

## FNAC based study of Thyroid lesions in pediatric age group (0-14yrs) in a tertiary care center for Head and neck diseases.

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### Abstract:

**Introduction:** Thyroid diseases are the second most frequent endocrinopathy in children and adolescents with girls being more frequently affected.<sup>[1]</sup>

**Objectives of the Study:** To analyse various Thyroid lesions diagnosed by FNAC in pediatric age group - 0 to 14yrs.

**Materials And Methods:** Pediatric patients (aged 0-14 yrs) with Thyroid swellings formed the study. Clinical, Biochemical, USG data and FNAC Thyroid were correlated to arrive at a diagnosis.

**Results:** Thyroid FNACs in Pediatric age group accounted for 16.7% of all total Thyroid FNACs. 370 cases (95%) occurred above the age of 5 yrs and Female to Male ratio was 5:1. Hashimoto's Thyroiditis was seen in 167 cases (42.1%) Colloid Goitre in 117 cases (30.3%), Nodular Goitre in 22 patients (5.6%). Thyroid Developmental anomaly encountered were; Thyroglossal cyst 46 cases (12%) and Thyroid Ectopia 14 cases (3.5%). Thyroid was unremarkable in 23 cases (5.6%).

**Conclusion:** Diffuse Thyroid disorders were more common than Nodular Thyroid diseases in pediatric age group. The other common Thyroid disorder was Developmental Thyroid disorders. Fine-Needle aspiration as a initial diagnostic test determines the pathology, triages the cases and also throws light on etiology; Hashimoto's Thyroiditis, Colloid goiter and Thyroid developmental anomalies.

**Keyword:** Thyroid, Pediatric, FNAC, Hashimoto's Thyroiditis, Ultrasonography.

### I. Introduction

Thyroid diseases are the second most frequent endocrinopathy in children and adolescents with girls being more frequently affected. It is multidisciplinary problem requiring cooperation of specialists in different fields of medicine. Thyroid nodules are relatively rare in children and adolescents and have prevalence between 0.2%-1.8percent. A thyroid nodule in a child is significant because of the risk of malignancy.<sup>[1,2]</sup> Presenting as either a solitary nodule or a multinodular goiter, Thyroid disease in children requires a thorough workup that includes a detailed clinical examination, blood tests, Ultrasonography, and Cytological assessment.<sup>[2]</sup>

### II. Objectives Of The Study

To analyse various Thyroid lesions diagnosed by FNAC in pediatric age group , 0 to 14yrs.

### III. Material And Method

This study was undertaken in Dept of Pathology of a Tertiary care center for Head And Neck diseases .The period of study was two and half years , January 2011 to June 2013. Pediatric patients of age, 0-14 yrs, referred from OP with Thyroid swellings were included. Clinical, Biochemical and USG data and FNAC thyroid findings were correlated to arrive at a diagnosis. FNAC procedure was done using standard technique with 26 G needle (Thin needle).

### IV. Results

A Total of 389 cases Pediatric Thyroid lesions investigated by FNAC, as a first line investigation formed the study group. Thyroid FNACs in Pediatric age (0-14yrs) accounted for 16.7% of all total Thyroid FNACs. Diffuse Thyromegaly was seen in 72.4% and Nodular disease in 27.6% of cases (FIG 1). There were 322 female, 67 male children, with a Female to Male ratio, 5:1. Most of the Thyroid diseases occurred above the age of 5 yrs i.e. 370 cases (95%). Age distribution is shown in Table 1.

Hashimoto's Thyroiditis was seen in 167 cases (42.1%) Colloid Goitre in 117 cases (30.3%) and Nodular Goitre in 22 patients (5.6%). Thyroid Developmental anomaly encountered were ; Thyroglossal cyst 46 cases (12%) and Thyroid Ectopia 14 cases (3.5%). Thyroid was unremarkable in 23 cases (5.6%). Age and distribution of various Thyroid Lesions are shown in Table 2.

