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Case Report

Anatomy Section

Pyramidal Lobe and its Clinical Significance- Case Report and Review of Literature

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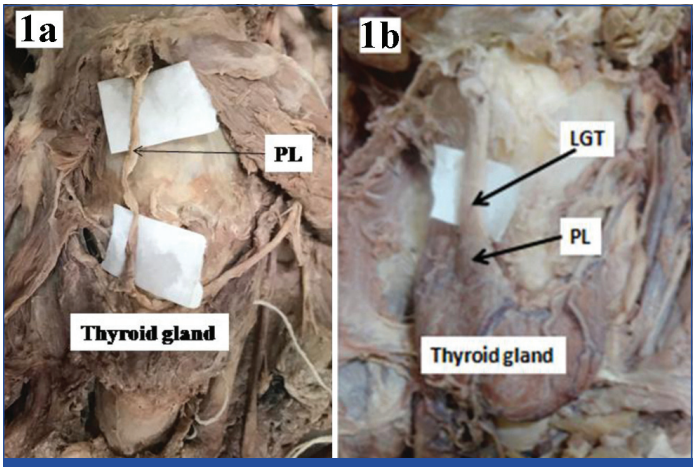
ABSTRACT

Thyroid gland normally consists of two lobes, one in right and another in left side, connected by isthmus, is the largest endocrine gland with numerous variations pertaining to number of lobes, absence of isthmus, its size and location. One of the variations of thyroid gland is occurrence of pyramidal lobe which may arise from lobes or isthmus of the gland. A review of literature coupled with reporting of two cases of pyramidal lobe has been carried out in the department of Anatomy, AIIMS, Rishikesh. Two pyramidal lobes were detected in two female cadavers out of six cadavers fixed in 10% formalin during dissection of head and neck. Mean age of cadavers was 70 years. Mean lengths and widths of pyramidal lobes in two cadavers were 48.02 mm, 28 mm and 52.99 mm, 18.1 mm, respectively. Pyramidal lobe if not removed may cause recurrences after total thyroidectomy and also it may be site of certain cancers or metastases for some tumours. Hence, knowledge of pyramidal lobe is very important to clinicians.

Keywords: Hyperthyroidism, Thyroidectomy, Thyroid gland

CASE REPORT

During routine dissection of neck for 1st year MBBS students in Department of Anatomy, two Pyramidal Lobes (PLs) were detected in two female cadavers out of six cadavers fixed in 10% formalin. Mean age of cadavers was 70 years. In one case length and width of PL was 48.02 mm and 28 mm respectively. In this case, PL arose from isthmus in midline [Table/Fig-1a]. In another case, the length and width of PL was 52.99 mm and 18.1 mm respectively. In this case, PL was observed arising from medial border of right lobe of the thyroid gland [Table/Fig-1b].



[Table/Fig-1]: Showing pyramidal lobe arising: (a) from isthmus; (b) from medial aspect of right lobe of thyroid gland.
PL: Pyramidal lobe; LGT: Levator glandulae thyroidae

DISCUSSION

The thyroid gland comprises of two lobes both in right and left sides joined by isthmus. Sometimes a third lobe, pyramidal lobe may be present. Pyramidal lobe arises from either of the two lobes or isthmus. Phukon MJ et al., through cadaveric dissection detected a pyramidal lobe rising from the medial border of the right lobe of the thyroid gland similar to our second case [1]. PL is more common on left compared to right side and the frequency is higher in males compared to females [2]. But in our case both PLs were detected in females.

Frequency of Pyramidal Lobe

Variations of the thyroid gland were firstly elucidated by Marshall CF [3]. He found a pyramidal lobe in 43% of the observed cases. Frequency of PL as described in standard text books of anatomy ranges between 15-75%. In a study in Koreans, PL was observed in 76.8% [4], Sultana SZ et al., detected PL in 50% of cases [5], Maria BE et al., [2] found it in 55% (32/58) of cadavers and Wahl R et al., [6] observed it in 53% cases and 39% of PL originated from right lobe and 8% from isthmus in his study. Few other studies demonstrated the frequency of PL to be 50% [7,8], 61% [9], 55.2% [10], 40.6% [11]. During preoperative diagnosis by ultrasonography or Tc-99m pertechnetate scintigraphy PL was detected in 50% of cases [8].

Incidence of PL is reported more in men (61.96%) than in women (50%). In addition to this, it is observed more in persons less than 50-year-old (67.3%) than in those older than 50 years (54.2%). The frequency of the pyramidal lobe described in surgical and anatomical texts ranges between 43-80% as elaborated by few scientists [2]. In the present study, authors observed PL in 33.33% cadavers.

Clinical Significance

The pyramidal lobe consists of normal thyroid tissue. So all the diseases detected in thyroid are likely to occur in the pyramidal lobe. There is scanty literature describing the length of PL. The mean length of the pyramidal lobe was 24.1 mm [2]. In present case, mean length of PL was 50.5 mm with mean diameter of 2 mm. Very long PL usually are thin according to Maria BE et al., which is also supported by our study. Therefore, thyroid tissue present in PL may be missed, not to speak of pre-surgical diagnosis even during thyroid surgery if the anterior neck region is not probed thoroughly [2]. Due to variation in the size and situation of PL, there are great chances of incomplete thyroidectomy. Therefore, the entire prelaryngeal region between the isthmus and the hyoid bone should be examined to ablate PL completely so that no thyroid tissue is left behind. To achieve this aim, all tissue from isthmus to hyoid bone should be excised [12].

Normally, thyroid cells in the pyramidal lobe are not active but become active when the functional thyroid tissue is removed. This explains why scintigraphy often does not detect a pyramidal lobe even if it is present [2]. Hence Scintigraphic imaging may always not be able to reveal PL as scintigraphic imaging detects functions not morphology. This explains why Maria BE et al., found PL in 55% cadavers while it was detected in 13% of cases through scintigraphic images. The PL can be the location of primary thyroid disease. Ogawa C et al., described a case of a minimally invasive follicular carcinoma arising

from the apex of the PL. The tumour was excised with the PL and the whole of the thyroid isthmus, including prelaryngeal lymph nodes. The patient had no complications and after 15 months of post-operative monitoring, she remained disease-free [13]. Zivic R et al., also mentioned two cases with malignant foci found in the PL. In the first case, the PL was the site of an isolated papillary carcinoma while in the second case it was the site of a multiple papillary carcinoma [9]. If PL is not completely ablated during surgery, its size may increase resulting in relapses after primary surgery. Remains of PL were found to the extent of 23% after total thyroid surgery in benign disorders as estimated by nuclear scanning with Tc 99m pertechnetate [12].

The ultrasonographic or scintigraphic images taken for preoperative diagnostic treatments are not reliable for detection of the PL. Thus anatomical studies become important for safer thyroid surgery.

CONCLUSION

Completeness of thyroidectomy may be compromised by an overlooked pyramidal lobe particularly when it is very thin. In case of thyroid cancer complete removal of all thyroid tissue is mandatory because leaving cancer cells would have severe consequences. Not only in malignant cases but also in case of a benign thyroid lesion recurrence is inevitable, if there are any thyroid residue in form of PL or otherwise. Thus detailed knowledge of anatomy, morphology and clinical implications of PL is of paramount importance to neck surgeons, endocrinologists, physicians and radiologists during management of pyramidal related diseases.

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