

# Diphtheritic Myocarditis Patient with an Impending Upper Airway Compromise

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To the Editor,

Myocarditis and conduction defects are common cardiac complications of diphtheria.<sup>1</sup> Herein, we report a case of diphtheria complicated by myocarditis and impending respiratory failure posted for emergency tracheostomy.

A partially immunized five-year-old boy weighing 14 kg was brought to the pediatric intensive care unit with fever and diffuse submandibular swelling. On examination of the oral cavity, whitish membranous patchy lesions were observed over the tonsillar area. The Albert stain was positive and antidiphtheritic serum injection and penicillin G were administered to the patient. The neck swelling increased with signs of inflammation after 3 hours of hospitalization. Later, the baby developed spontaneous oronasal bleeding with bradyarrhythmias of junctional rhythm (Fig. 1A). Blood investigations were unremarkable except for neutrophilic leukocytosis (white blood count of 27920/ $\mu$ L with neutrophils 89%). The baby was diagnosed to have faucial diphtheria with myocarditis and was scheduled for tracheostomy in view of impending upper-airway obstruction and transvenous pacing for bradyarrhythmias.

Standard anesthesia monitors were connected in the operating room. We, along with ear, nose, and throat surgeons, decided to proceed to tracheostomy after securing the oral endotracheal tube (ETT) as our patient was agitated and irritable. Videolaryngoscope-assisted orotracheal intubation under general anesthesia with maintenance of spontaneous respiration was

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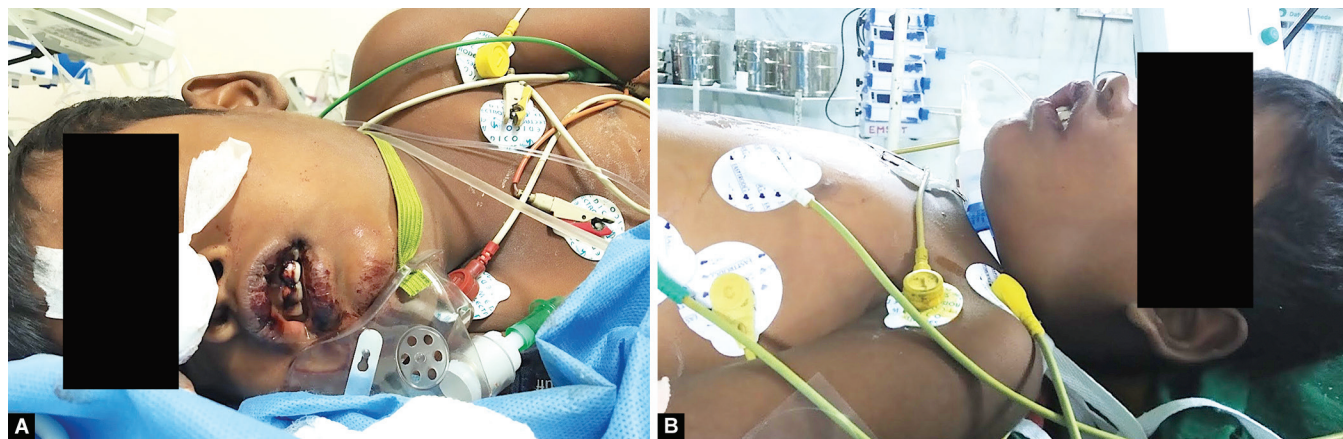
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planned considering the anticipated difficult airway.<sup>2</sup> However, our video laryngoscope was under repair at that time, and hence, we proceeded with gentle Macintosh direct laryngoscopy. The baby was induced with intravenous midazolam 0.5 mg, ketamine 20 mg, along with 2% sevoflurane in 100% oxygen with a fresh gas flow of 6 L/min. The baby received an intravenous infusion of propofol at 100  $\mu$ g/kg/min to maintain the depth of anesthesia without neuromuscular blockade. An experienced laryngoscopist took utmost precautions not to injure the diphtheritic membrane on



**Figs 1A and B:** (A) Preoperative patient showing diffuse submandibular swelling, oral, and nasal bleed; (B) Immediate postoperative patient with tracheostomy tube *in situ*

the tonsillar area (Cormack Lehane grade 2b), and the trachea was intubated with a 5 mm internal diameter ETT in the first attempt. The baby was kept on a mechanical ventilator, and anesthesia was maintained with isoflurane 1% and intravenous boluses of fentanyl and vecuronium. Awake flexible fiberoptic endoscopy can be another option. However, given the likely chance of further bleeding and compromised illumination with this technique on the background of oral and nasal bleeding in our patient, this option was not considered. A difficult intubation cart along with a needle cricothyroidotomy set and a manual jet-ventilation set was kept ready.<sup>3</sup> Surgeons proceeded with tracheostomy, and a 4.5 mm cuffed-portex tracheostomy tube was secured (Fig. 1B). Later, the baby received transvenous pacing through the right femoral vein. Despite standard treatment, the baby succumbed to death from diphtheritic myocarditis, resulting in severe biventricular dysfunction on the second postoperative day.

Endotracheal intubation and tracheostomy are the conventional options to manage an impending upper-airway compromise. Both invite technical expertise and are not associated without risks. Several authors suggest that tracheostomy is a better way of securing the airway than an ETT in this subset of patients due to the risk of bacteria spreading to the lower respiratory tract and pseudomembrane dislodgement.<sup>4</sup> Inflammation of sinoatrial and atrioventricular nodes is proposed to be the mechanism involved in conduction abnormalities in diphtheritic patients. Diphtheria antitoxin is not effective against the toxin already bound to the myocardium, so it is important to administer antitoxin in the early stages of the disease before systemic manifestations set in to reduce complications and mortality.

Bull neck, laryngeal patch, upper airway obstruction, and cardiac involvement were found to be associated with

mortality in children with diphtheria.<sup>5</sup> Strict implementation of immunization programs along with early identification and prompt administration of antitoxin is crucial for the prevention of mortalities from diphtheria.

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