



Case report

Combined tracheostomy and thyroidectomy in a patient with cervical spine fracture

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ARTICLE INFO

Keywords:

Cervical spine fracture
Spinal shock
Thyroidectomy
Tracheostomy

ABSTRACT

Background: Combined tracheostomy and thyroidectomy is usually done in case of removal of a large goiter causing damage to the tracheal wall. Thyroidectomy to get access to the trachea for surgical airway is a rare procedure. Tracheostomy following cervical spinal fracture is challenging as no hyperextension can be provided limiting exposure.

Case report: A 45-year-old intoxicated male with a head on bicycle accident suffered a C1 fracture and cervical spinal shock requiring emergent intubation. The C1 fracture was managed with a cervical collar. The patient improved neurologically on the ICU; however, he could not be weaned from mechanical ventilation thus requiring tracheostomy. On initial trauma CT-scan, a large goiter displacing the trachea to the left side was seen. He was kept in line stabilized using towels in the OR. A 5 cm transverse neck incision was made. The large partially retrosternal goiter reaching the aortic arch was stepwise mobilized out of the neck. The isthmus was divided; the enlarged right lobe was brought out of the neck and resected. The trachea was pulled to the midline, crosswise incised, the skin flaps were sutured down and a 7 Shiley cannula was inserted. A PEG tube was placed. The patient had a protracted course but ultimately was transferred alert and oriented to a long-term rehabilitation facility moving all extremities.

Conclusion: Combined thyroidectomy with tracheostomy in the setting of cervical fracture is technically challenging but was an essential step in the recovery of this patient.

1. Introduction

Combined tracheostomy and thyroidectomy is usually done in case of removal of a large goiter that causes damage to the anterior tracheal wall [1]. Multiple studies have established criteria which patients need a tracheostomy due to tracheomalacia [2,3]. Nevertheless, still some patients develop tracheal collapse after a thyroidectomy and need an emergent airway within few hours after surgery [4]. Tracheal resection with tracheostomy may also be required in case of cancer infiltration of the tracheal wall [5].

Thyroidectomy, in order to get access to the trachea for surgical airway, is a very rare procedure. In many cases, the tracheal wall can be exposed by mobilizing the enlarged thyroid gland; division of the isthmus may facilitate the procedure. Percutaneous tracheostomy may be done in patients with enlarged thyroid gland and can be done through the thyroid isthmus [6]; however, this approach may have a higher risk for post-operative bleed. If a goiter covers the trachea or displaces it to the side, partial resection may be required.

Tracheostomy in patients with cervical spinal fracture is challenging as no hyperextension can be provided thus limiting exposure to the trachea [7]. However, multiple studies have demonstrated the benefits of early tracheostomy in this patient cohort. For patients after anterior fusion, a percutaneous approach may be beneficial due to the much smaller incision and lower incidence of surgical site infection [8].

2. Case report

A 45-year-old African-American male had a head on bicycle accident while being intoxicated. He was brought to the emergency room and was diagnosed with a C1 fracture on CT-scan imaging (Fig. 1). Clinically, he was hypotensive and cervical spinal shock was suspected. He was emergently intubated for respiratory distress with emphasis on in-line stabilization of the cervical spine. Intubation was somewhat difficult due to moderate resistance to advance the tube below the larynx. Chest x-ray showed good positioning of the tube, but also a mass in the neck and upper mediastinum (Fig. 2a). He was admitted to the

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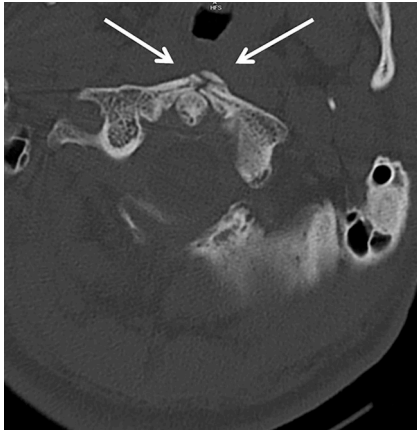


Fig. 1. Trauma CT-scan: C1 fracture (arrows).

