



PYRAMIDAL LOBE OF THYROID GLAND – SIGNIFICANCE IN THYROID SURGERY

KEYWORDS

Pyramidal lobe, Thyroid gland, Developmental anomaly

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ABSTRACT *Different developmental anomalies like presence of pyramidal lobe are often seen associated with thyroid gland. This variation associated with thyroid gland can lead to a number of complications during thyroidectomy. This study emphasizes on pyramidal lobe of thyroid gland in south Indian cadavers.*

Materials and Methods: A cadaveric study in Department of Anatomy, Govt Medical College, Kozhikode where 50 thyroid glands (40 males and 10 females) were dissected carefully. Incidence, attachment and gender difference of pyramidal lobe were noted.

Results : Pyramidal lobe was noted in 32 % of cases. Tabulated data was analyzed by Chi – Square chart and incidence in males and females were studied. The study showed no significant statistical difference in males and females.

Conclusions : This study highlights the developmental anomaly of thyroid gland namely pyramidal lobe and thereby helps to reduce the complications related to thyroid surgery.

INTRODUCTION

Thyroid gland is a highly vascular endocrine gland with 2 lateral lobes joined in the middle by an isthmus. The name thyroid is derived from the greek word 'thyreo-eides" meaning shield shaped. The thyroid gland was vaguely described by Galen in 130 AD. He believed that the secretion of thyroid gland lubricated the larynx. Thyroid gland was described in detail by Andrea Vesalius in 1514 and it was B Eustachius in 1520 who first used the term isthmus for the part connecting the two lobes of the gland.

Anomalies in thyroid gland development distort the morphology leading to a variety of variations of the gland. Caudal part of thyroglossal duct persists as pyramidal lobe in some individuals. Pyramidal lobe was first described by Morgagni in 1706. Staglizer (1941) stated that the pyramidal process develops from the lower part of thyroglossal duct by the differentiation of the duct tissue into glandular tissue. The length of the pyramidal process depends on the position at which fragmentation of the thyroglossal duct first occurs. Braun et al in 2007 states that pyramidal lobe could be a source of pitfall during thyroidectomy due to frequent but unreliable preoperative diagnosis on scintigraphic images. Geraci et al in 2008 opined that Pyramidal lobe in 50% of cases may go undetected while performing preoperative diagnostic procedures like USG or TC-99m pertechnetate scan. Further there are instances where non removal of pyramidal lobe during a total thyroidectomy for a thyroid carcinoma can lead to recurrence of the disease. All these emphasize the importance of study of pyramidal lobe of thyroid gland.

This study aims on reporting the developmental anomaly namely the pyramidal lobe associated with thyroid gland of south Indian cadavers which may hopefully reduce the complication related to thyroid surgery.

MATERIALS AND METHODS

This study on developmental anomalies of thyroid gland was undertaken in 50 cadavers (40 male and 10 female). 28 of them were adults and 22 fetuses. The study of the adult cadavers was undertaken in the specimens assigned for dissection of undergraduate students of Government Medical College, Kozhikode for a period of 2 years.

The fetuses for the study were obtained from Institute of Maternal and Child Health attached to Government Medical College, Kozhikode. Ethical committee approval was obtained. The fetuses were preserved in 37% commercial formalin by injecting the material into the anterior fontanelle (about 100cc),

the right and left side of chest cavity (about 50cc) and peritoneal cavity (about 300cc). Multiple injections were also given into the extremities. The fetuses thus injected were kept immersed in large buckets containing formalin until they were taken out for dissection.

A midline incision, extending from symphysis menti to suprasternal notch and 2 lateral incisions extending from suprasternal notch laterally was made. Skin, platysma and investing layer of deep cervical fascia were turned laterally. For better view of thyroid gland, strap muscles were detached from the upper end and turned down. The gross anatomical features of thyroid gland were looked. Two lateral lobes and isthmus were inspected. Developmental anomaly like presence of pyramidal lobe was looked for. If pyramidal lobe was present its upper and lower attachments were defined.

BIostatistics

1. QUALITATIVE DATA

The evaluated feature of thyroid gland namely the pyramidal lobe was included in the qualitative data. sex was included in each case.

