These thyroid nodules are often described as hyperplastic, adenomatous, or colloid. Most cystic thyroid lesions are hyperplastic nodules that have undergone extensive liquefactive degeneration. The common features of a nodular goiter are multinodular, inhomogeneous, well-circumscribed solid, semi-solid or mostly cystic tumors. Some are hyperechoic compared with the echogenicity of the normal thyroid tissue, some are isoechoic, and still others hypoechoic. The hyper- and isoechoic nodules are often partially circumscribed by a thin hypoechoic halo. The nodules may contain coarse calcifications within the tumor, or peripheral “eggshell” calcifications. The cystic areas are often purely anechoic, but they may also be hypoechoic or show fluid-fluid levels due to intracystic bleeding, often with avascular internal debris. Many, even tiny cysts, contain small, strongly hyperechoic foci, often with “comet tail” artifacts. These foci represent crystallized colloid. Some cysts have intracystic avascular septa and/or papillary solid tissue protruding from the wall. Some cystic nodules have a spongy or honeycomb-like appearance. The vascularity varies a lot when evaluated with color Doppler imaging. Sometimes only spreading, faint vascularity is observed throughout the nodule, but often there is strong vascularity inside the nodule combined with a distinct peripheral border flow.

**Common Features**

Multinodular
- Solid, semi-solid, or mostly cystic
- Variable internal structure: inhomogeneous; hyper-, iso-, or hypoechoic; cystic or spongyform
- Well-circumscribed to poorly encapsulated, merging into normal thyroid tissue
- “Eggshell” or coarse calcifications
- Strongly hyperechoic foci with “comet tail” artifacts

**Cytologic Morphology**

Nodular goiter usually presents a picture of thin and/or thick colloid together with some follicular epithelium and macrophages. In old nodes, the colloid may be degenerated. The material from colloid nodules with adenomatous hyperplasia may be very cellular and the amount of colloid scant. Additional punctures in other parts of the lesions may give a more representative specimen that is easier to interpret.

Cystic thyroid lesions are often a challenge to the cytopathologist. This is mainly because papillary thyroid carcinomas may be cystic. The epithelium floating in the fluid is often reactive and irregular, and may be difficult to distinguish from atypical epithelium in a cystic thyroid carcinoma. Many separate air-dried smears from fresh cystic fluid may reveal small papillary cell groups when interpreted immediately.
69-Year-old woman

- **Clinical history**: Surgery for goiter in 1986 and 1998. Now marginal zone B-cell lymphoma in skin. Large thyroid gland on CT. Lymphoma?
- **Ultrasound**: Colloid nodules. Probably follicular tumor posteriorly.
- **Cytology**: Colloid nodules.
- **18-Gauge histologic needle biopsy posteriorly**: Colloid nodule? Follicular tumor?
- **Left hemithyroidectomy**: Colloid nodules.

**General features**
Multinodular, mixed echogenicity
Inhomogeneous echo pattern
Each lesion quite well circumscribed
Small cysts
A few microcalcifications

**Features of tumor posteriorly, left lobe**
Hypoechoic
Well circumscribed
Mostly homogeneous echo pattern
Scantly vascularized
Small cysts

**FIGURE 3-1.** Ultrasound of colloid nodules in the left lobe.  