

# Parathyroid adenoma, follicular variant: frozen section reporting

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## Abstract

Parathyroid adenoma is a benign neoplasm of the parathyroid gland and the most common cause of primary hyperparathyroidism. It causes symptoms associated with hypercalcemia. Treatment is by surgical removal. A histopathologist is commonly involved in the reporting of parathyroid frozen sections with the aim to confirm the surgical excision of parathyroid tissue. This report highlights the diagnostic difficulty in the frozen section reporting of the follicular variant of the parathyroid adenoma which closely resembles thyroid tissue.

**Keywords** Adenoma; follicular variant; frozen section; parathyroid gland

## Introduction

Surgical pathologists dealing with the parathyroid virtually always evaluate parathyroid tissue in patients who have hypercalcemia.<sup>1</sup>

Solitary parathyroid adenomas are the most common cause of primary hyperparathyroidism, accounting for 75%–80% of the cases.<sup>2</sup> The mainstay of treatment is the surgical removal of hyper-functioning parathyroid glands. Traditionally, the role of the histopathologist has been to confirm or refute parathyroid tissue intraoperatively. This is undertaken by performing gross examination of the excised tissue followed by freezing the tissue to perform microscopy, called frozen section. It is also the aim of the pathologist to distinguish between single gland disease (adenoma) from multi-gland hyperplasia.<sup>1,3</sup>

As a common diagnostic specimen reported on frozen sections, the aim of this report is to present a variant of the parathyroid adenoma that can be difficult to diagnose and carries a risk of misdiagnosis.

## Case report

Here we present a case of a 68 year old female with type-2 diabetes mellitus and a history of recurrent nephrocalcinosis and

nephrolithiasis. The patient also complained of easy fatigability; blood tests showed raised serum Calcium and parathyroid hormone levels. Bone densitometry scan showed osteopenia but no osteoporosis. Ultrasound scan of the neck showed multinodular thyroid but was unequivocal for parathyroid enlargement. A Tc99-sestamibi scan showed enlargement of the left superior parathyroid gland and the patient was subsequently listed for a neck exploration.

Intraoperatively, enlargement of the left superior parathyroid was identified which was removed and sent for frozen section. The left inferior parathyroid appeared normal. Right parathyroid glands were not explored.

The specimen received for frozen section was a soft, pale nodule, weighing 1080 mg and measuring 21 × 8 × 8 mm. Frozen sections confirmed a parathyroid lesion which had a prominent microfollicular architecture, with a peripheral rim of normal parathyroid tissue (see [Figures 1–3](#)). The remaining specimen was processed for routine histology.

Formalin-fixed paraffin-embedded sections stained with H&E showed an encapsulated lesion composed of sheets of chief cells with uniform nuclei (see [Figures 4–6](#)). The lesion demonstrated a striking follicular growth pattern. The micro-follicles contained pink material, closely emulating thyroid follicles containing colloid. There was some degenerative change including hyalinization and calcification. Non-lesional compressed parathyroid tissue was present at the periphery of the lesion, as noted on frozen sections. The appearances were of a follicular variant of parathyroid adenoma. Malignancy was not present.

## Discussion

Grossly, parathyroid adenomas often replace single glands and tend to involve the lower glands more than the upper. Their weight varies from 300 mg to several grams, and their sizes range from less than 1 cm to more than 3 cm.<sup>2</sup>

Histologically, the typical parathyroid adenoma is a well circumscribed, often encapsulated lesion. It is a hypercellular lesion formed by chief cells arranged within a delicate capillary network. There is normal, or even atrophic rim of parathyroid tissue outside the capsule. The cells in the rim tend to be smaller and more uniform, with stromal and cytoplasmic fat abundant in the rim but absent in the adenoma.<sup>4</sup>

The tumour cells are either uniform or show mild nuclear pleomorphism to bizarre nuclear forms. The tumour demonstrates various growth patterns, including solid, glandular, trabecular and microcystic.<sup>4</sup>

