

Spontaneous thyroid cyst hemorrhage – a case report

Sergei Covantsev¹, Anna Bumbu¹, Yuri Barinov^{1,2}, Andrei Kolotilshchikov¹, Marina Peicova³, Natalia Pichugina¹

¹ Department of Research and Clinical Development, Botkin Hospital, Moscow, Russia

² Department of Surgery, Russian Medical Academy of Continuous Professional Education, Moscow, Russia

³ Department of Human Anatomy, N. Testemitsanu State University of Medicine and Pharmacy, Chishinau, Republic of Moldova

Corresponding author: Sergei Covantsev, Department of Research and Clinical Development, Botkin Hospital, Moscow, Russia; Email: kovantsev.s.d@gmail.com

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Abstract

The prevalence of thyroid nodules in the population ranges from 24.83% to 44.4%, with a notable increase observed in patients over 80 years of age, reaching up to 79.8%. In 0.7% to 1.59% of cases, patients presenting with spontaneous thyroid cysts or node hemorrhage require surgical intervention. The present report details a case of a 37-year-old woman who was admitted to the hospital with complaints of cervical pain on the left side of the neck, weakness, and a palpable mass on the anterolateral surface in the lower third of the neck on the left. The mass required aspiration and hemithyroidectomy. The case demonstrates the efficacy of point-of-care ultrasonography (USG) and cyst aspiration as initial steps in the process of decompression. However, it is imperative to exercise caution and meticulous monitoring of the patient, as the necessity for urgent or elective surgical intervention remains a possibility. Furthermore, it is imperative to perform elective surgery, as histological examination of thyroid glands post-hemorrhage reveals malignancy in 5.1–66.7% of cases.

Keywords

aspiration, compression, cyst, hemorrhage, thyroid

Introduction

The prevalence of thyroid nodules in the population is 24.83%–44.4% but tends to increase up to 79.8% in patients over 80 years.^[1,2] Goiters usually undergo slow and progressive enlargement, which, with time, can lead to airway compression in selective patients.

In rare cases, thyroid nodes or cysts may degenerate and bleed, resulting in rapid tissue expansion and potentially causing pain, stridor, airway compression, and even death.^[3] The potentially fatal complications from thyroid gland hemorrhage have been recognized since Simon described a fatal thyroid injury case in 1894.^[4] Pre-existing thyroid conditions such as nodes, adenomas, and cysts potentially make the thyroid more fragile and prone to inju-

ry.^[5–7] However, this type of injury has also been reported with normal thyroid glands. In rare cases (0.7%–1.59% of cases), patients with spontaneous thyroid cysts or node hemorrhages require surgical intervention.^[8,9] In these cases, patients undergo surgery due to life-threatening respiratory distress, which can be lethal in up to 27.8%.^[9]

We present a rare case of spontaneous hemorrhage into a thyroid cyst which required aspiration and hemithyroidectomy.

Case report

A 37-year-old woman was admitted to the hospital on March 2, 2023 with complaints of neck pain on the left, weakness,

and a mass on the anterolateral surface in the lower third of the neck on the left. The patient had been monitored for a long time due to a cyst in the left lobe of the thyroid gland. A week before the admission, she had pansinusitis which she treated with vitamin C and ibuprofen. On the morning of March 2, 2023, the patient noted the presence of a dense, painful formation in the area of her neck. The subsequent examination revealed the formation of a dense, elastic mass occupying the lower third of the anterolateral surface of the neck. The mass was not fused with the surrounding tissues, painful on palpation, measuring 3.0×2.0 cm. The skin above the mass region was unchanged. The patient could open her mouth in full without pain. There were no foci of odontogenic inflammation in the oral cavity. The mucous membrane was pale pink, normally moisturized. The tissues in the sublingual region were soft with no infiltrative changes upon palpation. There were no deviations in complete blood count, biochemical analysis and blood coagulation panel. However, she had a minor elevation of T3 – 6.15 pmol/l (normal range 3.8–6 pmol/l) and T4 – 14.96 pmol/l (normal range 7.86–14.41 pmol/l), and a normal TSH – 2.534 mcME/ml (normal range 0.34–5.6 mcME/ml).

The ultrasound examination of the soft tissues revealed the presence of a fluid formation with a thickened capsule

and peripheral blood flow measuring 30×28×33 mm. Multiple hyperechoic fine inclusions, indicative of the “comet tail” sign, were observed. Consequently, a CT scan of the neck with contrast enhancement was performed, which revealed an increase in the size of the left lobe due to a rounded cystic formation with a diameter of 31 mm. The content was highly dense ~ 80 Hounsfield units, without signs of contrast extravasation (Figs 1, 2).

