The prevalence of pyramidal lobe of the thyroid gland among Iraqi Society

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Abstract

Pyramidal lobe is an embryonic remnant of thyroglossal duct and it is observed as a structure arises upward from the right or the left thyroid lobe or its isthmus. The aim of this study was to determine a variable factors regarding the presence, location, shape and linear measurements of the pyramidal lobe of human thyroid gland. A sixty-four male and forty-one female cadavers with age range of (20-62) years were dissected at the neck region to explore the thyroid gland and clarified its pyramidal lobe. This anatomical study was carried out at the institute of forensic medicine in Baghdad and the forensic medicine unit in Tikrit teaching hospital during the period from September 2013 to May 2014.

This study observed that the high prevalence of the pyramidal lobe was in females 60.9% than in males 56.3% with total prevalence 58.1% among the population of both genders. Also, it was obvious that the pyramidal lobe arises as extension on the left lobe of the thyroid gland with prevalence 62.3% and the most common shape of it recognized by this study was the pyramidal shape with 50.8% followed by the triangular shape with 27.9%.

The three linear parameters of the pyramidal lobe were measured showing the average length of the pyramidal lobe was 14.6 ± 2.0mm, the average width was 7.7 ± 1.2mm and the average thickness was 2.8 ± 0.9 mm; but there was no significant differences ($p>0.05$) between the two sexes.

Introduction

Thyroid gland is an endocrine gland composed of two lateral lobes that connected by a isthmus in its middle portion. Persistence of the pyramidal lobe is a not-always a prominent character of the human thyroid gland that develops from the caudal portion of the thyroglossal duct. It can arises from the isthmus, the left or right lobe, upwards in the form a long process that can reach the upper border of the thyroid cartilage or even the hyoid bone (1).

The pyramidal lobe is of great importance in thyroid surgeries for several reasons. First, in total thyroidectomy , it is crucial to identify the pyramidal lobe and remove it, because this lobe may cause the recurrent hyperthyroidism following the incomplete resection of the gland (2). Second, it can be the site of origin of a thyroid cancer or contain intraglandular metastasis or multifocal disease, therefore; if it left behind in a patient who will require postoperative radioactive iodine, its presence will virtually nullify the anticipated benefit of radioactive iodine by absorbing most, if not all, of the radioactive material (3). Finally, this midline lobe may contain the Delphian lymph node, which is frequently the site of metastasis from a cancer in the body of the thyroid gland (4).

Materials & Methods

This anatomical study was carried out at the institute of forensic medicine in Baghdad and the forensic medicine unit in Tikrit teaching hospital during the period from September 2013 to May 2014 and conducted among sixty-four male and forty-one female cadavers who dissected there for different reasons with the age range of (20-62) years. The cadavers with any neck

trauma, injury or previous surgery were excluded from this study in addition to those with history of thyroid diseases.

The contents of the anterior aspect of the neck, including the pharynx, part of esophagus, larynx, trachea, thyroid, parathyroid glands and major vessels of the neck were explored during dissection. Meantime, observation notes were taken about presence or absence of the pyramidal lobe; and -if present- its position and shape were classified. After that, its length from base to apex, width at the base and the thickness at its maximum position were measured using a standard flexible tape measure and a digital electronic vernier (that sensitive to 0.01 mm). To measure each parameter three readings were taken and the average result was noted down.

Statistical analysis was obtained by using a Pearson chi-square test. The measured linear parameters (length, width and thickness of the pyramidal lobe) were compared between genders using a Student t-test. A p-value less than 0.05 was considered significant.

Results

This study showed that the pyramidal lobe was present in 36 males out of 64 cases 56.3%, while in female with 60.9% as it founded in 25 females out of 41 cases; therefore the total percentage was 58.1% as it was observed in 61 out of the total 105 cases but this gender difference was not significant ($p>0.05$).

Among the sixty-one cases that found with the pyramidal lobe as a single extension from the thyroid gland, the current study observed that it situated on the left lobe of the gland in 38 cases which represent 62.3% of those total cases (as it was demonstrated in 24 male cases which represent 66.7% of total male cases and it was founded in 14 female cases which represent 56% of total female cases); while it is located on the right lobe of the thyroid gland in 8 cases that represent 13.1% of the total cases (as it was showed in 5 male cases which represent 13.9% of total male cases and it was seen in only 3 female cases which represent 12% of total female cases); on the other hand, the pyramidal lobe lied on the isthmus of the thyroid gland in 15 cases that represent 24.6% of the total cases (as it was recognized in 7 male cases which represent 19.4% of total male cases and it was obvious in 8 female cases which represent 32% of total female cases). There was a significant difference ($p>0.05$) recorded regarding the left sided pyramidal lobe position in male compared to the other two positions, but there is no significant difference observed regarding the three mentioned positions of the pyramidal lobe in females.

