C-MAC video laryngoscopy in a difficult airway in a child with nephrotic syndrome with croup and severe neck oedema

Sir,

A 10-year-old boy, a known case of focal segmental glomerulosclerosis, presented to the paediatric emergency with generalised anasarca, neck swelling for seven days, and severe respiratory distress for one day. On examination, the child was conscious, preferentially adopted the sitting posture, and had neck swelling extending up to the sternal angle. His peripheral oxygen saturation (SpO\(_2\)) was 96% on room air. His neck girth was 40 cm (normal: 26.4-27.2 cm).\footnote{1} His height and weight were appropriate for age and sex. Air entry was reduced in bilateral subscapular and interscapular regions. Shifting dullness was present on abdominal examination. The provisional diagnosis was nephrotic syndrome with relapse with bilateral pleural effusion, ascites, and fluid collection in the neck with a probable local-site infection. His investigations revealed hypoproteinaemia, hypercholesterolemia and heavy proteinuria. Frontal view of the chest radiogram revealed the ‘steeple sign’ which was consistent with the diagnosis of acute laryngotracheobronchitis [Figure 1a]. The neck ultrasound showed subcutaneous oedema with fluid extension into the muscular plane. Needle aspirate of the neck swelling, diagnostic pleural and ascitic tap were transudate in nature.

Due to increasing neck oedema, impending respiratory failure and anticipated difficult airway, the child was planned for tracheal intubation, in the operating theatre (OT), by a multidisciplinary team consisting of paediatricians, intensivists and otolaryngologist. Tracheostomy consent was taken prior to the procedure. Intravenous glycopyrrolate 0.1 mg was given 30 min before shifting to the OT. SpO\(_2\) in the OT was recorded as 86% on room air and 98% on oxygen supplementation. On direct laryngoscopy, mouth opening was equal to 2.5 finger breadths. After opening of mouth and maximum protrusion of the tongue, only soft palate and base of uvula could be seen. Floor of the mouth was not elevated. There was severe glottic oedema with a narrow glottic opening. These findings suggested difficult intubation (Mallampati class III). Pre-oxygenation was done for 3 min, and intravenous midazolam and fentanyl were administered. Injection propofol followed by succinylcholine was given. Four to five low tidal volume breaths were given by face mask ventilation with ease. An attempt at conventional intubation by direct laryngoscopy failed due to poor visibility and narrow glottis. However, he was successfully intubated using C-MAC video laryngoscope (Karl Storz, Tuttingen, Germany) with acute angle D-blade in combination with Frova introducer with cuffed endotracheal tube...
of 5 mm internal diameter. The child was shifted to paediatric intensive care unit and put on synchronised intermittent mandatory ventilation mode. Additionally, he was given corticosteroids, albumin infusions and supportive care. He recovered fully after few weeks [Figure 1b]. Neck girth normalised to 27 cm at discharge. The child was regularly followed-up and did well.

Croup or laryngotracheobronchitis, a common paediatric emergency, is usually managed with steroids and adrenaline nebulisation. However, less than 2% children with croup require intubation.[2] In our child, glottic oedema due to croup and neck oedema due to relapse of nephrotic syndrome contributed to the difficult airway. Difficult direct laryngoscopy is encountered in 0.06 to 3% children.[3] Failed intubation, a life-threatening situation for the patient, requires anticipation and preparedness. Video laryngoscope is a newer generation device for management of the difficult airway. The presence of a camera at the light source helps in better visualisation of glottis for intubation.[4] Additionally, a ProFoa introducer aids in entry into the glottis due to its flexible distal tip with a 30° anterior angulation and has an adaptor that allows to oxygenate. It also reduces the risk of tissue damage and bleeding with video laryngoscope.[5] Awake fibreoptic bronchoscopy was not an option in this case due to excessive irritability and age of the child.[5,6]

To conclude, clinical parameters like increased neck circumference of 40 cm or more, and progressive worsening signs like worsening SpO2, and respiratory distress helped us to anticipate a difficult airway and arrange a backup of video laryngoscope.[1,3] Alternative approaches of securing the airway like video laryngoscopy may be useful in cases of an anticipated difficult airway in children.

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**Conflicts of interest**
There are no conflicts of interest.

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