## V. Discussion

Thyroid diseases are the second most frequent endocrinopathy in children and adolescents with girls being more frequently affected. It is multidisciplinary problem requiring cooperation of specialists in different fields of medicine. Thyroid nodules are relatively rare in children and adolescents and have prevalence between 0.2%-1.8percent. A thyroid nodule in a child is significant because of the risk of malignancy.<sup>[1]</sup> Most thyroid nodules, both benign and malignant, present as asymptomatic neck masses. A thyroid nodule in a child is significant because of the risk of malignancy.<sup>[3]</sup>

FNAC is the single most useful, initial diagnostic test in diagnosing Thyroid diseases. It is a good screening test for thyroid nodules in children and adolescents because of its high sensitivity. In adults, fine needle aspiration biopsy (FNAB) has been used extensively with a high degree of reliability. Pediatric (0-14yrs)<sup>[4, 5]</sup>

Pediatric (0-14yrs) thyroid FNACs accounted for 16.7% of all thyroid FNACs in this study. Diffuse disorders of Thyroid in pediatric age were seen in 72.4%, Thyroid nodules were present in 27.6% of cases. Hashimotos Thyroiditis (42.1%), Colloid Goitre (30.3%) were the most frequent causes of the diffuse form of goiter, particularly during puberty.

There is evidence that a high iodine intake may be associated with Hashimotos Thyroiditis<sup>[6]</sup>. Predisposing genetic and environmental factors, especially iodine supply trigger the onset of the Hashimotos Thyroiditis. The iodination of thyroglobulin (TG) stimulates the production of antibodies and the proliferation of lymphocytes. The prevalence of AT increases exponentially decades after supplying iodine in previously deficient areas and also that areas with good iodine supply present prevalences between three and five times higher than those found in deficient areas of the same region<sup>[7]</sup>. The cautious iodine fortification program, aiming at an average increase in iodine intake of 50 mug/day has been associated with a 50% increase in incidence of hyperthyroidism.<sup>[8]</sup>

Nodular Goitre was seen in 22 patients (5.6%) in this study. Thyroid malignancy was not encountered in this study. Multinodular goitre are rare in the paediatric age group. Fine-needle aspiration biopsy of the thyroid gland is minimally invasive and highly accurate in the diagnosis of thyroid nodules in the paediatric population. All solitary thyroid nodules are to be excised in children unless fine-needle aspiration definitively determines a benign histology.<sup>[1,2,3,5]</sup>

Thyroid Developmental anomaly encountered were ; Thyroglossal cyst 46 cases (12%) and Thyroid Ectopia 14 cases(3.5%) in our study. Combination of USG and FNAC increase sensitivity of detection of Thyroid Developmental anomaly. The Thyroglossal cyst is usually encountered in the Thyroid Location (60%) within 2 cm of the midline; other locations seen less frequently include submental (24%), suprasternal (13%), and intralingual(2%).<sup>[9]</sup> The incidence of papillary thyroid carcinoma arising in a Thyroglossal Cyst is rare and occurs in about 1 % of Thyroglossal Cysts.<sup>[10]</sup>

Lingual region in the most common site of Thyroid Ectopy.<sup>[8]</sup> Although most cases are asymptomatic, symptoms related to tumor size and its relationship with surrounding tissues may also appear. There have been many reports of the inadvertent removal of an ectopic thyroid gland that was mistaken for a Thyroglossal Duct Cyst resulting in profound hypothyroidism. Any disease affecting the thyroid gland may also involve the ectopic thyroid, including malignancy with a reported incidence of less than 1%.<sup>[11,12,13]</sup>

Thyroid disease in children requires a thorough workup that includes a detailed clinical examination, blood tests, Ultrasonography, and cytological assessment.<sup>[2]</sup> Based on the higher proportion of malignant nodules in children and the potential difficulty in obtaining repeat samples from children, complex solid cystic lesions, and diffusely infiltrating disease of PTC a unique presentation in children, The American Thyroid Association Guidelines Task Force recommends that all FNA in children should be performed with US guidance.<sup>[14]</sup>

## VI. Conclusion

Diffuse Thyroid disorders are more common than Nodular thyroid in pediatric age group . Fine-Needle aspiration of Thyroid as a initial diagnostic test determines the pathology, triages the cases and also throws light on etiology; Hashimoto's Thyroiditis, Colloid goiter and Thyroid developmental anomalies. The American Thyroid Association Guidelines Task Force recommends that all FNA in children should be performed with US guidance. Hashimoto's thyroiditis is most frequent cause of the diffuse thyroid disease, particularly during puberty in Iodine sufficient population. Thyroid disorders in pediatric age in iodine sufficient population needs further research.

