

## CASE REPORT

# Giant parathyroid adenoma presenting with multiple pathologic fractures: A case report

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## Key Clinical Message

Hyperparathyroidism is a common endocrine disorder, which must be suspected in patients presenting with fatigue, history of pathologic fracture and the diagnosis can be confirmed by elevated calcium and PTH levels, and the preferred treatment option.

## Abstract

Primary hyperparathyroidism (PHPT), a common endocrine condition, with elevated parathormone production causes increased blood calcium levels. Parathyroid adenomas cause the majority of PHPT cases. Significant hypercalcemia can result from giant parathyroid adenomas. A calcium crisis may not always arise in these individuals, despite enormous parathyroid adenomas and high parathyroid hormone levels, and the masses may first be mistaken for a thyroid mass. In this article, we discuss the case of a 57-year-old Iranian man who suffered from PHPT due to a massive parathyroid adenoma and had a history of extreme fatigue and several traumatic fractures. As specialists, we should have a strong clinical suspicion of giant parathyroid adenoma as reason of hyperparathyroidism. In patients with multiple bone problems such as pain and multiple pathological fractures and elevated levels of calcium and PTH, the diagnosis of GPA must be considered and their preferred treatment is surgery.

## KEYWORDS

hypercalcemia, parathyroid adenoma, parathyroid hormone, primary hyperparathyroidism

## 1 | INTRODUCTION

Primary hyperparathyroidism (PHPT) is a common endocrine condition that increases serum calcium levels because of abnormal parathyroid hormone (parathormone) secretion.<sup>1,2</sup> In Iran, PHPT is a serious condition with severe symptoms, major comorbidities, and a significant morbidity rate.<sup>3</sup> Parathyroid adenomas are the reason for 85% of cases with PHPT.<sup>4</sup> An adenoma with a weight >3.5 g and a diameter >2 cm is referred to as a giant parathyroid adenoma (GPA). The parathyroid gland typically weighs between 70 mg and 1 g.<sup>5,6</sup> The PA usually measures <2 cm, weighs <1 g, and generates a mild PHPT.<sup>6</sup>

Primary hyperparathyroidism also presents with nephrolithiasis, osteoporosis or osteopenia, pancreatitis, cognitive disorders, and other symptoms. Although most adenomas are asymptomatic and the most prevalent cause of PHPT, cases of PHPT are typically discovered during screening tests with elevated calcium and parathormone levels. The weight of the adenoma and PTH level are associated with the severity of symptoms.<sup>5</sup> Although giant parathyroid adenomas are uncommon, their surgical management can be challenging. In this literature, we present a case of a 57-year-old Iranian man who suffered from PTPH due to a giant size of parathyroid adenoma.

## 2 | CASE PRESENTATION

A 57-year-old Iranian man with a history of severe fatigue and multiple pathologic fractures after minor trauma from 2 years ago was referred to the otolaryngologist. He was a smoker. A bulging 3 × 3 cm in the left anteroinferior portion of the neck was seen in physical examination. Comprehensive laboratory analysis showed that the hematocrit and hemoglobin levels were normal. His thyroid hormones such as TSH, T3, and T4 were in normal range. Serum parathormone hormone level was 1486 mg/mL (normal range: 9–94 mg/mL), serum calcium was higher than normal at 13.9 mg/dL (normal range: 8–10.5 mg/dL), and creatinine level was 1.2 mg/dL.

The ultrasound sonography from thyroid gland and neck was performed. The results showed standard size of thyroid gland and a heterogeneous hyperechoic lesion with the size of 33 × 35 × 44 mm with cystic partition without vascularity in the inferior portion from the thyroid gland's left lobe that goes to the substernal. A 99-m Tc-MIBI parathyroid scintigraphy reveals a vast hyperactive area occupying the left lobe of the thyroid with extension to substernal (Figure 1).

