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**Simultaneous thyroglossal duct cyst with parathyroid cyst - a case report**

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**Abstract****BACKGROUND**

Thyroglossal duct cysts (TDC) are common congenital deformities. Most of them are cysts formed by the thyroglossal ducts that do not disappear and degenerate in the early embryonic stage [1]. TDC exists alone and is rarely complicated by other congenital embryonic malformations. Only a few reports of TDC with branchial cleft cysts, thyroid cancer, thyroid hematoma, and epidermoid cysts have been reported [2-5]. Therefore, we report a patient with TDC and parathyroid cyst (PC), a rare disease that has never been reported.

**CASE SUMMARY**

A 47-year-old woman presented to clinic in April 2021 with a neck tumor which she had noticed 5 days earlier. We perfected the relevant examinations, such as ultrasound and CT, and resected the tumor. After surgical treatment, the pathology revealed a cervical thyroglossal duct cyst and a left lobe parathyroid cyst. The patient was followed up for 1 year without significant recurrence.

**CONCLUSION**

We report a patient with a simultaneous TDC and a PC to explore the correlation between the two congenital anomalies.

## **INTRODUCTION**

Thyroglossal duct cysts (TDC) are common congenital deformities. Most of them are cysts formed by the thyroglossal ducts that do not disappear and degenerate in the early embryonic stage [1]. TDC exists alone and is rarely complicated by other congenital embryonic malformations. Only a few reports of TDC with branchial cleft cysts, thyroid cancer, thyroid hematoma, and epidermoid cysts have been reported [2-5]. Therefore, we report a patient with TDC and parathyroid cyst (PC), a rare disease that has never been reported. We report a patient with a simultaneous TDC and a PC to explore the correlation between the two congenital anomalies.

## **CASE PRESENTATION**

### ***Chief complaints***

a neck tumor which she had noticed 5 days earlier

### ***History of present illness***

A 47-year-old woman presented to clinic in April 2021 with a neck tumor which she had noticed 5 days earlier. Clinical examination revealed a 4cm-diameter soft mass under the jaw, which could be moved up and down with swallowing and tongue extension, and a 2-cm soft mass could be palpated under the left thyroid lobe. Preoperative examination of blood parathyroid hormone, serum calcium and serum phosphorus were all at normal levels. Ultrasonography revealed a thylohyoid cyst and a cystic mass in the left thyroid lobe, CT scan of the neck showed a low-density lesion anterior to the left thyroid cartilage, and a lesion posterior to the lower pole of the left thyroid lobe.

2

### ***History of past illness***

without special past illness

### ***Personal and family history***

without special personal and family history

### *Physical examination*

Clinical examination revealed a 4cm-diameter soft mass under the jaw, which could be moved up and down with swallowing and tongue extension, and a 2-cm soft mass could be palpated under the left thyroid lobe.

### *Laboratory examinations*

Preoperative examination of blood parathyroid hormone, serum calcium and serum phosphorus were all at normal levels.

### *Imaging examinations*

Ultrasonography revealed a thylohyoid cyst and a cystic mass in the left thyroid lobe, see Figures 1 and 2. CT scan of the neck showed a low-density lesion anterior to the left thyroid cartilage, and a lesion posterior to the lower pole of the left thyroid lobe, as shown in Figures 3 and 4.

## **FINAL DIAGNOSIS**

After surgical treatment, the pathology revealed a cervical thyroglossal duct cyst and a left lobe parathyroid cyst, as shown in Figure 5.

## **TREATMENT**

surgical treatment

## **OUTCOME AND FOLLOW-UP**

The patient was followed up for 1 year without significant recurrence.

## **DISCUSSION**

TDC are common in clinical practice, while PC are rare, and are easily misdiagnosed as thyroid cysts. When the embryo develops to the sixth week, the thyroglossal duct

degenerates on its own, leaving only a shallow depression at its starting point, the cecum. If the degeneration of the thyroglossal duct is incomplete during this process, the remaining epithelium may form a thyroglossal duct cyst in the course of the anterior median neck from the base of the tongue to the thyroid. The pathogenesis of PC is still unclear, but the pathogenic factors currently considered include: (1) the third or fourth pharyngeal sac remains during embryonic development [6]; (2) the residual Kursteiner's canal develops; (3) the fusion of microcysts [7]; (4) hemorrhage or degeneration of parathyroid adenoma [8]; (5) parathyroid secretions are retained in vesicles [9]. Most scholars support the first hypothesis, because the third or fourth pharyngeal sac can form cysts during embryonic development, and such cysts are characterized by thin walls and transparent fluid inside, while other hypotheses form cysts with thick walls, the cyst fluid is bloody or purulent. In this case, both thyroglossal duct cysts and parathyroid cysts were combined, and the patient had a history of congenital malformations such as primary iris cysts, which further indicated that there was a correlation between the embryonic origins of these three diseases.

Clinically, TDC presents as anterior neck mass that moves on protruding the tongue or swallowing due to its attachment to the hyoid bone. However, although clinical history and examination may suggest the diagnosis, imaging is required to confirm the clinical diagnosis and assess the anatomic extent of the lesion prior to treatment [10].

Ultrasonography is an ideal initial imaging investigation for neck masses as it is available, inexpensive, and does not involve ionizing radiation. For a curved surface such as the neck, using a gel pad can obtain more panoramic ultrasound images, and it allows the detection of otherwise-missed peri- or intra-lesional flow signals on Doppler imaging, increasing the diagnostic role of this technique in differential diagnosis of superficial lesions [11,12]. The typical ultrasonography description of a TDC is that of a well-circumscribed, round or oval anechoic lesion with thin walls and increased through-transmission; no internal flow with Doppler imaging [13].

The classic Sistrunk procedure is currently the preferred method for the treatment of thyroglossal duct cyst, which significantly reduces the postoperative recurrence rate

[14,15]. The treatment of NPC has not yet been finalized. The current treatment methods include puncture aspiration or absolute ethanol ablation, surgical resection, and regular review. Surgical resection has gradually become the mainstream method for the treatment of NPC. The traditional anterior cervical approach surgery can completely remove the cyst and relieve the compression symptoms of the patient, which is a safe and effective treatment method [16,17]. In this case, no recurrence was found in the 1-year follow-up after surgical resection.

### **CONCLUSION**

Simultaneous parathyroid cysts and thyroglossal duct cysts is very rare, and the embryologic origins of TDC and inferior PC appear to be associated.

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