Parathyroid cyst, a rare cause of cystic cervical lesion. Case report

Cristina Ghervan, Prashant Goel

Endocrinology Department, University of Medicine and Pharmacy “Iuliu Hațieganu”, Cluj-Napoca

Abstract

Parathyroid cyst is a very rare abnormality. The diagnosis can be made based on ultrasound and the analysis of the aspirated cystic fluid for parathyroid hormone (PTH). We report the case of a nonfunctional parathyroid cyst in a 50-year old female patient with an anterior neck mass. The patient was complaining of pain in the anterior cervical region, dysphagia, dyspnea and dysphonia started three weeks previously. Ultrasound demonstrated an anechoic and avascular lesion located in the left lobe of the thyroid. Fine needle aspiration (FNA) revealed a clear, colorless and watery cystic fluid, that showed a high concentration of parathyroid hormone (PTH) in both the native and the diluted content of the cyst, while serum PTH was normal, indicating a nonfunctional parathyroid cyst. The patient was in remission by percutaneous aspiration and there was no relapse of the parathyroid cyst after one-year follow-up.

Keywords: neck mass, parathyroid cyst, fine-needle aspiration, watery cystic fluid

Parathyroid cysts are rare lesions, arising in the neck and the anterior mediastinum. They represent 0.6% [1] of all thyroid and parathyroid lesions. In 1880, Sandstrom [2] first described a macroscopic parathyroid cyst, and in 1905 Goris [3] first described its surgical extirpation. In 1953 Crile [4] reported the first case diagnosed on fine-needle aspiration (FNA). Parathyroid cysts are divided in two categories: functional cysts (associated with clinical hyperparathyroidism) and nonfunctional cysts (associated with normal parathyroid function). In both cases high levels of PTH are detected in the cystic fluid. The majority of patients, 91%, have nonfunctional cysts, which are more frequent in females, with a mean age of 43.3 years. Functional cysts are more common in males with a mean age of 51.9 years. Most nonfunctional cysts are located in the inferior parathyroid glands, and 60% occur on the left side, while functional cysts are less predictable [1].

Nonfunctional cysts may be asymptomatic, or present with symptoms determined by compression of adjacent structures such as: dysphagia, dyspnea and dysphonia, while functional cysts are accompanied by hyperparathy-
roidism features. Diagnosis is made in the presence of a cystic mass (in the neck, in the thyroid or in the mediastinum) and on the analysis of the aspirated cystic fluid for PTH, along with serum PTH dosage.

Management of parathyroid cysts depends on the nature of the cyst: for functional cysts, surgery is indicated, while for nonfunctional cysts, surgery can be avoided by using fine needle aspiration.

**Case report**

SE, a 50-year old female, was admitted for the sudden appearance of an anterior neck mass, after a physical effort, three weeks before. The mass was situated in the left anterior cervical region, it was painful, and produced dysphagia, dyspnea and dysphonia. There was neither a personal history of neck irradiation, nor a family history of thyroid or parathyroid disease.

The physical examination disclosed an oval-shaped mass located at the lower pole of the left thyroid lobe. The mass, of about 5 cm in vertical diameter, had elastic consistency and was highly sensitive on palpation, without the presence of lymph nodes. On the basis of symptoms and physical examination, the provisional diagnosis was that of thyroid blood cyst. All thyroid function tests were normal. Ultrasound evaluation of the thyroid revealed a right thyroid lobe with normal volume (4.9 ml) and structure. The left lobe, having a volume of 23 ml, showed a lesion which was oval-shaped, with well-defined margins, anechoic, with acoustic enhancement and avascular, significant for a cyst, measuring 18.7 ml (fig 1).

Evacuation of the cyst was performed by fine-needle aspiration (FNA) under sonographic guidance (US) that yielded 20 ml of clear, colorless and watery fluid (fig 2), which raised the suspicion of a parathyroid cyst or a hydatid cyst. The analysis of the aspirated fluid for parathyroid hormone (PTH) showed a high value: 399 pg/ml, in both native and diluted fluid, while serum PTH was in the normal range: 42.6 pg/ml (normal range 15-65 pg/ml). The differential diagnosis with a hydatid cyst was provided by imaging (plain chest radiography and abdominal ultrasound) and serology (anti-Echinococcus granulosus antibodies) that showed no sign of infection.

After cyst evacuation, ultrasound showed a nodule with solid structure, with minimal cystic content and thick-wall lining, measuring 1.2 ml, indicating a retention cyst (fig 3).

