

# Fatal haemorrhage following fine needle aspiration of the thyroid

<sup>1</sup>M Dalvi, <sup>2</sup>F Dalvi, <sup>3</sup>R Ainsworth, <sup>4</sup>FW Gibb, <sup>5</sup>H Horsfall, <sup>6</sup>D Patel, <sup>7</sup>MWJ Strachan

<sup>1,2</sup>Speciality Trainee in Diabetes and Endocrinology, <sup>3</sup>Consultant Pathologist, <sup>4,7</sup>Consultant Endocrinologist, <sup>6</sup>Consultant Radiologist, Royal Infirmary of Edinburgh, Edinburgh, UK; <sup>5</sup>General Practitioner, Braids Medical Practice, Edinburgh, UK

**ABSTRACT** Fine needle aspiration is routinely performed as part of the assessment of thyroid nodules. It is generally regarded as a very safe procedure, though rarely significant bleeding can occur in its aftermath.

A 79-year-old female was referred for assessment of an incidental thyroid nodule which had been identified on computed tomography of the chest and extended into the retrosternal space. The patient was referred for fine needle aspiration under ultrasound guidance. Three passes were made with a 25 gauge needle into the nodule; a haemorrhagic aspirate was obtained and sent for cytological examination. Several hours later, the patient developed a cough and progressive breathlessness and died at home before she could be taken to hospital.

The key finding from the post-mortem was extensive haemorrhage within the capsule of thyroid. In the absence of another identifiable aetiology, the cause of death was considered to be acute haemorrhage into the thyroid gland. Thyroid fine needle aspiration is generally a safe procedure, but it is important to recognise that, rarely, major complications can occur.

**KEYWORDS** fine needle aspiration, thyroid haemorrhage, thyroid ultrasound

**DECLARATION OF INTERESTS** No conflict of interest declared

## CASE REPORT

A 79-year-old female was referred to a thyroid nodule clinic for assessment of an incidental thyroid nodule which had been identified on computed tomography of the chest, performed for another indication. This was a solitary well-circumscribed low attenuation nodule, centred on the isthmus extending into both lateral lobes, measuring 4.8 × 3.8 × 3.7 cm. The nodule also extended 3 cm retrosternally into the superior mediastinum, indenting the anterior wall of the trachea, with no evidence of significant luminal narrowing (Fig 1). The patient reported no obstructive neck symptoms and there was no history of previous thyroid disorders. She had a previous history of hypertension and her medication included lisinopril, bendroflumethiazide and aspirin. Thyroid function tests were normal.

She was referred for fine needle aspiration (FNA) under ultrasound guidance. Ultrasound demonstrated a 4.8 cm nodule with a spongiform appearance and a peripheral colour flow with no overtly suspicious ultrasonic features. The FNA was performed by a consultant radiologist with particular expertise in thyroid ultrasonography and with considerable experience in FNA. Three passes were made with a 25 gauge spinal needle into the nodule, using a non-

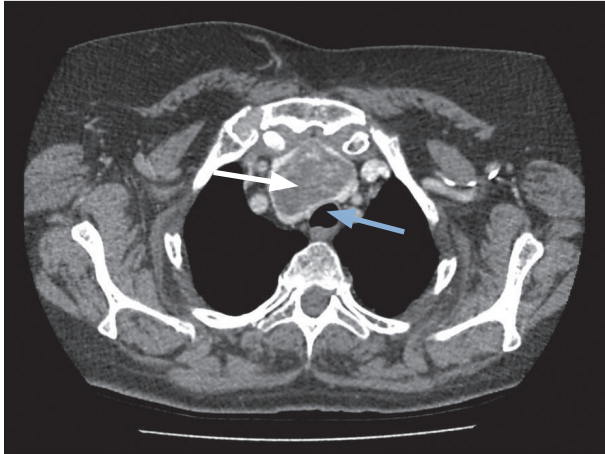
suction technique; a haemorrhagic aspirate was obtained and sent for cytology. The patient was observed for 15 minutes and there were no immediate post-procedural complications.

Several hours later, the patient developed a cough and progressive breathlessness. An emergency ambulance was called, but she died at home before she could be taken to hospital.

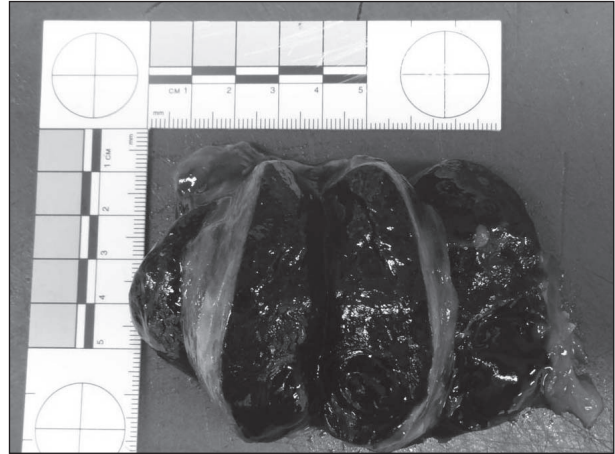
The patient's death was reported to the Procurator Fiscal and a post-mortem examination was performed. The key finding was extensive haemorrhage within the capsule of the thyroid. The haematoma replaced almost all of the thyroid parenchyma (Fig 2); there was no evidence of extra-capsular haemorrhage. The trachea was not compressed, but evidence of any compression may have been removed as a consequence of retraction of the sternum during the post-mortem. There was no evidence of myocardial infarction, pulmonary embolus, pulmonary oedema or any other cause of death. In the absence of another identifiable aetiology, the cause of death was considered to be acute haemorrhage into the thyroid gland.

