Prognostic Role of the Low Tri-Iodothyronine Syndrome in Brain Tumor Patients

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Introduction

Normal functioning of the thyroid axis is often disturbed in critically ill patients. Specifically, reduction of serum T3 concentrations accompanied by normal TSH concentrations is the most commonly observed pattern of impaired thyroid axis functioning in critical illness, and was coined the **Low T3 syndrome.** Reduced triiodothyronine (T3) concentrations were implicated in worse prognosis of brain tumor patients.

We investigated the association of thyroid hormone concentrations with health-related quality of life (HRQoL), discharge outcomes and prognosis of brain tumor patients.

Methods

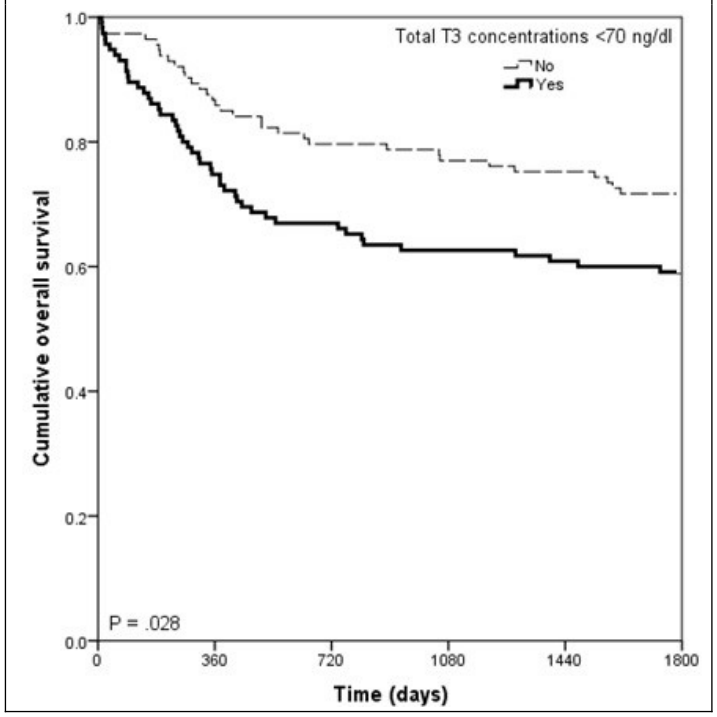
Two-hundred and thirty brain tumor patients (70% women) before brain tumor surgery were evaluated for HRQoL (ERTC QLQ-C30 and QLQ-BN20 questionnaires); and thyroid function profile. The Low tri-iodothyronine (T3) syndrome was defined as T3 concentration below the reference range. Unfavorable hospital discharge outcomes were determined as the Glasgow outcome scale score of equal to or lower than 3. Follow-up continued until November, 2015.

Results

In 93 (40%) patients the diagnosis was meningioma; in 49 (21%), high-grade glioma; in 36 (16%) pituitary adenoma; in 22 (10%), low-grade glioma; and in 14 (6%) acoustic neuroma.

Seventy-four percent of patients had Low T3 syndrome. After adjusting for the brain tumor histological diagnosis, patients' age, gender and functional status, lower free T3 concentrations were associated with worse HRQOL on the QLQ-C30 Global health status (ß=0.302, p=0.017), Emotional functioning (ß=0.422, p<.001) and Cognitive functioning (ß=0.259, p=0.042) domains, and with greater symptom severity on the QLQ-BN20 Fatigue

Figure 1. Kaplan Meier curves of overall survival in total sample as a functional low total tri-iodothyronine concentrations.



Preoperative Low T3 syndrome increased risk for unfavorable discharge outcomes adjusting for age, gender and histological diagnosis (OR=2.944, 95%CI [1.314-6.597], p=.009).

In all patients, lower total (p=.038) and free (p=.014) T3 concentrations were associated with greater mortality adjusting for age, gender, extent of resection, adjuvant treatment and histological diagnosis (Figure 1). The Low T3 syndrome was associated with greater 5-year mortality for glioma patients (HR=2.197; 95%CI [1.160-4.163], p=.016) and with shorter survival (249 [260] vs. 352 [399] days; p=.029) of high grade glioma patients independent of age, gender, extent of resection and adjuvant treatment.

Conclusions

The Low T3 syndrome is common in brain tumor patients and is associated with worse health status, impaired emotional and physical aspects of HRQoL and worse discharge outcomes. The Low T3 syndrome is associated with shorter survival of glioma patients. There is a need to evaluate whether treatment of the Low T3 syndrome can improve the quality of life and prognosis of brain tumor patients.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe prevalence and clinical importance of the Low T3 syndrome in brain tumor patients, 2) Discuss clinical value of thyroid function assessment in neuro-oncology setting, 3) Interpret thyroid axis functioning in neurosurgical brain tumor patients.

References

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Lietuvos mokslo taryba