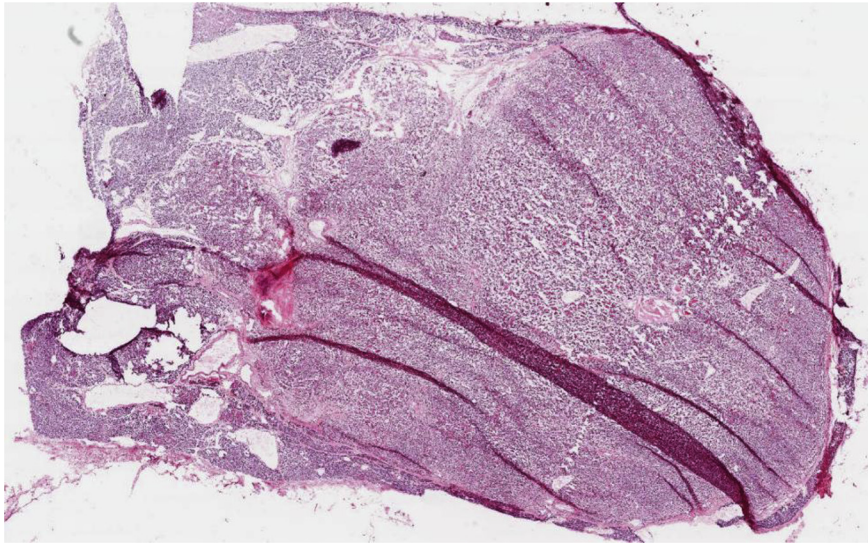
It is also not entirely unusual to see follicles or microfollicles, as in our case. The follicles are filled with eosinophilic material emulating colloid. In some cases, the eosinophilic material is amyloid, however, the presence of amyloid was not noted in our case upon staining with Congo Red. The follicular variant of the parathyroid adenoma thus can be confused with thyroid tissue and can cause erroneous interpretation as thyroid follicular neoplasm.

## Conclusion

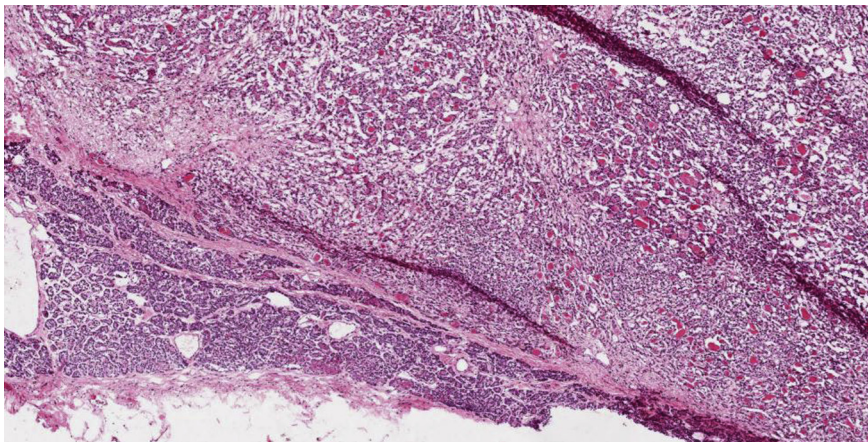
Parathyroid specimens are common endocrine surgical specimens for the histopathologist. These constitute the commonest frozen sections in the U.K. that are carried out as part of intraoperative assessment, to provide the surgeon with a diagnosis of adenoma or

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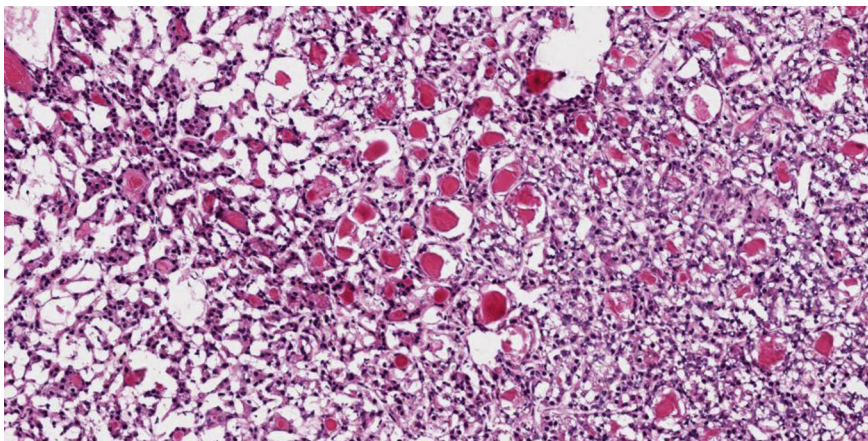
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**Figure 1** Frozen section, scanning view.



**Figure 2** Frozen section, 10 $\times$ . Note peripheral rim of normal parathyroid with fat.



**Figure 3** Frozen section, 200 $\times$ . Note prominent microfollicles with eosinophilic material.

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