



A morphological study of levator glandulae thyroideae and pyramidal lobe in normal adult human thyroid gland

Abhijeet Yadav¹, Mukul Yadav², Asha Dixit³

1- Assistant Professor, Department of Anatomy, Bundelkhand Medical College, Sagar (M.P.)

2 - Prof. & Head, Department of Anatomy, Bundelkhand Medical College, Sagar (M.P.)

3 - Ex- Prof. & Head, Department of Anatomy, Gandhi Medical College, Bhopal (M.P.)

Submission Date: 03-09-2014, Acceptance Date: 15-09-2014, Publication Date: 31-10-2014

How to cite this article:

Vancouver/ICMJE Style

Yadav A, Yadav M, Dixit A. A morphological study of levator glandulae thyroideae and pyramidal lobe in normal adult human thyroid gland. *Int J Res Health Sci* [Internet]. 2014 Oct 31;2(4):1030-33. Available from <http://www.ijrhs.com/issues.php?val=Volume2&iss=Issue4>

Harvard style

Yadav, A., Yadav, M., Dixit, A. A morphological study of levator glandulae thyroideae and pyramidal lobe in normal adult human thyroid gland. *Int J Res Health Sci*. [Online] 2(4). p.1030-33 Available from: <http://www.ijrhs.com/issues.php?val=Volume2&iss=Issue4>

Corresponding Author:

Dr. Abhijeet Yadav, Assistant Professor, Department of Anatomy, Bundelkhand Medical College, Sagar (M.P.).

E-mail: dr.abhijeetrocks@gmail.com

Abstract:

Thyroid is a brownish red, highly vascular endocrine gland. It has got a very important physiological role in humans. It develops as a downward growth from thyroglossal duct and a part of this duct may remain patent leading to development of a fibro muscular structure called levator glandulae thyroideae. Its presence in humans is known but problem arise during surgeries of thyroid or structures nearer to it. Keeping this point in view, we conducted a study on incidence of levator glandulae thyroideae in twenty six adult human thyroid glands of both sexes. The entire samples were collected from Department of Anatomy, Gandhi Medical College, Bhopal and Bundelkhand Medical College, Sagar. Pyramidal lobe and levator glandulae thyroideae were present in 30.76% and 34.61% cases respectively. They were situated to the left side of midline in most of the cases. Knowledge about pyramidal lobe as well as levator glandulae is very important during neck and thyroid surgery.

Key words: development; levatorglandulaethyroideae; pyramidallobe; thyroid gland; thyroglossal duct

Introduction

The thyroid is the earliest of the pharyngeal derivatives to make its appearance. It begins to develop by about 24th day (4th week) after fertilization from a median endodermal thickening in the floor of the primitive pharynx [1,2] between tuberculum impar and copula at a point later indicated by the foramen cecum [3]. As the embryo elongates and undergoes differential growth, the thyroid

diverticulum migrates anteriorly and inferiorly to the hyoid bone and laryngeal cartilages tethered by a slender thyroglossal duct [4]. Subsequently the thyroid descends in front of the pharyngeal gut as a bilobed diverticulum [3]. At first the thyroid diverticulum is hollow but it soon becomes solid and divides into right and left lobes, which are connected by the isthmus of the thyroid gland. By seventh weeks the thyroid gland has assumed its definitive

shape and has usually reached its final site in the neck. By this time the thyroglossal duct has normally degenerated and disappeared [2].

A pyramidal lobe, extending from the isthmus, is seen in about 50% of thyroid glands and is derived from the thyroglossal duct [1]. The pyramidal lobe may be attached to the hyoid bone by fibrous and / or some smooth muscle – the levator glandulae thyroideae, which represent a persistent part of thyroglossal duct [2]. According to Standring, musculus levator glandulae thyroideae is a fibrous or fibromuscular band that stretches from the pyramidal lobe or upper border of isthmus of thyroid gland to the body of the hyoid bone, usually on the left side [5]. According to Ranganathan [6], levator glandulae thyroideae is said to represent the detached part of infrahyoid muscles. According to Hamilton and Mossman [7], it may be considered as a fibrous or a muscular replacement of the pyramidal lobe. Allan [8] reported levator glandulae thyroideae, a band of connective tissue, which extended from the apex of right or left lobe or isthmus of the thyroid gland to the hyoid bone.

