

Case Report

KISSING SUPERIOR PARATHYROID GLANDS: A CASE REPORT

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ABSTRACT

Parathyroid glands are responsible for maintaining the calcium level in blood and usually a pair of superior and inferior parathyroid glands are located in the thyroid gland. Parathyroid glands are smaller and have variations in their size, shape, number and location. Thus, it is difficult to identify the parathyroid gland and leads to its accidental removal during thyroidectomy. This case report is an incidental finding of two superior parathyroid glands in the left lobe of thyroid gland in 68-year female cadaver. Both superior parathyroid glands were located at the first tracheal ring, 2 mm in size, circular in shape, tan yellow in colour, covered by a thin capsule and separated from each other in a distance less than 1 mm. They appear similar as a twin pair and seems to kiss each other. Both were confirmed by the histological method as parathyroid tissues. Superior parathyroid gland developed from the dorsal wing of fourth pharyngeal pouch, get detached from its origin and assumed a relatively constant final location either at the cricothyroid junction or at first tracheal ring. In this present case, the dorsal wing of the fourth pharyngeal pouch have undergone earlier embryological division into two separate superior glands during its descent to the cervical region in the left side. Embryological development of thyroid gland is linked with the development of parathyroid, thymus and ultimobranchial body. Thyroid gland developed from two sources. The median one contributes to thyroid isthmus and parts of the lateral lobe of thyroid. Lateral thyroid lobes derived its contributions from the caudal pharyngeal endoderm of the 4th and 5th pharyngeal pouches. The fusion of median and lateral thyroid forms the Zuckerkandl's tubercle. Superior parathyroid gland might have travelled along the superior border of isthmus and any changes in the development of thyroid might have influence in the development of parathyroid glands. Up to now a very few cases of kissing parathyroid glands are reported in the literature and this will provide an additional anatomical information of kissing superior parathyroid glands.

KEY WORDS: Kissing superior parathyroid glands, Complications of thyroidectomy, Parathyroidectomy, Cricothyroid junction, Twin parathyroid.

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INTRODUCTION

The parathyroid glands are essential for the life as they produce the parathyroid hormone, which is responsible for maintaining the plasma calcium level [1] and fetal bone formation [2]. Wang, (1976) stated that parathyroids are a small yellow-brown, ovoid or lentiform structures weighing 35 -40 mg and

measuring about 5×3×1 mm [3].

Parathyroid glands are small and are of different shapes [4].

Each thyroid gland usually has a pair of superior and inferior parathyroid glands. It is difficult for the surgeons to identify the parathyroid glands due to their smaller size during surgery.

Nanka et al. (2006) stated that the parathyroid glands are variable in number, size, shape and its location [5].

The superior parathyroid is identified to be more constant at the cricothyroid junction and inferior parathyroid glands are more variable in location [6].

Hence the knowledge of the different sizes, shapes, number and location of parathyroid glands is essential for the surgeons and pathologists for the better diagnosis and management of the parathyroid diseases.

There are previous reported studies on the size, shape, location, number, weight and parenchymal-stromal ratio of the parathyroid gland but lacking in the detailed studies of kissing parathyroid glands. Nanka et al. (2006) noticed the fusion of superior and inferior parathyroid glands as kissing pair [5].

This case is an incidental finding in 68-year female, the twin parathyroid glands were located at the first tracheal ring in the left lobe of the thyroid lobe during the anatomical dissection for a different research purpose at the Department of Anatomy, Faculty of Medical Sciences, University of Sri Jayewardenepura in the year 2014. Ethical clearance was obtained from Ethics review committee, Faculty of Medical Sciences, University of Sri Jayewardenepura.

In this case, thyroid gland has the isthmus extension on first and second tracheal ring. Total of three parathyroid glands were identified with two superior parathyroids in the left lobe and one superior parathyroid gland near the cricothyroid junction in the right thyroid lobe.

In the left lobe of thyroid, upper superior parathyroid gland (SPG) was located at the upper border of first tracheal ring just below the cricothyroid junction and lower SPG exactly located at the first tracheal ring. They are similar to one another in their size, shape, colour, location and were covered by a thin capsule. Both were circular in shape, 2 mm in size, tan yellow colour, and separated each other in a distance less than 1mm. Both superior parathyroid glands seem to kiss each other and found together as a twin pair

(Fig 1). Later they were confirmed by histological method as parathyroid tissues (Fig 2).

