

Original Research Article

Developmental Anomalies of Thyroid Gland, FNAC Based Study, In a Tertiary Care Hospital for Head and Neck Diseases

Nagarjuna Chary¹, Kumudachalam Pindicura², D.SreedharReddy³, N.Vivekanand¹, Arikeri Ramya Priyadarshini⁴, Archana Reddy⁴

¹Associate Professor, of Pathology, RIMS Adilabad, Telangana, India

²Professor of Pathology, Govt. ENT hospital, Hyderabad, Telangana, India

³Professor of ENT, Govt. ENT hospital, Hyderabad, Telangana, India

⁴Senior Resident of Pathology, Govt. ENT hospital, Hyderabad, Telangana, India

***Corresponding author**

Kumudachalam Pindicura

Email: drpkumuda@rediffmail.com

Abstract: Developmental structural abnormalities of the Thyroid gland are relatively rare and can be categorized into; Agenesis of Thyroid gland, Dysgenesis of the Thyroid, Abnormalities due to persistence of the Thyroglossal Duct. The aim is to analyse clinicopathological aspects of Developmental anomalies of Thyroid at a Tertiary care hospital for Head and Neck diseases. An analysis of 2977 consecutive patients with Thyroid abnormalities subjected to FNAC was done and Developmental anomalies of Thyroid were detected and categorized by clinical examination, USG scan of Neck and FNAC diagnosis. Histopathological examination was done in available cases. Developmental anomalies of Thyroid were detected in 132 cases out of 2977 patients subjected to FNAC for diagnosis for Thyroid lesions. Incidence of Developmental anomalies of Thyroid was 4.4%. Thyroglossal duct cyst was present in 125 cases (94.6%) followed by Thyroid Heterotopia, 6 cases (4.5%) and Hemi agenesis of Thyroid in a case (0.8%). Most common developmental anomaly of Thyroid was Thyroglossal duct cyst followed by Thyroid Ectopia. All midline neck swellings should be evaluated for Developmental anomalies of Thyroid to plan appropriate management.

Keywords: Thyroid, Developmental Anomalies, Thyroglossal Duct Cyst, Heterotopias, Hemiagenesis

INTRODUCTION

Developmental abnormalities of the Thyroid gland can be divided into three major groups: Duct Agenesis of Thyroid gland, Dysgenesis of the Thyroid, Abnormalities due to persistence of the Thyroglossal duct. Dysgenesis can be in the form of Hemiagenesis of the Thyroid or as an Ectopic Thyroid [1]. Developmental anomalies of the Thyroid gland are relatively rare and there are very few comprehensive reports of the same.

AIM

To study Clinico-Pathological characteristics of Developmental anomalies of Thyroid at a Tertiary care hospital for Head and Neck Diseases.

MATERIAL AND METHODS

A total of 2977 consecutive patients with various Thyroid lesions were subjected to FNAC were analyzed. Developmental anomalies of Thyroid were detected by triad of clinical examination, USG scan and

FNAC. USG scan and FNAC were the simultaneous first line of investigations in all the cases. Thyroid Technetium Scan was done whenever it was indicated. HPE in available cases were analyzed.

RESULTS

Developmental anomalies of Thyroid were detected in 132 cases out of 2977 patients with various Thyroid lesions. Incidence of Developmental anomalies of Thyroid was 4.4% in the present study. Thyroid developmental anomalies were most common in 1st and 2nd decades. The age range was from 1yr to 60 yrs. Overall male to female ratio was 1:1. Thyroglossal duct cyst was present in 125 cases (94.6%) followed by Thyroid Heterotopia in 6 cases (4.5%), and Hemi agenesis of Thyroid was seen in a case (0.8%).

The most common developmental anomaly of Thyroid encountered was Thyroglossal duct cyst (TG cyst) 125 cases, (94.6%). There were 67 females and 58 males presented with TG cyst in the study. There was no

gender predilection, M:F ratio was 1: 1.2 and the age ranged from 1yr to 60 years. Orthotopically located Thyroid was found in all cases (Fig1).

