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Thyroid gland rupture after blunt neck trauma: A case report and review of the literature



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ABSTRACT

INTRODUCTION: Soft tissue injuries are relatively common after blunt neck trauma, because of its complex anatomy, many vital structures can be compromised. Isolated trauma to the thyroid is highly uncommon and there are few cases reported in the literature.

PRESENTATION OF CASE: A 19 year-old female patient with no known pathologies who sustained direct blunt trauma to the right frontal half of the neck after falling down from a stair case. She arrived at the ER with moderate neck swelling and pain. There were no visible hematomas and no respiratory compromise was noted. Contrast enhanced CT-scan showed rupture and hematoma of the right thyroid lobe; she underwent surgical exploration with hemi thyroidectomy and recovered uneventfully.

DISCUSSION: Despite soft tissue injuries are relatively common after blunt neck trauma, isolated thyroid gland injury is extremely rare and is present in about 1–2% of the cases and in most of the cases there is an underlying pathology within the gland. Most patients arrived at the emergency room hemodynamically stable, presenting neck swelling, pain, respiratory distress, dysphagia and hoarseness. Diagnosis strategy should be focused to rule out respiratory or vascular compromise. Surgical exploration remains the most common treatment strategy.

CONCLUSIONS: Although the rarity of this condition, physicians should take in mind the possibility of thyroid injury after blunt neck trauma. Early detection and prompt treatment, can reduce life threatening complications. Management should be individualized to patient's characteristics and surgeon's experience.

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1. Introduction

Blunt neck trauma is uncommon [1]. When in neutral position, the neck is protected by the head, the shoulders and the chest; hyperextension, hyper flexion, deceleration, rotation and direct blow may contribute to dull trauma to the neck [2,3]. This is why most blunt neck traumas occur during motor vehicle collisions, direct blows, sport activities or strangulation.

Due to its complex anatomy, many vital structures can be compromised such as the larynx, trachea, pharynx, esophagus, major blood vessels and the spine [4]; their close proximity to the skin's surface makes them vulnerable to injury. Isolated trauma to the thyroid gland in this context is very uncommon. We present the case of healthy female who suffered thyroid gland rupture after falling down from a staircase.

2 Presentation of case

A 19-year old otherwise healthy woman sustained blunt neck trauma after falling down from a staircase (concrete, sharp edge) at an approximate height of five meters. She arrived at the emergency department 8 h after the event on account of increasing swelling and palpable mass on the right frontal side of her neck.

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Fig. 1. Swollen neck on patient's presentation.

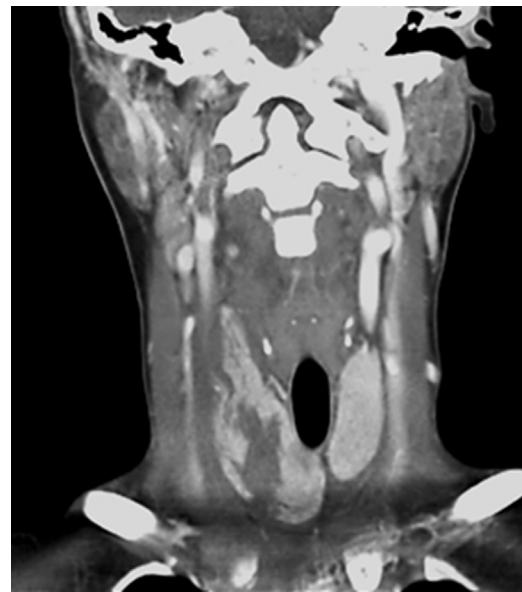


Fig. 2. CT scan demonstrating parenchymal rupture and hematoma of the right lobe.

On arrival she was awake, comfortable and speaking without hoarseness, she complained of difficulty swallowing and persistent pain on the right side of her neck. No dyspnea or stridor was present. She had no previous history of goiter, thyroid masses or thyroid disease.

Her vital signs were normal. Head and neck examination revealed moderate swelling of the right neck that was firm, non-fluctuant, non-pulsating and tender on palpation (Fig. 1). No abrasions or bruises were observed and no subcutaneous emphysema was palpable. Bilateral carotid pulses were normal and there was no jugular congestion, no bruits were auscultated. The rest of her physical examination was within normal parameters as well.

Blood test including thyroid function tests were within normal parameters. Considering the absence of respiratory distress or hemodynamic compromise a contrast enhanced CT-scan was order. An antero-posterior laceration of the right thyroid lobe with and adjacent hematoma measuring $3.1 \times 4.3 \times 4.6$ cm was found. Contrast media extravasation to the surrounding tissues could not be assessed (Fig. 2).

