

# 37 Parathyroid Glands

## Parathyroidectomies

Parathyroid glands are usually removed from patients with hypercalcemia. During the removal of these glands, the surgeon often needs help identifying parathyroid tissue, determining whether the parathyroid tissue is proliferative, and distinguishing between hyperplasia involving multiple glands and a neoplasm confined to a single gland. For the surgical pathologist, these issues translate into two simple questions that can be promptly addressed: (1) Is parathyroid tissue present? (2) How large is the parathyroid gland?

1. *Is it parathyroid tissue?* Parathyroid glands are oval, encapsulated nodules that have a homogeneous red-brown cut surface. This gross appearance of the parathyroid is not specific and may resemble a lymph node or a thyroid nodule. Fortunately, this distinction can be made with speed and relative ease by resorting to frozen section evaluation and/or with a touch imprint from the surface of the encapsulated nodule.
2. *How big is it?* Perhaps the biggest oversight when evaluating parathyroid tissue is forgetting to weigh the tissue. While histologic examination is important in confirming the presence of a parathyroid gland, the histologic findings may not reliably distinguish between normal and proliferative parathyroid tissue. Instead, this distinction is best made by weighing the gland. Therefore, it is critical that every specimen potentially representing parathyroid tissue be accurately weighed. Once an enlarged parathyroid gland is removed, remain alert. Remember to weigh additional

specimens, since their size may be critical in distinguishing between an isolated adenoma and diffuse hyperplasia.

With these two questions in mind, the dissection of parathyroid tissue is simple. Measure and weigh the specimen, and note its gross appearance including its shape and color. Use a scale that is accurate to the nearest milligram. If a portion of the gland has been harvested by the surgeon for the purpose of autotransplantation, ask the surgeon to estimate the weight of the gland that was harvested and record this value in the gross report. Sometimes, instead of a grossly apparent parathyroid gland, you may receive a portion of thyroid or thymus. Because the parathyroids may lie hidden deep in the parenchyma of these organs, they should be rapidly yet thoroughly dissected and inspected. In these cases, weigh the entire specimen before dissecting it, and then weigh the potential parathyroid gland alone once any associated tissues have been delicately removed. Bisect the parathyroid, and note the appearance of its cut surface.

Although the intraoperative parathyroid hormone assay is being increasingly used intraoperatively to guide the surgical management of primary hyperparathyroidism, in many practices surgeons still request frozen sections to confirm the removal of parathyroid tissue. Touch imprints of the cut surface of the specimen (immediately fixed in 95% alcohol and stained with hematoxylin and eosin) can be used to differentiate parathyroid from thyroid and lymphoid tissue, and they often serve as a valuable adjunct to the frozen section.

In addition to the parathyroid gland, remember to sample other tissues that may be part of

the specimen (e.g., thyroid gland, thymus, and associated soft tissues). Indeed, when these structures are removed in a search for an occult parathyroid gland, the entire specimen should be submitted for histologic evaluation if the parathyroid gland is not grossly apparent. In the rare case of a parathyroid carcinoma, sections should be submitted in an attempt to document local invasion by the tumor. These sections should demonstrate the relationship of the tumor to its capsule and to any adjacent structures (e.g., thyroid gland).

### **Important Issues to Address in Your Surgical Pathology Report on the Parathyroid**

- What procedure was performed, and what structures/organs are present?
- Is parathyroid tissue present? How many glands were removed?
- What is the weight of each parathyroid gland (to the nearest milligram)?
- Based on the comparative weights and histologic features, is the tissue most consistent with normal parathyroid tissue, multiglandular hyperplasia, or an adenoma? Keep in mind that the distinction between multiglandular hyperplasia and an adenoma requires correlation with the clinical and surgical findings.
- For parathyroid carcinomas: What is the size of the carcinoma? Does the carcinoma extend beyond the tumor capsule? Is angiolymphatic invasion present? Does the carcinoma infiltrate into adjacent soft tissues and/or the thyroid? Are the margins involved by tumor?