Hemiogenesis of Thyroid and Dual ectopia were rare developmental anomalies encountered in the present study. A single case of Hemiogenesis of Left lobe of Thyroid in 23yrs, female was encountered in the study. A USG neck evaluation and FNAC confirmed the diagnosis, who clinically presented with Nodule in right lobe of Thyroid.

Ectopic Thyroid was encountered in 6 cases. Ectopic thyroid was most common in females

(F,5:M,1). Most common location was Lingual, 3 cases. Suprahyoid-and Infrahyoid location,present in one case each.FNAC was performed intra orally in Lingual Thyroid, which were located in posterior third of the tongue. USG and FNAC were diagnostic and were confirmed by histopathoogy as Thyroid Hetertopia. One case of Dual ectopic Thyroid in a female child 14years (submental and at the base of tongue) was encountered in this study,confirmed by Thyroid Scintigraphy (Fig 2).Histopathological examination revealed colloid and Nodular goitre changes in 5 cases and Hashimoto’s Thyroiditis in one case.We did not encounter malignancy in Heterotopic Thyroid. Thyroid was absent in orthotopic location in all these cases.

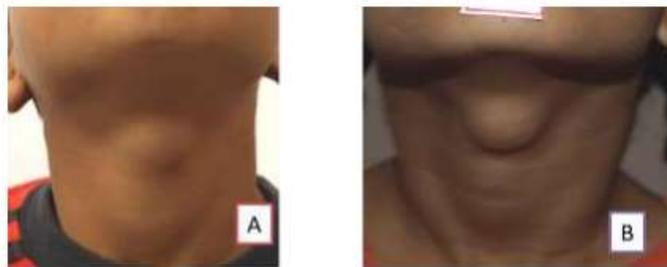


Fig-1: A) Thyroglossal cyst in male child; B) Thyroglossal cyst in female child

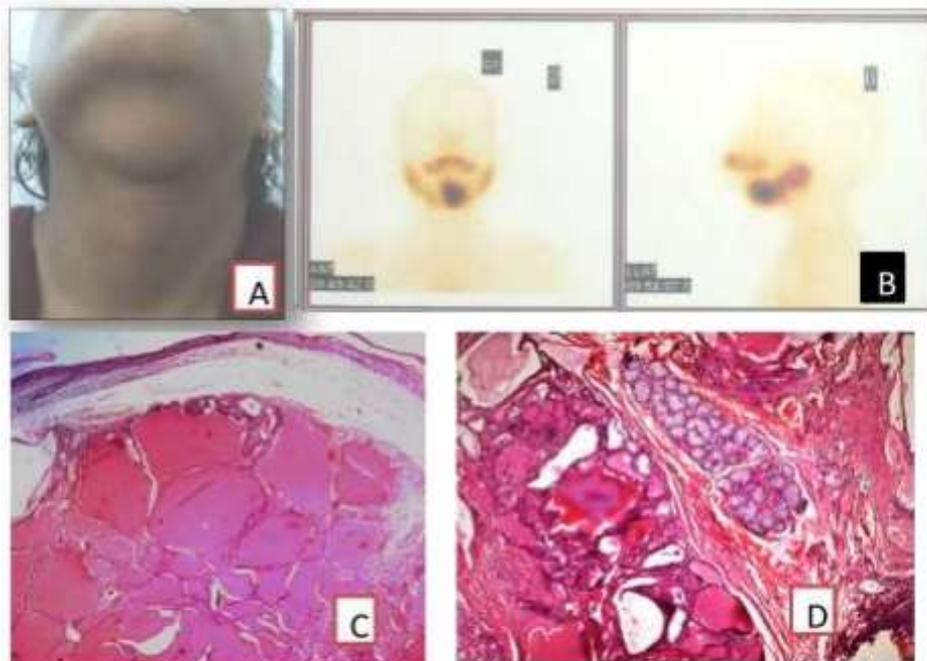


Fig-2: A) Clinical photo; B) Thyroid scintigraphy; C) Microphotograph of lingual part of dual ectopic showing subepithelial location of thyroid parenchyma; D) Deeper area with adjacent seromucinous gland

DISCUSSION

The Thyroid Gland develops from the foregut and descends by a circuitous route to its normal cervical position. Developmental abnormalities of the Thyroid gland can be divided into three major groups: (a) Agenesis of Thyroid gland, (b) Dysgenesis of the Thyroid; (c) Abnormalities due to persistence of the

Thyroglossal Duct. Dysgenesis can be in the form of Hemiogenesis of the Thyroid or as an EctopicThyroid [1].

