Tracheal Ring Fracture and Pseudomembrane Formation After Percutaneous Dilatational Tracheostomy

To the Editor:

Various complications from percutaneous dilatational tracheostomy (PDT) have been reported in the literature. Tracheal ring fracture can take place while either using single or sequential dilators during the procedure.[1] Fibrinous tracheal pseudomembranes can also appear in previously intubated patient.[2] Recently, we encountered a case in which both tracheal ring fracture and pseudomembrane developed as a consequence of PDT.

A 36-year-old woman with a history of diabetes mellitus and postpartum dilated cardiomyopathy was admitted to intensive care unit (ICU) with decompensated cardiac failure. She required intubation because of acute pulmonary edema. On day 6, she developed ventilator-associated pneumonia and on the 11th day, she underwent bronchoscopy-guided PDT. The procedure was performed by a thoracic surgeon using a single dilator technique (Blue Rhino; Cook Critical Care Inc.). There were no immediate complications. Moreover, there were no unusual findings during the insertion of the dilator and the tracheostomy cannula as evidenced endoscopically. The patient was disconnected from mechanical ventilation and discharged from the ICU 4 days later. To safely remove the tracheostomy cannula, a flexible bronchoscopy was performed on day 18. A fibrinous tracheal pseudomembrane was found above the tracheal stoma (Fig. 1A). It was removed using argon plasma coagulation through the flexible bronchoscope. Concomitantly, a segment of tracheal cartilage protruding into the tracheal lumen was evidenced (Figs. 1B, C). The cartilage was removed with the help of Kelly's forceps introduced through the tracheal stoma (Fig. 1D). The tracheostomy cannula was successfully removed and she remained asymptomatic at 15-day, 1-month, and 6-month follow-up.

PDT is a common and relatively safe procedure.[2] Prolonged intubation remains the most common indication. Complications from PDT could be encountered perioperatively or during the early or late postoperative period. Tracheal ring fracture is a perioperative complication that could occur while using single or sequential dilators. It could be un-noticed, despite bronchoscopic guidance during tracheostomy. Its incidence range from 5% to 36%[1] and its long-term significance remains poorly defined.[3]

Tracheal pseudomembranes may appear in previously intubated patients shortly after the extubation and is considered a potentially fatal complication from sudden airway obstruction if undetected and not managed in a timely manner.[4] It is usually located at the site where the tracheal tube cuff comes in contact with the tracheal mucosa. It is composed mainly of fibrin and desquamated necrotic epithelium. It could be permanently removed with a rigid bronchoscope or by means of flexible bronchoscopy techniques.[4–6]

In the presented case, both pseudomembrane and tracheal ring fracture were evidenced during bronchoscopic inspection performed before the removal of the tracheostomy cannula. In the beginning, extraction of the pseudomembrane with forceps through the flexible bronchoscope was not feasible because of its firm adherence to the tracheal wall, and the argon plasma use of coagulation was required. Removal of the piece of cartilage was possible with the use of Kelly's forceps introduced through the tracheal stoma.

In conclusion, tracheal ring fracture and postintubation tracheal pseudomembranes are not infrequent complications of the PDT, the latter being potentially fatal if not detected and treated in timely fashion. Bronchoscopic examination should be performed before decannulation for early detection and prompt management of PDT complications.

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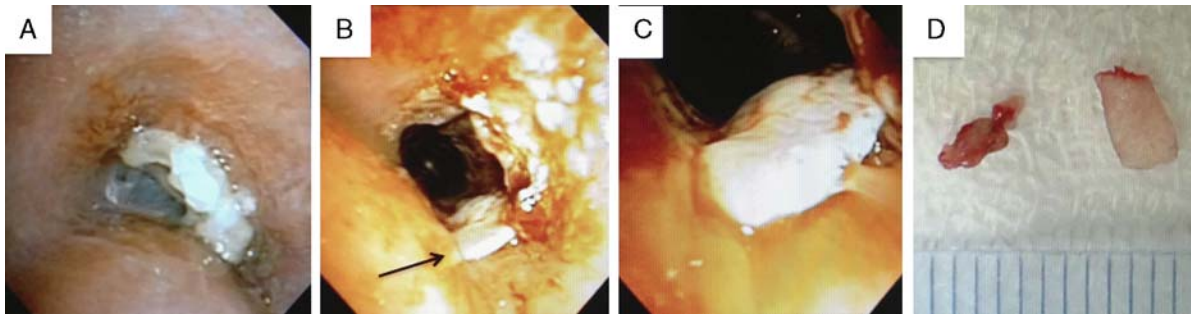

