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Hyperparathyroidism
What Preoperative Imaging Is Necessary?

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• Hyperparathyroidism • Preoperative imaging • Parathyroidectomy
• Ultrasonography

Key points

- Imaging should be used to guide surgical decision making; it should not be used to make or confirm the diagnosis of hyperparathyroidism.
- Positive imaging does not exclude the possibility of multigland disease, and, to date, small glands (<300 mg), ectopic glands, and multigland disease remain challenging to detect by all imaging modalities.
- It is important that surgeons consider the use of additional intraoperative tools when operating on a patient with primary hyperparathyroidism regardless of the findings of the preoperative evaluation.
- Primary hyperparathyroidism is a surgical disease for which there is no approved medical therapy; the morbidity of the operation with current strategies is minimal, and the benefits for the patient are tremendous.

The classic 4-gland exploration used to treat primary hyperparathyroidism has been challenged by the routine use of image-guided surgery. The successful use of preoperative localization studies to identify abnormal parathyroid gland(s) [1] has resulted in the frequent use of the minimally invasive approach to parathyroid surgery [2,3]. Surgeons and referring physicians encountering patients with hyperparathyroidism are now challenged to order radiographic studies to localize de novo disease.

Testing, in this case, preoperative imaging studies (Box 1), should be considered only when it would alter the clinical decision making of the treating

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Box 1: Imaging studies for preoperative evaluation, de novo primary hyperparathyroidism

Noninvasive first-line studies

High-resolution neck ultrasonography

Technetium 99m sestamibi scan

Noninvasive second-line studies

MRI

Computed tomography (CT) scan

Single-photon emission computed tomography/CT scan

Four-dimensional CT scan[a]

Invasive second-line study

Ultrasound-guided jugular venous sampling

[a] Inappropriate for young patients or those with a history of well differentiated thyroid cancer or kidney dysfunction.

physician. More invasive testing may be appropriate for recurrent or reoperative disease than for de novo disease (Box 2). In the case of a patient presenting with a new diagnosis of hyperparathyroidism (de novo), imaging studies should be ordered by or in consultation with the treating surgeon. The results of the preoperative testing should be used to determine the surgical approach, not to decide on the appropriateness of surgical exploration. The decision to refer to a surgeon and to undergo the surgery should be based on the clinical scenario using evidence-based guidelines and clinical expertise [4].

Box 2: Imaging studies for preoperative evaluation, recurrent or persistent primary hyperparathyroidism

Noninvasive

High-resolution neck ultrasonography

Technetium 99m sestamibi scan

MRI

Computed tomography (CT) scan

Single-photon emission computed tomography/CT scan

Four-dimensional CT scan*

Invasive

Selective venous sampling

Angiogram

Ultrasound-guided fine-needle aspiration

* Inappropriate for young patients or those with a history of well differentiated thyroid cancer or kidney dysfunction.