Atypical parathyroid adenoma with diffuse fibrosis

Christine M. Clark, BA[1]; Sakeena J. Payne, MD[1]; Joshua I. Warrick, MD[2]; David Goldenberg, MD, FACS[1]

[1]Department of Otolaryngology, Penn State Milton S. Hershey Medical Center, Hershey, PA

[2]Department of Anatomic Pathology, Penn State Milton S. Hershey Medical Center, Hershey, PA

BACKGROUND

Parathyroid adenomas are benign encapsulated neoplasms that are typically comprised of chief cells and feature a rim of normal parathyroid tissue at their periphery. A small subset can be classified as atypical based on the presence of some histologic features of malignancy, such as a trabecular growth pattern, increased mitotic activity, capsular invasion, and fibrous bands, without definitive findings of carcinoma.[1]

CASE DESCRIPTION

A 65 year-old male with a history of eucalcemic primary hyperparathyroidism was referred to our outpatient Otolaryngology clinic for surgical management of a left parathyroid adenoma.

Previous SPECT-CT revealed a 1.0 x 1.0 cm mass in the mid-superior pole of the left thyroid gland; however, this was diagnostically inconclusive, as the lesion did not exhibit increased radiotracer uptake. Thus, a US was performed, which showed a well-defined hypoechoic nodule suspicious for parathyroid adenoma located posteriorly to the left thyroid lobe.

A left parathyroidectomy with unilateral exploration was performed. Preoperative rapid PTH was 146.1. Upon medial retraction of the left thyroid lobe, an enlarged and firm retrothyroidal mass was encountered. This fibrotic mass was greater than 1 cm in size, encapsulated, and was found to be adherent to both the left thyroid lobe and the left RLN.

The mass was carefully dissected from the nerve and sent for pathologic review. The patient's PTH was then resent and found to be 11.0. The patient tolerated the procedure without complication and had an uneventful postoperative course.

CASE DESCRIPTION (cont'd.)

On histologic evaluation, the mass showed a thickened capsule and extensive atypical acellular fibrosis with embedded nests of cells (**Figure 1, A**). High power view of the nests demonstrated monomorphic endocrine cells, interpreted as parathyroid tissue (**Figure 1, B**).

Permanent sections of the nests of cells revealed findings more classic for typical parathyroid adenoma, including expansile sheets of tumor cells and monomorphic, low-grade endocrine cells on high power views (**Figure 1, C and D**).

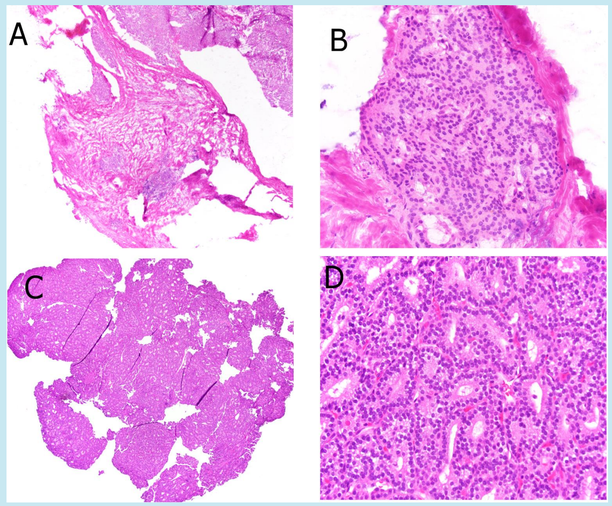

Figure 1.

A: Frozen sections of the biopsy material showing extensive fibrous tissue, with scattered embedded cell nests (H&E stained section, 20x magnification).

B. High power view of the cells nests demonstrating monomorphic endocrine cells, interpreted as parathyroid tissue (H&E, 400x magnification).

C. Permanent sections taken from the same area showing findings more classic for parathyroid adenoma, including expansile sheets of tumor cells (H&E, 20x magnification).

D. High power on permanent sections demonstrating the classic monomorphic, low-grade endocrine cells of parathyroid adenoma (H&E, 400x magnification).

DISCUSSION

Parathyroid adenomas with atypical features are infrequently encountered and can present a diagnostic challenge, as they share overlapping features with parathyroid carcinoma.

On histology, both tumor types can exhibit localized fibrous bands, fibrous trabeculae, and mitotic figures.[2] Features that definitively indicate parathyroid malignancy include invasive growth into the capsule and soft tissue. However, atypical parathyroid adenomas (APA) can adhere to local structures without direct invasion, further complicating the delineation between the two intraoperatively.[3]

Differentiating between these two entities is crucial, as these disease processes behave differently and require distinct postoperative surveillance approaches.

Our patient presented with eucalcemic primary hyperparathyroidism, which is an interesting finding given that patients with APA tend to present with higher serum calcium levels than those with typical adenomas.[4] Preoperative SPECT-CT results were suggestive of possible atypical features, as the soft tissue mass did not exhibit increased radiotracer uptake.

Intraoperative findings were also suggestive of atypia, including a firm and fibrotic mass that adhered to the left RLN and thyroid. We were able to peel the mass from the RLN without difficulty, suggesting that no true direct invasion was present and favoring APA as the likely etiology. The patient's initial pathologic specimen demonstrated extensive fibrotic tissue, which in itself is very rare for APA, as fibrosis tends to be more discretely localized, and only two cases of APA with widespread fibrotic tissue have been described in the literature.[5]

DISCUSSION (cont'd.)

Interestingly, permanent sections ultimately revealed findings more consistent with typical parathyroid adenoma. If we had relied solely on the initial histologic findings as opposed to clinical acumen and repeat PTH, the patient may have been unnecessarily subjected to a full exploration.

In conclusion, parathyroid adenomas that exhibit diffuse fibrosis are a rare entity that surgeons and pathologists should be knowledgeable of. It can be challenging to distinguish between APA and parathyroid carcinoma; consequently, caution must be exercised when dealing with parathyroid adenomas that do not behave in a typical fashion to ensure accurate diagnosis and management.

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PennState College of Medicine