
A rare complication of bedside tracheotomy: Thyroid crisis

Sir,

Tracheostomy is routinely performed for airway management in critically ill patients.^[1] Tracheostomy is associated with a few complications that may be early (airway bleeding, subcutaneous emphysema, vessel injury, infection, cricoid fracture, and others) or late (airway stenosis, tracheoesophageal fistula, and others).^[2] Herein, we describe an uncommon complication (thyroid storm) of bedside tracheostomy.

A 40-year-old previously healthy female was admitted with the complaints of fever and breathlessness of 1-week duration. Physical examination revealed tachypnea (40 breaths/min) and tachycardia (118 beats/min) and hypotension (mean arterial pressure, 55 mmHg). The pulse oximetric oxygen saturation was 72% at room air with a $\text{Pa}_{\text{O}_2}:\text{Fi}_{\text{O}_2}$ ratio of 120. The investigations revealed thrombocytopenia and anemia [Table 1]. Echocardiography revealed global hypokinesia with a left ventricular ejection fraction of 35%. A diagnosis of acute febrile illness with

Table 1: Hemogram, biochemistry, and thyroid profile of the patient

Parameter	At admission	At the time of worsening	At the time of discharge
Hemoglobin (g/dL)	8.0	8.3	8.6
Total leukocyte count (cells/ μ L)	13,000	16,800	14,900
Platelet count (cells/ μ L)	78,000	103,000	175,000
Sodium (mmol/L)	137	137	137
Potassium (mmol/L)	3.06	3.19	4.2
Urea (mg/dL)	21	57	21
Creatinine (mg/dL)	0.25	0.93	0.25
Aspartate transaminase (U/L)	34	73	34
Alanine transaminase (U/L)	46	37	46
Alkaline Phosphatase (U/L)	230	94	230
Bilirubin (mg/dL)	0.31	0.41	0.31
Protein (g/dL)	6.9	6.9	6.9
Albumin (g/dL)	2.27	3.02	3.27
Calcium (mg/dL)	7.9	8.9	9
Endotracheal aspirate culture	Sterile	Sterile	
Blood culture	Sterile	Sterile	
Mechanical ventilation settings			
Tidal volume, mL	320	300	Off ventilator
PEEP, cm of H ₂ O	10	5	
PaO ₂ :FiO ₂ ratio	120	225	
Plateau pressure, cm of H ₂ O	30	28	
TSH (μ U/mL), normal range: 0.27-4.2	-	0.005	
Total T3 (ng/mL), normal range: 0.8-2	-	1.85	0.607
Total T4 (μ g/dL), normal range: 4.8-12.7	-	22.9	6.07

TSH: Thyroid-stimulating hormone, PEEP: Positive end-expiratory pressure

myocarditis and pulmonary edema was made. She was endotracheally intubated and mechanically ventilated using the low-tidal-volume strategy.

The patient was empirically treated with intravenous antibiotics (ceftriaxone and azithromycin) along with supportive care. Over the next few days, her clinical condition improved with resolution of tachycardia, fever, and hypotension. She had weaning failure that was attributed to left ventricular dysfunction and intensive care unit (ICU) acquired neuromuscular weakness.

A bedside tracheostomy was performed to facilitate weaning. The thyroid was reported to be bulky and required manipulation during the tracheostomy. Twenty-four hours after tracheostomy, the patient had new onset fever and tachycardia associated with drowsiness. A possibility of hospital-acquired infection was kept, and her antibiotics were changed (intravenous meropenem and vancomycin) after drawing cultures from blood and tracheal aspirate. However, the fever and tachycardia persisted despite antibiotics. The cultures sent at the time of worsening were sterile. As the patient had worsened within 24 h of tracheostomy and the fact that thyroid was reported to be bulky during the procedure that required manipulation for performing the procedure, a possibility of thyroid storm was kept. The index case had a score of 65 according to the Burch and Wartofsky scoring system (a score of 45 or more is highly suggestive of thyroid storm) further supporting the diagnosis. Thyroid function tests revealed a low thyroid-stimulating hormone with elevated total T4 levels [Table 1]. She was treated with oral propylthiouracil (200 mg q 4 h), hydrocortisone (100 mg every 8 h), and oral propranolol (20 mg 6th hourly). This

resulted in control of heart rate and resolution of fever spikes over the subsequent 24 h. Subsequently, she was continued on carbimazole (10 mg once daily). The patient was successfully weaned off the ventilator and was discharged to home care on tracheostomy.

The index case highlights a hitherto unreported complication of tracheostomy (thyroid storm) that was identified and managed successfully with antithyroid drugs and supportive care. Thyroid storm is a rare complication of thyrotoxicosis, which is most commonly precipitated by the discontinuation of antithyroid drugs. It is possible that a primary diagnosis of thyrotoxicosis might have been overlooked in the index case and that measurement of thyroid hormone levels at baseline might have provided a more conclusive evidence. The same were not measured at baseline and is a limitation. However, the index case did not have any prior history of thyroid disorder and had no clinical features (tremor, palpitation, weight loss, and exophthalmos) of hyperthyroidism at presentation to the ICU. Moreover, serum T4 levels were elevated rather than T3 suggesting the release of stored hormone (during surgery) rather than Graves' disease. Thyroid surgery, trauma to the neck, and strangulation, especially with direct trauma to thyroid, are other reported causes of thyroid storm.^[3,4] In the index case, there were features of thyroid storm (fever, tachycardia, and altered sensorium) along with the absence of an infectious etiology and high thyroxine levels that developed within 24 h of tracheostomy.

Treatment of thyroid storm includes control of the hyperfunctioning gland with antithyroid medications including methimazole, carbimazole, or propylthiouracil.

Propylthiouracil decreases new hormone synthesis as well as the peripheral deiodination of T4–T3 and is best suited for the management of acute emergencies, as shown in the index case.^[5]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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DOI:

10.4103/lungindia.lungindia_238_18

How to cite this article: Kalpakam H, Dhooria S, Agarwal R, Mukherjee S, Sehgal IS. A rare complication of bedside tracheotomy: Thyroid crisis. *Lung India* 2019;36:77-9.

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