The patient has a clinical and instrumental signs of a cystic formation in the left lobe of the thyroid gland with accumulated blood. A puncture was performed under USG guidance and hemorrhagic fluid in the volume of 20 ml was aspirated and sent for cytological examination. The obtained material contained blood elements, abundant colloid, single macrophages, and single cells of the thyroid epithelium with degenerative changes. Cytological picture of the material obtained from the area of cystic degeneration. The patient reported a sense of relief following the procedure of fluid aspiration. However, during a 24-hour observation period, there was an increase of the mass volume. Due to the high risk of recurrent bleeding, compression syndrome, pain syndrome, surgical intervention in the volume of hemithyroidectomy was performed.

The patient was operated under general anesthesia. The thyroid gland was exposed through a collar incision on the anteri-

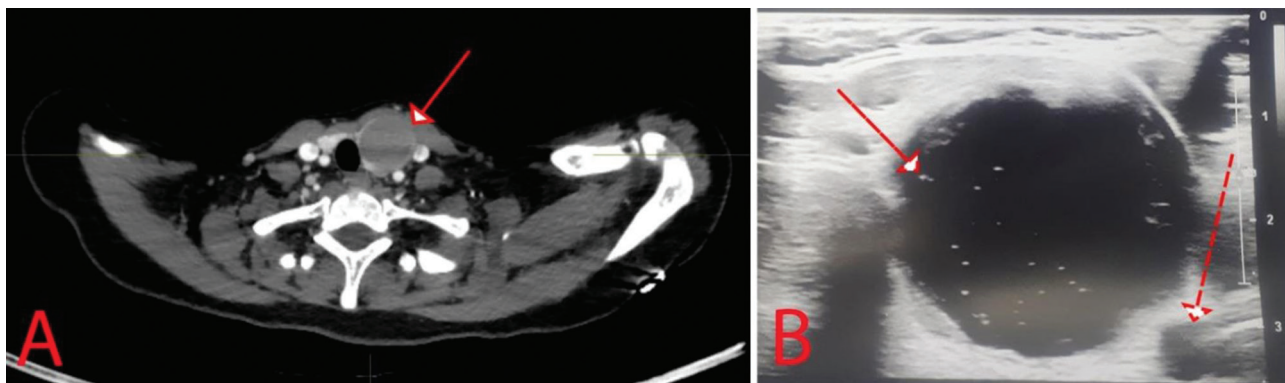


Figure 1. Imaging of the thyroid gland. A. CT of the thyroid (axial section, arrow indicates the cyst with hemorrhagic component); B. USG of the thyroid cyst (arrow indicates the “comet tail” sign; dashed arrow indicates the carotid artery).

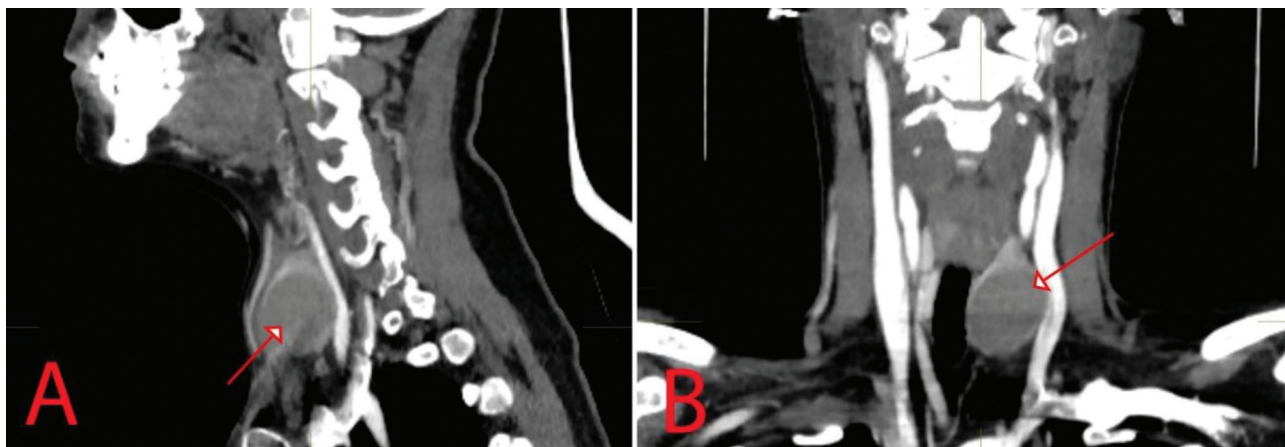


Figure 2. CT of the thyroid mass. A. Sagittal CT (arrow indicates the thyroid cyst); B. Frontal CT (arrow indicates the thyroid cyst).

or surface of the neck, without crossing the pretracheal muscles. During revision, the left lobe was 4.5×3.5×1.5 cm, the right lobe was 3.0×2.0×1.5 cm, and the isthmus was 1.0×1.0×0.5 cm. The entire left lobe of the thyroid gland was occupied by a volumetric formation of dense-elastic consistency up to 4 cm in diameter. We performed a hemithyroidectomy with visualization of the recurrent laryngeal nerve. The surgical material was sent for histological examination (Fig. 3). A drain was inserted for active aspiration from the wound followed by layer-by-layer wound suture. The surgical specimen examined contained fragments of the thyroid gland with a morphological appearance of a nodular colloid goiter and an encapsulated nodule with secondary changes in the form of hemorrhages, the wall of which was represented by fibrous tissue.

