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## Spontaneous thyroid hemorrhage on chronic anticoagulation therapy

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### Abstract

Even though highly vascularized, the thyroid gland rarely has spontaneous bleeding. Bleeding into the thyroid gland can result in potentially lethal acute airway compromise. This case report describes an elderly patient on warfarin for atrial fibrillation, who presented with swelling on the right side of her neck causing acute airway obstruction. An urgent computed tomography of the neck showed an enlarging hemorrhage into the right lobe of the thyroid gland. She was initially intubated for airway protection and her anticoagulation was reversed to stop the bleeding. She was closely monitored in the intensive care unit. After an uncomplicated tracheal extubation and recovery, she was discharged and scheduled for an elective total thyroidectomy. We desire that physicians be aware of this rare, potentially lethal bleeding complication.

### Introduction

The thyroid gland is a highly vascularized organ; however, spontaneous bleeding into the gland is rare and only a few cases have been reported.<sup>1-7</sup> Bleeding into this area can lead to sudden, life-threatening airway compromise by tracheal compression. Preexisting benign conditions such as a goiter, nodule, and cyst can increase the vascularity of the gland and may increase the vulnerability for bleeding.<sup>1</sup> Anticoagulation treatment may potentiate the severity of spontaneous bleeding, including bleeding into a goiter. We

describe a rare cause of acute airway obstruction secondary to spontaneous thyroid hemorrhage in the context of anticoagulant therapy with warfarin.

### Case Report

A 91-year-old female presented to the emergency department with progressively worsening dyspnea that began a few hours prior to presentation. Her pertinent medical history was significant for hypertension, atrial fibrillation on anticoagulation with warfarin, and hyperthyroidism due to Graves' disease in the setting of multinodular goiter. The patient had been well controlled on warfarin therapy, with no recent international normalized ratio (INR) excursions, with a longitudinal time-in-therapeutic range of 89%. Other chronic medications included atenolol, furosemide, and methimazole. The patient described her dyspnea as *trouble getting air though [her] throat* that was present even at rest. She also noticed a red-colored, pea-sized swelling in the right side of the neck, which had been enlarging with increasing tenderness. She had hoarseness of voice, but was able to phonate well. The patient was initially able to swallow liquids at the onset of symptoms, but progressively had difficulty in the hours that followed. The patient denied any trauma or ingestion of foreign objects. She had been on anticoagulation for 4 years, without any history of provoked or spontaneous bleeding complications.

Examination revealed an elderly woman in mild distress. Vital signs included a blood pressure of 130/96 mm Hg, normal temperature, an irregular heart rate of around 100 beats/minute, and a respiratory rate of 20 breaths/minute. Oxygen saturation was 99% on 2 L of oxygen. She had an irregularly enlarged thyroid with a 5×4 cm area of ecchymosis on the right side that was tender to the touch. She did not have labored breathing or stridor. She did have bilateral basal crackles on chest auscultation, with systolic ejection murmur in the aortic area.

Initial laboratory studies showed an INR of 2.0 (therapeutic goal 2.0-3.0), a thyroid stimulating hormone of 1.68 mIU/L (normal range 0.34-3.00 mIU/L), and a hemoglobin of 12.5 g/dL (normal range 11.5-15.5 g/dL). Chest x-ray showed cardiomegaly with mild pulmonary vascular prominence. In view of the worsening respiratory distress, urgent computed tomography of the neck was done, which showed an enlarged, heterogeneous thyroid gland, with

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a large (5.7×5.2×4.9 cm) heterogeneous nodule in the inferior right thyroid lobe consistent with an active intrathyroidal hemorrhage (Figure 1). The hemorrhage was causing mild mass effect on the subglottic trachea with substernal extension into the upper mediastinum. No bleeding into the retropharyngeal or parapharyngeal space was seen.

Based on the clinical and radiologic findings, the diagnosis of thyroid hemorrhage was made. As the patient was at risk for airway compromise in the setting of apparent expanding thyroid goiter hemorrhage, she was intubated and mechanically ventilated in the intensive care unit. She received 10 mg of intravenous vitamin K for reversal of anticoagulation, along with 3 units of fresh frozen plasma, and the INR was 1.3 within 6 hours later. The hemoglobin decreased to 11.3 g/dL and the hematocrit to 33.9% within 12 hours of the initial values, then remained stable. No further blood product transfusion was required. Warfarin was held through admission.