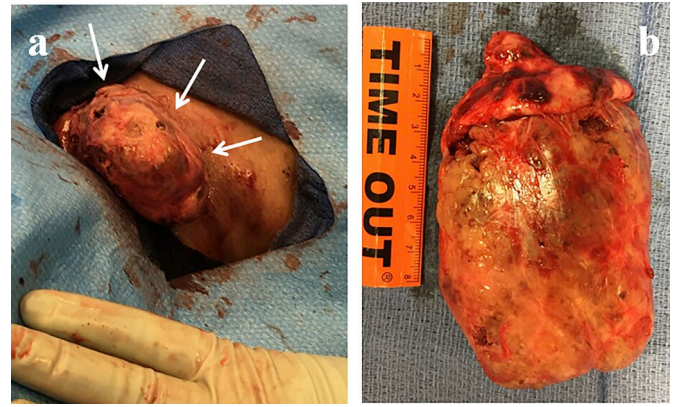


Fig. 3. a/Intraoperative findings: Goiter delivered out of the neck incision (arrows) b/Specimen: large goiter.

ICU and hemodynamically stabilized. The C1 fracture was managed non-operatively with in-line stabilization using a cervical collar. He improved neurologically moving all four extremities and became more alert during the following week. Indication for the tracheostomy was made as the patient could not be successfully weaned from the ventilator. Upon review of the initial trauma CT-scan, a large right sided goiter was seen, which displaced the trachea to the left side. This corresponded to the mass seen on initial chest x-ray (Fig. 2a, b, c, d, e).

Consent with his medical decision maker included the tracheostomy and a PEG tube but also the likely need for a partial thyroidectomy. In the operating room, the collar was removed and he was kept in line and the head was stabilized using towels. A 5 cm transverse incision was made 2 cm above the jugular notch. Subcutaneous fat and platysma were divided and the strap muscles were split in the midline. A large partially retrosternal goiter was present and the trachea could be felt behind the isthmus displaced to the left and no easy access could be obtained. A modified percutaneous approach using guidewire technique was technically not possible. Therefore, the large right-sided goiter was stepwise mobilized out of the neck. The feeding upper pole vessels and lateral veins were secured with ties, clips and the harmonic scalpel. The mediastinum could now be probed with a finger and it was found that the goiter reached all the way down to the level of the aortic arch. The isthmus was divided using the harmonic scalpel and thereafter, the goiter could be brought out of the neck (Fig. 3a). The prominent inferior pole vessels were exposed and secured with a 3-0 vicryl tie close to the capsule to protect the recurrent nerve. Last adhesions were cut and the specimen was handed off for pathology (Fig. 3b). The left thyroid lobe could now be dissected off the trachea and the trachea could be pulled to the midline. A crosswise incision was made into the

trachea at the 3rd tracheal ring and the skin flaps were sutured down pulling the anterior tracheal wall to the midline and anteriorly. A 7 Shiley cannula was inserted into the trachea after the endotracheal tube was pulled back. Ventilation was without any problems and subsequently the PEG tube was placed without any difficulties. Final pathology showed a 160g specimen including a distinct 8 × 6.5 × 4.5 cm adenomatoid nodule with widespread degenerative changes and multifocal areas of hemorrhage but no evidence for malignancy.

The patient was brought back stable to the ICU and started to wake up the next day. He was started three days later on low-dose heparin and developed a neck hematoma. Heparin was stopped and the hematoma did not hamper breathing and did not require surgical drainage. The patient's course was complicated by pneumonia caused by multidrug-resistant *Pseudomonas aeruginosa* and his clinical status gradually worsened. Gentamycin was given but caused renal failure and the patient required intermittent dialysis. In addition, his neurologic status deteriorated. The patient was unresponsive and stopped moving his extremities. Due to the grave prognosis, palliative care was consulted, however, the family decided to continue ICU care. Gentamycin was stopped and the kidney function gradually improved parallel to the patient slowly waking up and again starting to move his arms and legs. The tracheostomy was kept in place, enteric tube feeds were continued and the patient made a remarkable recovery. He was transferred to a long-term rehabilitation facility alert and oriented moving all extremities after a five week ICU stay. After three months he was decannulated and started to tolerate a diet. At a nine months follow up, the neck incision had completely healed; he had normal thyroid function and had no hoarseness. He had normal range of motion in his neck and was able to tolerate a regular diet. He had some balance issues resulting from the bicycle accident but otherwise a good quality of life.