The drain was removed one day after surgery and the patient was discharged two days after surgery. There were no complications during the 1-year follow-up. Because of the hemithyroidectomy, the patient required 50 mcg of L-thyroxine treatment.

Discussions

There have been several case reports of thyroid hemorrhage due to trauma.^[6,10] However, in rare cases, spontaneous hemorrhage into a thyroid gland can also occur.^[5] It is pro-

posed that partially cystic thyroid nodules with abundant blood supply, a non-smooth margin of the internal solid portion, and spongiform internal content are factors associated with spontaneous intranodular hemorrhage and can be detected by USG.^[11] Active hemorrhage might also be a sign of malignancy. Histological examination of thyroid glands after hemorrhage reveal malignancy in 5.1% to 66.7% of cases.^[8,9]

The most likely mechanism of thyroid hemorrhage is venous bleeding into the wall of a cyst or adenoma as injection studies on freshly excised adenomas found that capsular vessels had a poorly formed inner elastic intimal coat. The arteries were able to withstand injection pressures in excess of 250 mmHg, but the veins could rupture with pressure >100 mmHg. Therefore, thin-walled veins, enlarged lobular arteries and arteriovenous shunts all contribute as the anatomical factors of bleeding.^[3,7,12]

Thyroid gland hemorrhage is a complicated case since modern day thyroid surgery usually is carried out using an electromyographic endotracheal tube to monitor the recurrent laryngeal nerve. In the case of emergency surgery, it is often impossible to do electromyography, since the patient is intubated urgently. Therefore, surgery should be avoided if possible and, if necessary, limited to hemithyroidectomy to prevent bilateral paralysis of the recurrent laryngeal nerve.^[10]

