

## Can fluid resuscitation be a risk factor for laryngeal oedema in severe dengue?

Sir,

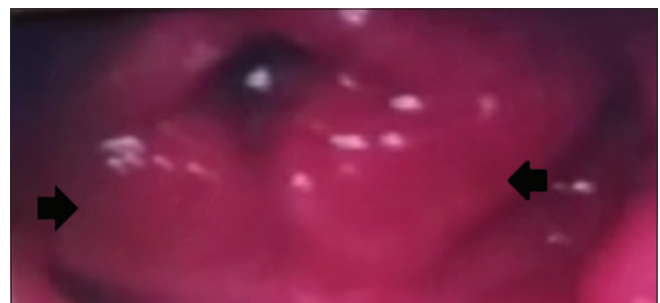
Post-extubation stridor (PES) is a frequent complication in intensive care settings requiring re-intubation.<sup>[1]</sup> Re-intubation is associated with increased duration of mechanical ventilation and morbidity.<sup>[2]</sup> Risk factors have been identified to predict PES in Intensive Care Unit (ICU) patients who warrant tests to prevent extubation failure and subsequent re-intubation.<sup>[1,3]</sup> We report a case of severe dengue in our ICU with failed extubation due to laryngeal oedema. Informed consent was taken before writing this report.

A 20-year-old female, with no previous co-morbidities was admitted to a private nursing home with chief complaints of fever, headache, vomiting and generalised body aches of 6 days duration. She received antibiotics (levofloxacin, amoxicillin-clavulanate and doxycycline) and platelet transfusion (four units of random donor platelets) along with intravenous fluids (details of resuscitation and haemodynamic monitoring were not available). Following 4 days of hospitalisation, she developed respiratory failure requiring non-invasive-ventilatory support, and was then shifted to our ICU with a diagnosis of severe dengue with respiratory failure. She was intubated with size 7 internal diameter endotracheal tube and put on mechanical ventilation. She was hypotensive (mean arterial blood pressure 55 mmHg), and norepinephrine at 0.1 mcg/kg/min was started targeting a mean arterial pressure of 65 mmHg. Investigations at admission to ICU showed persistent thrombocytopenia (platelet count of 13,000 cells/mm<sup>3</sup>). Her admission lactate was 40 mg/dl with Acute Physiology and Chronic Health Evaluation II score of 9 and Sequential Organ Failure Assessment score of 5. She was positive for dengue IgM serology and repeat testing for other tropical infections was negative. Broad spectrum antibiotics (meropenem and doxycycline) were started. She recovered from septic shock in 48 h and her oxygenation improved after 4 days of mechanical ventilation (PaO<sub>2</sub>/FiO<sub>2</sub> ratio increased from 150 at admission to 400). On day 6, an extubation attempt was made after ensuring adequate neuromuscular power (good coughing and neck holding), positive cuff leak test (120 mL tidal

volume difference), with around +800 mL cumulative balance from admission and a successful 90 min of spontaneous breathing trial. Within 15 min after extubation, she developed stridor with respiratory distress, and she was re-intubated. Dexmedetomidine sedation (40–60 µg/kg/h) was continued for 2 more days along with dexamethasone 8 mg 12 hourly and second attempt of extubation was made (+400 mL cumulative balance from admission). She again developed stridor and was re-intubated following which she was tracheostomized. Videolaryngoscopy revealed bilateral arytenoid swelling with normal vocal cord function [Figure 1]. She was liberated from mechanical ventilation within 2 days. Subsequently, she was decannulated and discharged after 15 days of ICU stay.

Endotracheal intubation is a commonly done invasive procedure in ICUs associated with complications.<sup>[4]</sup> Extubation failure in ICU can be multifactorial, due to neuromuscular weakness, heart failure, airway-related complications such as vocal cord injuries leading to paresis, granulomas and ulcerations, all leading to PES.<sup>[5]</sup> PES in ICU has a wide range of incidence varying from 5.0% to 55%.<sup>[1]</sup> Risk factors described include female gender, long duration of intubation, use of larger internal diameter tube, high cuff pressure, difficult intubation, recent history of upper respiratory infection, history of reactive airway disease and multiple attempts to secure the airway.<sup>[3]</sup>

The initial phase of illness in dengue (3–7 days of illness) is characterised by capillary leakage and third space fluid loss during which fluid resuscitation can lead to airway oedema.<sup>[6]</sup> This should be kept in mind when these patients present with respiratory failure and require securing the airway. Fluid resuscitation as a risk factor for airway oedema is not new and has been reported in physiological conditions such as pregnancy and neurosurgeries done in prone position.



**Figure 1:** Videolaryngoscopic view of bilateral arytenoid swellings (arrows)

To the best of our knowledge, this complication has not been reported in patients with severe dengue.

The 'cuff leak test' is commonly used to predict PES.<sup>[7]</sup> As with any clinical diagnostic test, it also has its own limitations, though it has a negative predictive value above 90% but an uncertain positive predictive value (69%).<sup>[1]</sup> Even our patient had a positive cuff leak test but developed PES. Ultrasonography, videolaryngoscopy and fibre-optic bronchoscopy are other tools in diagnosing airway oedema but are usually indicated in patients with documented risk factors for PES. Our case highlights that one should have a high index of suspicion in these patients for laryngeal oedema and besides the cuff leak test, other modalities to rule out laryngeal oedema should also be considered. In conclusion, fluid resuscitation along with capillary leakage in patients with severe dengue may lead to laryngeal oedema. A high index of suspicion should be maintained and adequate precautions should be taken during extubation in these patients.

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#### Conflicts of interest

There are no conflicts of interest.

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