2. QUANTITATIVE DATA

The quantitative features were entered in master chart and quantified according to their frequency. Tables were used to describe the frequency distribution of each parameter. Appropriate bar diagrams and pie charts were prepared for studying both the study groups (male and female).

STATISTICAL TEST

CHI SQUARE TEST

The chi square test was used to find out whether the observed series of frequency differ between both the study groups (Snedecor & Cochran 1967). The statistical significance or probability was expressed as P value. Statistical analysis was done by using SSP2 (Statistical package for social sciences) programme under the guidance of a statistician.

RESULTS

Pyramidal lobe was present in 16 cases (32%).

Pyramidal lobe was seen attached to left lateral lobe in 10 cases (fig 1,3) and to isthmus in 6 cases (fig 2,4).

Superiorly, Pyramidal lobe was attached to

- Levator Glandulae Thyroidea in 5 cases (fig 4)
- Hyoid bone in 8 cases (fig 2,3)
- Thyroid cartilage in 3 cases (fig 1)

Pyramidal lobe was noted in 27.5% of cases of males and 50% of cases of female. As the P value is above 0.05 no significant statistical difference is seen among males and females. Incidence of Pyramidal lobe is given in Table1, Chart 1,2.

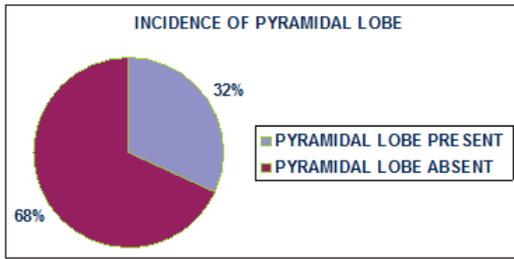


CHART 1

PYRAMIDAL LOBE	MALE		FEMALE		TOTAL	
	NO	%	NO	%	NO	%
PRESENT	11	27.5	5	50	16	32
ABSENT	29	72.5	5	50	34	68
X ² = 1.861 P VALUE = 0.172						
TABLE 1: INCIDENCE OF PYRAMIDAL LOBE IN MALES AND FEMALES						

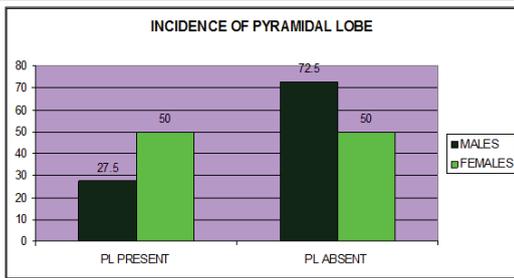


CHART 2

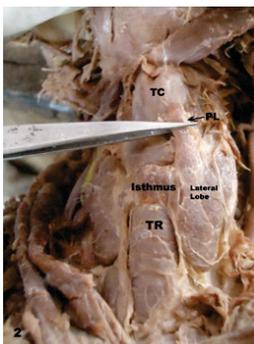


Fig 1: figure showing a pyramidal lobe extending from left lateral lobe to thyroid cartilage. (TC= Thyroid cartilage, TR= Tracheal ring, PL= Pyramidal lobe).

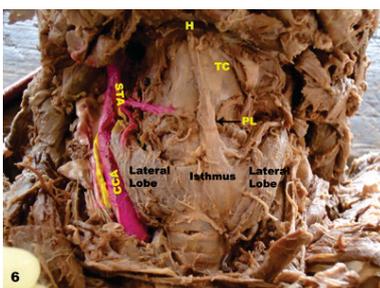


Fig 2: Figure showing a pyramidal lobe extending from

isthmus to hyoid bone. (PL=Pyramidal lobe, TC=Thyroid cartilage, H=Hyoid bone, STA=Superior thyroid artery, CCA= Common carotid artery).

