

## Pediatric follicular thyroid cancer

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**Section:** Paediatric radiology

**Area of Interest:** Thyroid / Parathyroids Thorax

**Procedure:** Diagnostic procedure

**Procedure:** Staging

**Imaging Technique:** Ultrasound

**Imaging Technique:** CT

**Special Focus:** Neoplasia Metastases Case Type:  
Clinical Cases

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**Patient:** 11 years, female

### Clinical History:

An 11-year-old girl referred to pediatric surgery from other institution, with a 1-year history of swollen neck and no other associated symptoms. Routine laboratory test showed a reduced TSH level to 0.150 milli IU/L with normal T3, T4 and thyroglobulin level. CT examination of the neck was requested.

### Imaging Findings:

Contrast enhanced CT neck was performed using a 16-slice spiral scanner (1.25mm collimation, 2.5 slice thickness, 2.7mm/s table feed, 3mm reconstruction), and showed large enhancing heterogeneous nodules in the thyroid region. Normal thyroid tissue could not be identified. There was consenting narrowing of the tracheal lumen. It was noticed that there were small pulmonary nodules in the apices of the lungs when CT neck was performed.

An urgent Ultrasound guided fine needle aspiration and needle core biopsy of the thyroid gland demonstrated follicular tissue with mild nuclear pleomorphism, hyperchromasia and no changes of papillary carcinoma. This was interpreted as suspicious of follicular carcinoma, since vascular and capsular invasions cannot be assessed on needle core biopsy.

Contrast enhanced 320 Omnipaque CT chest was done using 16 slice spiral scanner (1.25mm collimation, 5mm slice thickness, 2.7mm/s table feeds, 3mm reconstruction), and showed multiple round nodular lesions dispersed diffusely in both lungs.

### Discussion:

Thyroid carcinoma is extremely rare in children but is the most common pediatric endocrine neoplasm, representing 1-1.5% of all pediatric malignancies. [1, 2, 3]

Differentiated thyroid cancer is the most common type of thyroid malignancy in the pediatric population and encompasses both papillary (80-90%) and follicular (5-15%) carcinomas.[4, 5, 6, 7] Papillary carcinoma is shown to have lymphocytic infiltration and occurs in younger children. Follicular carcinoma is shown to have vascular invasion, and occurs in older children.[13]

Pediatric patients present with thyroid nodules less commonly than adults, but the rate of malignancy is much

higher, with an incidence of 1.5%. However, the rate of malignancy among pediatric thyroid nodules is approximately 16%, about three times that of adults.[8, 9] Because the rate of malignancy in childhood is very high, a high degree of suspicion should be maintained whenever a child presents with a solitary thyroid nodule and should be worked up aggressively. A diagnostic protocol of thyroid nodules is as follow:

1. Child's history, including any recent history and treatment of thyroid disease, radiation exposure or radiotherapy.
2. Clinical examination
3. Laboratory test
4. Thyroid ultrasound
5. Fine needle aspiration biopsy

Most children that presented in the literature with asymptomatic nodular thyroid enlargement, were detected by parents or by physicians during routine examination. They commonly present with advance disease. Extensive regional nodal involvements are represented in 70% of patients and around 10-20% of patients have distant metastases. The lungs are the most common sites of metastasis. [10]

Despite frequent detection of metastasis at the time of diagnosis, the prognosis is excellent with mortality rates of less than 10%. [11]

The morphologic study of the thyroid should done by ultrasonography, which plays an important role in identifying size, number, and characteristics of the nodules. Fine needle aspiration biopsy (FNAS) is the gold standard diagnostic test to define thyroid lesions.

The treatment of choice in cases of thyroid differentiated carcinoma is total thyroidectomy, with excision of the regional lymph nodes. A whole body scan followed by ablative radioiodine therapy in any remaining thyroid tissue should be done postoperatively. [12] Plasma TSH and thyroglobulin concentrations are used in long term follow up.

The take home message is that, CT neck with contrast should not be done as a first method of investigation, the use of ablative iodine therapy has to be postponed for at least six weeks, as the iodinated CT contrast may reduce the subsequent radioiodine uptake by thyroid tissue.

