Bilateral Inferior Parathyroid Adenomas in a 70-Year-Old Female with Chronic Fatigue and Hypercalcemia: A Case Report

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Abstract: Parathyroid adenomas are common causes of primary hyperparathyroidism and present with a wide spectrum of clinical features, including fatigue, generalized weakness, and depression. We present a case of a 70-year-old female with a known history of diabetes mellitus and hypertension, who presented with chronic fatigue, generalized weakness, and depression for two years. Laboratory investigations revealed elevated serum parathyroid hormone (PTH) and calcium levels. Imaging studies, including a contrast-enhanced CT of the neck, revealed bilateral inferior parathyroid adenomas. This case highlights the importance of considering parathyroid pathology in patients with unexplained fatigue, weakness, and mood disturbances. We discuss the diagnostic approach and management, along with a review of the literature on parathyroid adenomas.

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I. INTRODUCTION

Primary hyperparathyroidism (PHPT) is commonly associated with parathyroid adenomas, which are often diagnosed incidentally or when patients present with symptoms such as fatigue, weakness, and depression. Parathyroid adenomas can be diagnosed using a combination of laboratory tests (serum calcium and PTH) and imaging modalities, with CT and nuclear medicine being valuable tools for identifying adenomas. This case report presents a 70year-old female with bilateral inferior parathyroid adenomas, highlighting the importance of early detection and surgical intervention in elderly patients with chronic fatigue and mood disturbances.

II. CASE PRESENTATION

A 70-year-old female presented with a two-year history of chronic fatigue, generalized weakness, and depression. Her medical history included diabetes mellitus and hypertension, and she had been on antidepressants for the past three months. Laboratory investigations showed markedly elevated serum parathyroid hormone (PTH) and calcium levels, which prompted further evaluation.

Imaging studies, including a contrast-enhanced CT scan of the neck, revealed two distinct findings: a larger, heterogeneously enhancing lesion in the left inferior parathyroid gland measuring approximately $0.9 \times 1.5 \times 2.4$ cm, and a smaller lesion in the right inferior parathyroid gland measuring $0.4 \times 0.4 \times 0.5$ cm. Both lesions displayed cystic changes and washout on delayed-phase imaging, with associated feeding arteries identified on the scan, consistent with the "polar vessel sign," a characteristic feature of parathyroid adenomas. The left-sided lesion showed significant washout in the arterial phase (34%) compared to the venous phase (10.7%), while the right-sided lesion demonstrated even higher washout values, indicating the presence of hyperfunctioning parathyroid adenomas.

III. IMAGING FINDINGS

- > The CT Findings for the Left Inferior Parathyroid Adenoma were as Follows:
- Thin plain: +40 HU
- Arterial phase: +126 HU
- Venous phase: +96 HU
- Delayed phase: +90 HU
- Absolute arterial washout: 34%
- Absolute venous washout: 10.7%
- Relative arterial washout: 24%
- Relative venous washout: 6.6%
- For the Right Inferior Parathyroid Adenoma, the Findings Included:

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• Thin plain: +25 HU

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- Arterial phase: +198 HU
- Venous phase: +134 HU
- Delayed phase: +69 HU

- Absolute arterial washout: 70.5%
- Absolute venous washout: 59.6%
- Relative arterial washout: 62.1%
- Relative venous washout: 48.5%



Fig 1: Thin Plain and Arterial Phase



Fig 2: Arterial Phase



Fig 3: Arterial Phase



Fig 4: Venous Phase

The imaging features were highly suggestive of bilateral parathyroid adenomas, a diagnosis that was later confirmed surgically.

IV. DISCUSSION

This case emphasizes the importance of recognizing the clinical and radiological features of parathyroid adenomas in elderly patients. Primary hyperparathyroidism caused by parathyroid adenomas is often overlooked due to its subtle or non-specific symptoms, which include fatigue, weakness, and mood disturbances. The presence of markedly elevated serum calcium and PTH levels should raise suspicion for parathyroid pathology.

The use of contrast-enhanced CT imaging with washout characteristics has become an invaluable tool in identifying parathyroid adenomas. The "polar vessel sign," observed in this case, is a radiological hallmark of parathyroid adenomas, indicating the presence of a feeding artery. Studies have shown that the relative washout values on CT can help differentiate adenomas from other neck masses and provide useful information for surgical planning (1).

In this case, the patient developed severe hypokalemia following the initial diagnosis, which led to respiratory failure. This complication was promptly managed, and the patient was stabilized for surgery. Parathyroidectomy remains the definitive treatment for parathyroid adenomas, with successful outcomes in most cases (2).

V. CONCLUSION

This case highlights the importance of considering parathyroid adenomas in the differential diagnosis of elderly patients presenting with unexplained chronic fatigue, generalized weakness, and depression. Early detection and appropriate imaging are essential for accurate diagnosis and effective management. Surgical resection of parathyroid adenomas can significantly improve patient outcomes, especially in cases where complications such as severe hypokalemia arise.



Fig 5: Delayed Phase

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