Saulius Taroza – Associations among thyroid axis hormones, genetic polymorphisms, and acute ischemic stroke outcomes

Saulius Taroza finished his medical studies at Vilnius University in 2004. Professional qualification in neurology he gain from Lithuanian University of Health Sciences in 2009. PhD thesis on "Associations among thyroid axis hormones, genetic polymorphisms, and acute ischemic stroke outcomes" was defended extramurally in 2020 at the same university. Dr. Taroza currently is working as a junior scientific researcher in laboratory of Behavioural Medicine, Neuroscience Institute at LUHS and also as a neurologist in Palanga Clinic of Neuroscience Institute.

INTRODUCTION

Acute ischemic stroke (AIS) is the most common type of stroke, and despite breakthroughs in specific blood vessel recanalistation treatment, which alleviates stroke outcomes, AIS remains an important cause of mortality and morbidity both in Lithuania and globally. The absolute numbers of those who experienced a stroke, disability-adjusted life years, and mortality are growing because of an increasing life expectancy worldwide. According to the Lithuanian Health Information Center of the Institute of Hygiene, in 2018, 54.4% of deaths were attributed to circulatory system diseases, and 24.4% of deaths were due to cerebrovascular diseases. Importantly, stroke was the sixth leading cause of all deaths in individuals younger than 65 years of age. Considering the morbidity of AIS in Lithuania, approximately 10,000 residents experience this disease, and therefore, Lithuania is located in the increased zone of mortality and morbidity because of AIS. The importance of AIS is also evident in that it is one of the most common causes of long-term disability and imposes a heavy burden to those who are ill, their relatives, and the institutions responsible for their care.

AIM

To evaluate associations among thyroid axis hormones, genetic polymorphisms, and acute ischemic stroke outcomes.

OBJECTIVES

1. To evaluate the associations of thyroid and thyroid-stimulating hormones blood serum concentrations and mortality within 30, 90 and 365 days after experienced acute ischemic stroke and diagnostic value of these hormones to predict death.

2. To evaluate the associations of thyroid and thyroid-stimulating hormones blood serum concentrations and functional outcomes one year after experienced acute ischemic stroke.

3. To evaluate the associations of thyroid and thyroid-stimulating hormones blood serum concentrations and symptoms of post-stroke anxiety and depression both in the acute and subacute periods of ischemic stroke.

4. To evaluate the associations of deiodinases and organic anion transporting polypeptide 1C1 gene polymorphisms and functional outcomes one year after experienced acute ischemic stroke.

5. To evaluate the associations of deiodinases and organic anion transporting polypeptide 1C1 gene polymorphisms and symptoms of post-stroke anxiety and depression in the acute period of ischemic stroke.

6. To evaluate the associations of deiodinases and organic anion transporting polypeptide 1C1 gene polymorphisms and thyroid and thyroid-stimulating hormones blood serum concentrations in the acute period of ischemic stroke.

CONCLUSIONS

1. Compared with lower levels, higher free triiodothyronine serum levelsupon admission to the hospital due to acute ischemic stroke were associated with higher death probability within 365 days after acute ischemic stroke, but this did not add any additional value to the stroke severity and age for death prediction.

2. No associations were found between thyroid and thyroid-stimulatinghormones serum levels upon admission to the hospital because of acute ischemic stroke and functional outcome measured by modified Rankin Scale one year after acute ischemic stroke.

3. Compared with lower levels, higher free triiodothyronine serum levelsupon admission to the hospital because acute ischemic stroke wereassociated with a lower probability of symptoms of depression both in theacute and subacute ischemic stroke periods.

4. Type 3 deiodinase rs945006 single nucleotide polymorphism with wild-type homozygous genotype (TT), compared with genotypes with at leastone minor allele (TG + GG), was associated with good outcomes, butorganic anion transporting polypeptide 1C1 rs10770704 with wild-typehomozygous (CC), compared with genotypes with at least one minor allele (CT + TT), was associated with poor functional outcomes, as measuredusing the modified Rankin Scale one year after acute ischemic stroke.

5. Type 1 deiodinase rs12095080 genotypes with at least one minor allele (AG + GG), compared with the wild-type homozygous genotype (AA),were associated with a lower probability of anxiety symptoms, butrs11206244 genotypes with at least one minor allele (CT + TT), comparedwith the wild-type homozygous genotype (CC), conversely, wereassociated with a higher probability of anxiety symptoms during the acuteischemic stroke period. The organic anion transporting polypeptide 1C1rs1515777 minor allele homozygous genotype (GG), compared with atleast one wild-type allele-containing genotype (AG + AA), was associated with a higher probability of anxiety symptoms during the acute ischemic stroke period. Organic anion transporting polypeptide 1C1 rs974453genotypes with at least one minor allele (GA + AA), compared with thewild-type homozygous genotype (GG), were associated with a lower probability of depression symptoms during the acute ischemic strokeperiod.

No associations were observed among type 1–3 deiodinases, organic anion transporting polypeptide 1C1 genes single nucleotide polymorphisms andthe serum levels of thyroid and thyroid-stimulating hormones measure dupon admission to the hospital because of acute ischemic stroke.