Post-operative bleeding following hemithyroidectomy

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Case Presentation

NC is a 74 yo Caucasian Male hx of HTN, who first noted right neck swelling five months prior. Pt denied weight loss, night sweats, pain, fevers, lethargy, dysphagia, or hoarseness. Outpatient work-up included TFTs which were WNL, and an US of the thyroid, which showed a 4.6x1.5x1.8 cm mass in the right lobe. FNA revealed likely hyperplastic adenomatous nodule, cannot r/o follicular neoplasia. Pt was scheduled for r thyroidectomy and was medically cleared.

PMHx: HTN Meds: Atenolol, ASA
All: NKDA PSurgHx: L ing hernia repair
Case Presentation: Physical Exam

Pt sitting in chair, well-developed M in NAD
T98.8 134/76 77 14
PERRLA, EOMI
“fullness” noted in R neck, no LAD appreciated
S1S2
CTA bil
Abd soft, NT, ND, +BS
Ext: no c/c/e

WBC 6.8 H/H 14.6/43.0 Plt 160
Na 143 K4.2 Cl103 CO22 BUN 18 Crea 0.9 Glu 120
PT 11.9 PTT 22.9 INR 1.0
Case Presentation: Post-op

- Pt underwent right thyroidectomy. Intraop frozen section showed a focus of tissue suspicious for papillary carcinoma. Pathologists reported technical issues with the cryostat, and recommended follow-up of final pathology. Penrose drain was placed and wound was closed with staples. Perfect hemostasis was confirmed prior to closure.

- Pt was brought to the RR, and approximately 20 minutes later the dressing was noted to be completely saturated with active drainage from Penrose and swelling in the neck. Pt had no airway compromise and was hemodynamically stable.
Case Presentation: Re-op

- As pressure was maintained over the wound, pt returned to the OR for re-exploration.
- Wound was opened and mild oozing was noted from the muscular soft tissues of the right neck and the left lobe of the thyroid. Several “figure of 8” stitches and electrocautery were used to halt the residual bleeding.
- Hemostasis was again confirmed prior to closure, and the wound was stapled closed and a penrose left in place.
Case Presentation: Post-OP

- Pt was monitored in the ICU overnight. Pt remained hemodynamically stable with no active bleeding from the wound. Serial CBC revealed a stable H/H of 13.3/39. Serial troponins and EKG were negative for MI.
- Pt was D/Ced POD #2 tolerating a regular diet
Final pathology revealed nodular hyperplasia with hypercellular focus.
Final pathology revealed nodular hyperplasia with hypercellular focus.
Complications of Thyroidectomy
Thyroid Vascularization

The thyroid gland is a well vascularized organ with an abundant blood supply. Meticulous hemostatic technique is imperative.
Reducing Incidence of Post-thyroidectomy Hemorrhage

- Reeve et al. report a prospective study of 10,201 thyroidectomies at the Department of Surgery, Royal North Shore Hospital in Australia (1957–1997), 124 (1.2%) of which required reoperation to control hemorrhage.
- The authors implemented a number of practices, which they attributed to successfully reducing the incidence of post-op hemorrhage.

Prevention of Post-op hemorrhage

- Performance of the Valsalva maneuver by the anesthesiologist prior to closure.
  - This can stress potential bleeding points and therefore make them apparent to the surgeon prior to closure.
- Application of tracheal pressure overlying the wound as the patient is being extubated. Many patients cough as they are being extubated, and the authors postulate that this transient rise in CVP may contribute to post-op hemorrhage. Manual pressure may reduce the subsequent incidence of bleeding.
Prevention of Post-op hemorrhage

- Pre-op evaluation should include a careful history taking for potential bleeding disorders.
- The surgeon should be cognizant of pt's usage of aspirin, coumadin, or heparin.
- The wound should not be closed until impeccable hemostasis is achieved.
- Hemostasis should be reeval following removal of the shoulder roll and neck flexion by the patient.
- Reeve et al. recommend that the thyroid bed should be routinely lined with a layer of Surgicel.
Timing of Post-thyroidectomy Hemorrhage

- Abbas et al. Performed a prospective study on 918 patients who underwent thyroidectomy or parathyroidectomy from 1995 to 1999.
- Six of 918 thyroidectomy (0.7%) and 4 of 350 parathyroidectomy (1.1%) required re-operation for bleeding. In two cases the wounds were opened emergently at the bedside due to worsening airway obstruction.
- Excluding one patient who bled five days post-operatively, the time interval from the completion of surgery to the identification of a postoperative hematoma ranged from 2 to 48 hours, the median being 16 hours.

