SHORT COMMUNICATION

Post-thyroidectomy Bleeding

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In the past couple decades, surgery for benign and malignant thyroid diseases has become common. There has also been an increasing trend of incorporating thyroidectomies as day care or overnight procedures especially when the surgery planned is lobectomy for a benign pathology.[1] This is so because, generally, thyroid surgery is considered quite safe with overall complication rate being less than 2 to 3%.[2]

Recurrent laryngeal nerve (RLN) injury and hypoparathyroidism are most common complications of thyroidectomy. However, a more disturbing and life-threatening complication is post-thyroidectomy bleeding. Even though this complication is less common and less reported than the above-mentioned complications, it mandates special attention as it may lead to acute airway obstruction and death.

The incidence of post-thyroidectomy bleeding reported in the literature is 0.43 to 4.3%.[3] High-volume centers in developed countries have reported incidence as less as 2%.[4]

The hemorrhage that occurs post-thyroidectomy can be either reactive or secondary. In reactive hemorrhage, bleeding occurs within 24 hours of surgery, with most common cause being ligature slipping off of a major vessel. Bleeding from unidentified or unacknowledged vessels has also been implicated as a cause of reactionary hemorrhage. Intraoperative hypotension and vasoconstriction mask bleeding from the unidentified/unacknowledged vessels but as the blood pressure normalizes postoperatively, they begin to bleed.[1]

Secondary hemorrhage occurs 7 to 10 days postoperatively as is usually due to erosion of a vessel from infection.

The common causes of bleeding intraoperatively and post-thyroidectomy are enumerated below:[2]

- Slipping off a ligature on major vessels
- Reopening of cauterized vessels
- Bucking or retching during recovery
- Valsalva maneuver
- Increased blood pressure
- Ooze from the cut surface of thyroid

Eighty-five percent of post-thyroidectomy bleeding occurs in the first 24 hours, majority within 8 hours. Some cases with bleeding occurring as long as 20 days later have also been reported.[1] Thus, hemorrhagic symptoms that develop after 24 hours must never be neglected.[5]

Once a hematoma forms as a result of hemorrhage, it compresses the underlying airway causing an impairment in venous and lymphatic drainage.[1] There is congestion of arytenoids, epiglottis, and vocal cords. This laryngopharyngeal edema leads to airway obstruction and hypoxia, and death ensues.[2]

The seriousness of post-thyroidectomy bleeding should compel the surgeons to master its diagnosis and management should it occur under their watch. Overt signs such as externally visible swelling in the neck, blood-soaked dressing, or rapid filling of the wound drain, shortness of breath, tachycardia, or hypotension indicate ongoing relevant hemorrhage.[1] However, subtle symptoms such as cervical pressure or tightness, coughing, difficulty in swallowing, or restlessness may be the initial complaints of a patient and may present much before an externally visible swelling in the neck.

The clinical presentation almost always indicates the site of the bleed. Any bleeding between the subplatysmal plane and strap muscles accounts for superficial bleeding. In such cases, ecchymosis of skin is very prominent, dark in color, and most obvious at the point just superior to the bleeding focus below it[5] (Fig. 1).

A hematoma between the strap muscles and the thyroid bed indicates a deep hematoma. In these cases, the ecchymosis on skin and discoloration are less or may be even absent[5] (Fig. 2).

Mahoney reported that post-thyroidectomy bleeding is associated independently with increased rates of overall morbidity, hypocalcemia, RLN injury, pulmonary morbidity, wound morbidity, tracheostomy, readmission, return to operating room, and length of stay.[6]

The management of post-thyroidectomy bleeding should focus on the following aspects:[1]

- Preoperative identification of risk factors for post-thyroidectomy bleed
- Intense optimization of intra- and postoperative monitoring
- Management of post-thyroidectomy bleeding

1. Preoperative identification of risk factors:
   Recent meta-analyses have identified male gender, old age, Grave's disease, retrosternal goiter, redo surgery, neck dissection, hypertension requiring treatment, diabetes mellitus, bleeding disorders, and use of antithrombotic agents, Hematocrit <30% and multiple comorbidities are considered as independent predictors of post-thyroidectomy bleeding.[4,6,7]

