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Case report
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Brown tumor as an indication of a rare parathyroid carcinoma: A diagnostic challenge

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The authors stated that the written consent was obtained from the patient presented with images in the study.

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Abstract

Parathyroid carcinoma is an exceptionally rare cause of primary hyperparathyroidism, comprising less than 1% of cases. Its presentation often overlaps with benign etiologies, thereby posing significant diagnostic challenges. We present a case of a 70-year-old male with a history of prostate cancer who presented with profound hypercalcemia and markedly elevated parathyroid hormone. Imaging revealed lytic rib lesions consistent with osteitis fibrosa cystica (brown tumor). Surgical resection of a parathyroid mass confirmed parathyroid carcinoma. Postoperatively, the patient experienced symptomatic hypocalcemia due to non-adherence with calcium supplementation. This case highlights the need for clinical suspicion of parathyroid carcinoma in cases of severe hypercalcemia and skeletal manifestations and the importance of postoperative management in preventing complications such as hungry bone syndrome.

Keywords: Brown tumor, parathyroid carcinoma, severe hypercalcemia, osteitis fibrosa cystica, parathyroidectomy, hungry bone syndrome

Introduction

Parathyroid carcinoma accounts for less than 1% of primary hyperparathyroidism (pHPT) cases and may occur sporadically or in association with genetic syndromes such as Hyperparathyroidism-Jaw Tumor (HPT-JT) and Familial Isolated Hyperparathyroidism (FIHP); both of these syndromes are linked to mutations in the CDC73 gene [1, 2]. Parathyroid carcinoma often presents with severe hypercalcemia and nonspecific symptoms, including bone pain, kidney stones, and fatigue.

This report describes a 70-year-old male with a history of prostate cancer who presented with severe hypercalcemia and a rib lesion initially suspected to be metastatic disease. Further evaluation revealed a case of osteitis cystica fibrosa (brown tumor) secondary to parathyroid carcinoma. This case underscores the importance of a thorough evaluation of hypercalcemia, especially in patients with known malignancy.

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Case presentation

A 70-year-old male with a history including prostate cancer (post-prostatectomy), bipolar disorder, thyroid disorder, and polysubstance use presented with recurrent dizziness. Labs revealed elevated calcium (14.1 mg/dL; corrected 13.5 mg/dL), elevated parathyroid hormone (PTH) (470.7 pg/mL), and renal impairment (BUN 52, creatinine 1.6 mg/dL). TSH was suppressed at 0.25. A chest X-ray identified a left mid-lung pleural-based mass, prompting a CT scan. That scan revealed no pulmonary mass but uncovered a heterogeneous 2.5 × 1.2 cm lesion in the left thyroid gland and erosion of the right sixth posterior rib (Figure 1). Given the patient's history of prostate cancer, bone metastasis was initially suspected. A thyroid ultrasound (Figure 2) revealed a solid, hypoechoic TIRADS-5 nodule (1.7 × 1.5 cm). A nuclear medicine parathyroid scan (Figure 3) revealed increased uptake in the left parathyroid. A biopsy of the rib lesion confirmed osteitis fibrosa cystica (brown tumor) (Figure 4).

The patient underwent a left parathyroidectomy and hemithyroidectomy. His PTH dropped postoperatively from 169.9 pg/mL to 13.0 pg/mL. Pathology confirmed parathyroid carcinoma with metastasis to the ipsilateral thyroid.

Ten days post-op, the patient returned complaining of anxiety, paresthesia, muscle cramps, and increased sensitivity to the cold, likely due to hypocalcemia as a result of non-compliance with calcium supplements. He was counseled and monitored closely. He has since recovered uneventfully.

Figure 1. CT Chest showing rib lesion with cortical erosion (arrow).

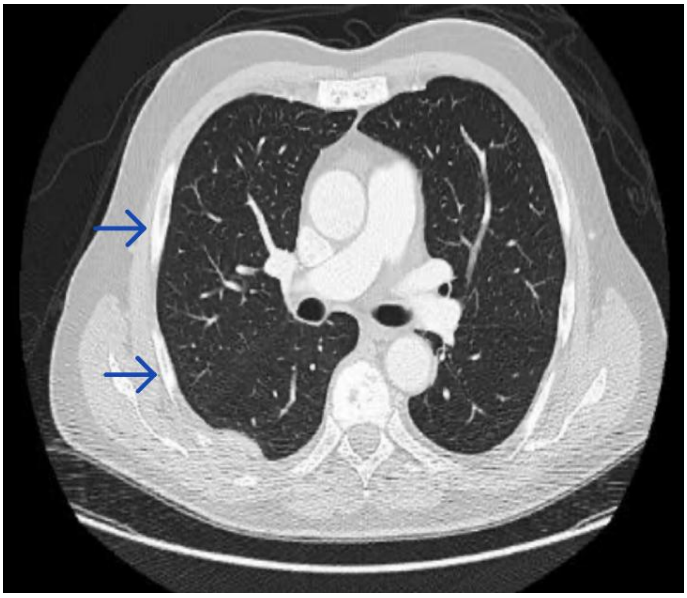


Figure 2. Thyroid ultrasound showing hypoechoic nodule in the left mid-gland.

