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SUBLINGUAL ECTOPY OF THE THYROID GLAND

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The sublingual ectopy of the thyroid gland is a rare abnormality, with an incidence of up to 10.7% of cases, which develops due to failed migration of cells from the thyroid anlage [1]. The ectopic thyroid gland is mainly located along the thyroglossal duct, more commonly in the proximity of the middle sagittal plan of the body, from the region of the foramen caecum of the tongue until the mediastinum [1, 2]. In our study, the developmental abnormalities of the thyroid gland were revealed in 3.9% of cases, characterized by agenesis of the thyroid gland and presence of the ectopic sublingual thyroid tissue.

Keywords: *thyroid gland, sublingual ectopy, abnormalities*

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ПОДЪЯЗЫЧНАЯ ЭКТОПИЯ ЩИТОВИДНОЙ ЖЕЛЕЗЫ

Подъязычная эктопия щитовидной железы — редкая аномалия, развивающаяся вследствие несостоявшейся миграции клеток из зачатка щитовидной железы, встречающаяся до 10,7% случаев [1]. Эктопия щитовидной железы преимущественно располагается вдоль щитовидно-язычного протока, от области слепого отверстия языка до средостения, ближе к срединной сагиттальной плоскости тела [1, 2]. В нашем исследовании, аномалии развития щитовидной железы составили 3,9% случаев, характеризующиеся агенезией щитовидной железы и наличием эктопической подъязычной щитовидной ткани.

Ключевые слова: *щитовидная железа, подъязычная эктопия, аномалии*

Introduction. The developmental abnormalities of the thyroid gland can be divided into three main groups: agenesis of the thyroid gland, dysgenesis of the thyroid gland and abnormalities due to persistence of the thyroglossal duct [3].

According to De Felice M. (2004) [2] the thyroid gland develops from two cell types of different embryological origin. The thyroid anlage gives rise to the thyroid follicular cells, while the parafollicular cells, which are derivatives of the fourth pharyngeal pouch, differentiate into the ultimobranchial bodies.

The thyroid gland is of endodermal origin and it belongs to the branchiogenic group. Its parenchyma derives from the pharyngeal epithelium of the primary gut. In the third week of embryonic life, days 20-24, by migration of the thyroid follicular cells' precursors, the endodermal cells of the thyroid anlage proliferate to form the thyroglossal duct [2, 4].

In the 5th week of the embryonic development, the thyroglossal duct descends caudally in the middle sagittal plane of the body, in front of the developing hyoid bone and thyroid cartilage of the larynx, and its distal end forms a bilobular diverticulum. In their merging process, the cells of the thyroid anlage

and those of the ultimobranchial bodies migrate to the site of the thyroid gland definitive location. In the early stages of development, the thyroid gland is represented by a cavity, which later converts into the thyroid parenchyma, giving rise to the thyroid follicular elements. The cells of the thyroid anlage are responsible for the thyroid follicles' organization and those of the ultimobranchial bodies scatter within the interfollicular space. Both the thyroid anlage and the ultimobranchial bodies in course of time disappear, but their cells are dispersing within the thyroid parenchyma [2, 4].

The appearance of the thyroid lobes occurs during the 5th week of gestation, and by the 7th week, the thyroid gland takes its typical position in the cervical region. During the 10th week of development, the thyroglossal duct is subjected to degeneration, remaining on the dorsal side of the tongue as foramen caecum. Cell differentiation continues until week 12, when functional maturation of the thyroid tissue occurs [4]. The ectopic thyroid tissue can be found in any location along the path of migration from the foramen caecum until the mediastinum.

Santangelo G. et al. (2015) [1] carried out a large study on 3092 of patients, as a result of which in 0.9% of cases, the ectopic thyroid tissue (ETT) was identified. The most common anatomical ETT sites were along the thyroglossal duct and in the lateral cervical region, both established in 21.4% of cases, followed by the mediastinal and lingual sites, both determined in 17.9% of cases and each of the sublingual and submandibular thyroid ectopic tissue was found in 10.7% of cases.

According to Grachev et al. (2022) [5], the abnormalities of the thyroid gland are present in 0.3-0.5% of population, with a lack or underdevelopment of the thyroid parenchyma such as agenesis, hemiagenesis or hypoplasia. The ectopic location of the thyroid parenchyma usually is characterized by the absence of the thyroid parenchyma at its typical site and presence of the thyroid tissue in uncommon sites.

The aim of the study. Our purpose was to study the incidence of the abnormal thyroid tissue in patients with thyroid gland pathology.

Material and methods. The study was conducted on 51 patients (8 males /43 females) with functional disorders of the thyroid gland. The patients were examined in the Republican Diagnostic Center from Chisinau, Republic of Moldova, in the period from May 2021 to January 2022.

The age of patients varied between 20-74 years, with an average age of 49.6 ± 14.8 years. The patients were divided into three age categories: young patients (20-30 years-old), young adults (31-45 years-old) and the last group (46-74 years-old), included middle and old age patients.

All the patients underwent scintigraphic examination that is one of the most accurate diagnostics and quantification methods in detecting the ectopic thyroid tissue, able to highlight the low, increased and normal intraparenchymal radiotracer uptake and distribution of the Iodine-123, ^{99m}Tc , I-131 and $\text{Tc}99$, as well as the abnormal sites of radiotracer uptake.

Ahead of examination, each patient was asked to sign an informed consent of participation in the research and only those patients who have signed it were included in the study. For the statistical analysis the descriptive and inferential statistics methods were used.

