



## Case Report

# An Unusual Cystic Lesion, Parathyroid Cyst

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### Abstract

Parathyroid cysts are rare benign lesions located in the cervical region or the upper part of the mediastinum. They comprise less than 1% of all cervical mass lesions and 0.5% to 1% of parathyroid lesions. Typically, they develop as cervical masses without symptoms, or they may be accidentally detected in imaging studies or surgeries performed for other reasons. Most cysts are not functional; however, 10% to 15% of patients show symptoms related to hyperparathyroidism and these cysts are defined as functional cysts. The treatment strategy changes according to whether or not the cyst is functional and the site of involvement. In 85% to 90% of cases, the cysts are located in the cervical region, most often in the inferior parathyroid glands. The significance of these cysts is in the diagnostic difficulties; generally, they are confused with thyroid pathologies and are therefore diagnosed during a surgical procedure. This report describes a 45-year-old male patient who was operated on with a diagnosis of cystic nodular goiter in the inferior part of the left lobe of the thyroid gland, who was later diagnosed with a parathyroid cyst according to the histopathological characteristics. Raising diagnostic awareness of parathyroid cysts and providing a review of the literature was the goal of this report.

**Keywords:** Cervical cysts, differential diagnosis, parathyroid cysts

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Parathyroid cysts (PC) are rare entities in routine clinical practice. PC was first defined in 1880 by Sandstrom, and Goris in 1905 reported the successful resection of a PC with cervical location.<sup>[1-3]</sup> PCs comprise less than 1% of all cervical mass lesions and 0.5–1% of parathyroid lesions.<sup>[1, 4, 5]</sup> Typically, they manifest as asymptomatic neck masses or are diagnosed during cervical imaging studies performed due to other reasons or intra or postoperative pathological analysis of the material. PCs can be classified as functional and non-functional cysts according to their co-occurrence with hyperparathyroidism.<sup>[1, 2, 6]</sup> Although most of these cysts (85–90%) are non-functional, according to the size of the lesion and local compression, symptoms such as pain, dyspnea, dysphagia, and hoarseness due to recurrent laryngeal nerve damage are reported. Of the cysts, 10–15% may be functional and they may manifest with acute para-

thyroid crisis.<sup>[2, 7]</sup> Treatment strategy varies according to the size and functionality of the cysts and the presence of compression symptoms.<sup>[3, 8]</sup> The clinical importance of these cysts is the diagnostic difficulty. They may easily go unnoticed during examination. Thyroid pathologies and other cystic mass lesions developing in that region such as thymic cyst, thyroglossal cyst, branchial cleft cyst, parathyroid adenoma and parathyroid carcinoma are conditions that should be discriminated.<sup>[3, 7]</sup>

We reported, a case interpreted as euthyroid thyroid cyst in the radiological examination, and was diagnosed as non-functional PC in histopathological examination after surgical resection. Along with the literature review on the subject, we aimed to increase the diagnostic awareness about parathyroid cysts among masses located at the cervical region.

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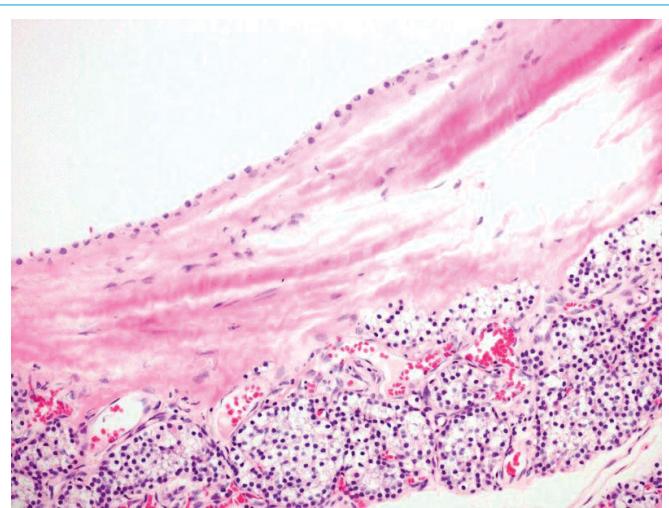
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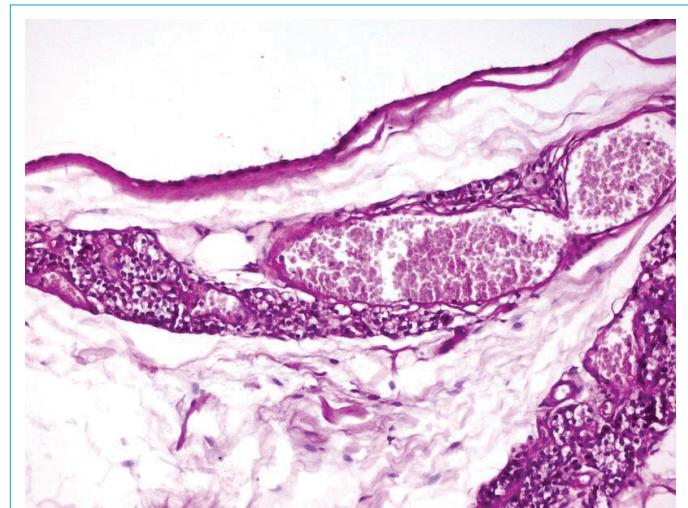
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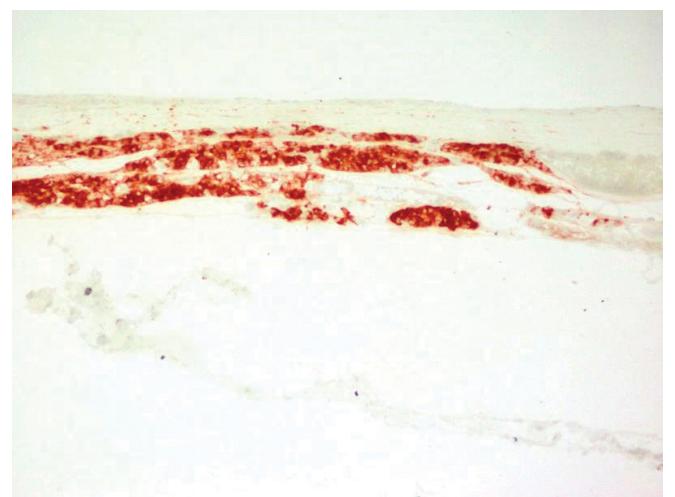
**Figure 1.** H & E staining (20x10), cystic development with thin columnar epithelium, vascularised fibroconnective wall and parathyroid glands within the wall.



