McGrath MAC versus Macintosh for perioperative endotracheal intubation: A re-analysis of a recent Cochrane review

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Introduction
• Cochrane evidence demonstrates that video laryngoscopy (VL) is better than direct laryngoscopy (DL) for successful tracheal intubation.1
• Multiple devices are available, meaning that identifying a particular device based on available evidence can be challenging.
• We reassessed the Cochrane meta-analysis to specifically compare McGrath MAC (Figure 1) versus Macintosh DL.

Methods
• We reviewed the randomized controlled trials (RCTs) included in the Cochrane review, selecting only RCTs that used McGrath MAC VL compared with Macintosh DL in perioperative care.
• Outcomes assessed were:
  - First-pass success (FPS)
  - Failed intubation
  - Esophageal intubation
  - Dental injury
  - Hypoxemia
• Meta-analysis was performed using RevMan 5.4.2
• Failed and esophageal intubations are rare events and were therefore assessed using the Peto odds ratio (OR).3
• The risk ratio (RR) was used for FPS and we present it alongside the original result from the Cochrane review.
• Meta-analysis was performed using RevMan 5.4.

Outcomes assessed were:
- First-pass success (FPS)
- Failed intubation
- Esophageal intubation
- Dental injury
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Results
• Compared with the 21 studies originally included in the Cochrane review, we excluded seven of these RCTs because two used a mix of VLs, two were not for perioperative care, two used McGrath series 3 or 5, and one was retracted.
• We included 14 RCTs with 3,137 patients (1,570 using McGrath MAC).
• FPS was significantly improved using McGrath MAC in comparison to Macintosh (RR 1.07, 95% CI 1.01 - 1.15) and the RR was similar to that reported in the Cochrane review (Table 1, Figure 2A).
• In addition, the use of McGrath MAC led to a significant reduction in failed intubations (OR 0.33, 95% CI 0.12 - 0.92) and a non-significant reduction in oesophageal intubations (Table 1, Figure 2B & C).
• To put this into context a hospital with:
  • an FPS of 85% with Macintosh, could expect FPS to increase to 91%.
  • a failed intubation rate of 3% with Macintosh, could expect this to drop to 1%.
  • There were insufficient data to report results on dental trauma or hypoxemia.
• In a leave-one-out analysis, results were not substantially impacted by any one study.

Conclusion
• In keeping with the findings of the 2022 Cochrane review, in perioperative care, FPS is higher with McGrath MAC in comparison to Macintosh DL and failed intubation is less common.
• To determine the clinical significance, real-world data, a larger RCT, or a network meta-analysis would be useful.

Table 1. Re-analysis of Cochrane review comparing only McGrath MAC with Macintosh

<table>
<thead>
<tr>
<th>Outcome</th>
<th>First-pass success, RR</th>
<th>Failed intubation, OR</th>
<th>Esophageal intubation, OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>McGrath MAC</td>
<td>1.07 [1.01, 1.15]</td>
<td>0.23 [0.04, 1.15]</td>
<td>Not reported as OR</td>
</tr>
<tr>
<td>Macintosh DL</td>
<td>1.05 [1.02, 1.09]</td>
<td>1.00 [1.00, 1.00]</td>
<td>Not reported as OR</td>
</tr>
</tbody>
</table>

References

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AM is a consultant anaesthetist in Edinburgh and has received honoraria from medtronic for lectures on videolaryngoscopy.