

Ultrasound-Guided Procedures for the Office

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KEYWORDS

- Ultrasound-guided
- Fine-needle aspiration biopsy
- Interventional ultrasonography

▶ Video versions of several figures in this article can be viewed at www.ultrasound.theclinics.com.

Over the past decade, ultrasonography (US) has become an instrumental component in the diagnostic evaluation of a multitude of head and neck pathologies. The technology can also be beneficial for image guidance during percutaneous and open head and neck procedures. Although US-guided fine-needle aspiration biopsy (FNAB) accounts for the vast majority of these procedures, US guidance can also be used for aspiration of fluid collections and therapeutic injections as well as an intraoperative adjuvant to guide revision surgery. A thorough understanding of the capabilities of interventional US allows optimal management of a wide variety of complex clinical scenarios.

FINE-NEEDLE ASPIRATION BIOPSY

Masses of the head and neck are frequently evaluated by FNAB to establish a diagnosis. Although some head and neck masses are easily palpable and hand-guided FNAB is feasible, many masses are indistinct or not palpable and image-guided FNAB is required. Additionally, it is not uncommon for a thyroid nodule or malignant adenopathy of the neck to be a complex mass with both solid and cystic components. In this situation, US guidance can decrease the chance of a nondiagnostic biopsy by ensuring that the solid component of the

mass is sampled during the procedure. US-guided FNAB for nodular disease of the thyroid is the most commonly performed US-guided procedure, but salivary gland masses and cervical adenopathy as well as a wide variety of unusual neck masses may require image guidance for cytologic assessment. In addition to understanding the indications for biopsy and mastering the techniques of performing a US-guided biopsy, it is critical that otolaryngologists possess a thorough understanding of the limitations and potential pitfalls of FNAB in the assessment of masses in these areas.

Thyroid

In patients with thyroid nodules, many factors are considered when determining whether or not surgical intervention is required. Because most thyroid nodules are asymptomatic and nonfunctional, the key determinant of the need for surgery is the risk that a nodule represents a neoplasm. Although history, physical examination, and specific US features can assist otolaryngologists in determining the potential for neoplasm, FNAB is considered the most accurate diagnostic evaluation to assess for malignancy (**Fig. 1**). In patients with larger nodules, palpation-guided FNAB can be easily performed in the outpatient setting without the need for image guidance. But, many thyroid nodules are not easily palpable and image guidance is required to complete the biopsy. Additionally, some palpable thyroid nodules can be

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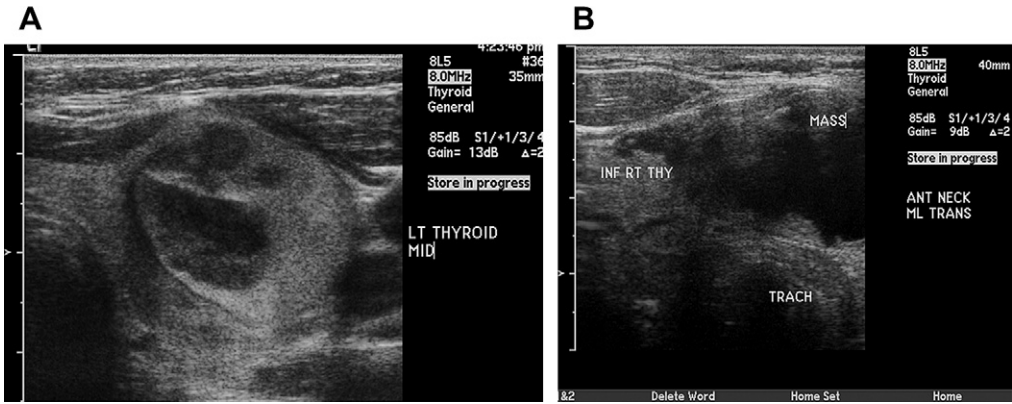


Fig. 1. US of thyroid nodules. Distinctly different-appearing thyroid nodules by US. (A) Thyroid nodule with US features suggestive of a benign nodule. (B) Thyroid nodule with US features suggestive of malignancy. Final histopathologic evaluation revealed both nodules to be follicular thyroid cancer.

complex masses with dominant cystic components. In this scenario, US guidance to ensure sampling of the solid component is valuable to ensure a diagnostic biopsy. Comparisons of palpation-guided and US-guided FNAB for thyroid nodules suggest that US-guided FNAB is more accurate and results in a lower rate of nondiagnostic biopsies. In a review of 376 FNABs of the thyroid, Izquierdo and colleagues¹ reported that for palpable thyroid nodules, US-guided FNAB was 20% more accurate (80%) and had a lower incidence of nondiagnostic specimens (7.1%) when compared with palpation-guided FNAB.

Recently, the National Cancer Institute proposed a 6-tiered classification scheme for the assessment of thyroid FNAB (Table 1).² Based on this system, the risk of malignancy for a thyroid nodule is defined and guidelines for management are proposed. In patients with nodules that by FNAB are suggestive of neoplasm, suspicious for malignancy, or malignant, surgery is recommended.³ It is critical, however, to consider FNAB as only one component of the diagnostic evaluation

of a patient with a thyroid nodule. In patients with history, physical examination, or imaging findings suggestive of malignancy, surgery should be recommended even if the FNAB is interpreted as low risk of malignancy.

In addition to the cytologic assessment of FNAB in a patient with suspected well-differentiated thyroid cancer, assessment for thyroglobulin in the saline washout of the needle after biopsy of a mass can be performed. Especially if a mass is suspected to be recurrent disease and has negative cytology, this technique can be a useful method to confirm the presence of disease. This technique can be used on masses suspected to be local or nodal recurrences, with the greatest benefit in lesions smaller than 1 cm.⁴ After a 1-mL saline washout, a thyroglobulin of greater than 4 to 10 ng/mL has been established as indicative of disease, but false-positive results can occur.^{4–6} This technique is valid even in patients who have antithyroglobulin antibodies.⁷ Analysis for BRAF can also be completed on material obtained by FNAB in patients suspected of having

Table 1
National Cancer Institute thyroid FNAB guidelines committee IV

| Suggested Category | Alternate Category | Risk of Malignancy |
|-------------------------------------|---|--------------------|
| Benign | | <1% |
| Atypia of undetermined significance | Indeterminant follicular lesions rule out neoplasm Atypical follicular lesion Cellular follicular lesion | 5%–10% |
| Neoplasm | Suspicious for neoplasms | 20%–30% |
| Suspicious for malignancy | | 50%–75% |
| Malignant | | 100% |
| Nondiagnostic | Unsatisfactory | — |

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