Surgical exploration was planned; the patient was brought to the operating room and general anesthesia was induced. Neck exploration with a 6cm Kocher incision was performed. An intraglandular and periglandular hematoma with parenchymal disruption on the right thyroid lobe was found. Active bleeding from superior thyroid artery was detected after drainage of the hematoma (Figs. 3 and 4). In view of the extensive trauma, right hemi-thyroidectomy was considered necessary and thereafter performed. The entire operation went uneventfully and the patient was then transferred to the regular ward for recovery.

The post-operative course presented no further complications and the patient was discharged on PO day 3. Final histopathology report showed no underlying pathology on the specimen. The patient presented transitory dysphonia that was successfully treated with conservative management; flexible nasolaryngoscopy at 2 weeks post-op revealed no alterations. Follow-up visits were at 1, 6, 12 months postoperatively, thyroid function tests were drawn on every visit, she remained euthyroid throughout her recovery.



Fig. 3. Intracapsular hematoma on the right thyroid lobe.

3. Discussion

Soft tissue injuries are relatively common after blunt neck trauma [5,6]. Direct impact to the anterior neck has been associated with vascular, bony, muscular, laryngeal, tracheal and esophageal injury [2,5]. Isolated thyroid gland injury is extremely rare and is present in about 1–2% of the cases [7]. The first fatal case of thyroid injury due to blunt neck trauma was described by Simon in 1894 [8]; since then, few cases have been published on this topic.

Early reports occurred in goitrous glands [9] which in addition to the rich vascular supply of the thyroid [2], translates to increased gland size and vascularity or the absence of a true capsule therefore elevating the risk for hemorrhage [10,11]. Nevertheless most of recently published cases occurred in otherwise healthy individuals.

A variety of mechanisms have been described including: direct impact to automobile steering wheels or security airbags, bicycle and motorcycle handle bars, and direct blow to the neck while



Fig. 4. Parenchymal rupture of the right thyroid lobe.

falling from horses, staircases or bed [9,12]. Others present as direct blow to the neck while practicing karate or hockey [13].

Probably the most extensive review is published in the German literature by von Ahnen et al. it analyzes a total of 36 case reports about rupture, hemorrhage or hematoma due to blunt neck trauma. Patient age range from 13 to 82 years old, 58% occurred in women and histological abnormalities were found in 38% of the cases. The left thyroid lobe was more likely to be involved and 59% were treated with surgery [9].

Most patients arrived at the emergency room hemodynamically stable, presenting neck swelling, pain, respiratory distress, dysphagia and hoarseness [4,5,12,13]. The most important objective is to identify and treat promptly lethal conditions such as airway obstruction due to expanding hematoma. Subcutaneous emphysema should be intentionally investigated. The onset of life-threatening situations has a range of 60 min to more than 24 h [10,11]. In the majority of cases thyroid gland injury became evident until imaging studies were performed.

The density of structures present in the anterior neck mandates throughout the investigation to rule out other injuries. Ultrasonography allows rapid identification of hematoma, parenchymal disruption, collections and the amenability for surgical or percutaneous drainage [1,6]. The contrast enhanced CT-scan is helpful in evaluating the surrounding structures [6], such as the presence of pre-existing conditions and any injury to vascular structures or the spine [2]. Major blood vessel rupture can be ruled out by arterial angiography [6,12]. Fiberoptic laryngoscopy can rule out laryngo-tracheal injury in case if no obvious findings in the CT scans [11].

Because of the infrequency of blunt trauma to the thyroid, no consensus has emerged on the diagnostic work-up and management. The approach to patients with blunt trauma should follow the Advanced Trauma Life Support® (ATLS®) principles in which vital functions such as airway, breathing and circulation are assessed and stabilized upon arrival [12,14]. According to the analyzed literature, invasive airway control was not required in most of the cases [6,10,11]. Specific injuries are then assessed in a secondary survey.

Although more than half of the cases were handled with surgical exploration, a more conservative approach with only observation (mean 72 h) has proven to be a feasible option [11,15]. Close monitoring after discharge either with laboratory tests or sonography is advised; a case of persistent dyspnea due to a non-resolved

hematoma, initially treated with observation, has been described 5 months after the original eve [16].

4. Conclusions

Every patient that sustained blunt neck trauma should be assessed and stabilized according to the ATLS® principles. Injury to vital structures such as the aero digestive tract, major neck blood vessels and spine should be ruled out first. On the secondary survey, although rare, isolated injury to the thyroid gland should be considered as a possibility especially if neck swelling is noted. Further evaluation with a contrast enhanced CT-scan is recommended in order to define which patient requires surgery or which can be left to observation.

Conflict of interest

All authors declare nothing to disclose.

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Nothing to declare.

Ethical approval

This case received approval by the research and ethics board of Christus Muguerza Hospital.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Author contribution

All authors have made substantial contributions as following: sa and mj conceived of the report, drafted the manuscript and designed the proposed algorithm. JM, EC, TG and DO made a review and critical analysis of the published literature. ZZ was responsible of the pathology analysis and image collection. all authors read and approved the final manuscript.

Guarantor

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