

LETTER TO THE EDITOR

Videolaryngoscopy for teaching and supervising rigid bronchoscopy in paediatric patients

Impiego della videolarinoscopia per l'insegnamento e la supervisione della broncoscopia rigida in pazienti pediatrici

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Dear Editor,

Rigid bronchoscopy is frequently used by otolaryngologists to evaluate the trachea and bronchi in paediatric patients. Bronchoscopes are introduced through vocal cords under direct vision laryngoscopy¹. Poor glottic exposure leads to multiple intubation attempts with the rigid bronchoscope and, subsequently, may be associated with oxygen desaturation or airway and dental injuries². Teaching and supervising otolaryngology residents to intubate the trachea with a rigid bronchoscope under direct vision laryngoscopy is difficult in paediatric patients. Low lung vital capacity and high oxygen consumption in small children also limits residents' training time. Furthermore, as airway spaces are narrow, instructors cannot see what the trainees are visualising, cannot recognise the trainee's problems and have to perform tracheal intubation themselves. This may delay the learning curve of rigid bronchoscopy in otolaryngology residency programmes.

The C-MAC videolaryngoscope (Karl Storz, Tuttlingen, Germany) is a relatively new device using modified Macintosh or Miller blades. It provides the possibility of obtaining both direct view of the larynx and a camera view displayed on a monitor screen^{2,3}. This device not only improves visualisation of the vocal cords, but also allows an operator assistant to follow the intubation process on the monitor, and to help in optimising the glottic view by external laryngeal manipulations⁴. The C-MAC videolaryngoscope has already been used as a teaching tool for tracheal intubation in children^{3,5,6}. In this report, we describe the use of a C-MAC videolaryngoscope as a device for training and supervising otolaryngology residents to intubate the trachea with a rigid bronchoscope in paediatric patients.

Twenty consecutive patients aged between 3 months and 2 years and scheduled for rigid bronchoscopy under general anaesthesia were included in this case series. Institutional approval and parental informed consent was obtained. In the operating theatre, all patients had standard monitoring

including three-lead electrocardiography, pulse oximetry, non-invasive blood pressure measurement and end-tidal capnography. Following general anaesthesia through mask induction with sevoflurane, an intravenous access was secured and 4% lidocaine was topically applied with an atomizer to anaesthetise the vocal cords. A second year otolaryngology resident placed the patient's head in moderate extension and exposed the larynx using a C-MAC videolaryngoscope with an appropriate-sized straight Miller blade. The resident introduced the tip of the rigid bronchoscope into the oral cavity, and gently directed it towards the laryngeal inlet and through the vocal cords. During the procedure, the resident was following his own manoeuvres on the monitor screen of the videolaryngoscope. Once the rigid bronchoscope was secured in the trachea, the blade of the videolaryngoscope was removed and bronchoscopy was continued following standard procedures. The resident was supervised by a senior otolaryngologist who continuously observed the exposure of the larynx and manipulation of the rigid bronchoscope on the videolaryngoscope monitor screen and provided instructions as required.

Three otolaryngology residents and one instructor were involved in this pilot study. The rigid bronchoscope was successfully inserted in the trachea without multiple attempts in all patients. Episodes of arterial oxygen desaturation ($SpO_2 < 90\%$), teeth injuries or soft tissue lesions were not observed in any patient. The otolaryngology residents and instructors expressed their satisfaction regarding the use of C-MAC videolaryngoscope as learning and teaching tool for intubation of the trachea with a rigid bronchoscope.

In conclusion, this report shows that a C-MAC videolaryngoscope is an effective tool for training otolaryngology residents to intubate the trachea with a rigid bronchoscope in paediatric patients. It optimises visualisation of the vocal cord by the resident, facilitates manipulation of the bronchoscope and reduces the risk of dental or soft

tissue injury. In addition, the videolaryngoscope gives the instructor the opportunity to directly observe the resident's manoeuvres and to provide advice as needed.

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