Egyptian Journal of Anaesthesia 34 (2018) 43–46

HOSTED BY

ELSEVIER

Contents lists available at ScienceDirect

Egyptian Journal of Anaesthesia

journal homepage: www.elsevier.com/locate/egja

Case report

Novel tubeless supraglottic ventilation in a difficult paediatric airway

Ruth Ng[a,1], Maryam Budiman[b,2], Mawaddah Azman[a,*], Bee-See Goh[a,c,1]

[a] Department of Otorhinolaryngology Head and Neck Surgery, Universiti Kebangsaan Malaysia Medical Centre (UKMMC), Kuala Lumpur, Malaysia
[b] Departmentof Anaesthesiology and Intensive Care, Universiti Kebangsaan Malaysia Medical Centre (UKMMC), Kuala Lumpur, Malaysia
[c] Institute of Ear, Hearing and Speech (Institute-HEARS), Universiti Kebangsaan Malaysia (UKM), Kuala Lumpur, Malaysia

ARTICLE INFO

Keywords:
Difficult paediatric airway
Tracheal stenosis
Supraglottic ventilation

ABSTRACT

Introduction: Discussion and careful planning are essential between surgeon and anaesthesiologist before upper airway surgery, especially in paediatric patients with upper airway obstruction. Tubeless supraglottic ventilation is an accepted technique worldwide.

Case: A 22-month old boy presented with upper gastrointestinal bleeding and right lung empyema with underlying pneumonia. He was treated for Haemolytic Uremic Syndrome secondary to pneumonia. The boy underwent upper gastroendoscopy under general anaesthesia for arrest of gastrointestinal bleeding and was kept intubated for 21 days. He was subsequently reintubated three days later for emergency video-assisted thoracoscopy, pleural stripping, and pus drainage under general anaesthesia. He was electively extubated on the third post-surgical day. Two weeks later, the patient developed stridor and suffered respiratory distress. A flexible fibreoptic scope revealed left vocal cord palsy. He was subject to emergency direct laryngoscopy and examination under general anaesthesia due to clinical suspicion of airway stenosis. Tubeless supraglottic ventilation was used and balloon dilatation with microlaryngeal surgery was successful.

Conclusion: Tubeless supraglottic ventilation is a novel and useful method in short upper airway surgery.

1. Introduction

Management of the difficult airway in an operative setting requires careful planning to avoid morbidity and mortality. Especially for paediatric patients with expected difficult airway, it is crucial to pay close attention to the details of implementing the chosen approach [1]. In our setting, we routinely conduct fruitful discussion between the anaesthesiologist and the operating airway surgeon on how the airway is to be managed intraoperatively. While jet ventilation provides tubeless ventilation in advantage of the airway surgeon, associated morbidities must be considered, especially in the paediatric patients with severe lung condition. We report a novel method for tubeless supraglottic ventilation in the management of a child with underlying right lobar collapse secondary to severe pneumonia, and upper airway obstruction secondary to tracheal stenosis.

2. Case

A 22-month old-boy presented with six days' history of fever associated with haematemesis and a one-day history of passing maelenic stool. Upon examination, the patient was lethargic, pale and dehydrated. Blood pressure was normo-tensive but tachycardic. Lung examination and chest imaging showed right upper lobe consolidation with reactive pleural effusion. Blood investigation showed anaemia, raised white blood count, raised urea and creatinine, and low platelet count. The boy was resuscitated and non-invasive ventilation was given. He was treated as Haemolytic Uremic Syndrome secondary to pneumonia.

Upper gastrointestinal bleeding was addressed by upper gastroendoscopy under general anaesthesia. He was intubated with a 4.5 mm non-cuffed endotracheal tube in a single attempt. After the procedure, patient was kept intubated and ventilated in the Paediatric Intensive Care Unit. Further investigation showed right lung empyema which was

Peer review under responsibility of Egyptian Society of Anesthesiologists.