In the subsequent days, the ecchymosis started to decrease in size and the thyroid gland became softer. The patient tolerated extubation on day 5 of hospitalization, although severe residual oropharyngeal dysphagia and speech and swallowing diffi-

culties continued. The patient was subsequently discharged to a rehabilitation facility on day 17 of her hospitalization and was scheduled for elective outpatient thyroidectomy.

## Discussion

Thyroid hemorrhage has been rarely reported even though the gland is highly vascularized. The common causes include fine needle aspiration, trauma, and spontaneous bleeding occurring with or without the concurrent use of anticoagulants.<sup>1</sup> Preexisting conditions such as a goiter, cyst, and nodule increase the risk of bleeding into the thyroid. Two proposed mechanisms might lead to hemorrhage into a goiter: abnormal thyroid vascular anatomy, and arteriovenous shunting in a cyst or nodule. Strenuous activity can increase the venous pressure and cause rupture of the vessels resulting in a thyroid hematoma.<sup>8,9</sup>

In the United States, the most common causes of goiter in the elderly are Graves' disease and multinodular goiters.<sup>10</sup> In this elderly patient population, atrial fibrillation is a common arrhythmia, encountered in 10%-15%.<sup>11</sup> Chronic anticoagulation, with warfarin or direct-acting oral anticoagulants, is indicated in patients with atrial fibrillation to prevent embolic strokes.<sup>12,13</sup> Administration of anticoagulants is often associated with the risk of bleeding. Trials across all anticoagulants (apixaban, dabigatran, edoxaban, rivaroxaban, and warfarin) have been done to evaluate the bleeding complications due to the treatment; however, none revealed any spontaneous thyroid hemorrhage.<sup>14-18</sup> Given the high incidence of atrial fibrillation in the elderly popula-

tion, the potential exists for large numbers of patients with a goiter and other thyroid abnormalities to be on anticoagulation therapy. Only 2 cases of spontaneous thyroid hemorrhage have been reported in patients on anticoagulation for atrial fibrillation.<sup>1,3</sup> Similar to our case, both of these cases occurred spontaneously in elderly women (ages 72 and 73 years), who were within therapeutic range on warfarin therapy, with INRs between 2.0 and 3.0 (2.1 and 3.0).<sup>1,3</sup> The literature is also limited with few reports of spontaneous thyroid hemorrhage in the presence of other anticoagulants for other indications. These reports include warfarin for mechanical valve replacement at a supratherapeutic INR of 12.8,<sup>2</sup> intravenous recombinant tissue plasminogen activator for an acute cerebral vascular accident,<sup>6</sup> combination clopidogrel/aspirin/enoxaparin (indication not stated),<sup>7</sup> therapeutic low-molecular weight heparin therapy for treatment of deep vein thrombosis,<sup>5</sup> and aspirin monotherapy (indication unknown).<sup>4</sup> As seen in our patient, acute hemorrhage within a goiter may compress the trachea and cause acute airway obstruction. The airway should be secured first with endotracheal intubation before any complex diagnostic and treatment procedures.<sup>19</sup> Bleeding into the thyroid gland is best diagnosed with computed tomography. If the patient is on warfarin or other anticoagulants, the anticoagulation should be reversed immediately, if possible, to stop further bleeding and airway compromise. Early surgical decompression is indicated only if the patient continues to have bleeding or mediastinal extension. Management may include partial or total thyroidectomy as well as further treatment with thyroid hormones to prevent hypothyroidism.<sup>4</sup>

Additionally, hemorrhage into the thyroid gland can result in release of preformed thyroid hormones and can cause acute hyperthyroidism. However, this is usually self-limiting and does not warrant any treatment.<sup>5,20</sup>

## Conclusions

With an increase in the number of patients receiving anticoagulation therapy, physicians should be aware of this rare, life-threatening, thyroid bleeding complication particularly in patients with goiters, enabling prompt recognition and management of these conditions.

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**Figure 1.** Computed tomography scan showing diffusely enlarged heterogeneous (5.7×5.2×4.9 cm) thyroid extending into the superior mediastinum. There is a mass effect on the subglottic airway from the large heterogeneous thyroid goiter. A) Axial view; B) sagittal view.

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