

Acute, Transient Thyroid Swelling after Fine-needle Aspiration Biopsy

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Case Summary

An adult with a history of asthma and inflammatory bowel disease underwent ultrasound-guided, fine-needle aspiration (FNA) of a thyroid nodule. Three FNA passes were uneventful, but the patient reported neck pain and fullness. There were no abnormalities by ultrasound or physical exam at that time. Cytopathology requested additional sampling for diagnostic adequacy. During three additional FNA passes, an observable swelling developed in the lower neck, and ultrasound showed diffuse thyroid enlargement with a heterogeneous and edematous appearance but no hematoma. The biopsy concluded and cold compression was applied. The patient was observed for 90 minutes. The symptoms improved and there was reduction in thyroid size. At no point was there respiratory compromise. The patient reported resolution of symptoms aside from residual odynophagia at follow-up three days after the biopsy.

Imaging Findings

Computed tomography (CT) one month prior revealed an incidental, 1.3 cm nodule within the left thyroid lobe (Figure 1). In accordance with American College of Radiology guidelines, ultrasound imaging was performed and FNA scheduled.¹ Pre-procedure ultrasonography of the left thyroid lobe confirmed presence of the nodule, which was surrounded with normal homogeneous thyroid tissue (Figure 1). Fifteen minutes after onset of symptoms, there was visible thyroid swelling and diffuse enlargement with edema and linear hypoechoic areas (cracks, Figure 2). The thyroid almost doubled in size before resolving over the two hours after onset of symptoms.

Diagnosis

Acute and transient thyroid swelling after fine-needle aspiration biopsy.

Discussion

Acute and transient thyroid swelling after FNA, sometimes referred to as cracking thyroid, is a rare and poorly understood complication of thyroid biopsy. Cracking thyroid is estimated to occur in approximately

0.1% of FNA biopsies, although the incidence is considerably uncertain given its rarity and potential under-reporting of cases.²

Despite its name, acute thyroid swelling after FNA does not appear to be limited to these procedures. A retrospective study of core-needle biopsies found that thyroid edema without hematoma occurred at a similar rate of 0.09% of thyroid nodules sampled.³ Unfortunately, the authors did not report on the ultrasonographic appearance of the thyroid following core-needle biopsy. However, given the rapid resolution of symptoms, the same etiology was likely in both procedures. Curiously, this phenomenon and imaging appearance has also been observed after subclavian vein catheterization (although the thyroid may have been inadvertently disturbed during the procedure) and during administration of recombinant tissue plasminogen activator.^{4,5}

The pathophysiology underlying acute and transient thyroid swelling is poorly understood. In all cases, resolution is rapid and hematoma is absent, suggesting profound vasodilation or vascular leakage rather than bleeding as the source of swelling. Mechanisms proposed to account for the vasodilation implicate the

Figure 1. Pre-procedure thyroid imaging. (A) Axial CT imaging of the neck reveals an incidental thyroid nodule (*) one month prior to biopsy. (B) Transverse ultrasonographic view of the left thyroid lobe and nodule (*). TR, trachea.

