Thyroid Malignancy in Children: Role of the Pediatric Endocrinologist

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Disclosure

Nothing to disclose
Objectives

- To illustrate how the multidisciplinary approach of thyroid malignancies at BC Children’s Hospital
- To review the technical aspects of hormonal determination relevant to thyroid malignancy and its management
- To understand the role of hormonal treatment in thyroid malignancy in children
Questions for the Pediatric Endocrinologist (1)

- Who is at risk for thyroid malignancy
- Hashimoto thyroiditis and malignancy
- When to refer for thyroid ultrasound?
- When to refer for a FNA?
- When to request refer to the surgeon?
- Partial/complete thyroidectomy usually the first line of treatment
Questions for the Pediatric Endocrinologist (2)

- Role of the Pediatric Endocrinologist in the follow up of thyroid malignancy post surgery
- LT4 treatment monitoring and goals
- Surveillance
- Practical issues around scintigraphy and Tg
TSH-stimulated thyroglobulin, $\text{I}^{125}$ scintigraphy and $\text{I}^{131}$ therapy

- TSH is required for stimulation of the thyroid tissue and I uptake by thyroid tissue

3 options:
- Withdrawal of L-T4 for 14 days (which causes a TSH>$30\text{mU/L}$ in a majority of patients)
- Withdrawal of L-T4 and addition of L-T3
  - Usually not required for withdrawal of 14 days. Can be considered for longer withdrawals or sensitive children
- Recombinant human TSH (thyrotropin alfa)
  - Can be considered for children sensitive to hypothyroidism or in children with hypopituitarism
Recombinant human TSH: protocol used at BC Cancer Agency

Well tolerated
- Risk of transient hyperthyroidism
- Nausea (11%), headache (7%)

Intramuscular injection
0.9 mg IM q24h x 2 doses or
0.9 mg IM q72 h x 3 doses

Radioiodine scan:
- radioiodine administration 24 h following the final rhTSH injection;
- scintigraphy 48 h after radioiodine (i.e., 72 h following the final thyrotropin injection)
- serum Tg determination 72 h following the final thyrotropin alfa injection
Thyroglobulin

- Tg is a specific and sensitive marker for recurrence of differentiated thyroid cancer
- It is more specific than whole body scan
- The higher the Tg, the larger the mass of the tissue
- Unstimulated Tg (under LT4 therapy) is a key component of FU
- Undetectable TSH-stimulated Tg is associated with a high likelihood of being disease-free
Thyroglobulin

- Up to 25% patients with differentiated thyroid carcinoma have Tg antibodies
Thyroglobulin determination

- Tg antibodies interfere with Tg determination by immunoassay (the most commonly used method of detection)
- Tg Abs lead to falsely lowered concentrations

Thyroglobulin determination by liquid chromatography and tandem mass spectrometry (LC-MS/MS) is independent from Tg Abs.

Conclusion

- Diagnosis and management of DTC is teamwork
- Nuclear medicine, surgery and pediatric endocrinology collaborate for the FU
- The algorithm used at British Columbia Children’s Hospital is described