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Ectopic Mediastinal Parathyroid Adenomas: Diagnostic and Therapeutic Challenges Through a Series of Three Cases

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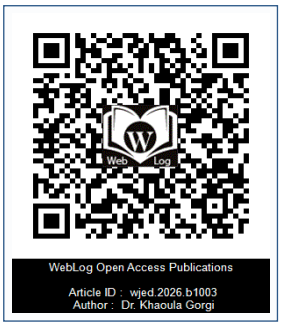

Abstract

Ectopic mediastinal parathyroid adenoma is a significant cause of refractory and recurrent primary hyperparathyroidism. Although rare compared to cervical locations, this pathology presents particular diagnostic and therapeutic challenges. We report a series of three cases illustrating these difficulties, along with favorable outcomes achieved through advanced imaging and appropriate surgical management. An updated literature review is provided to better understand the optimal care for these patients.

Introduction

Primary Hyperparathyroidism (PHPT) is a common endocrine disorder, often asymptomatic, primarily resulting from a single parathyroid adenoma (about 85% of cases) [1, 2]. Among these adenomas, approximately 10% are ectopically located outside the usual cervical region [3]. The mediastinal location, while uncommon, is clinically important due to the diagnostic and therapeutic challenges it poses. Conventional imaging may be inconclusive, complicating precise localization and surgical resection [4, 5]. Here, we present three cases illustrating these issues, followed by a detailed discussion of diagnostic and therapeutic options.

Clinical Observations

We report three cases of ectopic mediastinal parathyroid adenomas in patients with recurrent or persistent primary hyperparathyroidism.

- The first case involves a 54-year-old woman, previously operated twice for PHPT. She underwent left upper parathyroidectomy and mediastinal ectopic parathyroid resection. Ten years later, she presented with recurrent hypercalcemia, elevated PTH, hypophosphatemia, and increased 24-hour urinary calcium. Despite normal cervical ultrasound and cervicothoracic CT scans, sestamibi scintigraphy localized an ectopic mediastinal parathyroid focus.
- The second case is a 59-year-old woman operated for a left inferior parathyroid lesion. Despite persistent hypercalcemia, elevated PTH, and abnormal 24-hour urinary calcium, standard cervical and thoracic imaging were normal. Sestamibi scintigraphy revealed anterior mediastinal ectopy.
- The third case involves a 68-year-old man who underwent posterior mediastinal parathyroidectomy for ectopic primary hyperparathyroidism but presented persistent phosphocalcic imbalance. Conventional imaging (cervical ultrasound, cervicothoracic CT, and MIBI scintigraphy) failed to localize a focus; however, PET scan confirmed posterior mediastinal fixation, indicating recurrence or persistence of ectopic adenoma.

In all cases, evaluation for other components of Multiple Endocrine Neoplasia (MEN) was negative. All patients underwent targeted surgical resection of the mediastinal ectopic focus, resulting in notable clinical and biochemical improvement. Histopathological examination confirmed the diagnosis of ectopic mediastinal parathyroid adenoma in each case (Table 1).

Discussion

Ectopic parathyroid adenoma is a major cause of failure or recurrence following surgery for

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Table 1: Clinical and biological characteristics of the three patients with ectopic mediastinal parathyroid adenomas.

Parameter	Patient 1	Patient 2	Patient 3
Age (years)	54	59	68
Sex	Female	Female	Male
History	2 parathyroidectomies, recurrence	Initial parathyroidectomy	Posterior mediastinal parathyroidectomy
Serum calcium (mg/dL)	Elevated	Elevated	Elevated
PTH (pg/mL)	Elevated	Elevated	Elevated
Standard imaging (ultrasound, cervical CT)	Normal	Normal	Normal
MIBI scintigraphy	Mediastinal ectopy	Anterior mediastinum	Negative
PET scan	Not performed	Not performed	Posterior mediastinal fixation
Surgical intervention	Mediastinal excision	Mediastinal excision	Mediastinal excision
Postoperative outcome	Remission	Remission	Remission

PHPT. Among ectopic locations, the mediastinum, although rare (about 1-2% of cases), is particularly challenging [6]. This location often explains recurrences, as conventional cervical imaging (ultrasound, CT) is frequently negative or noncontributory [7]. Sestamibi scintigraphy remains a key examination but also has limitations, especially in deep mediastinal cases [8].

Our series highlights these diagnostic challenges: two patients had normal conventional imaging despite persistent hypercalcemia, while scintigraphy localized an ectopic mediastinal focus. The third patient had a negative scintigraphy but PET scan identified mediastinal fixation, confirming the utility of advanced imaging modalities in complex cases [9].

Surgical management of mediastinal ectopic adenomas requires meticulous planning, ideally at centers specialized in endocrine and thoracic surgery. Surgical approaches range from minimally invasive mediastinoscopy to thoracotomy depending on the lesion location [10]. Precise preoperative localization is essential to minimize operative risks and optimize outcomes [11].

Postoperative monitoring is critical for early detection of recurrence or complications. The clinical and biochemical remission observed in our patients confirms that surgery guided by multimodal imaging achieves effective management.

Finally, these cases underscore the importance of comprehensive workup to exclude Multiple Endocrine Neoplasia (MEN), since ectopic parathyroid adenomas may occur within this context [12].

Conclusion

Ectopic mediastinal parathyroid adenoma, though rare, is a significant cause of surgical failure or recurrence in PHPT. Its management requires a rigorous diagnostic strategy relying on multimodal imaging, including scintigraphy and sometimes PET scan. Surgery guided by precise localization remains the treatment of choice, allowing satisfactory remission. Careful postoperative surveillance is mandatory to detect any recurrence.

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