Equipment

Awake intubation of the adult trachea using the Bullard laryngoscope

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Awake intubation using the Bullard laryngoscope can be comfortably and easily performed in the adult. Five cases are presented in which tracheal intubation was performed under topical anaesthesia with light intravenous sedation. In each case, topical anaesthesia was performed by insertion of a Guedel oral airway, with lidocaine ointment applied to the inferior and posterior surfaces. In one case, Bullard intubation was successful where direct laryngoscopy and multiple attempts at bronchoscopic intubation by three different operators had failed. We conclude that the Bullard laryngoscope can be easily used in awake patients and may be a useful alternative where other methods for awake intubation have failed.

L'intubation vigile avec le laryngoscope de Bullard peut être accomplie aisément et confortablement chez l'adulte. On présente cinq cas d'intubations trachéales sous anesthésie topique avec sédation intraveineuse légère. Dans chaque cas, l'anesthésie topique a été réalisée avec l'insertion d'une canule orale de Guedel, lubréfiée avec de l'onguent de lidocaïne sur sa surface postérieure et inférieure. Dans un cas, l'intubation au Bullard a réussi alors que de multiples tentatives de laryngoscopie directe et de fibroscopie par trois manipulateurs différents avaient échoué. Nous concluons que le laryngoscope de Bullard peut être utilisé aisément et peut représenter une alternative utile quand les autres méthodes d'intubation vigile ont échoué.

Key words:
AIRWAY: anatomy, anaesthesia;
ANAESTHETIC TECHNIQUES: intubation, tracheal;
EQUIPMENT: laryngoscopes, Bullard;
INTUBATION, TRACHEAL: difficult, technique.

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Accepted for publication 4th November, 1994.

Awake tracheal intubation is frequently performed in patients with difficult airways. This procedure is most frequently performed in circumstances that include: (1) high likelihood of regurgitation and aspiration, (2) known or suspected cervical spine injury, and (3) known or suspected difficult mask ventilation. Awake intubation is frequently the safest approach in a patient with a difficult airway.[1] Consequently, a particular technique for managing difficult intubations that cannot be easily applied in the awake patient may not be very valuable. Saunders and Giesecke have questioned the utility of the Bullard laryngoscope in intubation of the awake adult, because in their study, satisfactory visualization of the glottis could not be obtained under topical airway anaesthesia in any of three patients. The topical anaesthesia method was not described and the tracheas were subsequently intubated by other unspecified methods.*

In this brief clinical series, intubation using the Bullard laryngoscope was accomplished in awake adults under mild sedation. Topical anaesthesia, of the upper airway only, was accomplished by coating the inferior and posterior surfaces of an oral airway with 5% lidocaine ointment. Because the Bullard laryngoscope is similar in shape to an oral airway and contacts the upper airway at points corresponding to these surfaces of the airway, optimal use of minimal topical anaesthesia was ensured. Airway protective reflexes were apparently preserved by this technique, as vigorous coughing coincided with intubation in each patient. Nerve blocks and transtracheal lidocaine injection were not required to intubate these patients' tracheas.

Case reports

A 36-yr-old black woman presented for biopsy of a left posterior ethmoid mass, posterior ethmoidectomy, and natural ostia enlargement. Her medical history was re-

**Saunders PR, Giesecke AH.* Clinical assessment of the adult Bullard™ laryngoscope. Can J Anaesth 1989; 36: S118–9.

TABLE Additional patients in whom awake tracheal intubation was performed using topical anaesthesia and the Bullard laryngoscope

Case	*Patient description*	*Procedure*	*Airway issues*	*Previous attempt*
1	23-yr-old woman	Exploratory laparotomy	Known cervical radiculopathy (in soft collar)	None
2	55-yr-old Hispanic woman Pickwickian syndrome Morbidly obese	Respiratory failure one day post-bilateral knee replacement	Difficult intubation at surgery	Macintosh-3 (blind) at time of surgery
3	48-yr-old white woman	Superficial parotidectomy (reexploration for bleeding)	Rapidly expanding haematoma (mouth opening 10 mm) Nausea and vomiting	None (Macintosh-3 laryngoscopy successful at original surgery)
4	13-yr-old black man Klippel-Feil syndrome	Posterior cervical spinal fusion Bone graft	Cervical immobilization, short neck	Fibreoptic bronchoscopy (multiple attempts), direct laryngoscopy (Macintosh-3): both failed
	Segmentation/fusion anomaly of C_1-C_2 Marked stenosis of cervicomedullary junction Odontoid subluxation	Halo application Odontoid resection		

markable for symptomatic gastroesophageal reflux that occasionally woke her at night. Her surgical history was of a tubal ligation performed under subarachnoid block. Her physical examination was remarkable for a height of 157 cm; a weight of 108 kg; a Mallampati class IV airway; a short, stout neck; and complete dentition.