Surgical treatment was scheduled. A 7-cm incision was performed on the left side of the neck, 2 cm above the

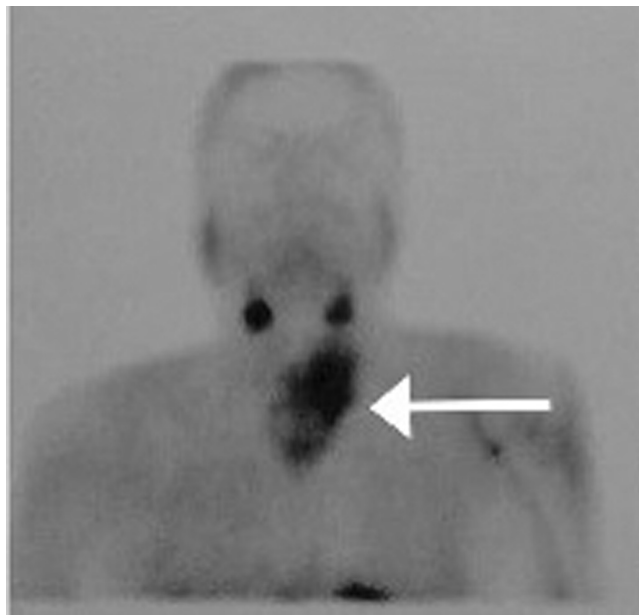
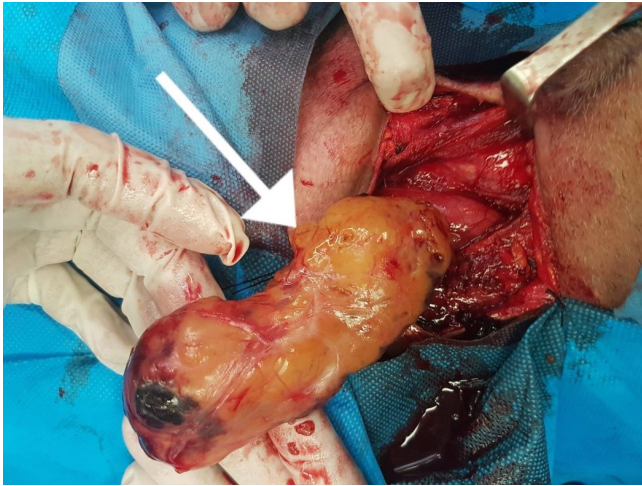


FIGURE 1 99-m Tc-MIBI parathyroid scintigraphy, GPA showed by arrow.

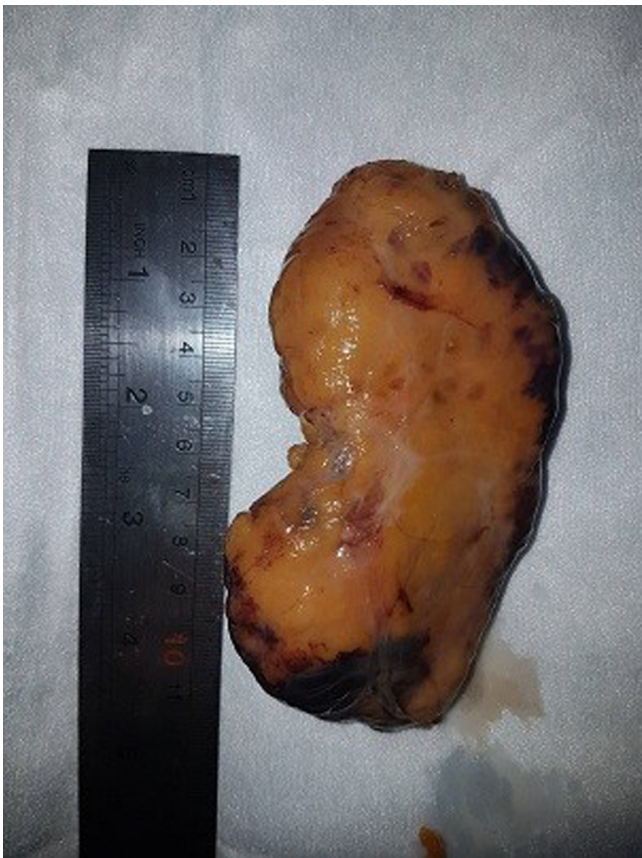
sternal notch. The lesion attached to the posteroinferior of the left thyroid gland (Figure 2). After the lesion excision, the PTH level reached 19.6 ng/L, and calcium dropped to 8.4 mg/mL. The dimension of the lesion was 11 × 5 × 4 cm, and the weight of 100 g showed homogenous yellowish-brown rubbery and cystic changes (Figure 3).