* Corresponding author at: Department of Otorhinolaryngology, 9th floor, Clinical Block, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaakob Latiff, 54100 Bandar Tun Razak, Cheras, Kuala Lumpur, Malaysia.
[1] Address: Department of Otorhinolaryngology, 9th floor, Clinical Block, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaakob Latiff, 54100 Bandar Tun Razak, Cheras, Kuala Lumpur, Malaysia.
[2] Address: Department of Anaesthesiology and Intensive Care,2nd floor, Clinical Block, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaakob Latiff, 54100 Bandar Tun Razak, Cheras, Kuala Lumpur, Malaysia.
E-mail address: mawaddah1504@ppukm.ukm.edu.my (A. Mawaddah).

https://doi.org/10.1016/j.egja.2018.01.001
Received 4 July 2017; Received in revised form 27 December 2017; Accepted 1 January 2018
Available online 05 January 2018

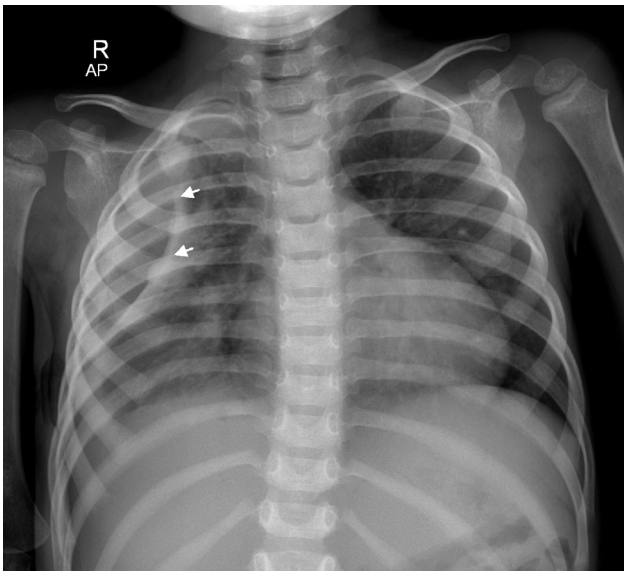

Fig. 1. Chest radiograph of the patient showing right upper lobe collapse (white arrowheads) with residual hydropneumothorax.

not responsive to intravenous cefepime 450 mg (50 mg/kg/dose) every 12 h and amikacin 60 mg every 8 h (20 mg/kg/day). The patient self-extubated on day 21 of intubation. He was then reintubated 3 days later for video-assisted thoracoscopy, pleural stripping, and pus drainage under general anaesthesia. The patient was extubated on the third day post-operation following partial recovery of his lung condition.

Two weeks after extubation, he developed stridor and a referral was made to the Otorhinolaryngology team. Upon assessment, the child had a breathy voice and biphasic stridor was heard with increased respiratory effort. Oxygen saturation was 97% under ambient conditions and a chest radiograph showed improvement in pleural effusion with residual right upper lobe lung collapse and residual hydropneumothorax (Fig. 1). Bedside flexible laryngoscopy was performed, showing reduced left vocal cord mobility with a significant phonatory gap. The working diagnosis made was left vocal fold paresis with tracheal stenosis. The patient was subsequently counselled for emergency examination under anaesthesia and direct laryngoscopy.

On preoperative assessment, this 22 months old boy weighed 10 kg and had biphasic stridor at rest. He had tracheal tug and subcostal recession with respiratory rate of 30 breaths per minute. Oxygen saturation was 97% under room air and lung auscultation showed reduced air entry on the right upper lobe with no crepitations. His neck movements were not limited, mallampati score was 2 with no receding chin.

During induction, sevoflurane of 8% concentration in 8L/min oxygen flow was given. Intravenous Propofol 8 mg (1mg/kg) and fentanyl 8mcg (1mcg/kg) bolus were administrated twice, on induction and before laryngoscope insertion. Direct laryngoscopy was performed. Topical anaesthesia was given to the airway with Lignocaine 2% (3mg/kg) using a malleable oral atomizer (MADgic® Teleflex, USA). Patient was ventilated with tubeless supraglottic ventilation technique by using an endotracheal tube (ETT) adaptor (ETT ID 3.0, Smiths Medical, USA), which was connected to the jet ventilating port of a Lindholm laryngoscope (Figs. 2a and 2b). A paediatric closed circuit was attached to the ETT adaptor. Bag ventilation was given with respiratory rate 25–30 breaths per minute, I:E ratio 1:2 with Sevoflurane 3–6% in 6L/min oxygen flow. Intravenous Propofol infusion of 100–120 mcg/kg/min was used throughout the procedure. The adequacy of ventilation was monitored by capnography and pulse oximetry. During diagnostic endoscopy, SpO2 was 99 to 100% and ETCO2 was between 35 and 40. Further assessment found Cotton-Myer grade 3 tracheal stenosis 4.2 cm from the vocal cord, with a thickness of 2 mm (Fig. 3). Balloon

