MORPHOMETRICAL AND HISTOLOGICAL STUDY OF THYROID PYRAMIDAL LOBE IN DIFFERENT AGES OF IRAQI POPULATION

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Abstract

The pyramidal lobe, commonly known as the third lobe of the thyroid gland, arises from the isthmus or the surrounding region of any lobe toward the hyoid bone. The thyroglossal duct remnants form the pyramidal lobe of the thyroid. Clinically, it could be overlooked. The levetor glandulae thyroideae is a fibrous or fibromascular band that occasionally runs up from the summit of the pyramidal lobe to the body of the hyoid bone; in some cases, it began at the isthmus or neighboring region of any lobe. Study design: A descriptive cross-sectional study. Materials and Methods: From June 2018 to February 2019, this anatomical study was conducted at the Baghdad Institute of Forensic Medicine and the Kirkuk Teaching Hospital's forensic medicine section. For each sex, the collected samples were separated into two age groups: Group A 0 - 20 years (39 males and 21 females), and Group B 21 - 50 years (39 males and 21 females) (39 male and 21 female). The presence, position, extent, size, and histological diagnostic of the pyramidal lobe were perceived anatomically. The pyramidal lobe was detected in different age groups, with male specimens appearing more frequently than female specimens and levator glandulae thyroideae appearing slightly more frequently on the left side of the median-sagittal plane. The goal of this study was to see how characteristics like age and gender can affect changes in the pyramidal lobe's presence, position, relationship, and size, which is important to endocrinologists, pathologists, and ultrasonography specialists. Thyroid surgeons must also be familiar with the levator glandulae thyroideae in order to minimize iatrogenic damage. As a result, we believe that our findings can be used to achieve a harmless and more successful thyroidectomy to ovoid recurrent thyroid disease.

Keywords: Pyramidal lobe. levator glandulae thyroideae. Thyroidectomy

Introduction

The thyroid gland begins life as an epithelial proliferation between the copula linguae and the tuberculum impar at the base of the tongue. The thyroglossal duct develops, proliferating and moving caudally. As a bilobed diverticulum, the thyroid gland descends through the thyroglossal duct. By the fifth week of embryonic life, the duct has degenerated.[1] A typical anomaly in thyroid development is the presence of the pyramidal lobe (PL), thyroglossal cyst, and auxiliary tissue along the thyroid descending route.[2] In some cases, the thyroid gland's pyramidal lobe, also known as the Lalouette pyramid.[3] The thyroid gland is the biggest endocrine gland and consists of two lobes (right and left) linked by an isthmus along the median line. Apart from these two lateral lobes, the pyramidal lobe extends superiorly from the thyroid gland's isthmus, usually to the left of the median plane.[4] The pyramidal lobe is an additional thyroid tissue that can arise as a consequence of a residue of the thyroglossal duct in some people. The size, shape, and frequency of this differs significantly concerning literatures.[5] The distal section of the thyroglossal duct, which grows along the traveling path of the thyroid gland and normally fades later in growth, appears to be linked to this lobe. Thyroid anomaly, morphological variation of the thyroid gland, or common constituent of the thyroid gland are all terms used to describe this condition. The pyramidal lobe may also be linked to the levator glandulae thyroideae muscle, which connects the pyramidal lobe to the hyoid bone or thyroid cartilage in some people.[6] Because it can be affected by the similar thyroid illnesses as the rest of the gland, the pyramidal lobe is clinically important.[7] It was expected that 50 percent to 70 percent of persons may have pyramidal lobe.[8] In individuals with differentiated thyroid cancer, identifying and removing the PL is also critical for successful postoperative radioactive iodine treatment.[9] Erasure of a present pyramidal lobe is vital to the endocrine physician first and foremost to minimize reappearance due to remaining thyroid tissue following whole thyroidectomy. Second, it allows for use of supplementary radioactive iodine treatment as a follow-up cure in differentiated thyroid cancer.[10] The goal of this study was to see how characteristics like age and gender can affect changes in the pyramidal lobe's presence, position, relationship, and size, which is important to endocrinologists, pathologists, and ultrasonography specialists. Thyroid surgeons must also be familiar with the levator glandulae thyroideae in order to minimize iatrogenic damage. As a result, we have faith in our findings can be used to execute a harmless and more successful of thyroidectomy to retain thyroid function following surgery.

