

December 2010

Ultrasound and Fine Needle Aspiration of Thyroid Nodules

Widespread use of FNA has improved detection of thyroid cancer and led to a decrease in thyroid surgery, with increased cancer rates at thyroidectomy. However, the importance of early detection of thyroid cancer in low risk patients remains uncertain - thyroid cancers are typically slow growing with low morbidity and mortality.

Thyroid nodules are extremely common, clinically apparent in 4-7% of adults, and present in up to 50-60% of adults at ultrasound. **Only 5% of clinically identified nodules are malignant**, with thyroid carcinoma accounting for 1% of all cancers and 0.5% of all cancer deaths, with a female predominance (NEJM, 2004).

Thyroid nodules include colloid cysts, colloid nodules, adenoma, multinodular thyroid/goitre and carcinoma.

Ultrasound is useful for confirming the location of suspected thyroid lumps, making a diagnosis of goitre (simple or multinodular) and for evaluating the size and features of nodules. Nodules less than 10mm are generally not of concern (there is uncertainty as to whether diagnosis of microcarcinomas improves life expectancy and concern that recommendation to biopsy these small nodules would lead to an excessive number of biopsies).

Benign sonographic features include an entirely or nearly entirely cystic appearance, a complete, thin and regular halo and a lack of calcifications or vascularised soft tissue component. **Malignant** sonographic features include microcalcifications (one of the most specific signs of thyroid carcinoma), interval growth, marked hypoechogenicity (not cystic), internal vascularity, irregular margins, local invasion and lymphadenopathy.

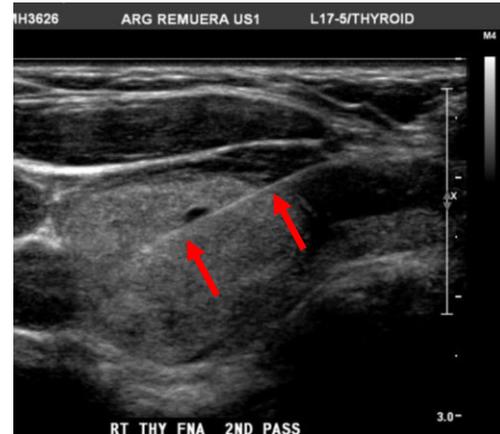
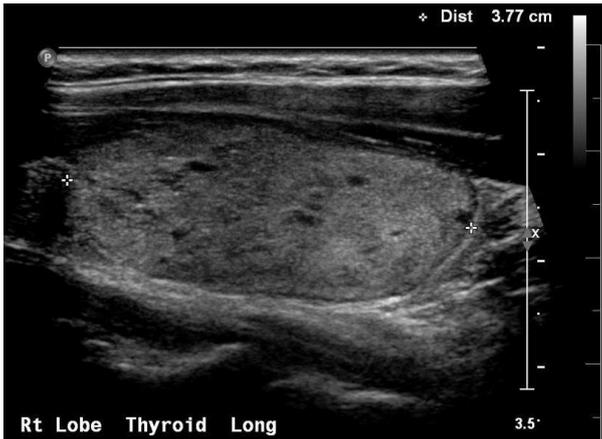
However, there is **no known combination of sonographic features that allow accurate differentiation** between benign and malignant nodules (AJR, 2009), and the degree of overlap of the sonographic appearances of benign and malignant nodules is great enough that a **cytologic FNA sample** is usually necessary to make the diagnosis of a benign or malignant nodule.



Large cystic mass with multiple tiny echogenic foci with comet tail artefacts (arrow), typical of colloid material in a benign colloid nodule with cystic degeneration.



Large solid hypoechoic mass with microcalcifications. The appearances are typical of a papillary carcinoma.



Large solid nodule (3.8cm) requiring FNA biopsy. Note 25g FNA needle (arrows). Benign follicular adenoma.

FNA performed on palpable nodules, or with ultrasound guidance for nonpalpable nodules, uses a very small needle (25g) to obtain a sample of cells from the lesion, and is safe, accurate and relatively inexpensive. Complications are rare and almost always minor. FNA results fall into the following: benign (70%), indeterminate (10%), malignant (5%) and nondiagnostic (15%) (The Oncologist, 2008).

Multiple sets of **guidelines** with regard to which thyroid nodules need to undergo FNA have been developed by various organisations. For example, Consensus Guidelines for FNA, developed by the Society of Radiologists in Ultrasound and published in Radiology (2008), aim to determine which nodules should undergo FNA and which need not undergo FNA. These guidelines are:

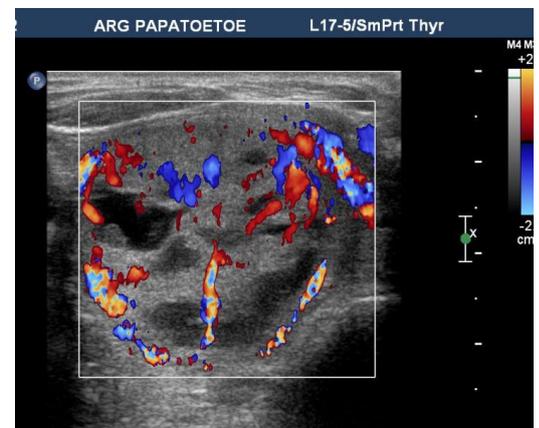
For **solid nodules 1cm or larger** - strongly consider FNA if microcalcifications are present

1.5cm or larger - strongly consider FNA if solid or mostly solid, or contain coarse calcification

2cm or larger - consider FNA if mixed solid/cystic, cystic with solid mural component, or shows substantial growth

FNA is likely unnecessary if a nodule is almost entirely cystic or the above features are absent

Multiple nodules - the above criteria should be applied to individual nodules. FNA is likely to be unnecessary if the thyroid is diffusely enlarged with multiple nodules of similar appearance.



Large (4cm) solid and cystic mass, with colour Doppler interrogation demonstrating marked internal vascularity.

Ultrasound guided FNA of thyroid nodules, as well as other lesions, is performed by skilled radiologists at Auckland Radiology Group at 101 Remuera Road.

Stephen Wood

The partners, associates and staff of Auckland Radiology Group extend season's greetings to you all and wish everyone a happy and successful New Year.