for memory

BACKGROUND

It is well known that hypothyroidism during pregnancy and infancy can impair brain development. In fact, congenital hypothyroidism is the most common preventable cause of mental retardation. Because of this, all newborns are screened at birth in order to detect congenital hypothyroidism as early as possible and initiate treatment to prevent impaired brain development. Hypothyroidism is common in adults and is frequently associated with cognitive issues, such as increased forgetfulness, mental slowing and “brain fog”. However, unlike in congenital hypothyroidism, there is limited data on whether hypothyroidism in adults results in structural brain defects. The current study examines the effect of hypothyroidism on the adult brain, in particular the hippocampus which is an area of the brain that plays a critical role in short and long term memory.

THE FULL ARTICLE TITLE

Cooke GE et al. Hippocampal volume is decreased in adults with hypothyroidism *Thyroid* 2014;24:433-40.

SUMMARY OF THE STUDY

The authors studied 11 patients between the age of 27–55 years (mean age 42 + years) who had been experiencing the classic symptoms and biochemical findings of hypothyroidism. Each participant had a brain MRI scan and the volume of the both the right and left hippocampus

was calculated and compared to a control group of 9 healthy subjects of similar age and education (mean age 38.6 + 4.0 years). The serum TSH of the patients with hypothyroidism was 61.8 mU/L, as compared with 1.6 in the controls, and free thyroxine levels in the patients was less than 1/3 that in the controls which confirms that the study group had significant biochemical hypothyroidism at the time of their MRI scan. The authors found that the average size of the right hippocampus was 12% smaller in those with hypothyroidism as compared with controls.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

While the number of subjects in the study was small, and while the authors did not repeat brain measurements after patients were treated with thyroid hormone to determine if the hippocampus volume normalized, these results do provide preliminary evidence that hypothyroidism in adults causes significant reduction in the volume of the right hippocampus. This could explain some of the memory deficits that have been observed in those with hypothyroidism.

— Phillip Segal, MD FRCPC

ATA THYROID BROCHURE LINKS

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

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

ABBREVIATIONS & DEFINITIONS

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

Hippocampus: Part of the limbic system of the brain which plays an important role in short and long term memory. Humans have two hippocampi, one in each side of the brain.

MRI (Magnetic Resonance Imaging): a medical imaging technique used to investigate the anatomy and function of the. MRI scanners use strong magnetic fields and radiowaves to form images of the body. The technique

is widely used in hospitals for medical diagnosis, staging of disease and for follow-up without exposure to ionizing radiation.

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.

Thyroxine (T4): the major hormone produced by the thyroid gland. T4 gets converted to the active hormone T3 in various tissues in the body.