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Supplemental Oxygenation with Endotracheal Tube Placed at the Glottic Opening for Severe Glottic Edema in a Patient with Tracheoesophageal Fistula

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Neonates mostly undergo intubation and prolonged mechanical ventilation in response to the respiratory insufficiency or for protection of the airway. These neonates are extubated either accidently or by planned methodology. One of the frequent complications following extubation in children on mechanical ventilation is upper airway edema (1). These patients usually present with respiratory insufficiency, stridor, or both. This may lead to re-intubation and an increased length of stay in the intensive care unit for further monitoring and treatment, consequently, increasing the economic burden on the caregivers (2).

A neonate born by normal vaginal delivery developed respiratory distress after being breastfed by the mother. The child was diagnosed with tracheoesophageal fistula. Gradually, the respiratory distress of the neonate increased, and intubation and mechanical ventilation was planned for him. He was intubated with uncuffed 3.0-mm internal diameter (ID) endotracheal tube, orally. The neonate was referred to the tertiary care center for mechanical ventilation and further management. He was admitted to the paediatric critical care unit for optimization before undergoing definitive surgery. During the stay in the paediatric critical care unit, the child was accidently extubated on day 2. His respiratory distress further augmented, leading to desaturation. Attempts at re-intubation were unsuccessful, as the glottis was not visualized with direct laryngoscopy by the paediatrician.

An anaesthetist was called for intubation because it was difficult to maintain oxygenation of the patient with bag and mask ventilation. We attempted intubation C-MAC® (Karl Storz, Tuttlingen, Germany) video laryngoscope; the glottis was visualized, and it exhibited severe glottic oedema with an almost negligible glottis opening. Intubation was tried with the smallest available endotracheal tube (2.0-mm ID), which could not be negotiated through the glottis. Ventilation was tried with i-gel supraglottic airway device but it was not possible to maintain oxygenation of the child. Surgical tracheostomy was planned for maintenance of the airway and mechanical ventilation of the child. To maintain oxygenation of the patient during the procedure, we placed the tip of the endotracheal tube on the glottis under the guidance of a C-MAC video laryngoscope such that the bevel just passed the glottis opening and was patent enough to partially inflate the lungs and oxygenate (Figure 1). Surgical tracheostomy was performed, and tracheostomy tube was inserted.

Previous studies have shown that preoxygenation (≥ 3 minutes of tidal volume ventilation or four vital capacity breaths in 30 seconds) is highly effective in delaying the process of desaturation during apnea (3, 4). Preoxygenation is feasible only when a difficult airway is anticipated and when elective airway management is planned. Another method to improve the safety of the patient is to provide supplemental oxygenation throughout the process of intubation and securing the airway (3). However, in our case, preoxygenation was not an option because the patient was already desaturating, with added difficulty in ventilation with mask, i-gel, and laryngeal mask airway.

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Figure 1. Tip of the endotracheal tube placed at the glottic opening for supplemental oxygenation during tracheostomy

This article reports a case of successful management of oxygenation of a child with severe glottic oedema by placing the tip of the endotracheal tube on the glottis opening under the guidance of a video laryngoscope until definitive airway with surgical tracheostomy was secured. This method can be used as an alternative to transtracheal jet ventilation, oxygenation through the suction port of a flexible fiberscope, and oxygenation through an atomizer or nebulizer (5) during emergency tracheostomy.

Informed Consent: Written informed consent was obtained from patients' parents who participated in this study.

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