Matory et al. analyzed 3,200 head and neck surgical procedures for complications. 54 patients had post-op hemorrhage. Parotidectomy accounted for the most post-op hemorrhage, 1.7% (14 of 510 patients), followed by thyroidectomy, 1.6% (8 of 504 patients). Thirty-one patients were treated by reexploration in the operating room, 13 had limited exploration on the ward and 10 were observed with no intervention.
Length of Hospital Stay following Post-Op Hemorrhage

- Mean hospital stay was reduced for patients who had wound exploration in the operating room, 6.2 days.
- For exploration on the ward, the length of stay was 10.8 days. Those that were observed stayed for 18.9 days.
- Drains had no effect on wound healing or mean hospital stay.

Aspirin: Mechanism of Action

- ASA (acetylsalicylic acid) is an inhibitor of cycloxygenase, the enzyme involved in the inflammatory cascade which converts arachadonic acid into precursors of prostaglandin.
- As opposed to other NSAIDS, ASA is an irreversible inhibitor and therefore has a longer duration of its antiplatelet effect.
Aspirin: Mechanism of Action

- Low dose ASA therapy is indicated for MI prophylaxis in pts at risk for CV disease
- Three therapeutic dose ranges
  - Low dose (<300mg/day) antiplatelet effects
  - Intermediate dose (300-2400 mg/day) antipyretic and analgesic effects
  - High dose (2400-4000 mg/day) antiinflammatory effects
ASA and post-operative bleeding

- ASA is commonly stopped pre-operatively, but a number of studies fail to show significant increase in peri-op bleeding without cessation of ASA.
- Pts were confirmed to have prolonged bleeding times pre-operatively.
- Peri-operative blood loss was not significantly increased in these patients when compared to historical controls.

ASA and Peri-op Blood loss

- Ferraris et al. Studied 52 patients who underwent unplanned operations, 22 of which were on ASA.
- 8 of the 22 patients had elevated bleeding times.
- No increase in perioperative blood loss was noted in the group taking Aspirin.

RLN Injury

- The RLN is a branch of the Vagus that supplies all the muscles of the larynx, except the Cricothyroideus. It communicates with the internal branch of the superior laryngeal nerve, and gives off a few filaments to the mucous membrane of the lower part of the larynx.

- Recurrent Laryngeal Nerve Injury results in vocal cord paralysis on the side of the injury.

- Acute effects include immediate flaccidity of the ipsilateral vocal fold, loss of abduction and adduction, severe dysphonia to complete paralytic aphonia, and, frequently, aspiration of food and drink into the trachea.

- Subsequently pt may either suffer from chronic denervation or develop nerve regeneration with partial or complete laryngeal muscle reinnervation.
Recurrent Laryngeal Nerve

- The Recurrent Nerve arises, on the right side, in front of the subclavian a.; ascends obliquely to the side of the trachea behind the common carotid artery, and either in front of or behind the inferior thyroid artery. On the left side, it arises on the left of the arch of the aorta, and winds below the aorta at the point where the ligamentum arteriosum is attached, and then ascends to the side of the trachea.
Recurrent Laryngeal Nerve

- The nerve on either side ascends in the tracheoesophageal groove, passes under the lower border of the Constrictor pharyngis inferior, and enters the larynx behind the articulation of the inferior cornu of the thyroid cartilage with the cricoid.
- In approximately 5 of 1000 patients, a nonrecurrent laryngeal nerve is found. The nonrecurrent laryngeal nerve branches from the vagus at approximately the level of the cricoid cartilage and directly enters the larynx without looping around the subclavian.
Recurrent Laryngeal Nerve

The thyroid gland overlies the recurrent laryngeal nerves bil. The RLN should be exposed along its entire course to avoid injury.
RLN Injury