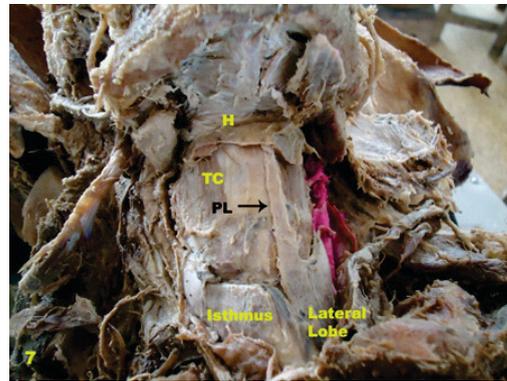


Figure 3: Figure showing a pyramidal lobe extending from left lateral lobe to hyoid bone (H=Hyoid bone, TC=Thyroid cartilage, PL= Pyramidal lobe)

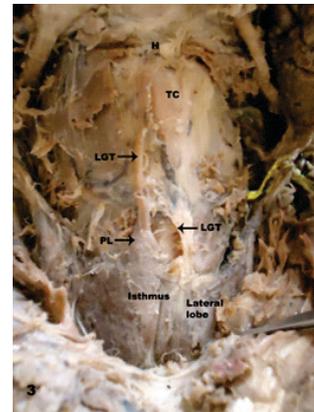


FIG 4: Figure showing a Pyramidal lobe extending from isthmus to levator glandulae thyroidea,(PL=Pyramidal lobe, LGT= Levator glandulae thyroidea, H=Hyoid bone, TC= Thyroid cartilage)

DISCUSSION

Any deviation in the development of thyroid gland can lead to a variety of developmental anomalies. Failure of development of entire gland can lead to agenesis of the gland, Hemigenesis or agenesis of isthmus. Total or partial persistence of thyroglossal duct can lead to many anomalies .A number of studies were conducted to investigate these morphological anomalies of thyroid gland. C.F.Marshall in 1895 made a detailed account of the variation in the shape of thyroid gland. He summarized his findings as follows 1) the extreme variation in the gross anatomy of the gland so that to speak of a normal thyroid gland is absurd. 2)the frequency of the presence of processes pyramidalis. In his study pyramidal lobe was seen in 43% of cases.

Braun (2007) observed that the pyramidal lobe arose commonly from the left lobe followed by the isthmus and the right lobe. Joshi (2010) noted that the pyramidal lobe commonly arose from the left lateral lobe in 47.05% cases followed by the right lobe in 32.55% cases and the isthmus in 20.58% cases.

In this present study Pyramidal lobe was observed in 16 (32%) cases; in 10 cases it was attached to the left lateral lobe and in 6 cases to the isthmus. Superiorly in 5 cases it was attached to the Levator glandulae thyroidea; in 8 cases to hyoid bone and in 3 cases to the thyroid cartilage. As the P value is above 0.05 no significant difference is seen between males and females. Many

earlier studies were done to note the incidence of pyramidal lobe. Comparative study is given on table 2. The observations made in the present study were more or less similar to that of Harjeet (2002) and Joshi (2010). However Braun (2007), Ranade (2008) and Marshall (1895) observed a high frequency of pyramidal lobe

Devishankar et al in 2009, during routine dissection observed a case of complete agenesis of isthmus with two widely separated lateral lobes. Each lateral lobe had a pyramidal lobe of its own. They opined that during development a high separation of thyroglossal duct can engender two independent thyroid lobes and pyramidal lobe with the absence of isthmus

A thorough knowledge of the pyramidal lobe will be highly useful for surgeons while performing tracheotomies and also in evaluation of scintigraphy.

TABLE 2

NAME OF INVESTIGATOR	INCIDENCE OF PYRAMIDAL LOBE
MARSHALL	43%
HAJJEET	28.90%
WON &CHAUNG	76.80%
BRAUN	55%
RANADE	58%
JOSHI	37.77%
PRESENT STUDY	32%

TABLE 5: INCIDENCE OF PYRAMIDAL LOBE AS REPORTED IN LITERATURE

Conclusion

This study is done to study the pyramidal lobe of thyroid gland. 50 thyroid glands were carefully dissected and photographs were taken to document each variation. Charts were prepared for the statistical analysis of the data obtained. The percentage frequencies of each parameter in male and female study group were compared using chi-square test. Pyramidal lobe was noted in 32% of cases. The difference in value between the two study groups was found to be statistically insignificant (P Value > 0.05). The findings of the present study stress the need for a sound knowledge of common anatomical variations in this region while performing thyroidectomy to avoid complications.

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