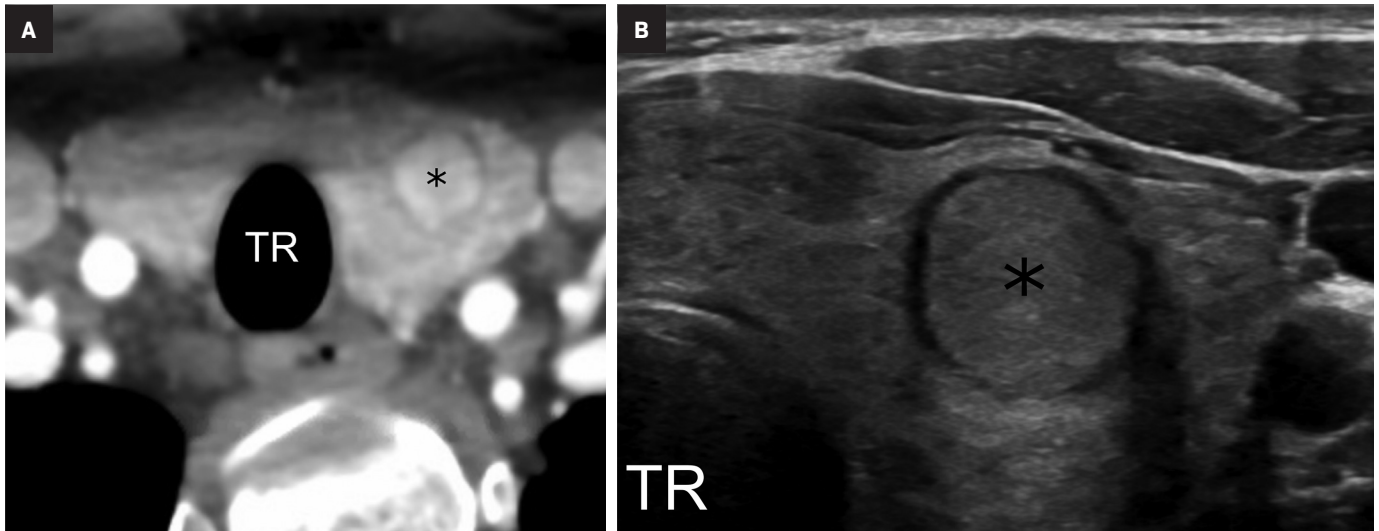
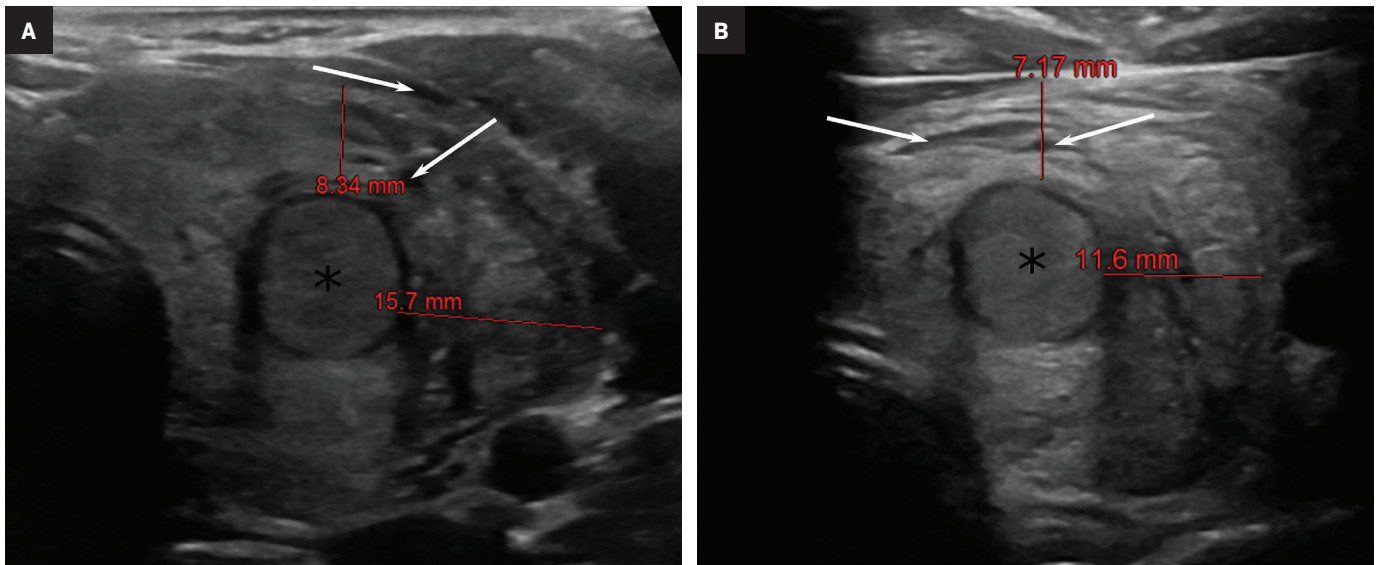


Figure 2. Peri-procedure transverse ultrasound imaging of the left thyroid lobe. (A) 15 minutes after onset of symptoms with diffuse enlargement of the thyroid and appearance of large, hypoechoic cracks (white arrows). Red bars indicate measurement of the thyroid tissue anterior and lateral to the nodule (*). (B) The same as A, 45 minutes after onset of symptoms.



release of vasoactive substances such as calcitonin gene-related peptide or histamine from mast cell degranulation.^{6,2}

Our patient had a history of atopic disease, including known asthma and inflammatory bowel disease. There is some suggestion that atopic conditions may predispose patients to this type of rare procedural reaction, given the role of histamine in the pathophysiology of atopy and the

strong correlation of atopy with other allergy-like reactions.^{7,8} Regardless, there is no clear relationship between patient age, gender, medical history, or underlying thyroid pathology and development of acute and transient thyroid swelling.

Rapid and profound thyroid enlargement is alarming and potentially dangerous given its proximity to the trachea. Fortunately, the condition generally appears to be benign and

largely self-limited, resolving spontaneously in a matter of hours. Close observation and conservative management with cold compression is likely sufficient, although others have given diclofenac or acetaminophen.⁹ Corticosteroids have also been administered, but as swelling typically resolves before the expected onset of steroid activity, their value is unclear.^{1,10}

Improved awareness of this rare and benign complication will help

reduce the risk of unnecessary and potentially harmful interventions such as administration of epinephrine or referral to an emergency department, while additional case reports may provide insights into the causative mechanisms.

Conclusion

Acute and transient thyroid swelling after FNA biopsy is a rare complication that presents with thyroid swelling, anterior neck pain, and appearance of hypoechoic linear areas (cracks) in the thyroid on ultrasound. While its pathophysiology is unclear, the condition occurs in 0.1% of thyroid biopsies and appears to be benign and self-limited, with signs and symptoms resolving within an hour or two. The condition can be managed successfully with close observation and cold compression. As

acute and transient thyroid swelling can be alarming to both the patient and proceduralist, awareness of this complication can prevent unnecessary interventions and lead to more appropriate patient care.

References

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