FIGURE 1. A, A whitish, fibrinous tracheal pseudomembrane adhered to the anterior and right lateral wall of the trachea above the stoma (the tracheal cuff is seen below the pseudomembrane). B and C, The tracheal pseudomembrane was removed and a piece of fractured cartilage was evidenced (arrow). D, The pieces of cartilage were removed with Kelly's forceps introduced through the tracheal stoma.

REFERENCES

1. Fikkers BG, Staatsen M, van den Hoogen FJA, et al. Early and late outcome after single step dilatational tracheostomy versus the guide wire dilating forceps technique: a prospective randomized clinical trial. *Intensive Care Med*. 2011;37:1103–1109.
2. Dempsey GA, Grant CA, Jones TM. Percutaneous tracheostomy: a 6 yr prospective evaluation of the single tapered dilator technique. *Br J Anaesth*. 2010;105:782–788.
3. Higgins D, Bunker N, Kinnear J. Follow-up of patients with tracheal ring fractures secondary to antegrade percutaneous dilational tracheostomy. *Eur J Anaesthesiol*. 2009;26:147–149.
4. Deslee G, Brichet A, Labuffe G, et al. Obstructive fibrinous tracheal pseudomembrane. A potentially fatal complication of tracheal intubation. *Am J Respir Crit Care Med*. 2000;162:1169–1171.
5. Lins M, Dobbeleir I, Germonpre P, et al. Postextubation obstructive pseudomembranes: a case series and review of a rare complication after endotracheal intubation. *Lung*. 2011;189:81–86.
6. Yildirim BB, Karalezly A, Hasanoglu HG, et al. Obstructive fibrinous tracheal pseudomembrane. *J Bronchol Interv Pulmonol*. 2012;19:129–131.

A Remedy for Hoarseness in a Patient With Granulomatosis With Polyangiitis

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To the Editor:

Granulomatosis with polyangiitis (GPA) is a multisystemic disease characterized by a necrotizing, granulomatous vasculitis that affects primarily the upper and lower respiratory tracts and kidneys. It typically presents as sinusitis, pulmonary infiltrates, and glomerulonephritis.[1] Unlike the well-described pulmonary parenchymal involvement, tracheobronchial manifestations are less recognized by physicians. These extraparenchymal pulmonary manifestations include involvement of the oral cavity, larynx, and trachea. Airway involvement is found in 15% to 55% of patients.[2–4] Laryngeal involvement is uncommon but if present, may occur either as a presenting feature or a late-stage manifestation of the disease and will occur in approximately 10% to 20% of cases.[5–6] The subglottis and upper trachea are most commonly involved, with the most common finding being circumferential scarring and critical narrowing of the airway. Vocal cord involvement has rarely been reported and is usually not a manifestation of the disease. We report a case of GPA with subglottic stenosis and contiguous involvement of the vocal cords.

A 31-year-old woman was diagnosed with GPA in 2001 (+ PR3-ANCA). Organ involvement included nasal septum, sinuses, joints, hearing loss, orbit, skin, and lung parenchyma. Her longstanding history included multiple relapses and resistance to standard treatment options including prednisone, cyclophosphamide, methotrexate, azathioprine, and rituximab. She presented to us in 2008 stating that she had noticed a nonproductive cough for the past 2 months. During that time, her cough had worsened and began to interfere with her sleep. In addition, she had become more short of breath, being able to climb only 7 stairs at a time before having to stop and rest.

On physical examination, wheezing was evident with decreased breath sounds over the right hemithorax. This was worrisome for bronchial airway involvement; a bronchoscopy was performed, which demonstrated a normal appearing larynx. A mild stricture (10%) was found in the subglottic area and a more severe stenosis was found in the bronchus intermedius (95% stenosis), both of which had a benign appearance. The latter was injected with depomedrol, incised using an electrocautery blade followed by