

## CUFF INFLATION TO AID NASOTRACHEAL INTUBATION USING THE C-MAC VIDEOLARYNGOSCOPE

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### SUMMARY

A preliminary report is presented of a technique for using the C-MAC videolaryngoscope to carry out nasopharyngeal intubations. The main thrust of the technique is that cuff inflation of the endotracheal tube is used to lift the endotracheal tube off the posterior pharyngeal wall and thus direct it towards the glottis. The technique was used successfully in 5 consecutive patients needing nasotracheal intubation. Indeed a couple of these patients might have been difficult to intubate using conventional laryngoscopy. The full technique is described together with pictures at the various stages of intubation.

**Key Words:** Cuff inflation; C-MAC videolaryngoscope; nasotracheal intubation, difficult intubation.

### INTRODUCTION

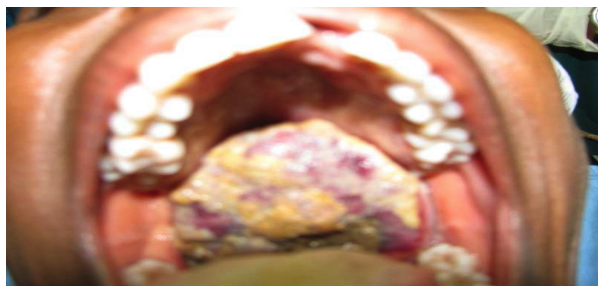
Videolaryngoscopy has in the past few years become an option for difficult intubations. There is also no reason why videolaryngoscopy cannot be used routinely for intubations and in fact should be used more frequently to gain the necessary experience so it can be used confidently for difficult intubations. The C-MAC is a new videolaryngoscope that uses a modified Macintosh blade. Experience with this device has been described in orally intubated patients<sup>1</sup>. When using it for orotracheal intubation the endotracheal tube is directed along the blade of the scope into the glottis. Obviously, with a nasotracheal intubation, it is not possible to do this. We describe a technique in which the C-MAC is used for nasotracheal intubation without the need to insert a Magill's forceps into the patient's mouth or to perform a direct laryngoscopy during intubation.

### METHOD

Because of the advanced pathology encountered in maxillofacial cases seen in our practice, we found it prudent to use the C-MAC videolaryngoscope for our nasal intubations. The technique to be described was developed while using the C-MAC for the nasal intubations.

### Technique

After attaching the appropriate monitors, routine pre-oxygenation, induction, relaxation with a neuromuscular blocking agent, and ventilation are done. Two minutes after giving the neuromuscular blocking agent, and having checked that the jaw is relaxed and the patient ready to be intubated, the endotracheal tube (size 6.0mm, 6.5mm or 7.0mm) is inserted through the nostril until its tip lies in the pharynx (approx 18-20cm from the nostril). The C-MAC videolaryngoscope is then inserted in the mouth and a good view of the laryngeal opening is obtained (Figure 2).



**Figure 1** Case 3 with lesion of palate

The cuff of the endotracheal (ET) tube is then inflated with approximately 10mls air and the endotracheal tube brought into view of the C-MAC monitor screen. The tip of the ET tube, having been lifted off the posterior pharyngeal wall by the inflated cuff is then directed towards the glottic opening. Once the tip of the ET tube is in the glottic opening (Figure 3), the cuff is deflated; the ET tube is advanced into the trachea thus intubating the trachea (Figure 4). The cuff is then re-inflated.

### RESULTS

Five patients have been intubated using this technique. Table 1 shows the demographic data and clinical information on these patients.

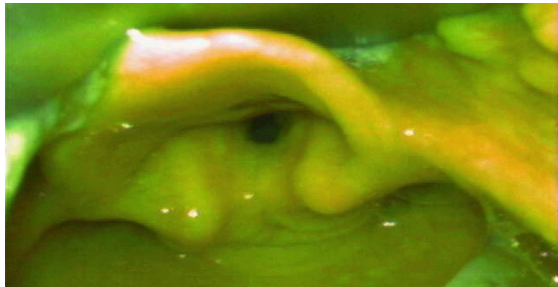
A size 6.5mm endotracheal tube was used on most patients. In case number 3, a size 6.0 ET tube was used as the lesion of the palate was quite large (and the patient quite small) and it was feared that the lesion might be partially occluding the nasopharynx making the

passage of a larger sized ET tube more difficult. Figure 1 shows the lesion in case number 3. Figure 2 shows a view of the larynx using the C-MAC videolaryngoscope, Figure 3 shows the inflated ET tube with the tip

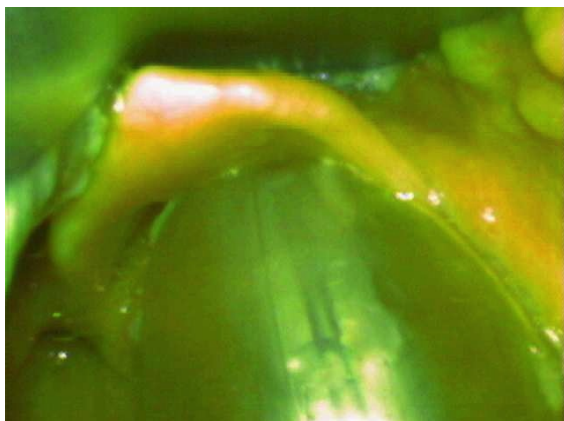
in the glottis, and Figure 4 shows the larynx after the patient has been intubated. In four cases the right nostril was used and in one case the left nostril was used.