Materials and Methods:

This study was done on twenty six human adult thyroid glands of both sexes. These entire samples were collected from Department of Anatomy, Gandhi Medical College, Bhopal and Bundelkhand Medical College, Sagar. The study was carried out for a period of four years. Routine dissection method was followed.

Grouping of the samples was done according to sex into 2 groups (Male, n=13 & Female, n=13). Incidence of pyramidal lobe, levator glandulae thyroideae, their measurements and sex differences were observed.

Results:

It was found that 8 (30.76%) out of 26 thyroid gland has pyramidal lobe. The incidence was being 5 (38.4%) in male and 3 (23.07%) in female. In each case the pyramidal lobe was single. It was also found from observations this lobe was situated more on the left side. The length (base to apex) and the breadth of the lobe varied from 0.5 to 3.6 cm and 0.4 to 1.7 cm respectively.



Figure 1: Classic pyramidal lobe with levator glandulae thyroideae

Out of 26 cadavers, levator glandulae thyroideae (Fig.2) was found in 9 (34.61%) samples of which 5 were in males (38.46%) and 4 were in females (30.76%). In 3 samples both lobes of thyroid gland were separated i.e. isthmus was absent (Fig.3) and in 2 cases the lower end of levator glandulae thyroideae was bifurcated and attached to each lobe of the thyroid gland. In one sample there was 2 levator glandulae thyroideae. The length of levator glandulae thyroideae varied from 0.5 to 5.0cm.



Figure 2: Median levator glandulae thyroideae



Figure 3: Bilateral levator glandulae thyroideae with absence of isthmus

Pyramidal lobe and levator glandulae thyroideae were present in 30.76% and 34.61% cases respectively. They were situated to the left side of midline in most of the cases. Mostly levator glandulae thyroideae had association with apex of pyramidal lobe to the body of the hyoid bone.

Discussion:

In the literature Izenstark et al. (1969) reported 35% [9], DeGroot (2001) reported 15% [10] and Harjeet et al (2004) reported 28.9% incidence [11] of pyramidal lobe which was lower than in present study. In the literature Pansky, Hansen, Dozois, Moore and Dalley, Enayetullah and Hamilton [1,4,12-15] reported higher percentage incidence than that observed in the present study for pyramidal lobe. Hamilton reported more common presence of pyramidal lobe on left side [15] and sex differences in the incidence between males and females as observed in the present study.

Harjeet et al. reported LGT in 19.5% thyroid glands [11]. Enayetullah found LGT in 32% cases and its association with pyramidal lobe in 22% cases [14]. In our study, most cases of LGT were associated with pyramidal lobe and most of the pyramidal lobes were situated on the left side. Sultana et al., reported 50% incidence of pyramidal lobe and 43.33% incidence of levator glandulae thyroideae [16,17] based on observations in 60 cases with 22 (84.65%) associated with the pyramidal lobe, all extending from the apex of the pyramidal lobe to the hyoid bone. In 4 cases, they found it to take origin from the isthmus, of which 2 were attached to the hyoid bone, as in the present case and the other 2 with the corresponding oblique line of the thyroid

cartilage above [16,17]. It is obvious from the above discussion that extent of levator glandulae thyroideae from isthmus to hyoid bone is of rare occurrence.

Conclusion:

Knowledge about pyramidal lobe as well as levator glandulae thyroideae is very essential during neck and thyroid surgery.

Acknowledgement:

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Source of Funding: Nil

Conflicts of Interest: None

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