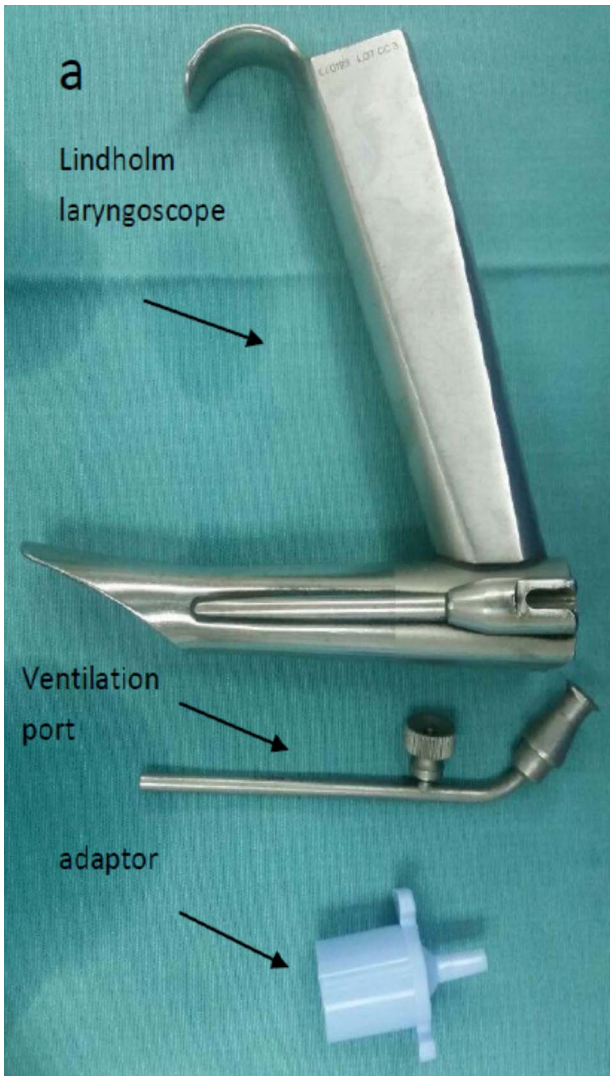

Fig. 2a. Instruments for tubeless supraglottic ventilation (before assembly): Lindholm laryngoscope, ventilation port and ETT adaptor (ETT ID 3.0, Smiths Medical, USA).

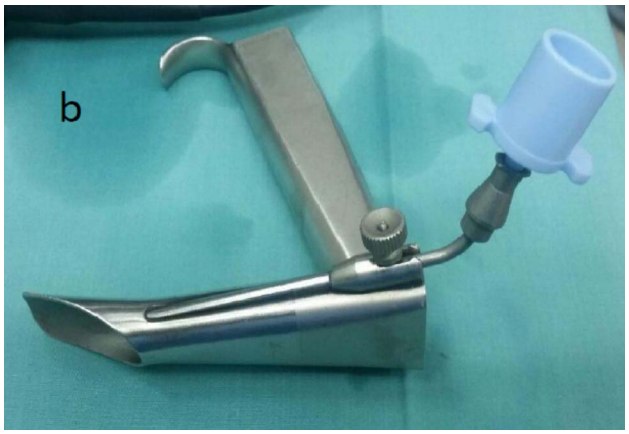

Fig. 2b. Instruments for tubeless supraglottic ventilation (after assembly): Lindholm laryngoscope, ventilation port and ETT adaptor (ETT ID 3.0, Smiths Medical, USA).

dilatation (Inspira Air™ Acclarent®, USA) of the stenotic segment was performed after incising the stenotic segment with cold instrument. Dilatation was performed twice with each lasting two minutes. During period of dilatation, the oxygen supply to the patient was obstructed resulting in mild desaturation up to 96% which picked up following