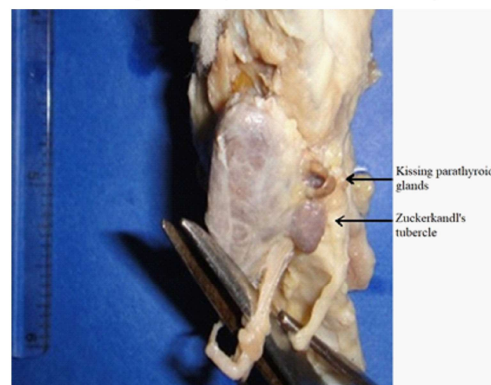


Fig. 1: Left lobe of thyroid showing the two similar superior parathyroid glands (kissing parathyroid glands).

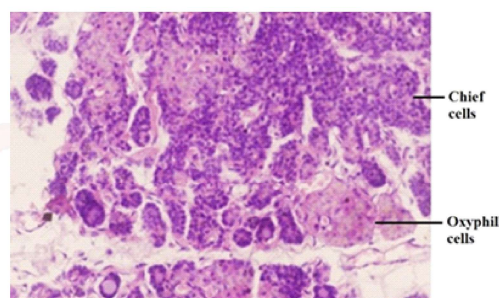


Fig. 2: Confirmation of identified parathyroid gland by histological method. Section shows small chief cell with central nucleus and pale eosinophilic cytoplasm. The oxyphil cells in nodular form with copious eosinophilic cytoplasm. (H & E stain x Mic Mag 100).

DISCUSSION

Sadler. (2010) commented that SPG developed from the epithelium of dorsal wing of fourth pharyngeal pouch and its ventral wing differentiated into ultimobranchial body. Inferior parathyroid gland developed from the dorsal wing of third pharyngeal pouch the ventral wing of third pouch forms the thymus gland which migrates downwards to the anterior mediastinum [7]. Hence the inferior parathyroid gland is dragged down a bit more than the SPG. The superior pair is not dragged downwards to the same degree. Thus, the glands are named after their final embryological positions.

The embryological development of thyroid gland is linked with the development of parathyroid, thymus and ultimobranchial body [8]. Tanberg. (1916) stated that there must be direct and indirect interactions between the functions of thyroid and parathyroid glands [9].

Cheng et al. (2008) pointed out that during

the development, thyroid gland reaches its final position in front of the trachea and the thyroglossal duct completely disappears before the 10th week of gestational life [10]. Thyroid isthmus was the main remainder of thyroid primordium [11].

Swapna et al. (2015) stated that the thyroid gland develops from a large median endodermal and two lateral anlagen. The median anlage develops as an epithelial proliferation from the floor of the pharynx at the base of the tongue primordium during 3rd - 4th week of the gestational life. Its site of origin is later indicated by the foramen cecum [12]. The median anlage contributes to the thyroid isthmus and parts of the lateral lobe of thyroid.

The lateral thyroid lobes derived its contributions from the caudal pharyngeal endoderm of the 4th and 5th pharyngeal (branchial) pouches [13]. The fusion of the median and lateral thyroid occurs and then the fusion body in such a manner is the Zuckerkandl's tubercle (ZT) [14]. The ZT is an extension of the thyroid gland, present at the most posterior side of each thyroid lobe.

Mohebati et al. (2012) stated that the first detailed anatomic description of the parathyroid glands by making a distinction between the superior and the inferior glands was made by Halsted and Evans in 1907 [15]. Yun et al. (2008) commented that the superior parathyroid gland and ZT have the constant anatomical relationship. Superior parathyroid glands were mostly found at the 1 o'clock, 2 o'clock or 3 o'clock position to the ZT on the left side and 8 o'clock, 9 o'clock, 10 o'clock or 11 o'clock position on the right side [14]. A thorough knowledge on the embryology of thyroid and parathyroid glands is essential for safety thyroid and parathyroid surgeries.

All superior parathyroid glands were located above the midpoint of isthmus and inferior parathyroid glands were at or below the midpoint of isthmus. Thus, midpoint of isthmus is a better landmark to differentiate the location of superior and inferior parathyroid glands [16]. SPG might have travelled along the superior border of isthmus and then along the posterior border of thyroid and finally situated near the cricothyroid joint. Any

changes or defect in the development of thyroid might have the influence in the development of parathyroid glands.

In this present study, both parathyroid glands were located close together at the 1st tracheal ring and exactly similar to each other. Thus, they were confirmed as the kissing superior parathyroid glands.

CONCLUSION

Documented studies on the kissing parathyroid glands were lacking in the literature and only a very few studies stated about the kissing parathyroid gland and this is the first reported case of kissing superior parathyroid glands in the Sri Lanka. The findings of this report will provide an additional anatomical knowledge of kissing (twins) parathyroid glands.

ABBREVIATIONS

SPG - Superior parathyroid gland

ZT - Zuckerkandl's tubercle

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Conflicts of Interests: None

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