Most common Developmental anomaly of Thyroid was Thyroglossal duct cyst (TG cyst) in the present study - 125 cases (94.6%). There was no

gender predilection and the age ranged from 1 year to 60 years. Normally located Thyroid was found in all cases of Thyroglossal cyst by Ultrasound examination. We did not encounter malignancy in Thyroglossal duct cyst.

Thyroglossal duct cyst, a common variation of abnormal thyroid development is one of the most frequent causes of a midline cervical mass in the paediatric population, majority appearing before 5 years of age with male preponderance [3]. In a large series, the age range was 16 months to 82 years, Twenty-eight percent of the patients were over 50 years of age and 10 percent were over 60 years [4].

The Thyroglossal duct is the embryological attachment of the Thyroid gland to the Tuberculum Impar and usually involutes after the 5th embryonal week. Failure to involute and atrophy results in persistence of a Thyroglossal Duct remnant or cyst, which is usually found at the level of the hyoid bone [2-4]. The cyst is usually encountered in the Thyro-hyoid location (60%) within 2 cm of the midline; other locations seen less frequently include submental (24%), suprasternal (13%), and intralingual (2%) [3]. The incidence of Papillary thyroid carcinoma arising in a Thyroglossal Duct Cyst is rare and occurs in about 1% of Thyroglossal Duct Cysts [5].

Hemiogenesis of Thyroid and Dual ectopia were very rare developmental anomalies encountered in the present study. One case of Dual ectopia of Thyroid (submental and at the base of tongue) was encountered in this study.

Ectopic thyroid tissue is a rare entity resulting from developmental defects at early stages of thyroid gland embryogenesis [6]. The migration of Thyroid primordium begins at the Foramen Cecum at the base of the tongue and then loops around the hyoid bone anteriorly and inferiorly and descends anteriorly to the thyrohyoid membrane into the orthotopic location in the infrahyoid portion of the neck. Thyroid ectopia is categorized into one of four typical locations with respect to this embryologic course: (a) the base of the tongue, (b) adjacent to the hyoid bone, (c) the midline infrahyoid portion of the neck, and, rarely, (d) the lateral part of the neck [7].

Prevalence of Ectopic Thyroid is one case per 100,000-300,000 persons and one in 4,000-8,000 patients with Thyroid Disease show this condition. Lingual region in the most common site of Thyroid Ectopy [8]. Although most cases are asymptomatic, symptoms related to enlargement are present in some. 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 malignancy in less than 1% [9-11].

Dual Ectopic Thyroid is extremely rare i.e. two ectopic foci of Thyroid tissue to be present simultaneously. Dual Ectopic Thyroid presents in the lingual and infrahyoid areas with no orthotopic Thyroid [12,13]. Around 32 cases of Dual Ectopic Thyroid gland had been reported and only two cases of triple ectopia Thyroid is reported [1].

Thyroidal hemiogenesis resulting from the failure of development of one Thyroidal bud to develop accounts for less than 0.1% of Thyroidal disorders. More than 100 cases of Thyroid Hemiogenesis have been reported. The left lobe was absent in 80% of these patients [1,14]. In this study Hemiogenesis of Thyroid presented in adult female with euthyroid status, clinically diagnosed as Solitary nodule Thyroid. Thyroid USG images revealed absent left lobe of Thyroid. The Diagnosis of Thyroid Hemiogenesis should be considered in any patient with unilateral absence of function on Thyroid Scintigraphy and by Ultrasonography. Recognition of this rare congenital anomaly is important to avoid unnecessary surgical intervention [15]. Co-occurrence of Hemiogenesis and Thyroid Carcinoma is extremely rare [16, 17].