Results and discussion. The first age category (20-30 years-old) constituted 11.8%, the second group (31-45 years-old) – 27.4%, and the last group (46-74 years-old) – 60.8% (Figure 1).

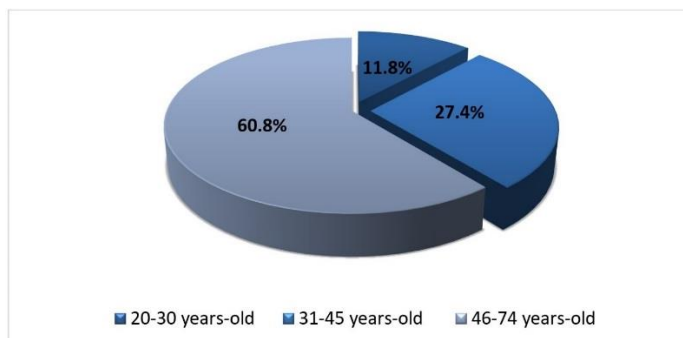


Figure 1. Age categories of patients.

The total surface of the thyroid gland varied between 0-49 cm², with an average of 24.86±9.53. The surface of the right lobe varied between 0-35 cm², with an average of 13.67±5.25, and that of the left lobe varied between 0-27 cm², with an average of 12.50±4.94 (Table 1).

Table 1.
The morphometric parameters of the thyroid gland

	Integral gland	Right lobe	Left lobe
Mean value of the TG surface ± SD	24.86±9.53 cm ²	13.67±5.25 cm ²	12.50±4.94 cm ²
Maximal value	49 cm ²	35 cm ²	27 cm ²
Minimal value	0 cm ²	0 cm ²	0 cm ²
Standard error	1.362	0.758	0.713
Dispersion	90.88	27.59	24.43
Kurt Excess	1.09	5.37	1.14
Skew Asymmetry	-0.30	1.04	0.34
Coefficient of variation (%)	38.35%	38.43%	39.54%

Note: TG – thyroid gland; SD – standard deviation

The radiotracer uptake of the entire thyroid gland and separately of each of the lobes was examined. The uptake capacity of the thyroid gland varied between 0-15.7%, with an average of 3.39±3.61.

The uptake capacity of the right lobe varied between 0-9%, with an average of 3.63±2.72, and uptake capacity of the left lobe varied between 0-9.3%, with an average value of 4.43± 2.82 (Table 2).

Table 2.
The uptake capacity of the thyroid gland

	Integral gland	Right lobe	Left lobe
Uptake range	0-15.7%	0-9%	0-9.3%
Mean value of the thyroid uptake	3.39±3.61	3.63±2.72	4.43±2.82

As a result of the scintigraphy, in 78.4% of cases, a prevalence of three main diseases was highlighted, among which were the cold nodules with a rate of 49% of cases, hot nodules were found in 15.7% of cases and the diffuse toxic goiter was diagnosed in 13.7% of patients. The rate of the other pathological conditions was 21.6% of cases.

Out of the total number of examined patients, in two cases the thyroid gland was absent and an anomalous thyroid tissue was revealed. Both patients were females, aged between 31-45 years-old.

The ectopic thyroid gland in a case had an oval shape and, in another case, it was of a round shape. In both patients the ectopic tissue was located in the sublingual region and total agenesis of the typical thyroid gland was marked out (Figure 2).

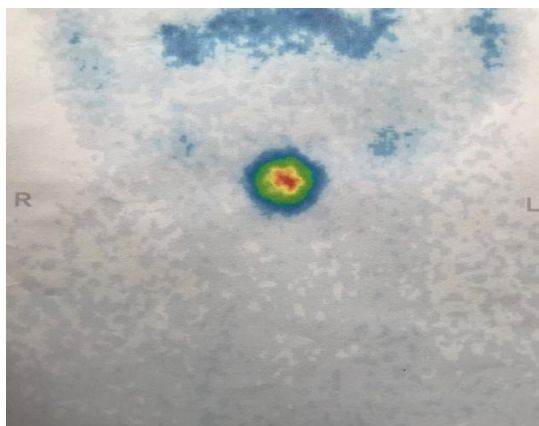


Figure 2. Sublingual thyroid gland.

Conclusion. The sublingual ectopic thyroid gland is a rare abnormality, determined by gene mutations, that usually is characterized by agenesis of the typical location of the thyroid gland and presence of ectopic thyroid tissue in the sublingual region.

References

1. Santangelo G, Pellino G, De Falco N, Colella G, D'Amato S, Maglione MG, De Luca R, Canonico S, De Falco M. Prevalence, diagnosis and management of ectopic thyroid glands. *Int J Surg.* 2016, Suppl 1:S1-6.

2. De Felice M, Di Lauro R. Thyroid development and its disorders: genetics and molecular mechanisms. *Endocr Rev.* 2004, 25(5), pp. 722-46. doi: 10.1210/er.2003-0028.
3. 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), pp. 143-146.
4. Rosen RD, Sapra A. Embryology, thyroid. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2024. <https://www.ncbi.nlm.nih.gov/books/NBK551611/>.
5. Grachev NS, Vorozhtsov IN, Ryzhov RV, Abramov DS. Klinicheskii sluchai — novoobrazovanie peregorodki nosa, okazavsheesya papillyarnym rakom ektopirovannoi shchitovidnoi zhelezy [Clinical case - neoplasm of the nasal septum, which turned out to be papillary cancer of the ectopic thyroid gland]. *Vestn Otorinolaringol.* 2022, 87(2), pp. 76-79.