Is cricoid pressure needed during rapid sequence induction?

Mendelson (1946) was the first to report the risk of pulmonary aspiration of gastric contents during mask anaesthesia. Fifteen years after Mendelson's publication, Sellick (1961) reported the use of cricoid pressure to prevent gastric contents entering the pharynx and subsequent aspiration into the pulmonary tree. Cricoid pressure or Sellick's manoeuvre is the application of sustained digital pressure to the cricoid cartilage of the larynx pushing it backwards and thus compressing the oesophagus between the posterior aspect of the cricoid and the body of C5–6. The cricoid cartilage is used because it forms the only complete ring of the larynx and trachea. It has traditionally been considered an integral part of patient safety in rapid sequence tracheal intubation and emergency airway management. This article explores the arguments for the use of cricoid pressure, the concerns and its potential serious disadvantages.

Sellick's initial cadaver study was followed by application of the technique during induction of 26 anaesthetized and paralysed high-risk cases. Twenty-three of them (one pregnant, the rest had intestinal obstruction or were at high risk for regurgitation) had no evidence of regurgitation or vomiting. In three cases (one forceps delivery, one malignancy of the lower oesophagus, one intestinal obstruction), release of cricoid pressure after intubation was followed by visible reflux into the pharynx.

Although this technique is advocated and recommended by the Royal College of Anaesthetists, it is not routinely performed in other European countries such as France. Despite this, surveys reveal that France boasts an aspiration rate lower than average. Another study revealed that 50–60% of paediatric anaesthetists in the UK do not use this technique (Stoddart et al, 1994). Critics argue that the sample sizes in Sellick's studies were insufficient and there is little evidence to support application of cricoid pressure.

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There is much confusion surrounding the correct application of cricoid pressure. Sellick described positioning the patient without a pillow using a two-handed technique. This position has subsequently been associated with increased incidence of failed intubations using conventional laryngoscopy (Brimacombe and Berry, 1997). There have been few clinical studies carried out to verify the potential advantages of the variations that exist.

There is conflicting evidence regarding alteration of laryngoscopic view with the application of cricoid pressure. This effect is certainly complex. However, in some individuals, a force close to that currently recommended (30 N) may cause complete loss of the glottic view (Haslam et al, 2005). Evidence shows that cricoid pressure impedes insertion of, and ventilation through, the ProSeal laryngeal mask airway in anaesthetized, paralysed patients (Li et al, 2007). In addition, after correct placement of the ProSeal laryngeal mask airway, application of cricoid pressure does not change tidal volume, but produces a significant increase in peak inspiratory pressure (Quigley and Jeffrey, 2007). When faced with a 'cannot intubate' or 'cannot mask-ventilate' situation, clinicians should re-evaluate the manner in which cricoid pressure is being applied and must be prepared to adjust or even to release it.

Another contentious issue is the correct pressure that should be applied. Cadaveric studies show 30 N to be adequate whereas 44 N has been suggested in other studies. Pressures greater than 20 N cause pain and retching in awake patients and a pressure of 40 N can distort the larynx and complicate intubation. One recommended procedure is to induce anaesthesia and apply a pressure of about 30 N to facilitate intubation. Some advocate application of 20 N until loss of consciousness after which this should be increased to 30 N.

The argument regarding correct force seems rather academic as the literature suggests that cricoid pressure is often incorrectly administered. Only regular training of anaesthetic personnel ensures safe and reliable application of cricoid pressure during rapid sequence induction of anaesthesia. Regular training with a 50 ml syringe has been shown to improve accuracy of correct force administration for several weeks only. Without regular practice (which is not mandatory in UK hospitals) cricoid pressure force becomes inaccurate and often inappropriately high or low.

Cricoid pressure is contraindicated in patients with suspected cricotracheal injury, active vomiting, or unstable cervical spine injuries. The technique may be particularly difficult in patients with a history of difficult intubation. Reported complications of cricoid pressure during intubation include oesophageal rupture, cricoid cartilage fracture and exacerbation of unsuspected airway injuries.

Arterial blood pressure and heart rate increases significantly after application of cricoid pressure. Thus, cricoid pressure can cause a relatively strong pressor response.

Conclusions

Although cricoid pressure may be difficult to perform optimally, it is rarely dangerous. It will undoubtedly remain a superficially simple and appropriate mechanical method to protect the patient from regurgitation and gastric insufflation. BJHM

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