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Management of Thyroid Gland Hemorrhage After Blunt Trauma: A Case Report and Review of the Literature

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Abstract

Background: Thyroid hemorrhage is a rare injury in patients suffering from blunt trauma to the neck. The case of a 60-year-old woman is described who developed increasing swelling in the neck with a mild inspiratory stridor after a fall from her bed. The fall had resulted in hemorrhage within a previously existing goiter. Further analysis by means of a CT scan revealed severe tracheal compression and active bleeding, which prompted immediate operative intervention. The patient recovered without complications. The decision-making process in this case is outlined, and other reports describing patients with thyroid hemorrhage after blunt cervical trauma are reviewed.

Conclusion: Although blunt thyroid injury is an uncommon condition, failure to consider the diagnosis or failure to anticipate complications of thyroid hemorrhage may result in progressive bleeding and airway compromise. Decision making is based on the patient's vital signs and, if possible, the findings on a contrast-enhanced CT scan of the neck.

Key Words

Blunt trauma · Thyroid · Hemorrhage · Airway management · Neck injury

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Introduction

Blunt trauma to the neck can result in bony, muscular, nervous, vascular and aerodigestive tract injury.

Traumatic hemorrhage of the thyroid gland is rare. However, recognition of this condition is important because it may cause acute airway compromise by (partial) obstruction, requiring prompt airway intervention. Injury due to a direct blunt force [1–5], like collisions with a steering wheel, bicycle handles, a staircase and barbed wire have been described. Indirect trauma [6–11] caused by hyperflexion of the neck has also been reported.

We report a case of blunt trauma after a fall from the bed, resulting in impending airway obstruction by thyroid gland hemorrhage. A review of the literature is given and the clinical management is discussed.

Case Report

A 60-year-old woman sustained blunt neck injury by falling out of her bed. She landed with her face and neck on the nightstand. The patient was referred to the hospital by her general practitioner because of increasing swelling in the neck and an inspiratory stridor. On presentation at the emergency department, the patient complained of having a difficulty swallowing and dyspnoea with minor exercise. She was known to have a small goiter for several years, but she did not use any medication. When at rest, the patient appeared comfortable and there were no obvious signs of respiratory distress. A mild inspiratory stridor was noted on deep inhalation. Her vital signs were normal, showing a blood pressure of 110/80 mmHg, a heart rate of 76 bpm and an O₂ saturation of 100%. Head and neck examination revealed an obvious swelling of the anterior neck, greatest on the left side (Figure 1). The neck

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Figure 1. Left lateral view of the patient showing the contour of the anterior neck in thyroid hematoma.

mass was firm, nonfluctuant, nonpulsating, and tender on palpation. Carotid pulses were normal, and there was no jugular venous congestion. Auscultation of the lung fields revealed good air movement bilaterally. Further examination showed a small hematoma on the left jaw, slightly tender on palpation. Hemoglobin was 8.2 g/dl (normal range 7.5–10) with a hematocrit of 0.39 (normal range 0.36–0.47), the platelet count was $314 \times 10^9/l$ (normal range 150–400), and INR was 1.0. Thyroid profile results were TSH 0.795 mU/l (normal range 0.5–3.9) and FTI 14.6 pmol/l (normal range 9–24). Because the patient showed no respiratory distress and had normal hemodynamics, further evaluation by means of a computed tomography (CT) was done.

A multidetector CT (MDCT) of the neck, after injection of 70 ml iodinated contrast material (Xenetix 350, Guerbet) and 40 ml saline, showed a large hematoma in the left thyroid lobe, measuring $6.4 \times 6.9 \times 8$ cm (Figure 2). The hematoma extended into the anterior mediastinum. Tracheal deviation to the right with luminal narrowing with a smallest diameter of 7 mm was noted. A small area of contrast extravasation within the hematoma indicated active bleeding (Figure 3). The case was discussed with the on-call anesthesiologist in anticipation of difficult airway management. The patient was brought to the operating room. After rapid sequence induction and during intubation, a surgeon was placed on standby to perform a surgical airway if necessary. By means of an extra long tube (OD 5 mm), it was possible to pass the area of compression located just below the level of the vocal cords. Neck exploration was performed through

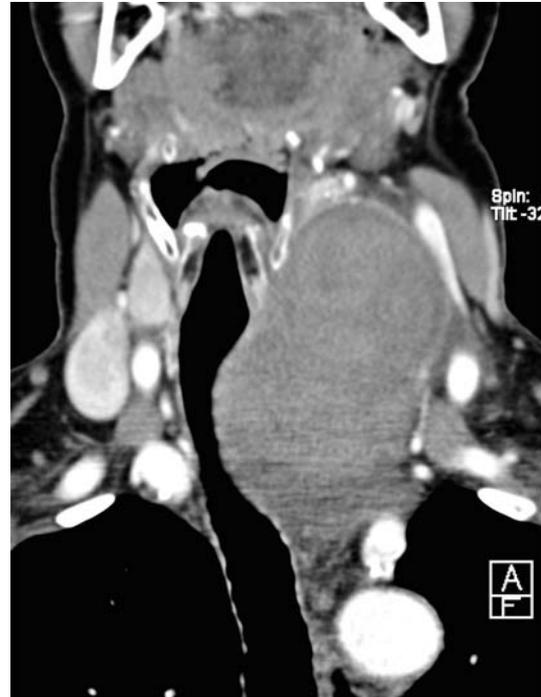


Figure 2. CT scan (a coronal maximum intensity projection and multiplanar reconstruction) of the anterior neck showing left thyroid hematoma compressing and deviating the trachea to the right side.