The pyramidal lobe of the present study was revealed in four different shapes; the first was the pyramidal shape which seen in 31 cases which represent 50.8% of the total cases (as it was shown in 17 male cases that represent 47.2% of total male cases and it was founded in 14 female cases which represent 56% of total female cases); the second recognized shape was the triangular which was in 17 cases that represent 27.9% of the total cases (as it was founded in 11 male cases which represent 30.6% of total male cases and it was clarified in 6 female cases which represent 24% of total female cases); the third was the string shape that founded in 8 cases that represent 13.1% of the total cases (as it was shown in 4 male cases which represent 11.1% of total male cases and it was obvious in 4 female cases which represent 16% of total female cases); and the last four shape was the flat one which was in only 5 cases that represent 8.2% of the total cases (as it was founded in 4 male cases which represent 11.1% of total male cases and it was recognized in 1 female case which represent 4% of total female cases). These findings observed a high significant difference ($p>0.05$) between the first pyramidal shape compared to the other three types.

The average length of the pyramidal lobe that measured from its basal site of attachment to its terminal apex in male specimens was 15.3 ± 2.1mm, while in female cases was 13.1 ± 1.8mm; therefore in the total cases was 14.6 ± 2.0mm. The

present study noticed that these findings with no significant differences ($p>0.05$) between the two genders.

The average width of the pyramidal lobe which measured at its basal site of attachment from side to side in male cases was 8.2 ± 1.1mm, but in female cases was 7.1 ± 1.3mm and in the total cases was 7.7 ± 1.2mm. This study findings observed no significant differences ($p>0.05$) between the two sexes.

The average thickness of the pyramidal lobe that measured at its obvious thick part in male specimens was 3.3 ± 0.8mm, while in female cases was 2.3 ± 1.1mm; therefore in the total cases was 2.8 ± 0.9mm. There is no significant differences ($p>0.05$) between the two genders was founded in these findings.

All the above mentioned result findings which obtained from this study were summarized in Table 1.

Discussion

The pyramidal lobe varies in its anatomical position, shape and size. The prevalence of the pyramidal lobe in this anatomical study was 58.1% out of total cases, which was quite close finding comparable with that reported in previous surgical studies done by Ryu et al (5) who reported pyramidal lobe during thyroid surgery in 60% of 135 patients, Kim et al (6) who detected a prevalence of 59.8% in 132 patients and Zivic et al (4) who founded the pyramidal lobe in 61% of 100 thyroid surgeries. Also other postmortem studies that reported the incidence of pyramidal lobe to be between 40% to 60% like Marshall (7) who stated that the pyramidal lobe was present in about 43%, but in not all of these cases it was symmetrically placed; also another postmortem study done by Ranade et al (3) who dissected 105 (88 male and 17 female) cadavers at southern India and founded the pyramidal lobe in 61 cases (58%).

The observations of the current study mentioned that the pyramidal lobe was more prevalent in female 60.9% than in male 56.3%, which in agreement with Filho et al (8) and Sturniolo et al (9) studies that observed the pyramidal lobe was more frequently appeared in female 61% & 57% than in male 50% & 43% respectively; and also in the Cengiz et al (10) study 81% patients with pyramidal lobe were females ; but in contrast to both Braun et al (2) study that founded the pyramidal lobes was more prevalent in male 62% than in female 50% and Sultana et al (11) study which observed a half of the cases (30 out of 60) had pyramidal lobe with their incidence was more in males 52.1% than that of females 41.7%.

The current study observed that the pyramidal lobe may be originated on the upper border of the isthmus in 24.6% or the medial border of any thyroid lobe or their upper poles with the highest incidence reported on the left lobe with 62.3%; which agreed with the data of other previous studies (4, 7 & 12). Begum (13) clarified the pyramidal lobe in 26.7% (16 cases out of 60) and most were from the left side.

The most common shape of the pyramidal lobe recognized by this study was the pyramidal shape with 50.8% of the total cases, that in agreement with Blumberg (12), Enayetullah (14) and Park et al (15) studies; on the other hand the other shapes not reported by the previous studies.