By percutaneous aspiration the patient was in remission of her painful and compressive cervical lesion and there was no relapse of the parathyroid cyst after one-year follow-up.
Discussion

Parathyroid cysts are very rare: about 250 cases have been reported so far. The peak incidence of parathyroid cyst occurs between the fourth and the sixth decade of life [5]. Most parathyroid cysts are solitary and unilocular, located near the lower poles of the thyroid gland. They are a pitfall diagnosis of nodular thyroid lesions, being often misdiagnosed as nodular goiter, solitary thyroid adenoma or even as thyroid carcinoma. In our case the history of a sudden appearance, after a physical effort, strongly suggested a thyroid hematocele; only the aspect of the extracted fluid redirected the diagnosis towards a parathyroid cyst.

Many theories have tried to identify their etiology but none can completely explain their origin and the factors contributing to their development. There are four hypotheses that have been proposed for the etiology of parathyroid cysts:

1. Ontogenic parathyroid cyst [6] that is developing from the remnants of the third or fourth branchial clefts; it is encapsulated, thin-walled and contains clear fluid.
2. Coalescent parathyroid cyst [7] that is formed from the coalescence of micro-cysts and may contain serous or sero-hemorrhagic fluid. The cyst is lined by a multilayer of parathyroid cells.
3. Parathyroid pseudo cyst [8] is due to the infarction and degeneration of an adenoma. It contains turbid, reddish-brown fluid; the wall is thick and fibrotic, with entrapped residual parathyroid tissue.
4. Retention cyst results from over-activity of the parathyroid gland [9] (without increase of the plasmatic hormonal level).

There are histological differences between functional and nonfunctional cysts. Nonfunctional cysts are simple cysts lined by a flattened-cubic to low-columnar epithelium. Several types of parathyroid cells are found in their walls: chief cells, water-clear cells, and oxyphil cells. The presence of smooth muscle in the wall of some parathyroid cysts suggests that these may arise from branchial pouch remnants. Some functional cysts lack an identifiable lining and are more properly termed pseudo-cysts. They may contain foci of hemorrhage or necrosis and brown, turbid or even bloody fluid with hemosiderin-laden macrophages. It is believed that these may arise from degenerating adenomas. Other functional cysts are multilocular, complex lesions with thin walls and are found in close association with either an adenoma or a hyperplastic gland. In our case both the aspect of the extracted fluid and the aspect of the remaining lesion indicate a retention cyst, but ontogenetic parathyroid cyst cannot be excluded.

Before the use of FNA, parathyroid cysts were diagnosed only by surgery, in patients presenting with a neck mass, with or without symptoms of compression. In ultrasound it is difficult to differentiate parathyroid cysts from thyroid cysts, thyroglossal duct cyst or branchial cleft cyst [5], therefore FNA proves to be a valuable diagnostic tool that is useful for both diagnostic and therapeutic purposes [10]. A clear, watery aspect of the extracted fluid is very suggestive for a parathyroid cyst, but other aspects of the fluid may appear, misleading the diagnosis. PTH dosage must be performed in the native fluid and in the diluted form, because sometimes the PTH level is so high that it cannot be detected by the dosage technique (the Hook effect) [11]. In our case, this problem did not occur: both values of PTH in the native and the diluted fluid were elevated and similar.

Serum PTH dosage is mandatory in order to differentiate a functional parathyroid cyst from a nonfunctional one [12-14]. In our patient, serum PTH showed normal values, so surgery could be replaced with percutaneous evacuation and surveillance. For functional parathyroid cysts, surgical excision is the only alternative [15-18].

The early complication post evacuation is cystic hemorrhage, while the late complication is the recurrence of the cyst. In both situations percutaneous evacuation can be repeated and completed by alcohol instillation. The complete disappearance of nonfunctional parathyroid cyst after FNA is mentioned in other papers: Sanchez et al [19] reported a case of nonfunctional parathyroid cyst treated with 1 ml of tetracycline injection on the third recurrence. Therefore, sclerosants are considered an alternative to surgery in the case of a recurring nonfunctional parathyroid cyst. In our patient there were no complications after cyst evacuation and no recurrence, therefore sclerosants were not necessary.

We chose to present this case because it illustrates a very rare pathology and its diagnosis and therapeutic problems. Even though parathyroid cysts are quite rare (with a prevalence of only 0,075% in unselected patients [20]), they should be suspected in case of a cystic mass in the lower poles of the thyroid or in the mediastinum, or in patients with hyperparathyroidism and hypercalcemia. The clinical features are not helpful, often misleading the diagnosis, as illustrated by our case, so the accurate diagnosis should be made on the basis of fine needle aspiration and analysis of cystic fluid for PTH, combined with serum PTH dosage. A correct diagnosis is essential to the therapeutic decision: in the case of a nonfunctioning parathyroid cyst the simple procedure of cyst aspiration can cure the lesion, thus avoiding surgical intervention.
Parathyroid cyst, a rare cause of cystic cervical lesion

References