

A practical approach to the common diagnostic dilemmas encountered in ultrasound examination for thyroiditis

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Introduction

This poster describes common types of thyroiditis and some of their typical ultrasound (US) appearances. An algorithm to classify US appearances has been developed but needs to be used in conjunction with patient history and blood chemistry.

Hashimoto's Thyroiditis

- The commonest autoimmune thyroiditis
- Hallmarked by lymphocytic parenchymal infiltration
- On US the thyroid returns a hypoechoic echotexture and hyperechoic linear stranding (10). Some patients in the acute stage will present with a micronodular echotexture (fig.1)
- Patients often present with a non-tender goitre, hypothyroidism (high TSH & low free T4) and a raised TPO antibody (8)
- TPO is a general marker for thyroid autoimmunity a frankly elevated level is more specific to Hashimoto's thyroiditis
- Symptoms commonly relate to the level of thyroid dysfunction

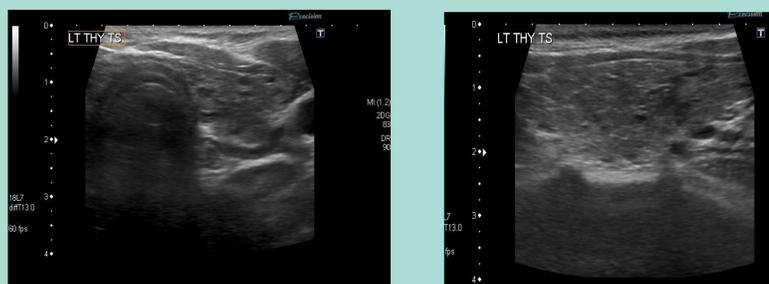


Fig.1 Images demonstrating a micronodular echotexture

The hyperechoic linear stranding suggests fibrotic change in the gland and a chronic presentation (fig.2). Patients that have end-stage disease may demonstrate a hypoechoic atrophic thyroid gland (fig.3).

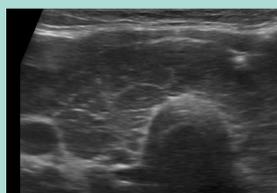


Fig.2 Hyperechoic linear stranding



Fig.3 An atrophic left lobe of thyroid gland

Graves' Disease

- Another autoimmune thyroiditis resulting in a hyperthyroid state.
- Mediated by antibodies known as thyroid stimulating immunoglobulins, that bind to thyroid receptor cells and cause an increase in the production of thyroid hormone.
- Ultrasound tends to show a diffusely enlarged hypoechoic gland (fig.4)
- In the active phase of disease it also demonstrates intense hypervascularity on colour Doppler. Described as an "inferno" it is said to be almost pathognomic for Graves' disease (1) (fig.5)

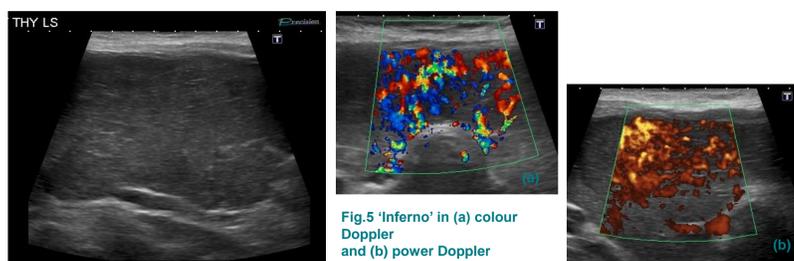


Fig.4 A diffusely enlarged gland in Graves' disease

Fig.5 'Inferno' in (a) colour Doppler and (b) power Doppler

- Measuring peak systolic velocity of the inferior thyroid artery as an indicator for Graves' disease has been investigated and velocities of greater than 40cm/s are thought to be diagnostic (5). This is corroborated by other studies that suggest the sensitivity and specificity of colour Doppler in Graves' are sufficient to use it instead of an isotope uptake scan (2). Other studies suggest increased flow in the superior thyroid artery can be used to characterise Graves' (3).

Infective Thyroiditis

- De Quervain's/sub-acute thyroiditis has a viral aetiology. In the initial acute phase, patients can be thyrotoxic and progress to being hypothyroid, and eventually return to a euthyroid state.
- Patient history is critical in pointing to the diagnosis. Patients present with anterior neck pain, that sometimes radiates to the jaw and may include dysphagia. They may have had an upper respiratory infection within the last month, it is thought that this can trigger the inflammatory destruction of thyroid follicles (8).
- In the transient thyrotoxic phase TSH will be suppressed, with a raised T4, but low uptake of iodine.
- Again the thyroid gland may present on ultrasound with a diffusely hypoechoic/heterogeneous echotexture. Acutely on this background there may be hypoechoic focal nodules (fig.6). They tend to be ill-defined with no vascularity, no microcalcifications and no cervical pathological lymph nodes (6). In the context of patient history and background gland heterogeneity it is safe to consider a follow-up scan over FNA of these nodules.



Fig.6 Two examples of ill defined focal areas in de Quervain's thyroiditis

- Patients with other types of infectious thyroiditis may have systemic symptoms such as high fever, leucocytosis and cervical lymphadenopathy. In this instance an FNA of a focal lesion may be helpful to send to microbiology to identify causative organisms to assist with treatment.

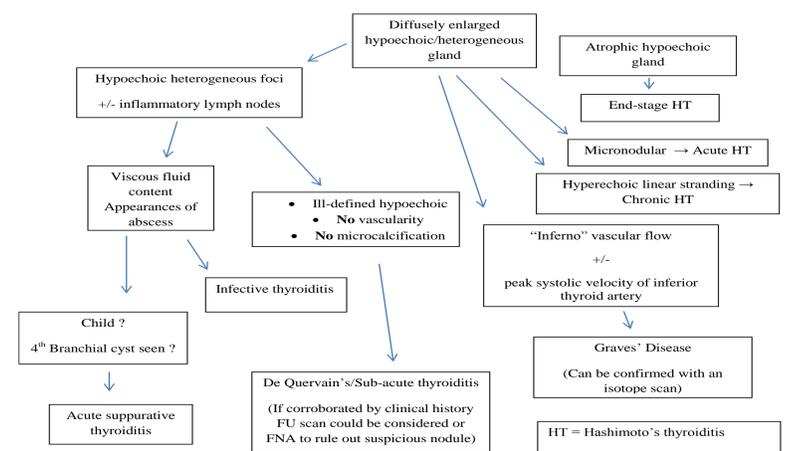


Fig.7 A case of fungal thyroiditis

Fig.8 Fungal nodule with no internal vascularity

- In bacterial thyroiditis there may be a thyroid abscess, viscous fluid content or a gas artefact.
- Acute suppurative thyroiditis tends to affect children and is associated with a 4th branchial cleft cyst on the left.

Algorithm for differential diagnosis using US



Conclusion

The majority of thyroiditis cases presenting to ultrasound will show a diffuse pattern of hypoechoic change. The specificity for a differential diagnosis within the thyroiditis sub-groups is low (7). Focal presentation may be on a background of diffuse change and clinical symptoms may assist with the differential diagnosis. The algorithm can help to point in a particular direction, so that a suggestion of sub-type can be made based on ultrasound appearances, however it needs to be combined with patient presentation, TFT's and other blood biochemistry. If TFT's and/or a clear patient history is not available then it is often wisest within the US report to merely state that there are appearances of thyroiditis without specifying the type. An increased vascularity is usually indicative of active inflammation.

References

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