TABLE 405-4 GRAYSCALE SONOGRAPHIC FEATURES ASSOCIATED WITH THYROID CANCER

	Median Sensitivity [range]	Median Specificity [range]
Hypoechoic compared with surrounding thyroid	81% [48–90%]	53% [36–92%]
Marked hypoechogenicity	41% [27–59%]	94% [92–94%]
Microcalcifications	44% [26–73%]	89% [69–98%]
Irregular, microlobulated margins	55% [17–84%]	79% [62–85%]
Solid consistency	86% [78–91%]	48% [30–58%]
Taller than wide shape on transverse view	48% [33–84%]	92% [82–93%]

Thyroid Ultrasound Ultrasonography is valuable for the diagnosis and evaluation of patients with nodular thyroid disease (Table 405-4). Evidence-based guidelines recommend thyroid ultrasonography for all patients suspected of having thyroid nodules by either physical examination or another imaging study. Using 10- to 12-MHz linear transducers, resolution and image quality are excellent, allowing the characterization of nodules and cysts >3 mm. Certain sonographic patterns are highly suggestive of malignancy (e.g., hypoechoic solid nodules with infiltrative borders and microcalcifications), whereas other features correlate with benignity (e.g., spongiform nodules defined as those with multiple small internal cystic areas) (Fig. 405-5). In addition to evaluating thyroid nodules, ultrasound is useful for monitoring nodule size and for the aspiration of nodules or cystic lesions. Ultrasound-guided FNA biopsy of thyroid lesions lowers the rate of inadequate sampling and decreases sample error, thereby reducing the false-negative rate of FNA cytology. Ultrasonography of the central and lateral cervical lymph node compartments is indispensable in the evaluation thyroid cancer patients, preoperatively and during follow-up.

HYPOTHYROIDISM

Iodine deficiency remains a common cause of hypothyroidism worldwide. In areas of iodine sufficiency, autoimmune disease (Hashimoto's thyroiditis) and iatrogenic causes (treatment of hyperthyroidism) are most common (Table 405-5).

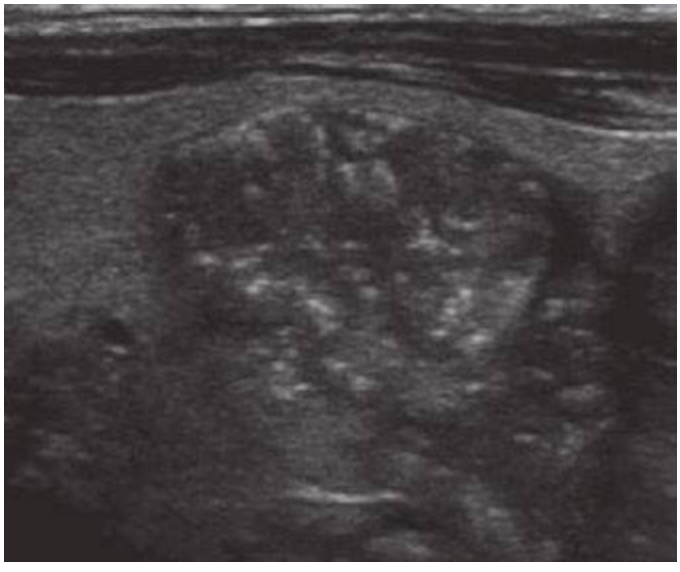
TABLE 405-5 CAUSES OF HYPOTHYROIDISM

Primary
Autoimmune hypothyroidism: Hashimoto's thyroiditis, atrophic thyroiditis
Iatrogenic: ^{131}I treatment, subtotal or total thyroidectomy, external irradiation of neck for lymphoma or cancer
Drugs: iodine excess (including iodine-containing contrast media and amiodarone), lithium, antithyroid drugs, *p*-aminosalicylic acid, interferon α and other cytokines, aminoglutethimide, tyrosine kinase inhibitors (e.g., sunitinib)
Congenital hypothyroidism: absent or ectopic thyroid gland, dyshormonogenesis, TSH-R mutation
Iodine deficiency
Infiltrative disorders: amyloidosis, sarcoidosis, hemochromatosis, scleroderma, cystinosis, Riedel's thyroiditis
Overexpression of type 3 deiodinase in infantile hemangioma and other tumors
Transient
Silent thyroiditis, including postpartum thyroiditis
Subacute thyroiditis
Withdrawal of supraphysiologic thyroxine treatment in individuals with an intact thyroid
After ^{131}I treatment or subtotal thyroidectomy for Graves' disease
Secondary
Hypopituitarism: tumors, pituitary surgery or irradiation, infiltrative disorders, Sheehan's syndrome, trauma, genetic forms of combined pituitary hormone deficiencies
Isolated TSH deficiency or inactivity
Bexarotene treatment
Hypothalamic disease: tumors, trauma, infiltrative disorders, idiopathic

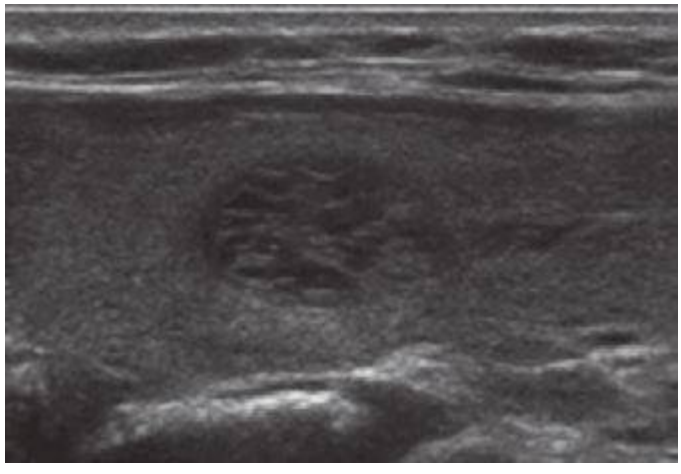
Abbreviations: TSH, thyroid-stimulating hormone; TSH-R, TSH receptor.

CONGENITAL HYPOTHYROIDISM

Prevalence Hypothyroidism occurs in about 1 in 4000 newborns. It may be transient, especially if the mother has TSH-R blocking antibodies or has received antithyroid drugs, but permanent hypothyroidism occurs in the majority. Neonatal hypothyroidism is due to thyroid gland dysgenesis in 80–85%, to inborn errors of thyroid hormone synthesis in 10–15%, and is TSH-R antibody-mediated in 5% of affected newborns. The developmental abnormalities are twice as common in girls. Mutations that cause congenital hypothyroidism are being increasingly identified, but most remain idiopathic (Table 405-1).



A



B

FIGURE 405-5 Sonographic patterns of thyroid nodules. ***A.*** High suspicion ultrasound pattern for thyroid malignancy (hypoechoic solid nodule with irregular borders and microcalcifications). ***B.*** Very low suspicion ultrasound pattern for thyroid malignancy (spongiform nodule with microcystic areas comprises over >50% of nodule volume).