

DIAGNOSTIC CHALLENGE

Where is the ET tube?

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Case history

A 79-year-old man developed acute onset of tongue and neck swelling while camping. Diphenhydramine was administered at the scene, and he was taken by car to the emergency department (ED) at a tertiary care hospital. His medical history included hypertension, asthma and chronic back pain. He was taking the following medications: lisinopril, salbutamol, ipratropium bromide, esomeprazole and ibuprofen. There was no change in diet or medications, and no insect bite. The patient had no known drug or food allergies.

On admission to the ED, he was alert and stable, with a pulse of 78 beats/min, blood pressure of 199/87 mm Hg, respiratory rate of 18 breaths/min, temperature of 36.9°C, and room air oxygen saturation of 97%. His tongue, soft palate and anterior neck were edematous down to the supraclavicular notch, and his (Mallampati) airway patency score was 4. Despite this, he was able to talk and swallow saliva. His chest was clear to auscultation, and there were no wheals on the skin.

Emergency treatment included the administration of 1:1000 epinephrine (0.5 mg intramuscularly), diphenhydramine (50 mg intravenously [IV]), ranitidine (50 mg IV), and hydrocortisone (100 mg IV) in rapid succession. The anesthetist and intensivist on call were notified. We anticipated a difficult airway and so we used the “triple set-up,” which included a difficult airway cart and percutaneous cryothyrotomy and tracheostomy sets. The anterior neck was infiltrated from the supraclavicular notch to the level of cryothyroid membrane with 10 mL of 2% lidocaine, plus 1:100 000 epinephrine. A midline vertical incision

was made through the subcutaneous tissues in preparation for a tracheostomy.

After sedating with ketamine (50 mg IV) and anesthetizing the hypopharynx with lidocaine spray, direct orotracheal intubation was attempted using a GlideScope® video intubation laryngoscope (Saturn Biomedical Systems Inc., Burnaby, BC). A 7.5 endotracheal (ET) tube containing a stylet was inserted to a depth of 23 cm beyond the teeth, but only the epiglottis was visualized during intubation.

A colorimetric end-tidal CO₂ detector (Portex® CO₂ Clip™, Smiths Medical ASD, Keene, NH) was connected to the ET tube and it demonstrated synchronous fluctuation in CO₂ with the respiratory cycle. Oxygen saturation remained above 90%, but there was no humidification of the tube during expiration. Furthermore, the patient began to phonate and bubbles appeared at the corner of his mouth. We attempted to determine the position of the ET tube with direct laryngoscopy, however this was unsuccessful. A fiberoptic bronchoscope could not be advanced through the distal portion of the ET tube.

The next step in emergency airway management should have been to:

- a) perform a chest x-ray to confirm ET tube placement;
- b) change end-tidal CO₂ monitors;
- c) aggressively ventilate the patient through the ET tube with bag–valve unit;
- d) attempt video laryngoscopy again; or
- e) proceed directly to tracheostomy.

For the Answer to this Challenge, see page 446.

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