**Figure 2.** PAS staining (20x10), Cytoplasmic PAS positivity is observed in the cyst lining epithelium.

## Case Report

A 45-year-old male patient was admitted to the hospital with a complaint of swelling at the cervical region for a long time. In the ultrasound examination, the echogenicity of the thyroid gland was normal and there was a cystic mass, 40x25x19 mm in size, extending from the inferior part of the left lobe of the thyroid to the retrosternal region. Radiological imaging was interpreted as a cystic thyroid nodule with an external extension. In cervical magnetic resonance imaging, there was a cystic mass lesion, 35 x 18 mm in size, adjacent to the trachea and related with the thyroid gland at the left part, showing hypointensity on T1 weighted images, and hiperintensity in T2 weighed images. Preoperative laboratory values were as follows, serum calcium (Ca): 9.8 mg/dl (8.8–10.6), phosphorus (P): 3.6 (3.5–5.5), sodium (Na):139 mEq/L (135–146), potassium (K):4.6 mEq/L (3.5–5.1) and chloride (Cl): 106 mEq/L (98–110). Serum parathormon (PTH): 56 (30–65), thyroid-stimulating hormone (TSH): 1.2 (0.5–5.0), free T4: 1.2 and free T3: 3.5. The patient underwent left thyroid lobectomy and cystic mass excision. The pathological examination of the lobectomy material revealed a lesion 55x25x20 mm in size; macroscopically the cut surface showed grey-brown area with colloid and there was no nodulation. The mass lesion with an oval spherical shape revealed a cystic nature; it was grey-white in color and 40 mm at its largest diameter. Wall thickness changed between 0.05 mm and 3 mm, and the cyst was filled with serous fluid. In the microscopic examination; a cystic lesion lined by low columnar epithelium with its wall lined with loose fibroconnective tissue was detected (Fig. 1). There were islands of parathyroid epithelial cells show-



**Figure 3.** Immunohistochemical staining for Chromogranin (20x10), Chromogranin positive parathyroid glands are observed in the fibro-connective cyst wall.

ing chromogranin positive (Fig. 2), thyroglobulin negative immunohistochemical staining within the fibroconnective tissue. The lining epithelium showed intracytoplasmic glycogen (PAS positive) (Fig. 3) and stained positive with pan cytokeratin. There was no significant pathology in the thyroidectomy material. The case was interpreted as non-functional parathyroid cyst.

## Discussion

PCs are rarely encountered lesions in routine clinical practice. PC incidence varies widely, from 0.075% to 3%, and there are approximately 300 cases reported in the literature. Mv Kay et al reported 107 giant non-functional PC

cases reported in the literature since 1925, and Rose et al reported the incidence of large PC cases as 0.09%.<sup>[8]</sup> Traditionally, PCs are classified as functional and non-functional. Functional cysts are clinically associated with hyperparathyroidism and comprise 10% of the cases; they are more common in males and can be found at any location between the mandibular angle and mediastinum. These lesions are derived from degenerated adenomas with central necrosis and constitute less than 1% of all hyperthyroidism cases. Non-functional cysts are more common (90%), and most of the patients are females. They are commonly found in the left inferior parathyroid gland region.<sup>[3, 5, 7]</sup> In general they are asymptomatic; however, there may be swelling at the neck, dysphagia, odynophagia and hoarseness associated with recurrent laryngeal nerve paralysis due to the site of involvement, size and compression of the adjacent structures. Rarely, cysts located in the mediastinum may cause respiratory system symptoms.<sup>[3, 7, 8]</sup>