**Differential Diagnosis List:** Pediatric follicular thyroid carcinoma, Diffuse enlargement or nodule of thyroid (benign or neoplastic), Inflammatory/neoplastic adenopathy

**Final Diagnosis:** Pediatric follicular thyroid carcinoma

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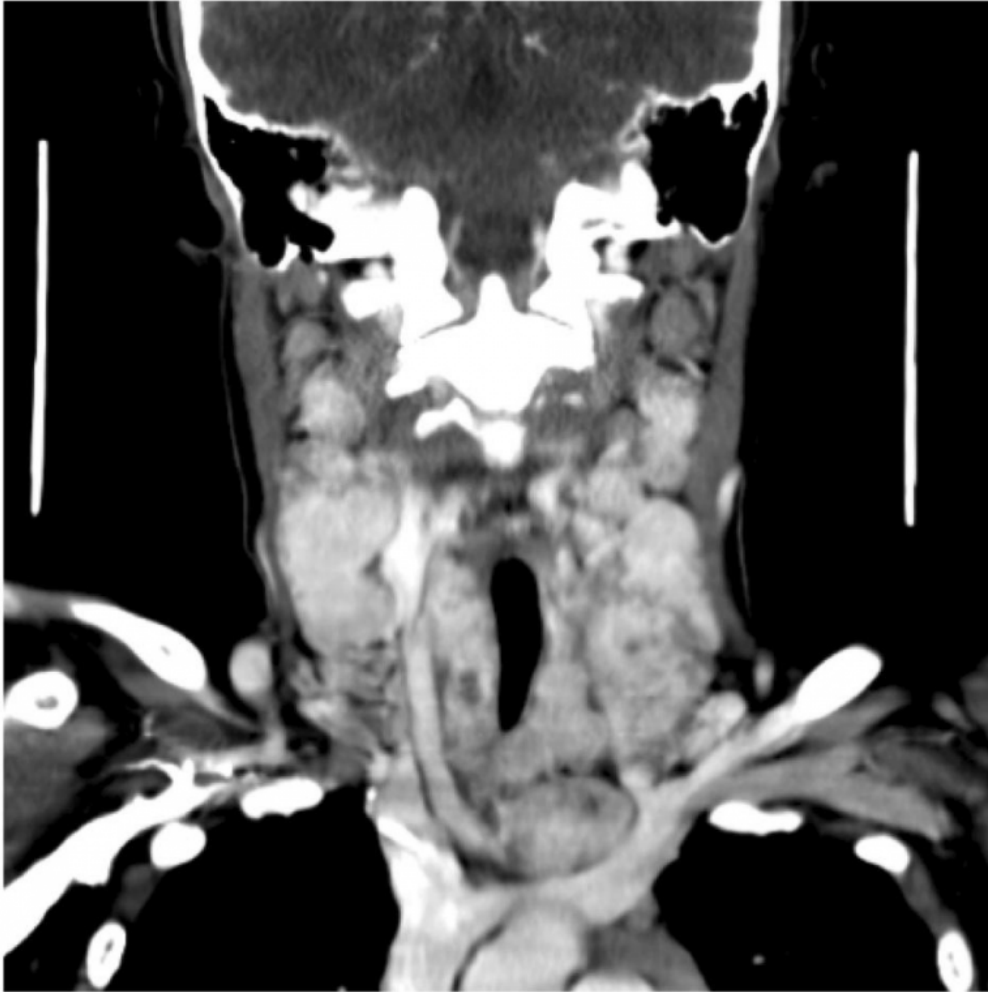
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**Figure 1**

