Reviewer's report

**Title:** A randomised, controlled crossover comparison of the C-MAC videolaryngoscope with direct laryngoscopy in 150 patients during routine induction of anaesthesia

**Version:** 3  **Date:** 23 August 2010

**Reviewer:** Richard Cooper

**Reviewer's report:**

A Randomized, controlled crossover comparison of the C-MAC and DL

I thank the authors for their clarification of several points that had been unclear to this reviewer. I believe the revised manuscript is substantially improved, however I still have some concerns that have not been addressed.

Major compulsory revisions:

Page 9, line 21: in most countries—with possible exceptions of Germany and The Netherlands—the use of a stylet is not considered a disadvantage and may in fact be routine as it potentially reduces the number of laryngoscopic attempts. This presupposes that the stylet is used properly. I am unaware of any evidence of a properly used stylet inducing injury with DL or VL. From this reviewer’s perspective, the use of a stylet reduces the known complications resulting from multiple laryngoscopies, compared with the unproven complications associated with a stylet. Please clarify which patients with a suboptimal view, required the use of a tube guide.

Table 2 does still uses the term “C-MAC4 Miller” which elsewhere has been referred to as C-MAC4/SBT. Please use this term consistently.

Page 9/10: 6 of 8 patients with highly limited direct laryngoscopic views—does this mean that with the C-MAC, a tube guide (stylet) was used whenever the video view was relied upon or was an attempt first made without a tube guide? Table 2 does not appear to differentiate between C-MAC3 and C-MAC4/SBT. It appears from Table 2 that there were actually more patients with incomplete glottic exposure (C/L IIa and IIb than C/L I) compared with studies using more angulated blades (see Cooper RM, Pacey J et al. CJA 529(2) 191, 2005) where the proportions were C/L I and II were 92% and 7% respectively. If incomplete glottic exposure is not clinically important, the authors should say this. Furthermore, if sub-optimal views are common, and this may necessitate a tube-guide, the authors should state whether the evidence supports that such a guide entails greater risk than a subsequent laryngoscopy. This reviewer does not believe that the literature supports such a position. The primary and secondary endpoints were stated in the Background and statistical methods but these terms were not specifically referred to thereafter. These have an important bearing on the authors’ conclusions since they have not demonstrated consistent
superiority over DL and improved laryngeal

Page 10, line 10: I have reviewed 10 of my own video recordings of VL with both the GlideScope and the C-MAC and cannot see a difference between the pharyngeal exposure provided when the larynx is seen. I am unconvinced that viewing the monitor during the introduction of the ETT is any safer with the C-MAC compared to the GlideScope. I believe that palatopharyngeal injuries are just as likely to occur to with both devices if the use is watching the monitor rather than looking into the oropharynx during endotracheal tube insertion. It is neither the stylet nor the blade that has resulted in palatopharyngeal injuries but rather blind advancement of the endotracheal tube (which can be equally observed with both devices).

Page 10, line 21: suggest elevation of the epiglottis rather than performing “an upload of the visualized epiglottis (glottic side).”

Page 11, line 2: please clarify whether the modifications to reduce fogging and dazzling were made during or following the study of 150 patients. If during, please indicate the number of patients studied before and after so the reader might have a better sense if confidence whether this problem has truly been rectified. It would appear from the authors’ response to the reviewers that the modifications to the C-MAC occurred during the study.

Table 1: please rename reclination as cervical extension as has been done elsewhere.

Table 3: this table would have been more useful had the authors provided data relating the subjective assessment of handling in the setting of good vs. sub-optimal laryngeal exposure. If the laryngeal view is good with DL, it is not surprising that the users would prefer DL. If the view is poor, it is more likely that they would prefer VL. As the authors stated in their Background, since poor laryngeal exposure may be found in up to 9% of patients, this is probably the group of greater concern interest for VL. As it stands, the study indicates that poor handling was experienced in only 11 patients when DL was used compared with 19 for C-MAC3 and 19 for C-MAC4. Please comment.

Data from Table 2 indicates that “suboptimal views” were seen in seen in 24 patients by DL, of which 16 were still C/L II (a or b). They are generally not a challenge to intubate. In contrast, 15 patients were C/L II using the C-MAC, which is not an inspiring improvement. If the primary endpoint is improved glottic view, have the authors will need to present their case more convincingly that C-MAC offers significantly superior laryngeal viewing compared with DL? The conclusions should be modified to indicate that there is a greater likelihood of reducing the number of C/L III or IV views and but a study with more challenging airways would be required to confirm this suspicion.

Minor Revisions

Methods: line 3—I suggest that stainless steel Macintosh-shaped blade might be further simplified as “This stainless steel blade retains the original Macintosh shape. It has a closed blade design…”

Page 4, line 18—I suggest “computer-based open randomization to determine
the sequence of the three laryngoscopies: conventional direct laryngoscopy, C-MAC3 and C-MAC4."

Page 5, line 14—I suggest “…in the sequence determined by randomization. The blade was introduced to the right of the tongue and advanced toward the vallecula.”

Page 8, line 3: please provide the name of the semi-flexible tube guide used and its manufacturer. Is this in fact the same as a gum elastic bougie or Eschmann Introducer?

Page 8, line 5: please make it clear in the text, whether fogging interfered with intubation.

Page 8, line 6: the meaning of the term “dazzling” was provided to the reviewers but not the readers.

Page 9, line 15: suggest changing “short time to laryngoscopy” to “times comparable to direct laryngoscopy”

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I am an unpaid consultant to Verathon Medical, the company that manufactures a competing product (GlideScope). I have received a loan of a Storz C-MAC for clinical evaluation and have demonstrated both products as numerous workshops.