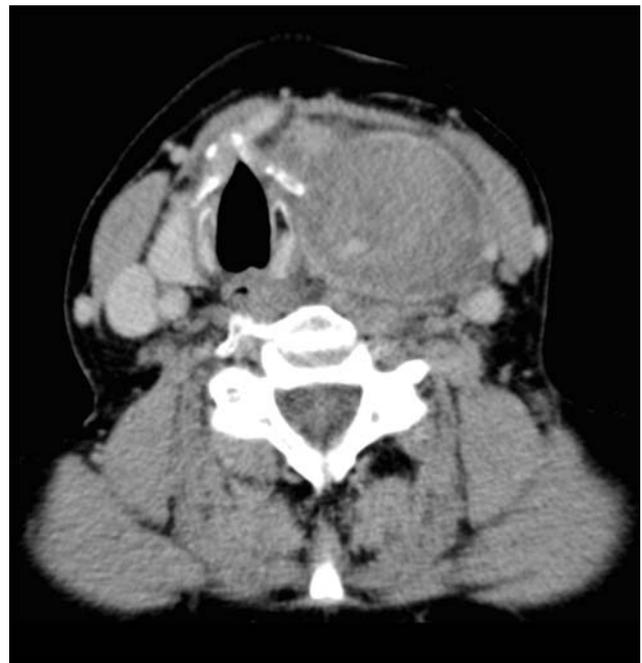


Figure 3. CT scan (transverse view) of the anterior neck showing left thyroid hematoma with contrast extravasation indicating active bleeding.



Figure 4. Peroperative view of left thyroid goiter with hematoma.

a left Kocher's incision. The diagnosis of left thyroid hematoma of 12 cm within a nodular goiter was confirmed (Figure 4). Subtotal resection of the left thyroid lobe with the hematoma was performed. There were no signs of tracheomalacia and subsequent detubation in ICU was uncomplicated. The postoperative course was uneventful. Her voice was unaltered. Serum calcium (ionized) levels remained within normal limits (1.19 mmol/l), and the patient was discharged home on the second postoperative day. The patient was completely recovered at follow-up after two weeks. Histological examination showed a nodular goiter with extensive bleeding but without signs of malignancy.

Discussion

Thyroid injury is rare after blunt neck trauma. The rich vascular supply of the thyroid gland may predispose it to hemorrhage after trauma. The gland is poorly protected, and when hemorrhage occurs the bleeding will not be contained. Also, the axis of the trachea may act as a resistant underlying cylinder that may counteract blunt forces [3]. Most cases report a prior history of goiter [1, 3, 6–11]. Nodular changes lead to enlargement of the organ, making it more exposed to direct trauma. Also, the thyroid tissue may be more fragile and blood flow within the gland may be increased up to 100-fold [6]. The onset of life-threatening symptoms varies from immediate to 24 h after injury. The approach to patients with blunt neck injury should follow Advanced Trauma Life Support® (ATLS®) principles [12]. During primary survey, vital functions such as airway, breathing and circulation are assessed and

stabilized. Thereafter, during secondary survey, the injuries should be further evaluated. The majority of the patients with blunt thyroid injury present with swelling of the neck. Some patients will never experience respiratory distress throughout the clinical course. On presentation, our patient had a stridor on deep inhalation only. However, this may be indicative of impending airway compromise. Swelling or tenderness of the anterior neck after blunt trauma should prompt further evaluation, such as a lateral radiograph of the cervical spine, ultrasonography, CT or carotid angiography. A CT with contrast may be the diagnostic method of choice [9]. This method gives accurate information about the size of the hematoma, compromise of the airway and thyroid abnormalities such as presence of multinodular goiter, adenoma or cyst. Contrast-enhanced CT is most useful for delineating the extent of the injury to the thyroid gland, such as the extent of the rupture and hematoma, fracture of the larynx skeleton, injury to the carotid artery or jugular vein, or traumatic injury of the spine. In our case, contrast-enhanced CT during the secondary survey was used for diagnosis. The CT revealed the hematoma and showed active bleeding. These findings, combined with the clinical signs of impending airway compromise, were the indication for an immediate operative intervention. The altered position and compression of the trachea shown on the CT scan provided important information for the anesthesiologist, who was anticipating advanced airway management. A surgeon was placed on standby to perform a surgical airway if necessary.

The outcome is favorable and no mortality is reported in all cases in the literature. Heizmann et al. [9] proposed an algorithm for management of thyroid gland injury. Different treatments involve: conservative treatment with observation in an intensive care unit [2, 5], surgical exploration [1, 3, 4, 8–11] with evacuation of the hematoma and/or resection of the thyroid in the presence of pathological tissue and aspiration of hematoma [6]. Patients with unstable vital signs always require prompt intubation and surgical intervention. In the case of respiratory and hemodynamic stability, the approach depends on the extent of the injury, such as tracheal compression, dimensions of the hematoma, lacerations of other cervical structures, and the presence of thyroid abnormalities.

Although blunt thyroid injury is an uncommon condition, failure to consider the diagnosis or failure to anticipate complications of thyroid hematoma may result in progressive bleeding and airway compromise.

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