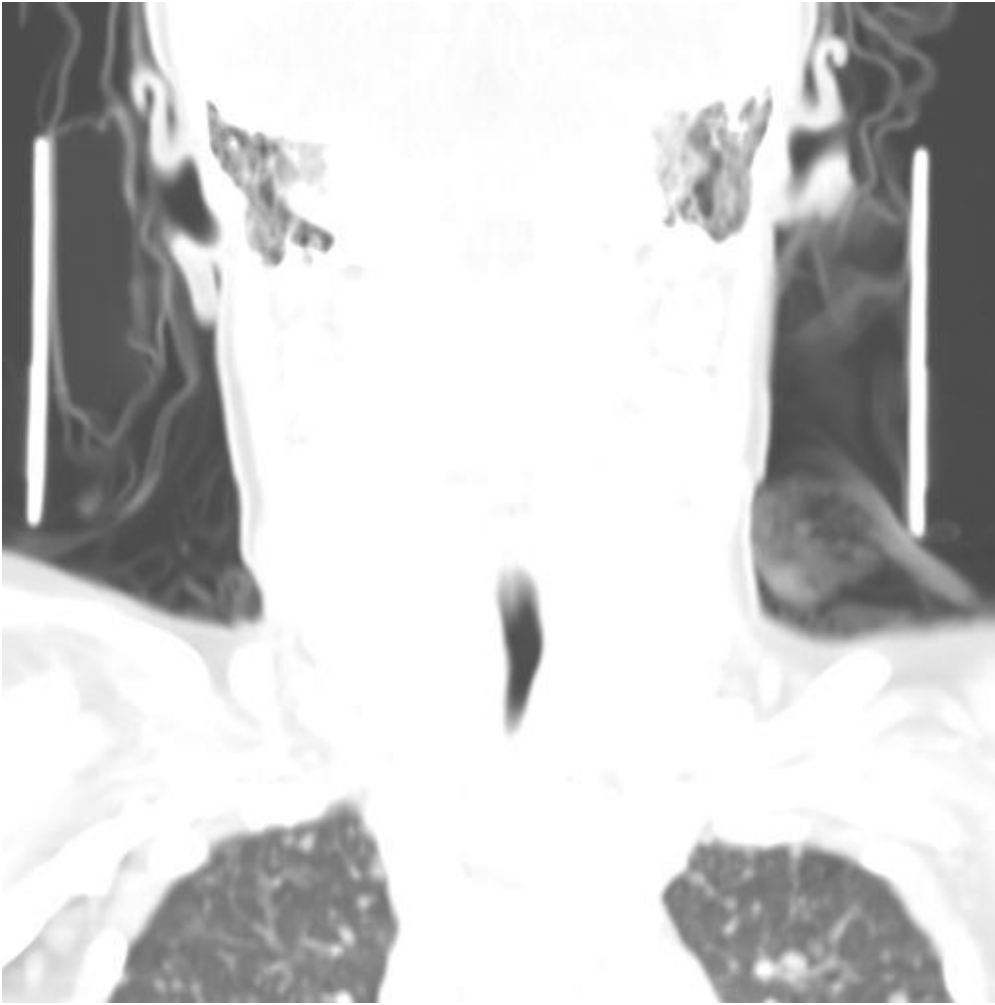
a



**Description:** CT of the neck, shows large lobulated thyroid and involvement of regional lymph nodes.

**Origin:** Radiology department, SKMC

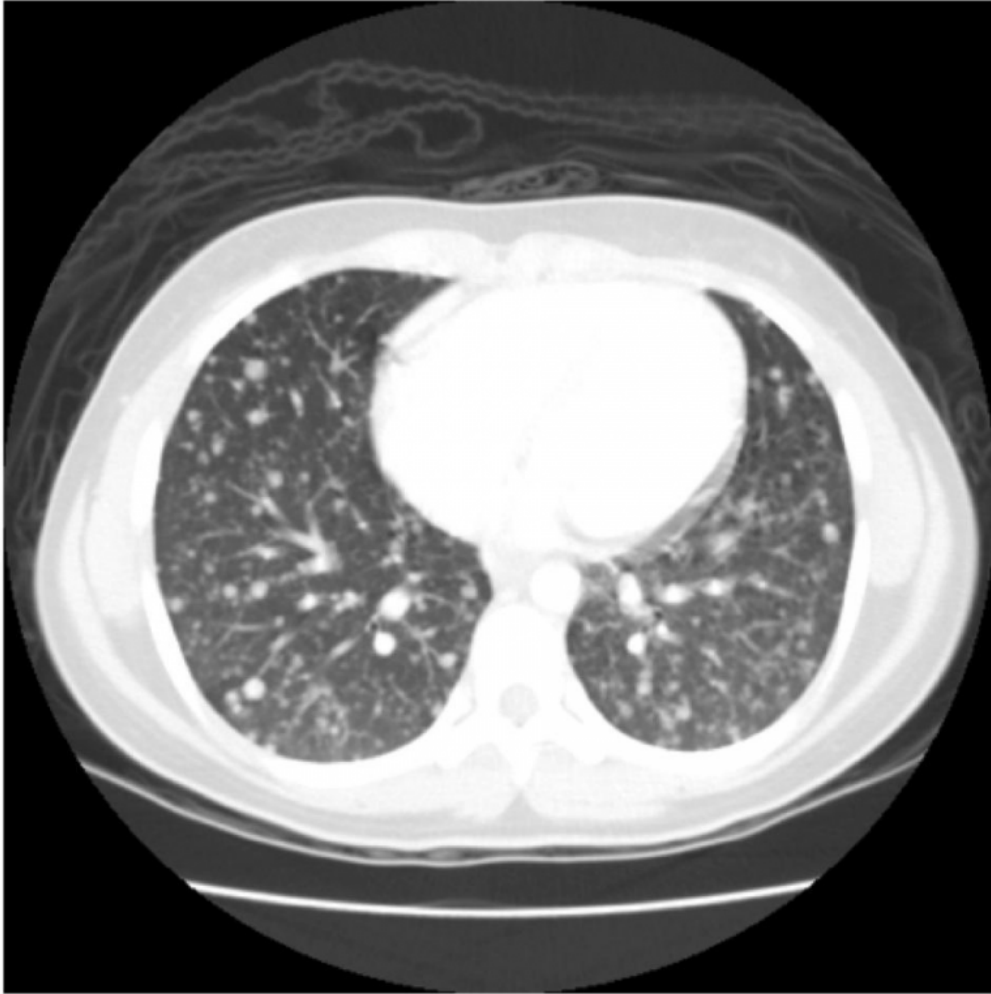
**b**



**Description:** CT of the neck, shows small nodules noticed in apices of the lungs. **Origin:** Department of radiology, SKMC.

**Figure 2**

**a**



**Description:** CT thoracic, showing diffuse nodular lesions in both lungs. **Origin:** Department of Radiology. SKMC

**Figure 3**

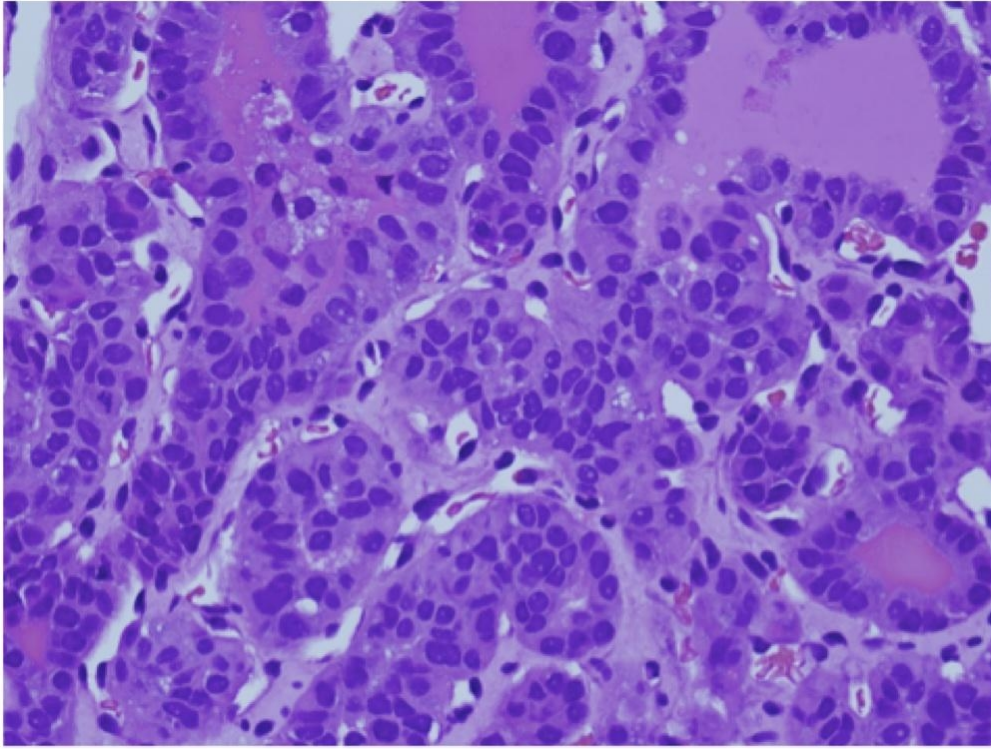
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**Description:** Neck US done during the biopsy, shows multinodular hyperechogenic lesions of the thyroid. **Origin:** Department of Radiology, SKMC

**Figure 4**

**a**



**Description:** Thyroid tissue showing small and medium sized follicles with mild nuclear pleomorphism and hyperchromasia, (Hematoxylin-Eosin stain, magnification X40). **Origin:** Department of Radiology, Pathology, SKMC