CONCLUSION

Most common Developmental anomaly of Thyroid was Thyroglossal duct cyst with no gender predilection. Orthotopically located Thyroid was found in all cases of Thyroglossal cyst. Thyroid Ectopia was the next most common Developmental disorder, with a very rare case of Dual Ectopia. Thyroid was absent in normal location in Thyroid Ectopia. A very rare case of Left Hemiogenesis of Thyroid was encountered in this study. Imaging Techniques along with FNAC are most essential in diagnosis of Developmental Thyroid Disorders.

REFERENCES

1. Jain A, Pathak S; Rare developmental abnormalities of thyroid gland, especially multiple ectopia: A review and our experience. *Indian J Nucl Med.*, 2010; 25(4): 143-146.
2. Baisakhiya N; Giant Thyroglossal Cyst in an Elderly Patient. *Indian J Otolaryngol Head Neck Surg.*, 2011; 63(Suppl 1): 27-28.
3. Kepertis C, Anastasiadis K, Lambropoulos V, Mouravas V, Spyridakis I; Diagnostic and Surgical Approach of Thyroglossal Duct Cyst in Children: Ten Years Data Review. *J Clin Diagn Res.*, 2015; 9(12): PC13-PC15.
4. Katz AD, Hachigian M; Thyroglossal duct cysts. A thirty year experience with emphasis on

- occurrence in older patients. *Am J Surg.*, 1988; 155(6):741-4.
5. Yang YJ, Haghiri S, Wanamaker JR, Powers CN; Diagnosis of papillary carcinoma in a thyroglossal duct cyst by fine-needle aspiration biopsy. *Arch Pathol Lab Med.*, 2000; 124(1):139-42.
 6. Noussios G, Anagnostis P, Goulis DG, Lappas D, Natsis K; Ectopic thyroid tissue: anatomical, clinical, and surgical implications of a rare entity. *Eur J Endocrinol.*, 2011; 165(3):375-82.
 7. Zander DA, Smoker WR; Imaging of ectopic thyroid tissue and thyroglossal duct cysts. *Radiographics*, 2014; 34(1):37-50.
 8. Guerra G, Cinelli M, Meselella M, Tafuri D, Rocca A, Amato B, Rengo S, Testa D; Morphological, diagnostic and surgical features of ectopic thyroid gland: a review of literature. *Int J Surg.*, 2014; 12 Suppl 1:S3-11.
 9. Leung AK, Wong AL, Robson WL; Ectopic thyroid gland simulating a thyroglossal duct cyst: a case report. *Can J Surg.*, 1995; 38(1):87-9.
 10. Noussios G, Anagnostis P, Goulis DG, Lappas D, Natsis K; Ectopic thyroid tissue: anatomical, clinical, and surgical implications of a rare entity. *Eur J Endocrinol.*, 2011; 165(3):375-82.
 11. Sturniolo G, Violi MA, Galletti B, Baldari S, Campenni A, Vermiglio F, Moleti M; Differentiated thyroid carcinoma in lingual thyroid. *Endocrine*, 2016; 51(1):189-98.
 12. Baik SH, Choi JH, Lee HM; Dual ectopic thyroid. *Eur Arch Otorhinolaryngol.*, 2002; 259(2):105-7.
 13. Ulug T, Ulubil SA, Alagol F; Dual ectopic thyroid: report of a case. *J Laryngol Otol.*, 2003; 117(7):574-6.
 14. Kocakusak A, Akinci M, Arikan S, Sunar H, Yucel AF, Senturk O; Left thyroid lobe hemiagenesis with hyperthyroidism: report of a case. *Surg Today*, 2004; 34(5):437-9.
 15. McHenry CR, Walfish PG, Rosen IB, Lawrence AM, Paloyan E; Congenital thyroid hemi-agenesis. *Am Surg.*, 1995; 61(7):634-8; discussion 638-9.
 16. Khatri VP, Espinosa MH, Harada WA; Papillary adenocarcinoma in thyroid hemiagenesis. *Head Neck*, 1992; 14(4):312-5.
 17. Jianbiao Wang MM, Gao L, Chunyi Song MM; Thyroid hemiagenesis associated with medullary or papillary carcinoma: report of cases. *Head & Neck*, 2014; 36(11): E106–E111.