

way and anaesthesia have to be maintained until intubation is achieved, and afterwards also if the latter should prove difficult or fail. Awake intubation seems a reasonable choice for Drummond's case. If anaesthetic drugs are used, for the uncooperative patient, urgent situations, or other reasons, the possibility of difficulty with airway maintenance because of the restraints on head and neck movements, etc. and that a risk and gamble are being taken, must be kept fully in mind.

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REFERENCES

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- 2 Crosby ET. Tracheal intubation and cervical injury (Reply). *Can J Anaesth* 1992; 39: 1001.
- 3 Suderman VS, Crosby ET, Lui A. Elective oral tracheal intubation in cervical spine-injured adults. *Can J Anaesth* 1991; 38: 785-9.

REPLY

Thank you for the opportunity to respond to Dr. Williamson. A proportion of head-injured trauma patients will arrive in the emergency rooms hypoxic, acidotic and haemodynamically compromised. These conditions as well as untoward movements of the head and neck in a patient not recognized to have an injured spine increase the risk for a secondary neurological injury. However, urgent intubation, ventilatory support and haemodynamic resuscitation are mandated and during these interventions, the patients should be assumed to have a CSI and be managed accordingly. All techniques of airway management result in some cervical spinal movement but the clinical experience of many centres, worldwide, utilizing a variety of airway management techniques in traumatized patients, has shown that these movements do not lead to secondary neurological injury. Again this is provided that the patients are recognized to be at risk for CSI and managed appropriately. If necessary, in order to ventilate a patient effectively or to achieve intubation in this scenario, one moves the head and neck but one does it as little as is necessary to achieve these ends. An airway should not be abandoned because of an unwillingness to move the head or neck. The technique of intubation is not particularly relevant in terms of preventing secondary neurological injury as careful application of many techniques is associated with similar outcomes. These techniques include flexible fiberoptic laryngoscopy, rigid direct and indirect (Bullard) laryngoscopy, retrograde intubation, blind nasal intubation or via establishment of a surgical airway.

In the situation where elective intubation is planned for a patient with CSI, the circumstances differ but the goals remain the same. The aim is to effect tracheal intubation and avoid secondary neurological injury. The preoperative assessment of the patient should include examination of the spinal injury and determination of the risk of secondary injury. High-risk

groups for secondary injury after CSI are not well identified but probably include those with little canal reserve such as elderly patients with spinal spondylosis and pre-existent cervical myelopathy or patients with ankylosing spondylitis. Patients with near-total or total ligamentous disruption and perhaps those with extensive bone destruction as occurs with osteolytic (metastatic) spinal lesions may also constitute higher-risk patients. Following the assessment of the neck, which includes discussion with the neurosurgeon, it is apparent that, although most patients have a diminished protective reserve following injury, they will readily tolerate the spinal movement necessary to effect intubation. The airway should then be assessed. Provided that the airway examination reveals little potential for a difficult intubation and the spinal injury constitutes a low-risk injury, the trachea should be intubated with care, with every effort taken to limit spinal movement. The technique chosen for intubation and whether or not general anaesthesia and muscle relaxants are used to effect intubation is not, to my mind, relevant. If the assessment of the airway indicates the potential for difficult intubation, then the patient should be managed with an awake intubation.

If it is felt that the neck is so unstable that the cord will be threatened with even the modicum of spinal movement that will result from endotracheal intubation, then the patient should be intubated awake, by whatever technique the anaesthetist has the highest degree of experience and comfort. The patient is not intubated awake because the neck is moved less nor because the cervical muscles splint the neck as there is no data to support that either is true. The trachea is intubated and the patient is positioned for surgery before induction of general anaesthesia so that a neurological evaluation may be carried out after tracheal intubation and positioning and the patient may be demonstrated to be intact. Access to the patient's subjective and objective neurological response to the intubation manoeuvres and positioning may provide useful clinical information especially if the patient is to be operated in the prone position for posterior stabilization. Appropriate airway topicalization and adequate sedation allows most patients to tolerate these manoeuvres very well.

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Difficult laryngoscopy – “BURP”

To the Editor:

I wish to make some comments re: “Difficult laryngoscopy” by Dr. R.L. Knill.¹ The article describes what many anaesthetists practice. The steps affectionately named “BURP” should be used in all but the easiest cases of intubations.

During laryngoscopy – using the curved blade – the anaesthetist causes displacement of the larynx by these manoeuvres:

- 1 pushing the tongue to the left
- 2 forcing the floor of mouth anteriorly – with the tip of the blade in the vallecula.

