

## RISK OF MALIGNANCY IN HYPERFUNCTIONING THYROID NODULES IN CHILDREN

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**Background:** A rare cause of hyperthyroidism is a hyperfunctioning thyroid nodule (HFTN). In adults, a HFTN is considered reassuring, with a low risk of malignancy. In children, however, the 2015 guidelines on pediatric thyroid nodules recommend surgical removal of HFTN. This recommendation was in part due to one retrospective case series which cited a malignancy rate of 29% in children with surgically resected HFTN. However, several factors in this study limit the generalizability to other patient populations. More recent studies found the malignancy rate to be much lower (0-6%). In addition, controversy exists over the optimal pre-surgical evaluation of HFTN including need for ultrasound and FNA biopsy. Children with differentiated thyroid cancer have an excellent prognosis. Thus, the risk of surgery must be weighed against the risk of thyroid cancer. The aim of this study is to evaluate the prevalence of malignancy in HFTN at our institution and determine if pre-operative ultrasound and FNA can differentiate malignant and benign nodules.

**Materials/Methods:** This is a retrospective chart review of patients age 18 years or younger seen at Texas Children's Hospital from 2008-2019 diagnosed with HFTN. Twenty-three patients had confirmed HFTN. HFTN were classified as classic (N=11) or non-classic (N=12) based on features of thyroid scan and uptake and degree of extra-nodular gland suppression.

**Results:** The mean age of presentation was 14 years (range 5-18 years) and 70% were female. Nodules were large (36 mm  $\pm$  1.2 mm) and 70% had a single nodule, with the remainder having multiple HFTNs. Classic HFTN were more likely to present with overt hyperthyroidism. All had an ultrasound and pathology, 21 had FNA biopsy and 2 had surgery without FNA. One patient had malignancy with invasive, metastatic follicular thyroid carcinoma on final pathology. In this patient, ultrasound and FNA were abnormal and concerning for malignancy. In the remaining 22 patients, ultrasound was reassuring with no features concerning for malignancy and pathology from FNA and/or surgery were benign.

**Conclusions:** Our study found a low prevalence of malignancy in HFTN in children at 5%, compared to malignancy rate of ~25% in other pediatric thyroid nodules. Pre-operative ultrasound and FNA can help identify malignancy in HFTN. Given the low malignancy rate, close observation instead of surgery should be considered in children presenting with subclinical hyperthyroidism who are found to have HFTN with a reassuring ultrasound and benign FNA.