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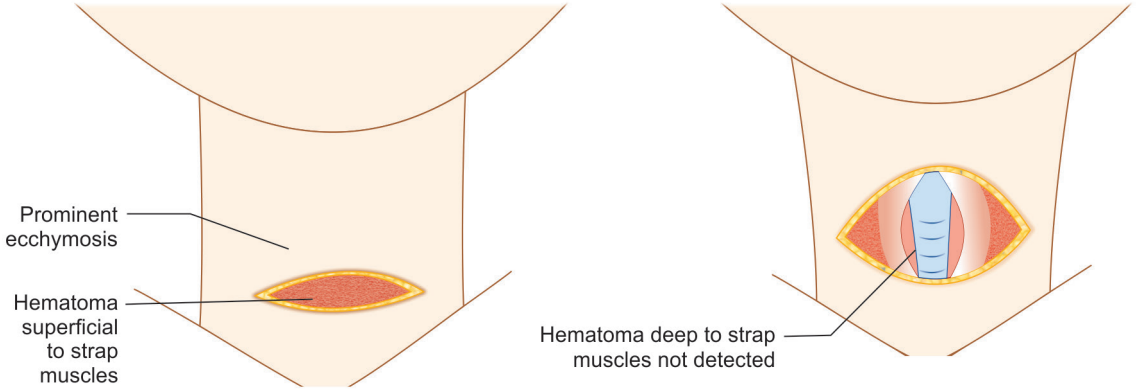


Fig. 1: Superficial hematoma depicting the prominent ecchymosis of skin and clot in between the subplatysmal plane and strap muscles

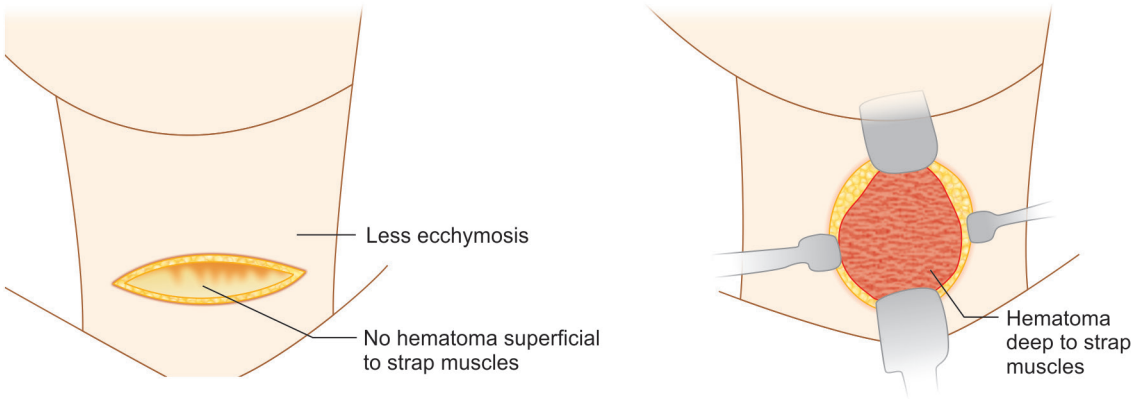


Fig. 2: Deep hematoma showing less discoloration of skin and a clot between the strap muscles and thyroid bed

Some of these factors are nonmodifiable such as gender, age, and preoperative diagnosis. However, preoperative control of modifiable risk factors could improve outcomes.

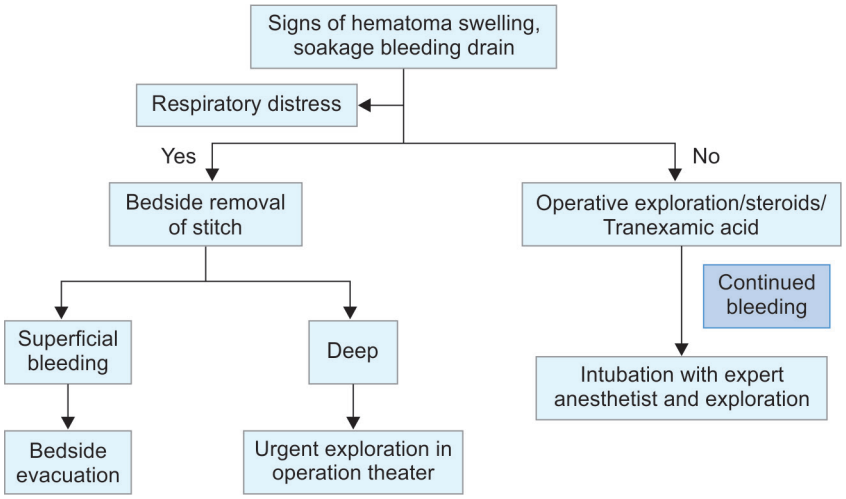
2. Intense optimization of intra- and postoperative monitoring:
There is no substitute for meticulous technique in preventing post-thyroidectomy bleeding. The surgeon, regardless of his level of training, has a direct bearing on the incidence of postoperative bleeding.[1] Most common bleeding occurs from superior and inferior thyroid vessels. The branches of superior thyroid artery are very difficult to identify after slipping of ligature; therefore, special attention has to be given during their ligation. If the strap muscles are divided, utmost care has to be taken to ensure that the cut ends do not bleed.[5] Complete hemostasis of cut surface of remnant thyroid using suture ligation is recommended. The quality of ligatures or clips used during surgery is relevant for final hemostasis.[1] Residents should be educated to pay special attention during subplatysmal dissection (avoid injury to anterior jugular veins), drain insertion (never to be done through sternocleidomastoid), and closure of strap muscles. The strap muscles should not be closed very tightly; else one may not appreciate the hematoma under the skin and the clot would cause major airway problems.[5] Extra care should be taken that during the drain insertion, anterior jugular vein or any small vein should not be punctured.