Since the floor of the mouth, tongue and larynx are intimately connected any movement of one will result in the displacement of the others. Thus, forcing the tongue to the left will tend to move the larynx to the left. This can be corrected by manoeuvring the larynx to the right. Pushing the floor of the mouth anteriorly with the tip of the blade will move not only the epiglottis but the whole larynx anteriorly. This is corrected by gently pushing the thyroid cartilage posterior and somewhat upward. These correcting manoeuvres first should be carried out by the anaesthetist using his right thumb and index finger and then by the assistant – usually a nurse. Often, it is best to guide the assistant's thumb and index finger until the best possible view of the vocal cords is presented and then ask him/her to "hold it."

Using these steps routinely will allow a gentler, less traumatic intubation with less tilting and with less pressure on the upper teeth. In cases of existing anatomical abnormalities, such as described by Dr. Knill, the steps described become essential.

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REFERENCE

- 1 Knill RL. Difficult laryngoscopy made easy with a "BURP". *Can J Anaesth* 1993; 40: 279–82.

REPLY

Dr. Relle claims that the "BURP" manoeuvre I proposed as an aid to manage difficult laryngoscopy¹ is a technique which is already used by many anaesthetists in practice. He also suggests that "BURP" improves the exposure of the glottis by offsetting the displacements of the larynx produced by the laryngoscope blade, and that it reduces the trauma of routine laryngoscopy.

These suggestions of Dr. Relle seem based upon his clinical experience with laryngeal manipulations, together with an assumption that the manoeuvre he employs is synonymous with "BURP." It must be pointed out, however, that Dr. Relle's manoeuvre differs from "BURP" in several important ways. The purpose of Relle's manoeuvre is to facilitate "all but the easiest cases of intubation," whereas "BURP" is intended as an aid for very difficult cases only.¹ The displacements of the larynx associated with his manoeuvre are rather modest and loosely defined: the larynx is shifted backward "gently," upward "somewhat" and rightward only to the extent of countering an effect of laryngoscopy. The displacements associated with "BURP" are more extensive and specific: the larynx is shifted backward until it abuts against the cervical vertebrae, upward as far as possible in the neck, and rightward by a defined 1–2 cms.¹ Dr. Relle's manoeuvre is effected initially by the laryngoscopist with the laryngoscope in place until the "best possible view of the vocal cords" is obtained. On the other hand, "BURP"

can be applied only by a trained assistant¹ since it is not possible for a laryngoscopist to induce all of its displacements effectively while maintaining an endoscopic view of the upper airway. These differences between the two manoeuvres mean that inferences about one cannot necessarily be extended to the other.

Each of the comments of Dr. Relle, when applied to "BURP," appears misplaced. I am not aware that the particular displacements of the larynx associated with "BURP" have ever been employed in practice; several experienced clinicians tell me they have never heard of its specific manipulations. I doubt that "BURP" acts to benefit laryngoscopy by countering shifts of the larynx produced by the laryngoscope blade; rather, I suspect that any benefit would result from repositioning of the larynx in a more vertical and right-sided laryngoscopic line of vision independent of any effect of the laryngoscope blade.¹ While it is conceivable that both Relle's technique and "BURP" may reduce the risk of trauma by routine laryngoscopy (i.e., laryngoscopy without difficulty), this may not be an important benefit since the incidence of such trauma is probably quite low in any case.

Problems of difficult laryngoscopy that complicate tracheal intubation remain an important source of anaesthetic morbidity and mortality.² The possibility that some of these difficulties may be overcome readily by various external manipulations of the larynx appears to have received little or no investigation. I concur with Dr. Relle that his manoeuvre may ease the management of some cases of difficult laryngoscopy; I suspect that "BURP" will be helpful in a greater number of such cases.¹ However, these impressions are based upon anecdotal experience only and require formal investigation.

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REFERENCES

- 1 Knill RL. Difficult laryngoscopy made easy with a "BURP." *Can J Anaesth* 1993; 40: 279–82.
- 2 Caplan RA, Posner KL, Ward RJ, Cheney FW. Adverse respiratory events in anaesthesia: a closed claims analysis. *Anesthesiology* 1990; 72: 828–33.

Equipotent dose regimens required when comparing epidural opioids

To the Editor:

We read, with great interest, the article by White *et al.*¹ They compared the incidence of side effects during epidural PCA with morphine and fentanyl in the treatment of pain after orthopaedic operations. The morphine loading dose was 25 to 40 times higher than the fentanyl loading dose. No criteria have been defined for the administration of different bolus amounts. The selection of