ment with a bolus, followed by continuous infusion of naloxone, and tracheal intubation was not needed. Subsequent testing of the PCA determined that, when the door of the PCA was closed, due to a defect in the pump, there was unintended pressure on the free flow protection device which allowed for free flow. This defect was not visible to the naked eye. Following this event, all the PCA machines in the hospital were evaluated by the manufacturer, and none was found to have this defect. The same pumps are still used in our hospital, and there have been no reported recurrences. Following this case, our protocol for attaching the PCA was changed, such that, after PCA set up, there is a specific examination to test for the absence of free flow, prior to attaching the tubing to the intravenous line of the patient. In the event described in this letter, the PCA tubing was clamped until after it had been attached to the patient's intravenous tubing. This experience further emphasizes that a free flow protection device is not infallible, and regardless of manufacturer, the absence of free flow should be confirmed prior to attaching the PCA to the patient.

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Use of the Airtraq® with a fibreoptic bronchoscope in a difficult intubation outside the operating room

To the Editor:

No single airway device or technique will be successful in every clinical situation. A comatose 60-yr-old male, with extensive radiation therapy to the neck, required urgent tracheal intubation for respiratory failure (pneumonia). Airway examination revealed hardened neck structures, a limited mouth opening, a fixed mandible, the neck in flexion, and a reduced thyromental distance. The patient was breathing spontaneously with the oxygen saturation maintained at 95% with a nonrebreathing face mask. Considering the limited airway examination and the patient's clinical condition, a decision was made to avoid direct laryngoscopy and the use of a muscle relaxant.

The upper airway was atomized with lidocaine, in preparation for a fibreoptic bronchoscopic (FOB) intubation. Two successful FOB attempts, with an Ovassapian airway (Teleflex, Hudson RCI, Durham, NC, USA), were followed by the inability to slide either an 8.0-mm or a 7.0-mm endotracheal tube (ETT) (Sheridan, Temecula, CA, USA) past the oropharynx. Using the rotational insertion technique, a small Airtraq® (King Systems, Noblesville, IN, USA), loaded with a 7.5-mm ETT, was passed through the limited mouth opening. The glottis was fully visualized ("Cormack and Lehane grade 1 view") in the left upper corner of the viewfinder. However, the hardened pharyngeal tissue did not allow any Airtraq® maneuvring of the glottis to the centre of the viewfinder for an optimal intubation attempt. Similarly, exterior laryngeal manipulation was ineffective. With the Airtraq® *in situ*, the pediatric FOB was advanced through the ETT (Figure 1). The vocal cords were easily identified,

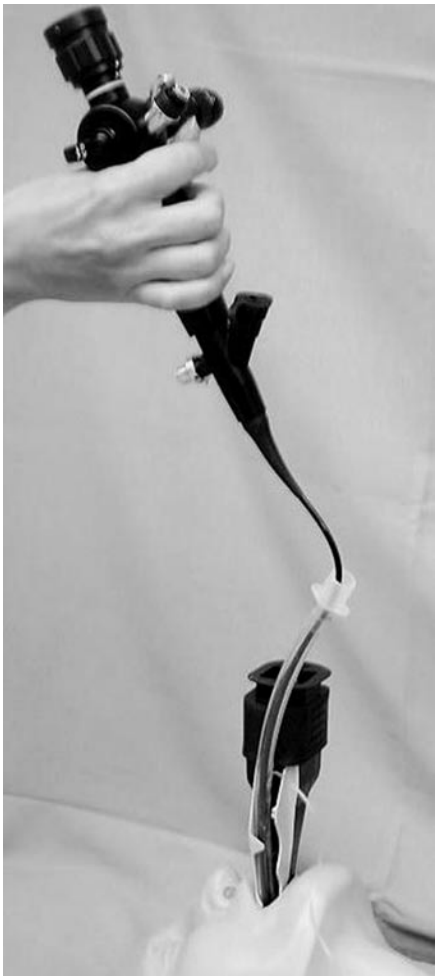

FIGURE 1 The pediatric bronchoscope advanced through the endotracheal tube housed in the Airtraq® channel.