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Material and Method

This anatomical study took place between June 2018 and February 2019 at Baghdad institute of forensic medicine and from forensic medicine department of Tikrit Teaching Hospital. The samples were separated into two age groups. Male and female age groups are 0-20 years and 21-50 years. intrapartum asphyxia, bullets injuries, brain stroke, sudden death, car accidents were all listed as causes of death for each cadaver. Exclusion criteria include death by poisoning or hanging, any crushing damage or thyroid gland cutting, and post-mortem alterations. During dissection, the components of the anterior portion of the neck were examined, with the larynx, trachea, thyroid, and main vessels of the neck. Meanwhile, notes were recorded on the existence or lack of the pyramidal lobe, as well as its site and shape if it was present. After that, a digital electronic vernier with standard fixed measure was used to measure its length, breadth, and thickness. Two readings were collected for each parameter using available instruments, and the average outcome was recorded. For histological preparation in a plastic container, pyramidal lobe tissue blocks were fixed in 10% formalin saline. The tissues were rinse by tap water, dehydrated with increasing concentrations of alcohol, cleaned with xylene, infiltrated, and embedded in paraffin. Routine Haematoxylin and Eosin (H & E) staining was used on paraffin blocks cut at a thickness of 5 mm. The light microscope utilized for microscopic description was an OLYMPUS CHB from Tokyo, Japan, which was investigated at low magnification power (X10 eyepiece).

Finding

After routine dissection of the front neck, a pyramidal lobe was recognized, Arising from the thyroid isthmus or either lobe. The pyramidal lobe reaches or extends over the thyroid cartilage toward the hyoid bone by crossing the top boundary of the cricoid cartilage. Branches of the left superior thyroid artery supplied the pyramidal lobe mainly. Total Out of group A 53 dissected neck specimens, the PL was found in 12/31 (38.71%), in the male specimens and 8/23 (34.78%) in female specimens. Also, total the pyramidal lobe was found in 14/39 (35.89 percent) of male samples and 6/20 (30 percent) of female samples from group B 59. For each gender indicated in the (Table 1), the pyramidal lobe was observed to arise from the isthmus in most specimens, and in some cases ascend from the left or right lobes (Figures 1 and 2). The levator glandulae thyroideae was joined inferiorly to the Pyramidal lobe slightly adjacent to the isthmus, and superiorly to the lower margin of the Hyoid bone's body. We also saw that it passed extremely close to the thyroid cartilage lamina in the future. Out of 60 instances, the levator glandulae thyroideae was discovered in 12 of them (20 percent). The pyramidal lobe was examined histologically using H&E stained transverse slices. The pyramidal lobe is made up of numerous thyroid follicles set in thick irregular connective tissue and numerous horizontal bands of skeletal muscle in normal thyroid tissue (Figure 3). For each group and both genders, all pyramidal lobe measures are presented in (Table 2).

Discussion

The pyramidal lobe includes of normal thyroid tissue. So all the syndromes detected in thyroid are probable to happen in the pyramidal lobe. Pyramidal

Table 1: Show site origin of the pyramidal lobe.

Groups	Sex	Site of origin	Incidence	Percentage
A	Male	left side	2	16.66%
		right side	1	8.33 %
		Isthmus	9	75%
	Female	left side	1	12.5%
		right side	0	0
		Isthmus	7	87.5%
B	Male	left side	2	14.29%
		right side	0	0
		Isthmus	12	85.71%
	Female	left side	1	16.66%
		right side	0	0
		Isthmus	5	83.3%

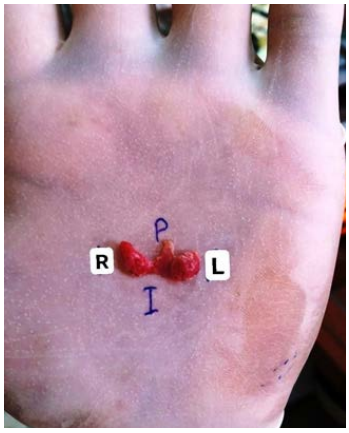

Figure 1: Show the (P) pyramidal lobe arising from (I) isthmus shifting to (L) left lobe (R) right lobe. (group A).

Figure 2: Show the (P) pyramidal lobe arising from isthmus (group B).

Table 2: Means ± SD Length, breadth and thickness of the pyramidal lobe in male and female correlated to different age groups.

