

Case Report

An Enlarging Cystic Thyroid Mass: Uncommon Cause of Primary Hyperparathyroidism

Jad G. Sfeir and Diana S. Dean*

Division of Endocrinology, Diabetes, Metabolism and Nutrition, Department of Medicine, Mayo Clinic, Rochester, MN, USA

*Corresponding author

Diana S. Dean, Division of Endocrinology, Diabetes, Metabolism and Nutrition, Department of Medicine, Mayo Clinic, USA. 200 First St. SW, Rochester, MN 55905, USA, Tel: 507-266-3769; Fax: 507-284-5745; Email: Dean.Diana@mayo.edu

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Abstract

Parathyroid cysts are quite rare and often mistaken for thyroid cysts. They are mostly nonfunctioning; functioning parathyroid cysts are an extremely rare cause of primary hyperparathyroidism. We present a 64 year-old man that presented with what is initially diagnosed as an enlarging symptomatic thyroid cyst and treated with suppressive thyroid hormone therapy. After our review, primary hyperparathyroidism was suspected based on his biochemical profile. Surgical resection confirmed the diagnosis of a parathyroid cyst stemming from degeneration of a preexisting parathyroid adenoma. We discontinued thyroid hormone replacement that was causing iatrogenic hyperthyroidism. Data on decrease in thyroid nodule volume after thyroid hormone suppression is inconsistent and benefit is not clear; there is also increased risk of thyrotoxicosis, particularly in the elder population.

ABBREVIATIONS

TSH: Thyroid Stimulating Hormone; PTH: Parathyroid Hormone

INTRODUCTION

Thyroid nodules are quite common with a reported incidence of 20 to 76% based on population and autopsy studies [1,2]. Cystic nodules represent a large proportion of those, although the actual incidence is variable depending on the criteria used for defining a thyroid cyst; whether it is mixed cystic and solid, partially cystic or a pure cyst. Aspiration of the cystic fluid can reduce the size of the nodule but there is a high rate of recurrence due to fluid re-accumulation or hemorrhage [3,4]. It is reserved for symptomatic cysts.

Parathyroid cysts, on the other hand, are quite uncommon and are very often radio graphically mistaken for thyroid cysts.

We present a case of an enlarging neck mass that was initially mistaken for a thyroid cyst on ultrasound but later identified as a functioning parathyroid cyst causing primary hyperparathyroidism.

CASE PRESENTATION

A 64 year-old man was referred for evaluation of a neck mass noted on examination one year prior to presentation. At that time, an ultrasound identified a 5-cm cystic right thyroid mass that had benign cytology after fine needle aspiration. The mass doubled in size over the past year to the point that he was unable

to button his shirt. He has also developed dyspnea, dysphagia to solids, as well as dysphonia and hoarseness of the voice that he describes as “voice cracking”. He was evaluated locally with an ultrasound that noted the now-10-cm cystic mass. Aspiration of the cyst yielded 137 mL of fluid but it re-accumulated within 3 days. He was also started on levothyroxine one month prior to presentation with the aim of “shrinking the nodule”.

A right thyroid nodule, easily mobile with swallowing, was palpated on our exam. It measured 9.8x5.9x7.6 cm on ultrasound and had cystic appearance (Figure 1A,1B). Left tracheal deviation was noted on chest x-ray (Figure 2) and decreased right vocal cord mobility was seen on direct laryngoscopy (Figure 3). Laboratory testing was consistent with primary hyperparathyroidism with total serum calcium of 11.0 mg/dL and parathyroid hormone [PTH] of 207 pg/mL. A mild iatrogenic hyperthyroidism was also noted with a thyroid stimulating hormone [TSH] of 0.2 mIU/L (Table 1).

After discontinuation of levothyroxine, a right thyroid lobectomy was performed with intra-operative PTH measurements indicating appropriate decline: 244 pg/mL at baseline decreased to 47.5 pg/mL at 20 minutes. Surgical pathology identified a parathyroid adenoma with degenerative cystic changes including fibrosis and hemorrhage; the thyroid parenchyma was unremarkable. Post-operative calcium was 9.5 mg/dL.

DISCUSSION

Parathyroid cysts are quite uncommon, with a reported

incidence of 0.1-2% based on ultrasound studies [5,6]. They usually occur between fourth and sixth decade of life and are mostly [up to 90%] nonfunctioning [7]. Functioning parathyroid cysts result from degeneration of a previous adenoma and represent only 1-2% of cases of primary hyperparathyroidism [8].

Cysts size is highly variable, ranging between 0.5 and 15 cm [9]. Large cysts [≥ 4 cm] are less common and tend to be

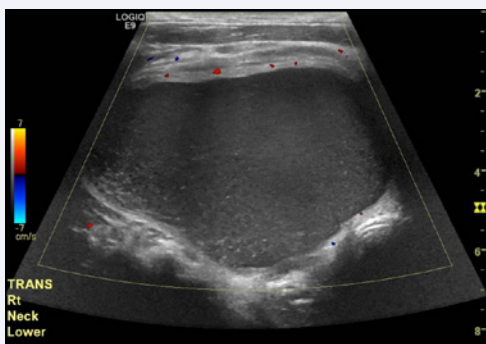


Figure 1a Soft tissue ultrasound of the neck revealed a cystic appearing mass.

