

Abstract

Primary hyperparathyroidism is caused by autonomous function of one or more of the (usually) four parathyroid glands, resulting in hypercalcaemia, and if untreated, osteoporosis and nephrolithiasis. Resection of all abnormal parathyroid tissue results in normalisation of serum calcium and remission of complications. Sonographic evaluation of parathyroid glands is usually performed only once the biochemical diagnosis of hyperparathyroidism is secure, and a decision to proceed to parathyroidectomy has been made. Normal parathyroid glands are not visible sonographically as they are indistinguishable from surrounding adipose tissue. However, densely cellular parathyroid adenomas can be identified on neck ultrasound as ovoid, hypoechoic structures, typically posterior or inferior to the thyroid gland. Knowledge of the clinical circumstances (eg risk factors for secondary or tertiary hyperparathyroidism, risk factors for familial multigland disease, presence of underlying thyroid diseases such as Hashimotos) will assist in sonographic evaluation. Neck ultrasound as part of routine workup prior to parathyroid surgery is valuable, not only to identify structurally abnormal parathyroid glands to assist with surgical planning, but to identify co-incident thyroid pathology that may also require surgical treatment. Accurate pre-operative parathyroid localisation may permit focussed parathyroidectomy instead of 4-gland surgical exploration. As distinguishing parathyroid adenomas from small lymph nodes can be sonographically difficult, corroboration of parathyroid localisation with a complementary technique, such as dynamic parathyroid computed tomography or parathyroid scintigraphy is valuable, with these additional techniques able to identify ectopic glands outside the neck or postero-medial to the thyroid. Fine needle aspiration with needle rinse for biochemical detection of PTH can provide confirmation of parathyroid tissue. For optimum sonographic parathyroid localisation, close collaboration between clinicians, other imaging modalities, and correlation with final surgical and pathological diagnosis is essential for diagnostic accuracy and quality improvement.