Generally, the diameter of PCs changes between 1 and 10 cm, the mean diameter being 3 to 5 cm. Of the cases, 85% – 90% develop at any region between the sternal notch and mandibular angle, 10% to 15% of them was identified in the mediastinum. They may be seen at all ages, but most commonly between 40 and 60 years of age. Non-functional cysts are 2.5 folds more common in females in comparison to males, but functional cysts are 1.6 folds more common in males than females.

Although the pathogenesis of PC is unclear, there are several theories about their development; (a) development of a macrocyst due to accumulation of secretion and volume increase within the embryological remnants of 3rd and 4th branchial clefts, (b) degeneration, infarct or bleeding of parathyroid gland or adenoma, (c) merge of microcysts within the normal or adenomatous parathyroid tissue, (d) persistence of Kursteiner's canal (duct) and (e) retention of parathyroid hormone (PTH) in the colloid vesicles.<sup>[1, 3, 7]</sup>

Although most of these theories are associated with embryologic remnants, there are no pediatric cases reported in the literature.<sup>[7]</sup>

The differential diagnosis for PC include a variety of conditions such as thyroid pathologies (i.e. nodule, adenoma), thymic cysts, thyroglossal duct cysts, branchial cleft cysts, bronchogenic cysts, lymphangiomas, parathyroid adenomas and parathyroid carcinoma. Suspicion of PC at the preoperative period is quite important because of the difficulties in the confirmation of the diagnosis; most of the cases are diagnosed intraoperatively or postoperatively at the pathological analysis of the surgical specimen. One of the supplementary diagnostic methods is fine needle aspiration biopsy. It is the initial recommended procedure in

cervical masses because of technical convenience, low cost and minimum tissue destruction. At the same time, it has been reported to prevent unnecessary surgeries and contribute to surgical planning of PCs. In most of the studies, it has been reported that the aspiration of clear and colorless fluid suggests PC, and fluid PTH level analysis has been recommended for diagnosis. PTH level in the cyst fluid has been found to be higher than serum PTH level in both functional and non-functional cysts.<sup>[1, 3, 7, 9]</sup>

It has been reported that ultrasound, computerized tomography or magnetic resonance imaging may be helpful in discriminating solid/cystic cervical masses and showing their anatomical relation, and that thyroid scintigraphy may be helpful in revealing the presence of non-functional cysts, however none of these imaging methods can discriminate the thyroid/parathyroid origin of the lesions.<sup>[1, 3, 7–9]</sup>

In physical examination, PCs are soft, mobile masses. They have a semitransparent thin wall with smooth and shiny surface, that can easily be dissected from the thyroid tissue and surrounding tissues. They are filled with clear, colorless, or yellow fluid. Histologically, non-functional parathyroid cysts are lined by flattened cuboidal or columnar epithelium involving glycogen and have a wall made up of loose connective tissue. The embedded parathyroid tissue within the wall is diagnostic.<sup>[1, 2, 6, 7]</sup> Functional cysts have no lining epithelium, and they are sometimes called false cysts. They may involve hemorrhage and necrosis and a brown or blurred fluid with hemosiderin laden macrophages.<sup>[6]</sup> The cystic lesion in the present case was lined by loose, degenerated connective tissue, and the cyst wall had a lining of low cuboidal cells. The lining epithelium showed positive staining for glycogen with PAS (Periodic acid-Schiff) histochemical staining. Within the connective tissue of the cyst wall, parathyroid tissue with positive immunohistochemical staining for Chromogranin was detected.

Treatment strategy varies according to the functionality, size and site of involvement of the PC. Treatment options include fine needle aspiration of cyst fluid, injection of sclerosing material and surgical excision of the cyst. Fine needle aspiration, at the same time, can be used in diagnosis and is recommended in the treatment of non-functional PCs. Sclerosing agents such as tetracycline or alcohol have been used for recurrent cysts; however, they are reported to be associated with complications such as fibrosis and laryngeal nerve paralysis. Surgical excision is recommended in functional cysts, symptomatic non-functional cysts and in cases where aspiration cannot be safely performed or in cases with persistent diagnostic uncertainty despite successful aspiration.<sup>[2, 3, 6–8]</sup>

In our case, the cystic lesion in the cervical region was first considered to be a euthyroid thyroid cyst radiologically, however after surgical resection it was histopathologically confirmed as a non-functional parathyroid cyst. In conclusion, as alternative treatments can be used in cervical region masses, it is particularly important that parathyroid cysts radiologically mimicking thyroid cysts are involved in the differential diagnosis.

#### Disclosures

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

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