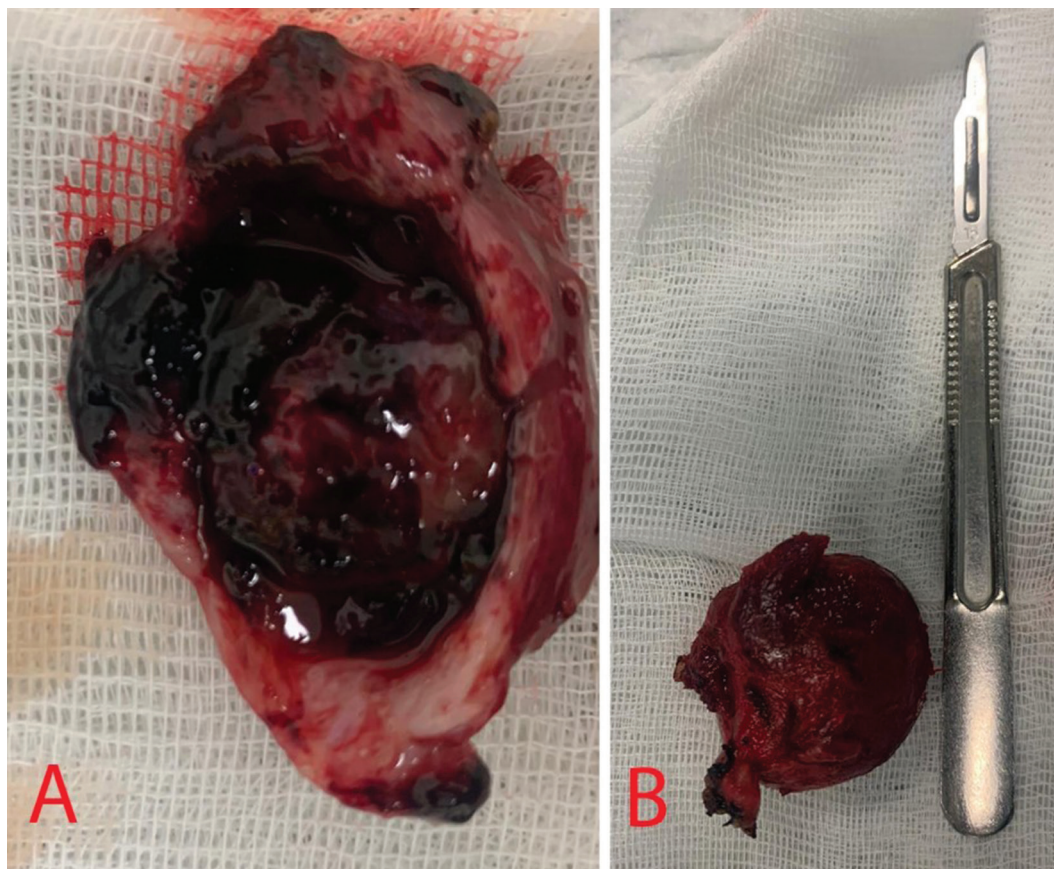


Figure 3. Macroscopic specimen of the thyroid gland. **A.** Sectioned thyroid gland with hemorrhagic content; **B.** Unsectioned thyroid gland lobe.

A number of case reports describe thyroid gland rupture and hemorrhage following blunt neck trauma due to a pre-existing thyroid gland node.^[6,10] Heizmann and co-workers proposed a classification of thyroid gland trauma that also helps to determine the severity of the condition (Table 1).

Table 1. Thyroid gland trauma classification by Heizmann et al.^[6]

Grade	Description of the lesion
I	Small parenchymal lacerations, bleeding into nodules, subcapsular hematoma
II	Rupture of the thyroid gland \pm parathyroidal hematoma
III	Rupture of the thyroid gland with significant neck hematoma including tracheal compression
IV	Rupture of the thyroid gland and neck hematoma with associated lacerations to the larynx skeleton and/or to carotid and jugular vessels

The management of these patients is primarily based on the airway patency.^[5,6] We believe that point-of-care USG is the optimal method for initial diagnosis.^[5] If the mass is large, difficult to assess or the patients develops signs of respiratory insufficiency then the next step is intubation followed by surgery. In a patient exhibiting stability, point-of-care ultrasonography (US) can be followed by computed tomography (CT) with intravenous enhancement. The absence of active bleeding and the absence of signs of respiratory distress allow for the performance of elective surgery. Another possibility of point-of-care USG is the performance of USG-guided aspiration to determine the content of the cyst and for decompression.^[5] However, it should be noted that cyst aspiration can also lead to hemorrhage, therefore, the patient should be carefully monitored. The patient should also undergo complete blood count, coagulation panel and thyroid hormones level (T3, T4, thyroid-stimulating hormone) evaluation during admission. The latter should be performed because thyroid trauma can lead to subacute, acute thyroiditis and, in severe cases, to thyroid storm. If patients receive antiplatelet therapy or anticoagulants, these must be stopped and, if possible, reversed.^[5]

Cyst aspiration can be combined with tetracycline or minocycline injection, fibrin sealant and systemic steroids.^[13-15] The cumulative frequency of cyst disappearance after tetracycline or minocycline injection is 33%, 45%, 52%, and 59% after 1, 2, 3, and 4 treatments, respectively.^[14]

Heizmann et al. provide an algorithm which is based primarily on CT with intravenous contrast to determine the degree of trauma of the thyroid gland and presence of extravasation.^[5] Patients with grade I-II injury of the thyroid in the absence of associated injuries and hemodynamic stability can undergo observation, while grade III-IV injuries, presence of associated injuries and hemodynam-

ic instability requires emergency intubation and surgical treatment.^[6] Observation of the patient in an intensive care unit is necessary as long as a significant risk of airway compromise exists, but should not be less than 24 hours.^[6] Appearance or increase of dyspnea, a mass volume increase, hemodynamic instability call for an emergency surgical intervention. Conservative treatment should include antibiotic therapy to prevent abscess formation and anti-inflammatory therapy to reduce swelling. In the event of a patient's medical state deteriorating, emergency intubation is indicated to ensure airway protection, and surgical intervention is typically necessary, which frequently involves hemorrhage control and hemithyroidectomy.^[5]

Conclusions

Spontaneous thyroid cyst hemorrhage is a rare complication. The preexisting factors are linked to the anatomy of cystic lesions such as thin-walled veins, enlarged lobular arteries and arteriovenous shunts. The current case demonstrates that point-of-care USG and cyst aspiration can be effective first steps for decompression; however, the patient should be carefully monitored as they still might require urgent or elective surgery.

Author contributions

S.C., A.B., Yu.B., and M.P. contributed to the design and implementation of the study; S.C., A.B., Yu.B., M.P., N.P., and A.K. collected the data; S.C., A.B., Yu.B., M.P., N.P., and A.K. contributed to the analysis of the results; S.C., A.B., Yu.B., M.P., N.P., and A.K. contributed to the writing of the manuscript.

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Competing interests

The authors have declared that no competing interests exist.

Ethical statement

Written informed consent was obtained from the patient to publish this case report.

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