

# *Editorial*

## **Embryological Descent, Remnants and Implications for Thyroid Surgery**

The thyroid gland is the first of the body's endocrine glands to develop, on approximately the 24<sup>th</sup> day of gestation. The gland originates as a proliferation of endodermal epithelial cells on the median surface of the developing pharyngeal floor. Descent is complete at 7<sup>th</sup> gestational week. The thyroid is functional by the 8<sup>th</sup> week of gestation.

In this descent there are several anomalies which give rise to clinical conditions. In addition, there are some remnants of this embryological process which have critical significance in thyroidectomy.

There are four embryological remnants that are recognized and are very important in thyroidectomy

They are:

- Thyroglossal duct remnants (TGDR)
- Pyramidal lobe
- Tubercle of Zuckerkandl
- Thyrothymic remnants /rests

While some standard text books of Anatomy and Embryology mention tract remnants and the pyramidal lobe, very little emphasis is given to the tubercle of Zuckerkandl and the thyrothymic remnants /rests.

A persistent thyroglossal duct courses through the base of the tongue from the foramen caecum. It then passes inferiorly, anterior to, and rarely through, the hyoid body, and often has a diverticulum that hooks below and behind the hyoid, before it courses towards the thyroid gland. TGDRs may present at any age as a cyst, abscess, sinus, fistula or tumour, anywhere along the embryological course of the thyroid gland.

The common anomaly of the thyroglossal duct remnant is a thyroglossal cyst and the close relationship of the embryological tract to the hyoid bone must be borne in mind during surgery and the excision of the central part of the hyoid is essential to minimize the risk of recurrence.

The pyramidal lobe is a narrow lobe of the thyroid gland that arises from the upper border of the isthmus and extends upward, sometimes as far as the hyoid bone; it marks the point of continuity with the thyroglossal duct. The pyramidal lobe may arise from the right or left side of the isthmus. Most studies have shown that the pyramidal lobe exists in 40-60% of the people. Failures to excise the pyramidal lobe will result in a pyramidal lobe recurrence. Rarely the main enlargement of the thyroid is confined to the pyramidal lobe.

The tubercle of Zuckerkandl (TZ) is an embryological remnant of thyroid gland which first described by Austrian anatomist Emil Zuckerkandl in 1902 as the “processus posterior glandulae thyroideae”, is as a distinguishable thickening or nodule at posterolateral aspect of the gland. Its close relationship to the recurrent laryngeal nerve (RLN) makes it an important surgical landmark in thyroid surgery. Though it was described in 1902, it was forgotten for more than 100 years, hence called the ‘forgotten tubercle’. This is primarily because subtotal thyroidectomy was considered the main technique of thyroid surgery during those 100 years.

With the emergence of the era of total thyroidectomy and more reoperative thyroid surgery being undertaken by endocrine surgeons the significance of the tubercle has been emphasized in the last two decades. The TZ when present is said to “point” to the position of the RLN and the superior parathyroid like an arrowhead. These facts are critical for thyroidectomy. It is common site for goiter recurrence.

There are some embryological remnants of thyroid tissue located in the line of the thyrothymic ligament, referred to as thyrothymic remnants (TTR) or rests. Several studies have shown that rests of thyroid tissue within the thyrothymic area are relatively common (50%). They are often mistaken for lymph nodes or parathyroids. Eighty percent of identified rests are attached to the thyroid proper by a pedicle of thyroid tissue. Twenty percent are entirely separate and most rests are small, with 88% being less than 1 cm in diameter. These need to be identified during thyroidectomy to ensure completeness of surgery which is crucial in preventing recurrence and also very important in thyroid cancer surgery.

These facts regarding embryological descent remnants needs greater emphasis in the teaching of Anatomy and Embryology and must be included in the standard text.

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