In the operating room, after routine monitors were placed, the patient was sedated with midazolam 1 mg, fentanyl 50 μg, and droperidol 2.5 mg *iv*. The patient was awake and responsive to verbal commands after this sedation. Glycopyrrolate, 0.2 mg *iv*, was administered to diminish secretions. Topical airway anaesthesia was initiated with lidocaine 10% spray to the anterior tongue and posterior pharyngeal walls. Lidocaine 5% ointment was applied to the tongue with a tongue blade. Finally, lidocaine 5% ointment was liberally applied to the inferior and posterior surfaces of a standard #4 oral airway. This airway was introduced into the mouth and slowly advanced to the posterior pharynx over five minutes until it was completely inserted. When the oral airway was well tolerated, it was removed, and the Bullard laryngoscope blade (Figure) was inserted in the airway and rotated until the handle was vertical. Slight vertical lift easily and completely exposed the vocal cords. The patient tolerated this manoeuvre comfortably without coughing. A 7.0-mm endotracheal tube was advanced through the vocal cords under direct vision, provoking vigorous coughing, and general anaesthesia was expeditiously induced with thiopentone 200 mg *iv*. Anaesthesia was maintained with isoflurane, nitrous oxide, oxygen, and vecuronium was given for neuromuscular blockade. The trachea was extubated uneventfully at the end of surgery after neostigmine and glycopyrrolate reversal of neuromuscular blockade, and recovery of consciousness and protective airway reflexes.

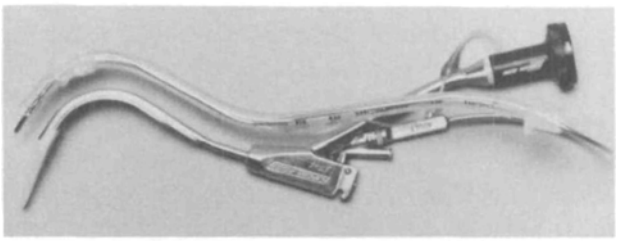

FIGURE A Bullard laryngoscope with intubation stylet and endotracheal tube ready for use. At the right is the eyepiece by which the glottis is visualized. On the left is a blade extender, which we use routinely for larger patients. At the right is an attachment for a standard laryngoscope battery handle.

Subsequent to this case, we used the same regimen to perform awake intubations in four other patients (Table). In each, the vocal cords were easily visualized and oral intubation was successful on the first attempt.

Discussion

In our initial case, the Bullard laryngoscope was used for the awake intubation of a patient with considerable gastroesophageal reflux symptoms and a potentially difficult, unproved airway. This intubation was comfortably accomplished with minimal sedation and minimal topical anaesthesia of the upper airway. Bilateral superior laryngeal nerve block and transtracheal lidocaine injection

were considered inappropriate for this patient, given her gastroesophageal reflux history.

Noting that the Bullard laryngoscope and an oral airway have similar shapes and contact points with the upper airway, we used a common oral airway to facilitate more optimal utilization of airway anaesthesia. Protective airway reflexes were still intact, as evidenced by vigorous coughing coincident with tracheal intubation.

Among the other cases presented, #4 was the most notable, because multiple unsuccessful intubation attempts over the course of 45 min had included fibreoptic bronchoscopy by three different operators, and one attempt at direct laryngoscopy with a Macintosh #3 blade and manual cervical immobilization. The Bullard laryngoscope was used in case #2 because it does not require a large light source and is hence more easily portable to locations outside the operating room than the fibreoptic bronchoscope. In case #3, the Bullard laryngoscope was chosen because successful laryngoscopy is possible with only a 6-mm opening between the teeth, though a slightly larger opening may be required to pass the endotracheal tube.

Shigematsu *et al.*[2,3] advocated a modified technique for tracheal intubation using the Bullard laryngoscope. They claimed that this is an effective way to manage difficult intubations. However, anaesthesia had been induced in their patients with thiopentone and vecuronium before intubation. Consequently, the utility of their technique in a safe approach to a very difficult airway was not demonstrated.

This is the first report describing successful intubation using the Bullard laryngoscope in a series of awake adult patients under topical anaesthesia. In the only previous report, Gorback[4] described five patients whose tracheas were intubated with the Bullard, in one of whom intubation was under topical anaesthesia while awake. Thus, it was not clear that his topical anaesthesia method, inhaled nebulized lidocaine, can consistently or frequently yield adequate conditions for Bullard laryngoscopy. Further, inhaled nebulized lidocaine may yield widespread and nonspecific anaesthesia of the entire airway above and below the vocal cords, which might be undesirable in patients at risk for regurgitation and aspiration. Borland and Casselbrant[5] reported the use of the paediatric Bullard laryngoscope for awake intubation of the tracheas of 17 neonates and infants. Finally, our report is unique in describing a case where the Bullard laryngoscope succeeded after multiple failed attempts at fibreoptic bronchoscopy by experienced operators in a patient with Klippel-Feil syndrome. If the Bullard laryngoscope and trained personnel had not been available, awake retrograde intubation or tracheostomy would have been required. This situation points to a distinct role for awake Bullard intubation in noninvasive management of the difficult airway.

Using minimal sedation and the topical anaesthesia method previously described, the Bullard laryngoscope may be appropriately and easily used in intubation of the awake patient. In some cases, the Bullard laryngoscope may be useful even when fibreoptic bronchoscopy has failed in the hands of experienced operators. The topical anaesthesia method employed is simple, noninvasive, and requires only a Guedel oral airway. The Bullard laryngoscope is easily portable; hence, this method for awake intubation may become popular in remote locations, including the general hospital wards.

References

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