Even a smooth recovery of the patient by the anesthesiologist is imperative to ensure an uneventful postoperative period.[1]

A close clinical monitoring every 4 to 6 hours in the first 24 hours is mandatory. Early detection of bleeding can improve outcomes significantly. Keeping tracheostomy tray bedside can be a helpful practice[2] especially when expert anesthesiologist is not available and also in cases where short segment tracheomalacia may be suspected. Optimization of the intra- and postoperative monitoring is a team effort.

3. Management of bleeding:
Any evidence of hemorrhage should receive a prompt response. If the patient is in severe distress, the wound is opened bedside by removing both the skin clips/sutures and deep layer sutures to evacuate the hematoma and release the pressure. There is no urgent need to perform tracheostomy in such patients,[2] but they must be brought back to the OR for a complete wound exploration and evacuation of the remaining hematoma and control of bleeding site. An urgent senior surgical opinion should be sought, and the anesthesiologist should be informed to prepare for intubation and exploration.[1]

The techniques of hematoma evacuation mentioned in the literature are interesting. Lee et al.,[5] remove the hematoma starting from its lesser portion and then proceed toward the



Algorithm 1: Management of post-thyroidectomy bleed

largest portion. This helps to coincide with the focus of bleeding and helps to detect the location. The hematoma is removed using warm saline to avoid injury to RLN and parathyroid glands. Bleeding from the soft tissues such as muscles or remnant thyroid tissue is controlled via electrocauterization and suture ligation (Algorithm 1).

Blind clamping to achieve hemostasis should be avoided at all costs. All the identified bleeding vessels should be doubly ligated for secure hemostasis. The wound should be closed with closed suction drain in all cases of re-exploration.[1]

An interesting observation in the literature has been that after the initial successful re-exploration, patient's postoperative course continues as any other standard thyroidectomy.[2]

Only a handful of patients with superficial hematoma and minimal swelling, lack of symptoms, and nonprogression of the hematoma should be considered for conservative management.[1]

Practical points for trainees in the management of post-thyroidectomy bleed:

- Informed consent should include the small risk of an off-site postoperative bleed and its repercussions.[7]
- Hematoma is more common in patients with a large dead space.[2]
- Neither the use of new surgical/technical innovations (energy-based devices, topical hemostatic agents), less-invasive resections, nor strict standardization has reduced the incidence of bleeding.[1]
- Use of drains has not been found useful in preventing post-thyroidectomy bleeding. In fact, the hematoma may block the drain tube and give a false impression.[2]
- Hematological and coagulation parameters or ultrasound examinations of the neck are not reliable measures for the detection of bleeding. These are not encouraged due to the acute nature of this complication.[1]
- There is no difference in the rate of postoperative hemorrhage in the inpatient group compared with the outpatient (day care) group.[7]
- Day care patients should be discharged only after observing them for a minimum period of 6 hours and with early access to healthcare facility.[7]
- A male patient of advanced age with multiple comorbidities, receiving anticoagulant or antiplatelet drugs, with Graves' disease, and requiring re-operative surgery or total thyroidectomy for retrosternal goiter, who experiences postoperative hypertension, is an amalgam of high-risk patients for post-thyroidectomy hemorrhage.[7] Patients who do not have these features may be selected for day care surgery.

Post-thyroidectomy bleeding is associated with a mortality rate of 0.6%.[2] It is the responsibility of the entire surgical team to ensure preoperative, intraoperative, and postoperative optimization and management of thyroid surgeries in order to avoid this life-threatening complication. We recommend the Algorithm 1 for the management of post-thyroidectomy bleed.[8]

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