CASE REPORT

Airway management of a life-threatening post-thyroidectomy haematoma

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SUMMARY

Neck haematomas are rare but potentially life-threatening complications of thyroid surgery. Postoperative monitoring, early diagnosis and immediate management are critical, as this condition can rapidly lead to compression and obstruction of the upper airway. We present a case of a 69-year-old woman who suffered respiratory failure resulting from a post-thyroidectomy haematoma with airway obstruction and severe haemodynamic compromise, presenting a difficult anaesthetic challenge. Following development of a likely 'cannot intubate, cannot ventilate' situation despite haematoma evacuation, the patient underwent emergency cricothyroidotomy, before rapid sequence intubation and subsequent surgical haemostasis.

BACKGROUND

This case is important because due to the rarity of post-thyroidectomy haematomas—especially when they reach the life-threatening stage—their proper management is not well known even among some senior clinicians. Features related to the source of bleeding (superficial or deep to the strap muscles), and the clinical manifestations associated with each, are not commonly known to ward staff likely to be monitoring and managing these patients postoperatively. The common perception of management of this condition among clinicians (frequently influenced by multiple choice examination questions) is simply to 'release the sutures'. Whereas there is truth in this, it is essential for clinicians facing this scenario to appreciate the anatomy associated with layered closure following thyroid surgery in order to enable comprehensive haematoma evacuation and release of airway compression in the event of deep haematomas. Thus in these cases, release of sutures to both the skin and the strap muscles as well as evacuation of haematoma may be critical in the prevention of asphyxiation.

This case additionally demonstrates dilemmas faced when making decisions regarding definitive airway management in highly pressurised situations.

Thus, in the emergency situation, it is vital to conduct proper airway assessments to enable timely decisions regarding airway management to be made and to prevent potentially catastrophic consequences.

Unfortunately, there has, at a local hospital, been a case of a fatality in a similar situation where definitive management procedures were not taken.

CASE PRESENTATION

A 69-year-old woman of Afro-Caribbean descent underwent an elective near total thyroidectomy

operation for a large multinodular goitre with tracheal compression. Besides pain around the operative site, the early postoperative period was uneventful. Approximately 7 h postoperatively, she reported increasing discomfort, but was haemodynamically normal and therefore was given simple analgesia. Approximately 3 h later, she informed ward staff that she was experiencing increasing pain and having difficulty breathing. She suddenly began to deteriorate, and the on-call senior house officer (SHO) was quickly notified and cardiac arrest team called. On arrival, the SHO found the patient in severe respiratory distress. Despite basic airway manoeuvres, use of a nasopharyngeal airway, a laryngeal mask airway and a bag, valve and mask through which high-flow oxygen was delivered, oxygen saturations on the bedside monitor fell rapidly from 80% to 35% to unrecordable, over the course of <1 min. The blood pressure reached a peak of 225/110 with the heart rate rising to 135 bpm. The neck was visibly swollen and there were no obvious signs of ecchymosis. The skin wound, which had been glued, along with the subcutaneous sutures, were released, leading to an initial high pressure ejection of blood. As this was performed, the patient's conscious level dropped and her respiratory effort reduced. Following release of these sutures, saturations reached 70% and did not improve until the longitudinal suture layer to the platysma muscle had been completely released and the haematoma evacuated with saline. Following this intervention, the oxygen saturation reached a peak of 75%. An initial airway assessment was made and the decision regarding securing it presented a challenge for the clinical team. Owing to the difficulty in visualising the airway in this patient with a preoperative Mallampati score of 3, and the current likelihood of near or complete obstruction resulting from a combination of laryngopharyngeal oedema (caused by impeded venous and lymphatic drainage¹) and laryngospasm, the anaesthetist voiced concern about a 'cannot intubate, cannot ventilate' (CICV) scenario and the need to rapidly attain ventilation through alternative means. We therefore performed a needle cricothyroidotomy, inserting a 14G cannula attached to a saline-filled syringe. Proper placement was confirmed by aspiration of air bubbles. Transtracheal jet ventilation was then performed to manage the acute respiratory failure. This improved the oxygen saturations slightly, however, they remained below 85%. A decision was reached between the anaesthetic, intensive care and ear nose and throat (ENT) registrars at the bedside,

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with advice from the consultant anaesthetist on-call (via telephone) to attempt intubation, with the ENT registrar ready with a surgical airway kit in the event of failure. Using an Eschmann tracheal tube introducer, rapid sequence intubation was eventually performed successfully by the intensive care registrar using a size 6 endotracheal tube. With this adequate ventilation and oxygenation, oxygen saturations returned to 100%. Intravenous access was established, and fluid resuscitation started. The haemodynamic parameters normalised over the course of approximately 30 min and, once stable, the patient was transferred to theatre for identification of the bleeding source and attainment of haemostasis. Large blood clots identified deep to the strap muscles were washed away with normal saline, and bleeding points within the strap muscles and subcutaneous tissues were cauterised with bipolar diathermy. A second redivac drain was inserted into the thyroid bed, the wound was closed in layers and the patient transferred to the intensive care department postoperatively.

INVESTIGATIONS

An *arterial blood gas test* was performed after the sutures had been released and the haematoma was evacuated, and after needle cricothyroidotomy with transtracheal jet ventilation started. It was performed to assess the oxygenation, ventilation and the effects of this disturbance on acid/base balance.