**Fig1: Clinical Picture**



**A & B - Colloid goiter, C & D- Nodular goiter**

**TABLE 1: Age distribution of Pediatric Thyroid Lesions**

AGE	FEMALE	MALE
0-5	9	10
6-10	93	28
11-14	220	29

**TABLE 2: Age and distribution of various Pediatric Thyroid Lesions.**

Disease - YEARS	0-5	6-10	11-14	Total
Hashimoto's	—	50	117	167
Colloid goitre	3	36	78	117
Nodular goitre	—	2	20	22
Thyroglossal cyst	14	20	12	46
Ectopic thyroid	2	3	9	14
Unremarkable	—	10	13	23

### References

- [1]. Calkovsky V, Hajtman A. Thyroid diseases in children and adolescents; Bratisl Lek Listy.2009;110(1):31-4
- [2]. Jeremy T. Guille, Adwoa Opoku-Boateng et al. Evaluation and Management of the Pediatric Thyroid Nodule The Oncologist 2015 jan;20(1):19-27
- [3]. Millman B, Pellitteri PK. Nodular thyroid disease in children and adolescents. Otolaryngol Head Neck Surg. 1997 Jun;116(6 Pt 1):604-9.
- [4]. Chang SH, Joo M, Kim H. Fine needle aspiration biopsy of thyroid nodules in children and adolescents. J Korean Med Sci. 2006 Jun;21(3):469-73.
- [5]. Willgerodt H, Keller E, Bennek J, Emmrich P. Diagnostic value of fine-needle aspiration biopsy of thyroid nodules in children and adolescents. Pediatr Endocrinol Metab. 2006 Apr;19(4):507-15.
- [6]. Lind P<sup>1</sup>, Langsteger W, Molnar M, Gallowitsch HJ, Mikosch P, Gomez I.
- [7]. Epidemiology of thyroid diseases in iodine sufficiency Thyroid. 1998 Dec;8(12):1179-83.
- [8]. Emilio Garcia-Garcia Maria Angeles Vazques-Lopez et al. Iodine intake and prevalence of thyroid autoimmunity and autoimmune thyroiditis in children and adolescents aged between 1 and 16 years. European Journal of Endocrinology (2012) 167 387–392.
- [9]. Laurberg P<sup>1</sup>, Jørgensen T, Perrild H, Ovesen L, Knudsen N, Pedersen IB, Rasmussen LB, Carlé A, Vejbjerg P. The Danish investigation on iodine intake and thyroid disease, DanThyr: status and perspectives. Eur J Endocrinol. 2006 Aug;155(2):219-28.
- [10]. Chrysostomos Kepertis<sup>1</sup>, Kleantis Anastasiadis,<sup>2</sup> Vassilis Lambropoulos,<sup>3</sup> Vassilis Mouravas,<sup>4</sup> and Ioannis Spyridakis<sup>5</sup>. Diagnostic and Surgical Approach of Thyroglossal Duct Cyst in Children: Ten Years Data Review. J Clin Diagn Res. 2015 Dec; 9(12): PC13–PC15.
- [11]. Yang YJ<sup>1</sup>, Haghir S, Wanamaker JR, Powers CN. Diagnosis of papillary carcinoma in a thyroglossal duct cyst by fine-needle aspiration biopsy. Arch Pathol Lab Med. 2000 Jan;124(1):139-42.
- [12]. Leung AK<sup>1</sup>, Wong AL, Robson WL. Ectopic thyroid gland simulating a thyroglossal duct cyst: a case report. Can J Surg. 1995 Feb;38(1):87-9.
- [13]. Noussios G<sup>1</sup>, Anagnostis P, Goulis DG, Lappas D, Natsis K. Ectopic thyroid tissue: anatomical, clinical, and surgical implications of a rare entity. Eur J Endocrinol. 2011 Sep;165(3):375-82. doi: 10.1530/EJE-11-0461. Epub 2011 Jun 29.
- [14]. Sturniolo G<sup>1</sup>, Violi MA<sup>2</sup>, Galletti B<sup>3</sup>, Baldari S<sup>4</sup>, Campenni A<sup>5</sup>, Vermiglio F<sup>6</sup>, Moleti M. Differentiated thyroid carcinoma in lingual thyroid. Endocrine. 2016 Jan;51(1):189-98. doi: 10.1007/s12020-015-0593-y. Epub 2015 May 19.
- [15]. Management Guidelines for Children with Thyroid Nodules and Differentiated Thyroid Cancer The American Thyroid Association Guidelines. Task Force on Pediatric Thyroid Cancer. THYROID Volume 25, Number 7, 2015