## 3 | DISCUSSION

Primary hyperparathyroidism is a prevalent endocrine disease defined by persistent hypercalcemia and high PHT levels.<sup>7</sup> This condition has an annual prevalence of about 21 cases per 100,000 people, and 85% of these cases are caused by a parathyroid adenoma.<sup>8</sup> Limited incidents of giant parathyroid adenoma (GPA) have already been observed since it is an uncommon cause of PHPT.<sup>9</sup> Patients may also exhibit high PTH and normalized calcium levels. This condition is classified as normocalcemic hyperparathyroidism to distinguish it from secondary hyperparathyroidism.<sup>10,11</sup> Patients with elevated baseline calcium levels need to be closely monitored after surgery because the nonpathologic parathyroid glands stop working normally due to a feedback response. Transient hypocalcemia may occur after resectioning the dysfunctional gland due to a severe reduction in calcium levels.<sup>12</sup> Our patient was identified as having high PTH and calcium levels. Postoperative measurement after 24 h revealed normal PTH level and calcium levels because of the normal function of the three nonpathologic parathyroid glands before surgery.



**FIGURE 2** Excised specimen of a giant parathyroid adenoma which is showed by arrow.



**FIGURE 3** Dimension of a removed giant parathyroid adenoma 11×5×4 cm.

A number of imaging modalities are primarily used for preoperative management of PHPT and localization of the pathologic glands, even though the diagnosis of PHPT is established by clinical and laboratory criteria. Before surgery, a neck U/S scan can locate the parathyroid gland

with a sensitivity and specificity of around 85% and 75%, respectively. Giant parathyroid adenomas are seen in minority cases of PHPT, and there is a challenge with the definition of GPA regarding their weight. There have been reports of patients with gland weights more than 110g, whereas Spanheimer et al. described large parathyroid adenomas as having a weight greater than 3.5g.<sup>5,6</sup> In our surgery, we removed an 11×5×4 cm and 100g specimen. Primary hyperparathyroidism is managed surgically by removing the pathologic parathyroid tissue, whether it is through locally invasive parathyroidectomy or bilateral neck exploration.<sup>13,14</sup>

In cases with hypercalcemia, osteoporosis, renal calcifications, or symptoms, parathyroidectomy is suggested as a last option for treating parathyroid adenoma. This procedure aims to find four parathyroid glands by accessing the thyroid gland and, according to its size, cutting and removing the abnormal ones. A solitary overactive parathyroid gland is removed using a minimally invasive procedure in a minimal-invasive parathyroidectomy.<sup>13</sup> We used 7-cm incisions also on the left side of the neck in our case because of the massive size of the parathyroid gland. We only reported an unusual case and showed that a hyperfunctional large parathyroid adenoma in an old patient might have a very high PTH level and a history of pathologic fracture, which might be difficult to diagnose and manage.

#### 4 | CONCLUSION

As specialists, we should have a strong clinical suspicion of giant parathyroid adenoma as reason of hyperparathyroidism. In patients with multiple bone problems such as pain and multiple pathological fractures and elevated levels of calcium and PTH, the diagnosis of GPA must be considered and their preferred treatment is surgery.

#### AUTHOR CONTRIBUTIONS

**Hassan Abshirini:** Formal analysis; writing – original draft. **Mahsa Heidari:** Data curation; investigation; project administration; supervision. **Ali Fahimi:** Resources; writing – original draft. **Parastoo Ghorbani:** Validation; writing – review and editing. **Erfan Ghadirzadeh:** Writing – review and editing. **Sasan Shafiei:** Writing – review and editing.

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#### CONFLICT OF INTEREST STATEMENT

None declared.

## DATA AVAILABILITY STATEMENT

The data are available with the correspondence author and can be reached on request.

## CONSENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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