



Pediatric Thyroid Carcinoma Protocol at Children’s Cancer Center

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BACKGROUND

Historically, no thyroid cancer screening protocol is offered to children, since the prevalence of nodules is 0.2 to 5%, and up to 20% of the nodules will disappear before adulthood. Also, the concern that excessive diagnostic resources are not reducing the mortality rate and may lead to unnecessary procedures . Except for some groups at risk of PTC, such as the prior radiated patients, genetic syndromes, familial history of thyroid cancer, and previous malignancies.

OBJECTIVES

A retrospective analysis was performed to define the screening protocol results used in and dedicated Children's Cancer Center. Clinical and treatment features were investigated to validate the use of ultrasound of the neck after diagnosing cancer-related syndromes, radiotherapy, and chemotherapy.

METHODS

A medical record review of all subjects was performed after IRB approval. We reviewed the records of pediatric oncology patients who were referred to St. Jude for management of thyroid nodules/cancers from 2007 – 2017. Patients older than 18 years old by the time of the diagnosis or incomplete work-up were excluded. Demographic, clinical, and disease-specific variables were obtained and evaluated. Two arms were used; *denovo* thyroid cancer group and PTC as secondary malignancy. Statistical tests were used to determine the relationship between groups, surgery and permanent section results.

RESULTS

The final cohort (N = 53) included 34 females and 19 males (mean age 15.4 ± 6.4[SD] years). Forty-two (79.2%) had papillary carcinoma, 7 follicular carcinomas (13.2%), 3 medullary carcinomas (5.6%), 1 Hurthle carcinoma (1.9%), and 1 Spindle epithelial tumor with thymus-like differentiation (SETTLE) (1.9%). Twenty-nine (45%) had thyroid cancer as secondary malignancy, twenty-four denovo thyroid cancer (42%). Twenty-eight (53.7%) patients had evidence of thyroid metastasis, the majority were loco-regional metastases to cervical lymph nodes (85.2%), and 14.8% presented with distant metastases to the lungs appreciate. Twenty-three out of 42 (54.7%) papillary thyroid carcinoma patients underwent total thyroidectomy with either central neck dissection (CND) or unilateral modified radical neck dissection (MND). The primary malignancy group was more likely to have neck dissections than primary tumors (15 vs. 8) despite identical numbers of LND in preoperative US. All thyroid cancer patients underwent either a total or completion thyroidectomy due to the cancer's invariably aggressive nature with no reported mortalities in the series. BRAFE V600 mutation was significantly associated with *denovo* group children submitted to radiation. Patients exposed to radiation presented with a more aggressive disease compared to primary cases. Lymph node metastasis was found in 64.7% (11/17) BRAFV600E negative patients, versus 22.2% (2/9) in patients with BRAFV600E mutation. Twenty-six (49.1%) out of 53 thyroid cancers received post-operative radioisotope treatment. The median duration of follow-up was 51.3 months (range 7.5 – 145).

RESULTS

Overall good prognosis in childhood thyroid cancer, with surgery being the most effective treatment, was confirmed in our analysis. 53% of metastatic disease at first presentation, and distant metastasis corroborate the evidence that pediatric thyroid carcinoma may have more aggressive features. Despite the high metastasis rate, pediatric PTC have a lower mortality rate than the adult counterparts. Although, neck involvement does not impact the overall mortality, may represent a significant burden of disease.	<i>Denovo</i>		Secondary	Total
	24		29	53
	Age (median)	10.2	16.5	
	Diagnosis	18 PTC 3 FTC 3 MTC	24 PTC 4 FTC 1 HTC	
	Clinical Presentation			
While this study is significantly limited with the small sample size, pediatric thyroid cancer is commonly related to extensive, aggressive disease in the neck and an earlier peak incidence than the overall population. It’s uncertain if chemotherapy can impact the incidence of PTC as head and neck radiation exposure. Therefore, it is recommended that children with any form of childhood cancer, should be followed up long-term to screen for a second primary. Once patients transition to the long-term survivor’s clinic at our instituion, they all undergo thyroid ultrasounds at every 6-month follow-up.	RLN paralysis	2	1	3
	US LND	14	14	28
	Lung Mets	7	1	8
	Risk Factors			
	H&N RT		11	
	QT		20	
	Genetic Syndromes	3	3	6
	Genetic			
	BRAF V600E	7	2	9
	RAI	11	15	26
	MND (CND)	8 (6)	8 (2)	24

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