**Correspondence to MWJ Strachan**  
Metabolic Unit,  
Western General Hospital,  
Edinburgh EH4 2XU  
UK

**e-mail** mark.strachan@nhs.net



**FIGURE 1** CT scan at the level of the manubrium. There is a large thyroid nodule (white arrow) located posterior to the manubrium and causing indentation of the anterior surface of the trachea (blue arrow)



**FIGURE 2** Post-mortem specimen of the thyroid showing complete replacement of the thyroid parenchyma with blood clot

## DISCUSSION

Thyroid nodules are common in clinical practice; the risk of malignancy is low, but not negligible. At the time this patient was seen, the prevailing UK national guidelines recommended thyroid FNA as the key investigation in the assessment of thyroid nodules associated with normal thyroid function tests.<sup>1</sup> More recently published UK guidelines place greater weight on the initial assessment of thyroid nodules by ultrasound. Nodules with benign features on ultrasound scan, as in this case, do not require further assessment.<sup>2</sup>

The thyroid gland is very vascular and, following FNA, focal pain and minor haematoma are common complications.<sup>3</sup> Major haemorrhage causing airway compromise is rare. In one study of 625 patients who underwent thyroid FNA, three patients developed neck haematomas that required surgical intervention.<sup>4</sup> In another study of 11,000 patients who underwent thyroid FNA, no major complications were reported.<sup>5</sup>

Thyroid haemorrhage is usually caused by venous extravasation into the surrounding parenchyma,<sup>3</sup> but occasionally arterial bleeding can occur.<sup>6</sup> Risk factors for bleeding have not been studied systematically, but are said to include hypertension.<sup>3</sup> Bleeding diathesis is a relative contraindication, but thyroid FNA is routinely performed on patients taking aspirin and oral anticoagulant therapy.<sup>3</sup> There is wide variation in the technical approach to thyroid FNA<sup>7</sup> and to the approach to patients with a potential bleeding diathesis. In the case presented here, the retrosternal extension of the nodule and the fact that it was indenting the anterior surface of the trachea were considered to be relevant to the airway compromise that was presumed to have occurred following the acute haemorrhage.

## CONCLUSION

Thyroid FNA is generally a very safe procedure, but it is important to recognise that major complications can occur on rare occasions. Patients who undergo thyroid FNA should be given clear advice to seek urgent medical help if they experience difficulty in breathing or swallowing following thyroid FNA. Particular caution should be applied to thyroid nodules with a retrosternal component.

## LEARNING POINTS

- Thyroid haemorrhage is a potentially lethal complication of fine needle aspiration of thyroid.
- All patients should be given advice to seek urgent medical help if breathing or swallowing difficulties occur in the aftermath of thyroid biopsy.

## REFERENCES

- 1 British Thyroid Association and the Royal College of Physicians. *Guidelines for the management of thyroid cancer*. 2nd ed. 2007. [http://www.btf-thyroid.org/images/documents/thyroid\\_cancer\\_guidelines\\_2007.pdf](http://www.btf-thyroid.org/images/documents/thyroid_cancer_guidelines_2007.pdf) (accessed 19/7/16).
- 2 Perros P, Colley S, Boelaert K et al. British Thyroid Association guidelines for management of thyroid cancer. *Clin Endocrinol* 2014; 81 (suppl): 1–122. <http://dx.doi.org/10.1111/cen.12515>
- 3 Polyzos S, Anastasilakis A. Clinical complications following thyroid fine-needle biopsy: a systematic review. *Clin Endocrinol* 2009; 71: 157–65. <http://dx.doi.org/10.1111/j.1365-2265.2009.03522.x>
- 4 Lo Gerfo P. The value of coarse needle biopsy in evaluating thyroid nodules. *Thyroidology* 1994; 6: 1–4.
- 5 Gharib H, Goellner JR. Fine needle aspiration biopsy of thyroid: an appraisal. *Ann Intern Med* 1993; 118: 282–9.
- 6 Ranta A, Sand J, Salmi J et al. [Fatal cervical edema following diagnostic fine needle aspiration]. *Duodecim* 1996; 112: 2024–5.
- 7 Baloch ZW, Cibas ES, Clark DP et al. The National Cancer Institute Thyroid fine needle aspiration state of the science conference: A summation. *Cytojournal* 2008; 5: 6. <http://dx.doi.org/10.1186/1742-6413-5-6>