- ▶ pH: 6.9 (range 7.35–7.45)
- ▶ pCO₂: 18.05 kPa (range 4.67–6.00)
- ▶ pO₂: 16.56 kPa (range 10.67–13.33)
- ▶ Base excess (BE): –8.8 (range –2–+2)
- ▶ HCO₃[–]: 25.9 mEq/L (range 20–26)
- ▶ Lactate: 10.2 mEq/L (range 0.4–2.2)
- ▶ SO₂: 94.6% (breathing 100% oxygen)
- ▶ Haemoglobin (Hb): 10.7 g/dL
- ▶ Glucose: <7.8 mmol/L
- ▶ Na: 135–145 mmol/L
- ▶ K⁺: 3.5–5.0 mmol/L
- ▶ Cl[–]: 98–107 mmol/L

An ECG was taken to assess cardiac electrical activity.

Normal sinus rhythm, with no acute abnormalities.

A *full blood count* was performed to assess the degree of blood loss and to check the platelet concentration.

- ▶ Hb: 10.8 g/dL
- ▶ White cell count: 4–11 ($\times 10^9$ /L)
- ▶ Platelet: 211 150–400 ($\times 10^9$ /L)

Coagulation was performed to assess for any clotting abnormalities, which may cause bleeding and may be correctable.

- ▶ International normalised ratio: 0.9–1.2

DIFFERENTIAL DIAGNOSIS

Acute airway compression secondary to neck haematoma.

TREATMENT

ABCDE approach, cardiac arrest team called.

A—Airway manoeuvres, nasopharyngeal airway, high-flow oxygen via non-rebreathe face mask. Assessment for intubation, release of neck sutures and evacuation of haematoma, needle. Cricothyrotomy and transtracheal jet ventilation. Definitive airway—endotracheal tube.

B—Clinical assessment including auscultation, assessment of oxygen saturations, oxygenation and ventilation, arterial blood gas.

C—Blood pressure and heart rate monitoring. Cardiac monitoring. Intravenous access, venesection and fluid administration, ECG.

D—Glasgow Coma Scale assessment. Blood sugar monitoring
E—Neck wound assessment. Full peripheral examination.
Transfer to theatre for haematoma evacuation, definitive haemostasis and drain insertion.

OUTCOME AND FOLLOW-UP

Postoperatively, the patient was transferred to the post-anaesthesia care unit and extubated successfully. She made a good recovery with no impairment to swallow or cough, and no endocrinological parameters a year postoperatively. She currently reports, however, of vocal fatigability, which objectively is not demonstrable clinically, however, there is evidence of significant reflux-related damage on nasendoscopy. She is now on proton-pump inhibitors for this and is undergoing specialist assessment with a consultant ENT surgeon.

DISCUSSION

Although they are an established and well-known complication of thyroid surgery, there are few recent case reports or publications related to the acute management of postoperative haematomas. Lee *et al*² characterised patterns of post-thyroidectomy haemorrhage and associated clinical presentations in a retrospective review of 1048 cases of thyroidectomy. They noted that features associated with superficial bleeding such as prominent, dark ecchymosis were seen in 75% of cases of superficial bleeding but in only 33% of cases of deep bleeding. Respiratory distress occurred in a third of patients with deep haematoma but in none of the patients with superficial haematoma. Appreciating the surgical anatomy of the neck and the clinical differences associated with superficial and deep haematomas may influence diagnosis of likely bleeding location and should influence the acute management of patients in life-threatening respiratory distress.

The CICV situation is a critical scenario historically related with anaesthetic-associated deaths. With the advancement of critical care research and development of management algorithms, the incidence has reduced and now fewer than 50% of anaesthetists are expected to encounter such situations.³ The continued existence of CICV may be attributable to a lack of specificity and low predictive value of current techniques for predicting difficult airways.⁴ Needle cricothyroidotomy and subsequent transtracheal jet ventilation or surgical cricothyroidotomy are life-saving treatments recommended in this emergency situation by the difficult airway society and the American Society of Anaesthesiologists.^{5 6}

Patient's perspective

- ▶ I remember, after the operation, waking up in the evening and screaming 'I cannot breathe, can you get me a doctor?!'. My mouth was full of blood. I tried to get out of the bed. I remember seeing a crowd of people running into the ward. I then remember fighting against them as they tried to hold me down. That was all I could remember. It felt like a dream. The next thing I remember was waking up on the ward and recognising my daughter!
- ▶ From what I have gathered, before and after my operation, with all of its complications, I only have praise and thankfulness for all of the medical teams, for their skilfulness in the operation and for the professional aftercare I have received.

Learning points

- ▶ Life-threatening postoperative neck haematoma can be a rapidly progressive illness that ward based staff, on-call doctors and the cardiac arrest team should be prepared to diagnose and manage early.
- ▶ Knowledge of the neck anatomy associated with thyroidectomy operations is vital to ensure comprehensive management of deep haematomas. It may be advisable to ensure that a copy of the operation note remains with the patients' bedside notes, together with suture cutters.
- ▶ Intubating these patients can be difficult, and prompt consideration of alternative airway management options can be lifesaving.
- ▶ Complications including laryngeal nerve injury may arise following initial surgery and management of neck haematomas.

Competing interests None declared.

Patient consent Obtained.

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