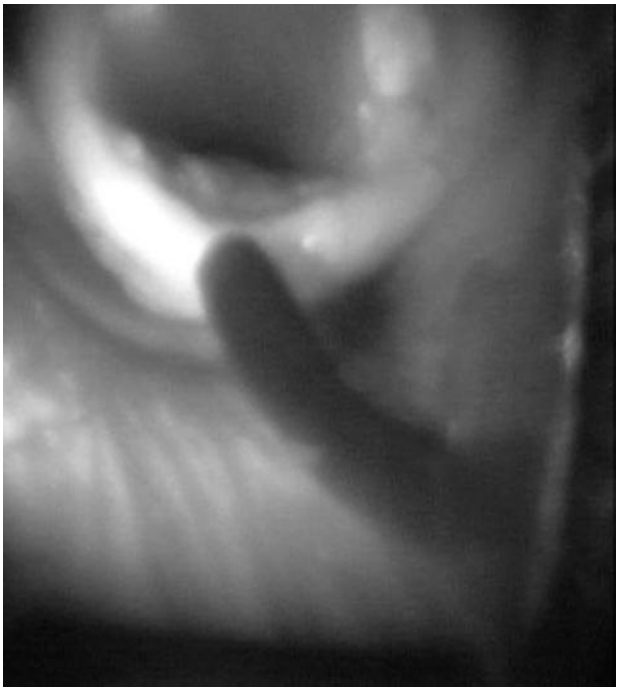

FIGURE 2 The fibreoptic bronchoscope easily negotiates the sharp angle between the tip of the endotracheal tube (right lower corner of the viewfinder) and the glottis (left upper corner of the viewfinder).

and the ETT was advanced under direct visualization. Oxygenation was maintained between airway instrumentations with assisted face mask ventilation. The rescue ventilation plan was a laryngeal mask airway. The patient's trachea was extubated after four days.

The Airtraq® is a battery operated, disposable optical laryngoscope. The viewfinder allows indirect visualization of the glottis, the surrounding structures, and the tip of the ETT mounted in the side channel.[1] The patient favourably tolerated the bronchoscopy and the indirect laryngoscopy, but the intubation attempts failed. Possible causes for the failed FOB intubation were: impossible jaw advancement, suboptimal head position, and the sharp angle between the tip of the ETT and the glottis generated by the hardened and distorted pharyngeal tissue. There is minimal information about difficult Airtraq® intubation. Possible anatomic limitations are: a small sternomental distance (large chest, obesity, and flexed neck), a small mouth opening, and a large tongue. The case presents an unanticipated cause for a difficult Airtraq® intubation: pharyngeal tissue rigidity.

In difficult to intubate and obese patients, the Cormack and Lehane glottic view with an Airtraq® is consistently superior to the Macintosh view,[2,3] but it may underestimate the intubation difficulty with an indirect laryngoscope.[4] Airtraq® intubation requires optimal positioning of the glottis in the middle of the viewfinder ("Airtraq® grade 1 view"), as the ETT will advance towards the glottis under a predetermined angle, defined by the configuration of the airway channel and the ETT angulation. There is no independent ETT manipulation.[5] A partial or total glottic view, that is off-centre, is suboptimal for intubation and should be considered an "Airtraq ® grade 2 view". A grade 2 view can be optimized with internal or external glottic manipulation. Inability to visualize the glottis, with or without the epiglottis, should correspond to an "Airtraq® grade 3" and "grade 4 view", respectively. The combined use of the Airtraq® and the FOB compensated each others' limitations: the Airtraq® placed the tip of the ETT in the immediate vicinity of the glottis, and the fibrescope negotiated the sharp angle between the tip of the ETT and the glottis. Combined use of airway devices may overcome their individual limitations.

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