- Current consensus is that the RLN should be clearly exposed and identified to avoid injury.
- Some recommend intraop nerve monitoring, though this is not a substitute for exposure and identification.
- Medicolegally many recommend laryngoscopy before the initial operation; some pts may have a prior long-standing compensated unilateral vocal cord paralysis
- Prior to reop, indirect laryngoscopy is recommended to eval vocal cords

Superior LN Injury

- Branch of the Vagus which innervates the cricothyroideus muscle
- Tenses the vocal cords when they are approximated, providing timbre to the voice
- Important for projecting the voice and for screaming, but injury is often subclinical
- Devastating injury for singers, politicians, media announcers, mothers of young children
- At one time referred to as “the nerve of Amalita Galli Curci” because of the termination of this world class opera singer’s career after a thyroidectomy for benign disease performed during the 1930s
Superior Laryngeal Nerve

- It descends, by the side of the pharynx, behind the internal carotid artery, and divides into two branches, external and internal.
- The external branch descends on the larynx to supply the Cricothyroideus.
Superior Laryngeal Nerve Injury

Superior pole vessels should be ligated close to the gland to avoid injury to the external branch of the superior laryngeal nerve.
One study evaluated the relationship between the superior thyroid pole and the SLN in 72 human cadaver dissections. Type IIB relationship between SLN and the pole was increased in pt's with an enlarged hemithyroid and in pt's of short stature. The author's posit that these pt's may be at greater risk for SLN injury.

- When both lobes of the thyroid are resected, pt is at risk for iatrogenic parathyroid injury.
- Parathyroids are supplied by end-artery branches of inf thyroid artery.
- Many surgical units report a post-operative hypoparathyroidism rate of < 2%.
Parathyroid Injury: Proper Technique

Inferior thyroid artery should be divided close to the thyroid gland to avoid compromise to the blood supply to the parathyroid glands.
Parathyroid Injury: Transplantation

- If end-artery damage to a parathyroid gland is observed, this gland may be transplanted to the forearm or a “dry” pocket of the sternocleidomastoid.
- A “slice” of the gland may be sent for frozen section to confirm that it is indeed parathyroid prior to transplantation.
- If a parathyroid appears congested or ischemic, an incision may be made in the capsule to drain excess venous blood and restore viability to the gland.
Parathyroid Injury: Transplantation

- Some surgeons recommend routine transplantation of at least one parathyroid gland to prevent post-op hypocalcemia.
- Zedenius et al. performed parathyroid transplants to the SCM in 100 consecutive patients with no reported post-op hypocalcemia.
- A similar study by Lo et al in 98 patients had no patients with permanent hypocalcemia, but 21% with transient post-op hypocalcemia.


Parathyroid Injury

- Postoperatively pt's should be monitored for sx of hypocalcemia
  - Perioral tingling, paresthesias of the extremities
  - Trousseau's Sign: carpal spasm with inflation of the blood pressure cuff above systolic pressure
  - Chvostek's Sign: facial spasms with tapping of the facial nerve 2 cm anterior to the tragus of the ear
  - Prolonged QT interval on EKG
  - Depressed tendon reflexes
- Calcium levels should also be followed in the first 24 hours.
Parathyroid Injury

- Normocalcemia on the first post-op day is highly predictive of the patient remaining so.
- Postoperative hypocalcemia may be managed with daily calcium carbonate supplementation with the possible addition of Vitamin D analog such as Rocaltrol.
- Hypocalcemic pt's should be evaluated again in 2 weeks in order to assess recovery; most patients may be weaned off of supplementation by three months time.
Complications of Thyroid Surgery Performed by Residents

- Study from Downstate by Dr. Shaha and Dr. Jaffe is a retrospective study of 200 consecutive pts undergoing thyroid surgery
  - One case superior laryngeal nerve injury
  - One case of temporary recurrent laryngeal nerve palsy
  - One case of temporary hypoparathyroidism
  - Three cases of post-operative hemorrhage requiring reexploration
  - Two diabetic pts with wound infections

- Thyroidectomy appears to be a safe operation in the hands of residents under supervision.

Shaha A, Jaffe BM. Complications of thyroid surgery performed by residents. Surgery. 1988 Dec;104(6).