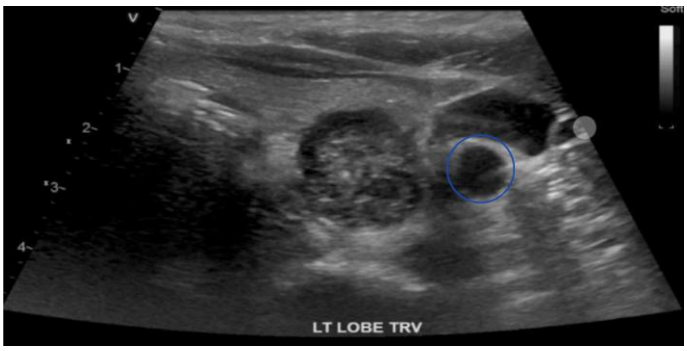


Figure 3. Nuclear medicine scan with increased uptake in left parathyroid.

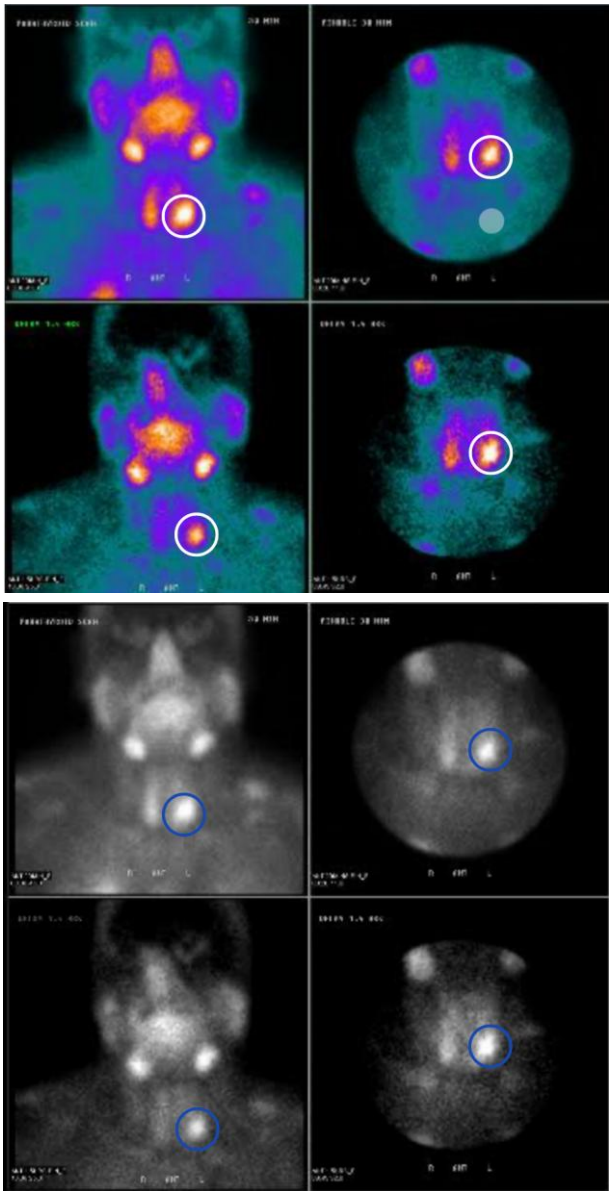
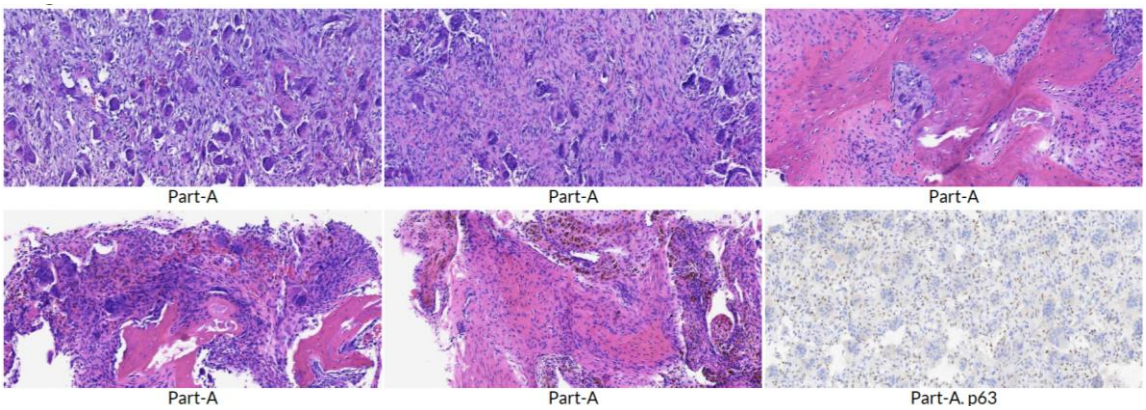