Group and sex	Length	Breadth	Thickness
Group A male 12	12.75±1.7	5.5±0.73	2.8±0.3
Group A female8	12.23±1.5	5.51±0.21	2.78±0.26
Group B male 14	13.3±1.67	7.83±0.64	3.62±0.57
Group B female6	13.12+1.8	6.82±0.61	3.25±0.56

lobes can develop from any of the two lobes or the isthmus and vary in position and extent. The variations in the pyramidal lobe of the thyroid gland as a result development and movement of the thyroid gland from its beginning in the tongue downwards to the neck. The thyroid gland is related to the pharynx by a thin epithelial stalk referred as the thyroglossal duct, which commonly becomes obliterated by the 8th to 10th weeks of pregnancy. While the pyramidal lobes is considered thyroid tissue, it must be studied in conjunction with thyroid gland architecture. According to recent research,

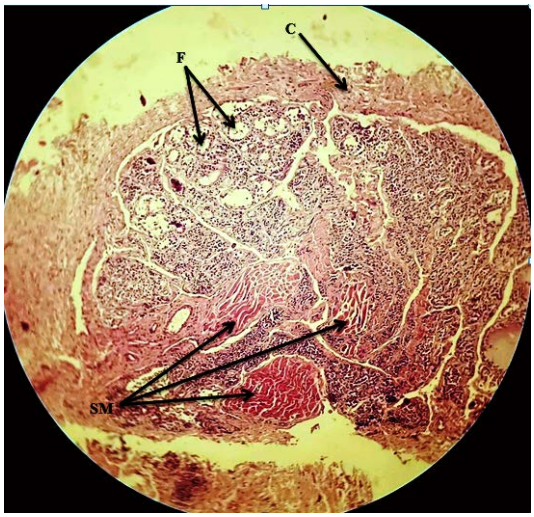

Figure 3: Show the levator glandulae thyroideae (SM) with thyroid follicles (F) both structures surrounded by capsule (C) Hematoxylin and Eosin 10X.

the pyramidal lobe prevalence ranges from 12 to 65 percent.[11,12] Variances in prevalence can be due to differences between countries, as well as differences in sample sizes and characteristics. Marshall CF [13] was the first to discover the frequency of thyroid gland Pyramidal lobe differences In 43 percent of the cases he examined. In a study of Koreans,[14] PL was found in 76.8% , while Sultana et al.[15] (2008) found it in 30 (50 percent) of the 60 sample. Maria BE et al.,[16] discovered it in 55 percent (32/58) of cadavers, and Wahl R et al.,[17] discovered it in 53 percent of cases in his study, with 39 percent of PL originating from the right lobe and 8 percent from the isthmus, which contradicts our findings. PL is more prevalent on the left side than the right, and males have a higher frequency than females. PL was found to be present in 50 present[18], 61 percent[19], 55.2 percent[20], and 40.6 percent in a few more trials[21]. Men are more likely than women to develop PL (61.96 percent) (50 percent). Furthermore, it is seen more frequently in people under the age of 50 (67.3 percent) than in people beyond the age of 50. (54.2 percent). In this investigation, PL was found in male and female cadavers in groups A (12/31 (38.71 percent) and 8/23 (34.78 percent), respectively. Group B was found in 14/39 (35.89 percent) male specimens and 6/20 (30 percent) female specimens. 71 28.9 percent of cases, according to Harjeet et al.[22] Our findings were comparable to those of Braun et al.(16) and Geraci et al.[23] who found that the manifestation of PL is more common in males (62 percent and 57 percent, respectively) than females (50 percent and 43 percent, respectively) patients. This contrasts with the findings of Cengiz et al. and Pushpa et al.[24,25] who found that 81 percent and 75.2 percent of PL patients respectively. The length of PL is poorly described in the literature. The pyramidal lobe was In males, the PL measured 8 to 80 mm (average 50 mm) and in females, 5 to 54 mm (average 42 mm). The PL had an average diameter of 15 mm (range 4–20 mm). [12] And 50.5 mm long with a mean diameter of 2 mm.[13] And 24.1 mm long on average[26]. Other researchers have observed shorter mean lengths ranging from 23 mm to 25 mm, 27 mm, and 29 mm.[27,28] All prior researchers who were within the range of our findings mentioned in the previous section's table(2). There is a high risk of incomplete thyroidectomy due to variations in the size and location of PL. As a result, the entire prelaryngeal region between the isthmus and the hyoid bone should be checked to thoroughly ablate PL and ensure that no thyroid tissue remains. All tissue from the isthmus to the hyoid bone should be removed to attain this goal.[29] Thyroid cells in the pyramidal lobe are normally dormant, but when active thyroid tissue is removed, they become active. This explains why, even when a pyramidal lobe is present, scintigraphy frequently fails to detect it.[12]

Conclusion

As a result, the presence of the Pyramidal lobes during preoperative diagnosis in patients with thyroid disease, where it is frequently unvisualized, should not be overlooked.

Recommendation

To avoid difficulties following thyroid surgery, doctors should remove Pyramidal lobes throughout the thyroidectomy, particularly if it is attached superiorly by any structures.

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