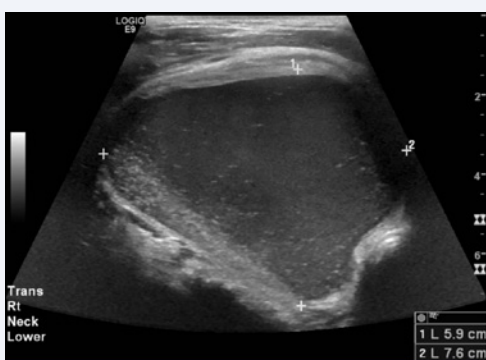


Figure 1b Measurements of the cystic mass on transverse view.



Figure 2 A chest X-ray showed tracheal deviation (arrow) due to the large neck mass.

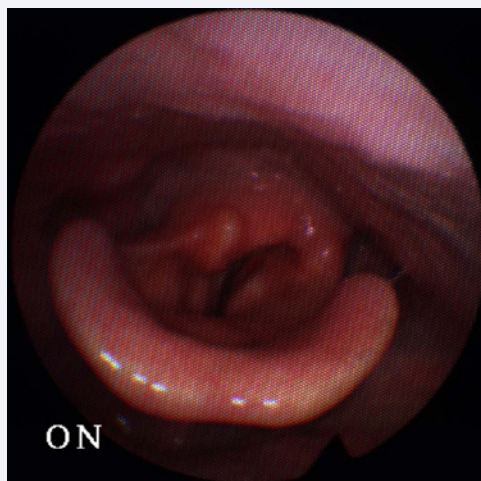


Figure 3 Direct fiberoptic laryngoscopy showed decreased right vocal cord mobility compared to the left.

Table 1: Baseline Laboratory Testing Results.

Laboratory Testing	Baseline	Reference Value
TSH	0.2	0.3 - 4.2 mIU/L
Total Serum Calcium	11.0	8.9 - 10.1mg/dL
Phosphorus	3.0	2.5 - 4.5 mg/dL
PTH	207	15 - 65 pg/mL
Serum Creatinine	0.8	0.8 - 1.3 mg/dL

Abbreviations: TSH: Thyroid Stimulating Hormone; PTH: Parathyroid Hormone

mediastinal in location, presumably following a descent due to gravity and negative intrathoracic pressure [10]. Although most parathyroid cysts are asymptomatic, larger mediastinal cysts can cause compressive symptoms [11]. There does not seem to be direct correlation between size and the functional status of the cysts [10,12].

Diagnosis

Parathyroid cysts have the typical cystic appearance on ultrasound, although often this modality cannot identify the origin of the cyst [6]. Indeed, they can often be mistaken for thyroid cysts [13]. Parathyroid imaging, such as sestamibi scan, is useful only when the cysts are functional, although results can be equivocal [6,7].

Fine needle aspirates typically return a clear watery fluid [14]. Functioning cysts can have a yellow-brown colored aspirate due to the degeneration of a pre-existing adenoma [6]. One report associated hypercalcemia with the presence of hemorrhage in the cyst [15]. Colloid and few-to-none epithelial cells are seen on cytopathology [14]. Differentiating parathyroid from thyroid origin of the cyst typically requires PTH washout on the aspirate [13]. Both functioning and nonfunctioning parathyroid cysts have elevated cystic fluid PTH concentrations [6]. Intra-cystic thyroglobulin levels are low but calcium can be detected even in nonfunctioning parathyroid cysts [13,14].

Treatment

Nonfunctioning parathyroid cysts are typically treated with aspiration of the cystic fluid with variable results [5-7,6-19]. There is a moderate risk of fluid re-accumulation and repeated aspirations may be required. Recurrent cases have been successfully treated with ethanol sclerotherapy, although surgical resection is more widely used [20]. On the other hand, surgical excision remains the treatment of choice for functioning cysts in order to treat hormonal excess[6-8].

TSH suppression for thyroid nodules

Another important teaching message from this patient is the unsafe practice of levothyroxine suppressive therapy in euthyroid patients aiming at decreasing the size of thyroid nodules. In fact, it has largely been abandoned due to lack of evidence. The concept of TSH suppression relies on the fact that TSH stimulates the growth of thyroid cells. There are multiple uncertainties, however, related to such practice. First, the clinical benefit of reducing the size of a thyroid nodule is unknown. Second, data on volume reduction of thyroid nodule in response to TSH suppression has been variable and inconsistent [21,22]. A meta-analysis showed a non-statistically significant trend towards volume reduction by more than 50% of benign nodules after thyroid hormone therapy [21]. Third, in clinical trials where there was a decrease in thyroid nodule volume after levothyroxine therapy, only 22-26% of nodules responded to TSH suppression [21,23]. This indicates that most nodules do not respond to this therapy. Thyroid cysts in particular seem to be the least responsive to TSH suppression [24]. Fourth, the degree of TSH suppression that is required to produce a significant change in nodule size remains unclear. Finally, this practice can be quite unsafe, particularly in the older population that has a higher risk of thyrotoxicosis [25].

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