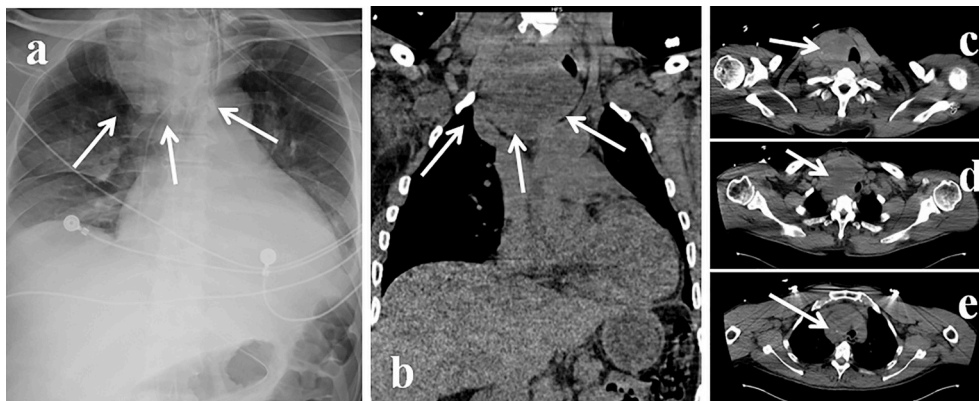


Fig. 2. a/Chest x-ray showing large neck mass (arrows) b/CT-scan at admission (sagittal): large retrosternal goiter reaching level of the aortic arch (arrows). c,d,e/CT-scan at admission (transverse cuts at various levels): large goiter compressing trachea and displacing it to the left (arrow).

3. Discussion

We report on a successful combined thyroidectomy with tracheostomy in a patient with a C1 fracture. This is a technically challenging procedure due to limited tracheal exposure but the surgical airway was an essential step in the recovery of this patient.

Avoiding long term intubation and providing early PEG placement in patients with cervical spine fractures is associated with improved outcome and should be attempted to avoid secondary complications such as nasogastric tube syndrome, laryngeal damage, pneumonia, muscle weakness and delirium from long term sedation amongst many others [7–9].

Combined thyroidectomy and tracheostomy is mainly a procedure done for tracheomalacia associated with large goiters and is a safe procedure [1]. The addition of a surgical airway does not increase morbidity or mortality although surgical site infection risk is increased. Our patient received pre-operative antibiotic prophylaxis. We sutured the tracheal flaps to the skin to minimize microbial contamination of the cavity and in order to pull the trachea to the midline and anteriorly to avoid collapse of the lumen in case tracheomalacia would have been a problem. Thyroidectomy through a smaller incision of only 5 cm as in our case is feasible. In the setting of a large retrosternal goiter, it is crucial to completely mobilize the upper portion of the gland prior to bring the lower portion out of the chest. Devascularization was started lateral and thereafter, the upper pole vessels were secured. Division of the isthmus and dissection of the upper portion of the right sided goiter gave then exposure to the retrosternal portion and once the mass was delivered out of the neck only the lower pole vessels had to be ligated. Recurrent nerve monitoring was not available in our case but may be useful to protect the nerve in similar cases.

Our patient had a postoperative bleed after heparin was given for DVT prophylaxis but did not require reoperation. He had multiple other medical complications but ultimately recovered well. Large goiters should not be considered a contraindication to tracheostomy in patients requiring a surgical airway.

Author disclosure statement

The article is not under review at another journal, there are no financial disclosures or conflicts of interest to be reported.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rmcr.2019.100860>.

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