**Table 1** Demographic and clinical information on patients

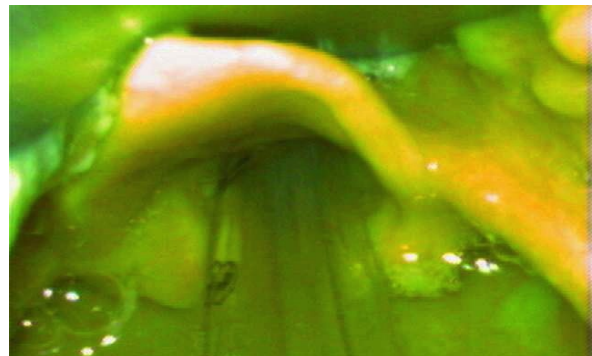
Case No.	Age	Sex	Weight	Nostril used for intubation	Diagnosis	Surgical procedure
1	51	M	58kg	right	Palatal tumour	Excision biopsy
2	39	M	82kg	left	Oro-antral fistula	Repair/closure of fistula
3	34	F	46kg	right	Pleomorphic adenoma of palate	Excision of adenoma
4	24	F	78kg	right	Right mandibular osteoma	Paring down of osteoma
5	18	F	61kg	right	Sublingual mucocoele	Enucleation



**Figure 2** View of larynx using the C-MAC



**Figure 3** View of inflated cuff in glottis



**Figure 4** Intubation of larynx after cuff deflation

In the four cases in which the right nostril was used, the endotracheal tube entered the trachea easily. In the case that the left nostril was used, the ET tube with the cuff inflated easily entered the glottis, but advancing the tube into the trachea after the cuff was deflated needed some manipulation, though intubation was successful. The time taken for intubation (from the beginning of placement of the ET tube into the nostril to after the first ventilation had been given following intubation) was measured on case number 5. This was 35 seconds. There was no desaturation or any other complication during intubation of any of the cases.

## DISCUSSION

Securing the airway is pivotal in anaesthesia. Airway problems leading to hypoxia are a major cause of morbidity and mortality associated with anaesthesia. Videolaryngoscopy has emerged as an important technique in dealing with difficult intubations. In a study of tracheal intubation on 60 patients<sup>1</sup> using the C-MAC, intubation was successful in all patients. Fifty-two patients were intubated on the first attempt, six on the second attempt and two on the third. A gum elastic bougie guide was needed on eight of the patients. Malik et al<sup>2</sup> compared the use of the Pentax AWS videolaryngoscope, the Glidescope videolaryngoscope and the Macintosh laryngoscope in predicted difficult intubations. The rate of successful intubations was lower with the Macintosh (84%) compared with the Glidescope (96%) or the Pentax AWS (100%).

In a comparison of Glidescope videolaryngoscopy to direct laryngoscopy for nasotracheal intubation<sup>3</sup>, Jones et al found that median time to intubation was 23.2 seconds faster with the Glidescope than with direct laryngoscopy (43.5sec vs 66.7sec). Postoperative sore throat (moderate or severe) was significantly lower in the Glidescope group (9%) compared to the direct laryngoscopy group (34%). Two of the patients in the direct laryngoscopy group could not be intubated in 150 seconds. One of these was then intubated using the Glidescope, and in the second an oral intubation was done. In our cases we did not document the incidence of postoperative sore throat.

Although flexible fibreoptic intubation is the gold standard for difficult intubations, there are instances when this is not successful. Asai<sup>4</sup> reports on three cases with unstable cervical spine and airway oedema/retropharyngeal haematoma where attempted awake fibreoptic intubation was unsuccessful. These patients then had successful awake nasotracheal intubation using the Pentax-AWS videolaryngoscope.

In our cases we inflated the cuff of the endotracheal tube to lift it from the posterior pharyngeal wall, thus helping to bring it into view and also direct it towards

the glottis. This technique of cuff inflation has been described for blind nasal intubation in spontaneously breathing patients.<sup>5,6</sup> In our cases, muscle relaxation was given to facilitate videolaryngoscopy. Videolaryngoscopy might have been difficult in spontaneously breathing patients unless they were deeply anaesthetized.

## CONCLUSION

The C-MAC video laryngoscope can be used successfully for nasotracheal intubation. Cuff inflation of the nasotracheal tube helps direct the tube anteriorly towards the glottis, thus facilitating intubation.

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