The present study mentioned that the average length was 14.6 ± 2.0mm, the average width was 7.7 ± 1.2mm and the average thickness was 2.8 ± 0.9 mm; on the other hand, most authors describe the parameters of the pyramidal lobe according to surrounding structures like Harjeet et al (16) claimed that the structure reaches the hyoid bone in 5% of cases, Marshall (7) reported such length in over 50%, while Braun et al (2) noted such an extent in 25%. Other researchers gave information on the length of the pyramidal lobe varies considerably, like a study done by Filho et al (8) who stated that the length of the pyramidal lobe ranged from 10-50 mm, while Braun et al (2) noted a median length of 24.1 mm with a range of 3-63 mm, and

Geraci et al (17) who founded that no pyramidal lobe exceeded the 20 mm.

Conclusion

This anatomical study observed that the prevalence of the pyramidal lobe was 58.1% among the population of both genders; on the other hand, it was more prevalent in females 60.9% than in males 56.3% but this gender difference was not significant ($p>0.05$).

After exploration of the thyroid gland, the highest incidence 62.3% revealed that the pyramidal lobe arises as extension on the left lobe of the gland and there was a significant difference ($p>0.05$) recorded regarding the left sided pyramidal lobe position in male compared to the other two positions, but there is no significant difference observed regarding the three different positions of the pyramidal lobe in females.

On the other hand, the most common shape of pyramidal lobe recognized by this study was the pyramidal shape with 50.8% followed by the triangular shape with 27.9%; therefore, these findings revealed a high significant difference ($p>0.05$) between the first pyramidal shape compared to the other three types.

In general, this study mentioned that the average length of the pyramidal lobe was 14.6 ± 2.0mm, the average width was 7.7 ± 1.2mm and the average thickness was 2.8 ± 0.9 mm with no significant differences ($p>0.05$) between the two sexes.

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Table 1: Shows the percentage of the presence, anatomical positions, different recognized shapes and measurements regarding the pyramidal lobe of the human thyroid gland among Iraqis.

Gender / Parameter		Male	Female	Total
Percentage %		56.3%	60.9%	58.1%
Position	Left	66.7%	56%	62.3%
	Isthmus	19.4%	32%	24.6%
	Right	13.9%	12%	13.1%
Shape	Pyramidal	47.2%	56%	50.8%
	Triangular	30.6%	24%	27.9%
	String	11.1%	16%	13.1%
	Flat	11.1%	4%	8.2%
Length in mm		15.3 ± 2.1	13.1 ± 1.8	14.6 ± 2.0
Width in mm		8.2 ± 1.1	7.1 ± 1.3	7.7 ± 1.2
Thickness in mm		3.3 ± 0.8	2.3 ± 1.1	2.8 ± 0.9