Figure 4. Histology from rib biopsy confirming osteitis fibrosa cystica.



Discussion

Diagnosis and preoperative considerations

Parathyroid carcinoma should be considered in pHPT patients with calcium levels above 14 mg/dL and PTH levels above five times the upper limit of normal [3, 4]. Although rare, brown tumors can mimic metastatic lesions, especially in patients with a history of malignancy [5]. Imaging localized this lesion, and a biopsy confirmed brown tumor. Imaging techniques, such as ultrasounds and 99mTc sestamibi scans, are helpful for diagnosing parathyroid carcinoma and localizing the lesion. However, such techniques do not assist with assessing the malignant potential of the tumor.

Treatment and surgical approach

Surgical resection remains the primary treatment for parathyroid carcinoma. En bloc resection, including the adjacent thyroid and surrounding tissue, is associated with improved outcomes [6]. Our patient underwent this approach.

Postoperative management

Hypocalcemia, including hungry bone syndrome, is a frequent complication of parathyroidectomy. Early recognition and compliance with supplementation are crucial to avoid morbidity.

Recurrence and palliative care

Recurrence rates are high (49–60%), primarily due to incomplete removal or failure to excise the parathyroid tumor [7]. Vigilant follow-up is essential. For inoperable recurrence, calcimetics and bisphosphonates may help control hypercalcemia [8]. Most patients with parathyroid carcinoma ultimately succumb to complications related to hypercalcemia rather than the tumor itself [9].

Conclusion

This case highlights the diagnostic challenges of parathyroid carcinoma, especially when it manifests with brown tumors mimicking metastatic disease. Severe hypercalcemia and skeletal lesions warrant consideration of parathyroid carcinoma, even in patients with other malignancies. Early diagnosis, complete surgical resection, and diligent postoperative care are critical for optimal outcomes.

References

1. Owen RP, Silver CE, Pellitteri PK, Shaha AR, Devaney KO, Werner JA, et al. Parathyroid carcinoma: a review. Head Neck. 2011 Mar;33(3):429-36. doi: 10.1002/hed.21376.
2. Simonds WF. Genetics of Hyperparathyroidism Including Parathyroid Cancer. Endocrinology and metabolism clinics of North America. 2017 Jun 1 [cited 2023 Nov 7];46(2):405–18.
3. Schoretsanitis G, Daskalakis M, Melissas J, Tsiftsis DD. Parathyroid carcinoma: clinical presentation and management. American Journal of Otolaryngology. 2008 Sep 25;30(4):277–80
4. Yabanoglu H, Arer IM, Ozarslan F. Parathyroid Cancer: Review of Uncommon Disease. Acta Endocrinol (Buchar). 2024 Apr-Jun;20(2):212-221. doi: 10.4183/aeb.2024.212.
5. Jacquet-Francillon N, Prevot N. Brown tumors in nuclear medicine: a systematic review. Ann Nucl Med. 2023 May;37(5):255-270. doi: 10.1007/s12149-023-01832-1.
6. Roser P, Leca BM, Coelho C, Schulte KM, Gilbert J, Drakou EE, et al. Diagnosis and management of parathyroid carcinoma: a state-of-the-art review. 2023 Apr 1;30(4).
7. Alnajmi RAY, Ali DS, Khan AA. Persistence and Recurrence of Primary Hyperparathyroidism. Best Practice & Research Clinical Endocrinology & Metabolism. 2025 Mar;39(2):101986.
8. El-Hajj Fuleihan G, Clines GA, Hu MI, Marcocci C, Murad MH, Piggott T, et al. Treatment of Hypercalcemia of Malignancy in Adults: An Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab. 2023 Feb 15;108(3):507-28. doi: 10.1210/clinem/dgac621.
9. Rodrigo JP, Hernandez-Prera JC, Randolph GW, Zafereo ME, Hartl DM, Silver CE, et al. Parathyroid cancer: An update. Cancer Treat Rev. 2020 Jun;86:102012. doi: 10.1016/j.ctrv.2020.102012.