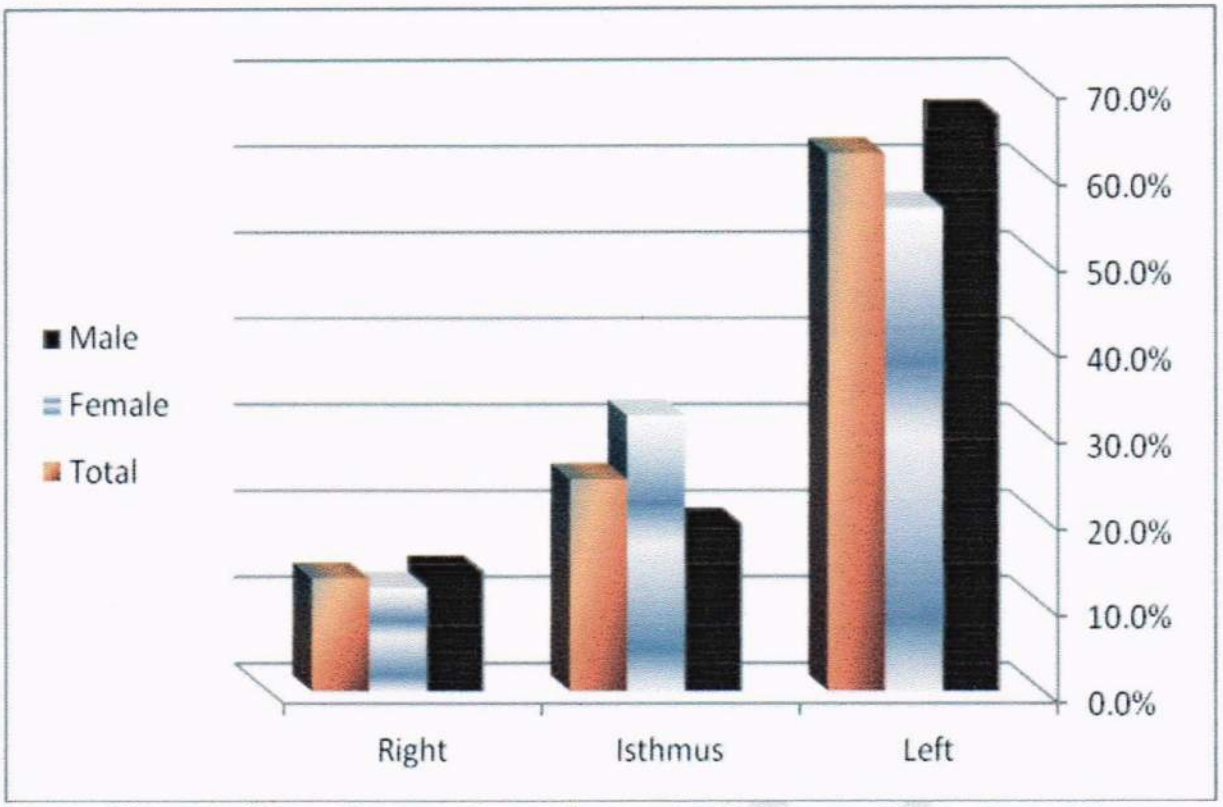

Figure 1: Shows the prevalence of pyramidal lobe according to its position.

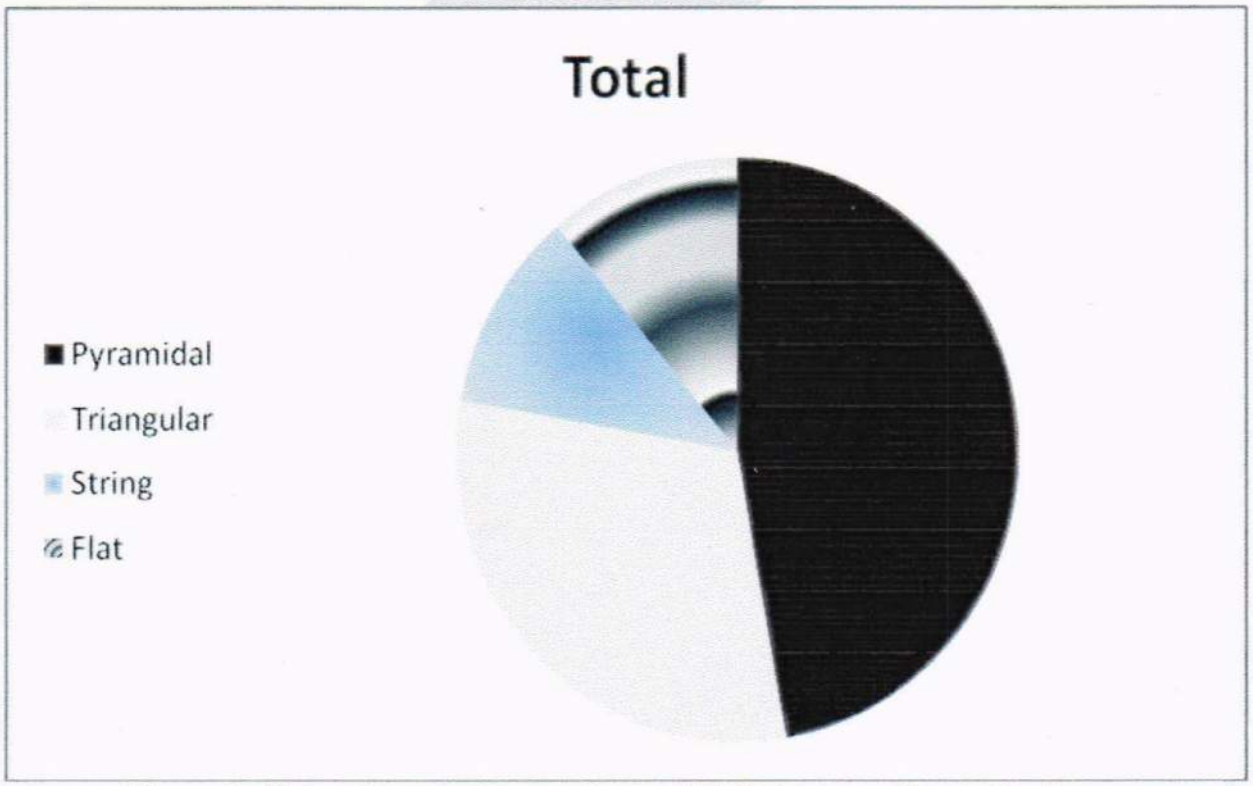

Figure 2: Shows the prevalence of pyramidal lobe according to its shape.