How should clinical outcomes factor

into purchasing decisions about

Macintosh-style laryngoscopes?

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Objective

• Intubation with a Macintosh blade is a routine procedure in perioperative care and evidence demonstrates that video laryngoscopy (VL) improves intubation success versus direct laryngoscopy (DL).¹

Conclusions

- No difference in clinical efficacy was determined between McGrath MAC* and C-MAC* although their superiority to DL was confirmed.
- A cost-minimization analysis is likely sufficient to inform purchasing decisions.



Improving healthcare decisions

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- We wish to understand the type of health-economic analysis required to inform purchasing decisions between the two common VL devices, C-MAC* and McGrath MAC*.
- The purchase cost could present a key factor when choosing a device without compromising patient safety.

McGrath Mac* VL vs. Macintosh* DL

		McGrath		Macintosh			Risk Ratio	Risk Ratio
	Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% C	I M-H, Random, 95% Cl
	Altaiee 2020	50	50	50	50	14.0%	1.00 [0.96, 1.04]	+
	Altun 2018	35	40	34	40	7.0%	1.03 [0.86, 1.23]	
	Bakshi 2019	36	37	35	37	11.2%	1.03 [0.94, 1.13]	
Firet_nace	Cakir 2019	31	31	30	31	11.5%	1.03 [0.95, 1.13]	
1 1131-4033	Colak 2019	44	45	41	45	10.8%	1.07 [0.97, 1.19]	+
•	Ing 2017	9	11	15	16	3.4%	0.87 [0.64, 1.19]	
01100000	Kaur 2020	39	40	35	40	9.3%	1.11 [0.98, 1.27]	+-
SUCCESS	Kido 2015	24	25	16	25	3.4%	1.50 [1.11, 2.03]	
000000	Kriege 2017	1019	1084	896	1087	14.2%	1.14 [1.11, 1.18]	-
	Ruetzler 2020	61	66	56	63	10.2%	1.04 [0.93, 1.16]	
	Shippey 2013	24	24	18	24	4.9%	1.32 [1.04, 1.68]	
	Total (95% CI)		1453		1458	100.0%	1.07 [1.01, 1.15]	
	Total events	1372		1226				
	Heterogeneity: Tau ² =	0.01; Chi ²	= 53.7	3, df = 10	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	Test for overall effect:	Z = 2.20 (P=0.0	3)	Favours Macintosh Favours McGrath			

C-MAC* VL vs. Macintosh* DL

	C-MA	С	Macint	osh		Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	M-H, Random, 95% Cl
Akbar 2015	44	45	39	45	7.2%	1.13 [1.00, 1.28]	
Anders 2017	39	39	34	39	6.8%	1.14 [1.01, 1.30]	
Aziz 2012	138	149	124	147	10.6%	1.10 [1.01, 1.19]	
Bhat 2015	47	50	43	50	6.6%	1.09 [0.96, 1.25]	+
Blajic 2018	59	60	56	59	12.2%	1.04 [0.97, 1.11]	
Gupta 2013	60	60	55	60	10.6%	1.09 [1.00, 1.18]	
Kapadia 2021	51	55	50	55	8.0%	1.02 [0.91, 1.14]	- - -
Küçükosman 2020	30	30	30	30	12.6%	1.00 [0.94, 1.07]	+
McElwain 2011	26	29	25	31	3.3%	1.11 [0.90, 1.37]	-
Sarkilar 2015	50	55	53	55	9.1%	0.94 [0.86, 1.04]	
Teoh 2010	93	100	98	100	13.0%	0.95 [0.89, 1.01]	
Total (95% CI)		672		671	100.0%	1.04 [1.00, 1.09]	◆
Total events	637		607				
Heterogeneity: Tau ² =	0.00; Chi²	= 23.0	2, df = 10	(P = 0.	01); l² = 57	7% ⊢	
Test for overall effect:	Z = 1.83 (F	P = 0.0	7)			0.7	Z U.O I Z O Favours Macintosh Favours C-MAC
	•		-				I AVOUIS MACHILOSH I AVOUIS C-MAC



	McGra	th	Macintosh			Peto Odds Ratio		Ratio	
Study or Subgroup	Events	Total	Events	Total	Weight	Peto, Fixed, 95% CI		Peto, Fixed, S	∂5% CI
Altaiee 2020	0	50	0	50		Not estimable			
Anandraja 2021	0	30	0	30		Not estimable			
Bakshi 2019	0	37	1	37	6.7%	0.14 [0.00, 6.82]	+		
Cakir 2019	0	31	0	31		Not estimable			
Kaur 2020	0	40	0	40		Not estimable			
Kido 2015	0	25	0	25		Not estimable			
Ruetzler 2020	3	66	5	63	50.9%	0.56 [0.13, 2.33]			
Shippey 2013	0	24	1	24	6.7%	0.14 [0.00, 6.82]	<		
Yoo 2018	1	22	5	22	35.7%	0.22 [0.04, 1.21]	← _		
Total (95% CI)		325		322	100.0%	0.33 [0.12, 0.92]			
Total events	4		12						

	McGrath Macintosh Peto Odds Ratio Peto Odds Ratio Study or Subgroup Events Total Events Total Weight Peto Eixed 95% Cl Peto Eixed 95% Cl	C-MAC Macintosh Peto Odds Ratio Peto Odds Ratio Study or Subgroup Events Total Events Total Weight Peto Eixed 95% Cl Peto Eixed 95% Cl
	Altajee 2020 0 50 0 50 Not estimable	Akbar 2015 0 45 2 45 6.9% 0.13 [0.01, 2.15]
	Anandraja 2021 0 30 0 30 Not estimable	Anders 2017 0 39 5 39 16.6% 0.12 [0.02, 0.73]
	Bakshi 2019 0 37 1 37 6.7% 0.14 [0.00, 6.82]	Aziz 2012 6 149 12 147 59.5% 0.49 [0.19, 1.26]
	Cakir 2019 0 31 0 31 Not estimable	Bhat 2015 0 50 0 50 Not estimable
	Kaur 2020040Not estimable	Blajic 2018 0 60 0 59 Not estimable
Failad	Kido 2015 0 25 0 25 Not estimable	Gupta 2013 0 60 0 60 Not estimable
raileu	Ruetzler 2020 3 66 5 63 50.9% 0.56 [0.13, 2.33]	Hostic 2016 1 52 1 40 6.8% 0.76 [0.05, 12.72]
	Shippey 2013 0 24 1 24 6.7% 0.14 [0.00, 6.82]	Küçükosman 2020 0 30 0 30 Not estimable
	Yoo 2018 1 22 5 22 35.7% 0.22 [0.04, 1.21] 🕇 🗖 🚽	McElwain 2011 1 29 2 31 10.2% 0.54 [0.05, 5.38] ◀ ■
Intubation		Ninan 2016 0 30 0 30 Not estimable
IIIGNATION	Total (95% CI) 325 322 100.0% 0.33 [0.12, 0.92]	Sarkilar 2015 0 55 0 55 Not estimable
	Total events 4 12	Teoh 2010 0 100 0 100 Not estimable
	Test for overall effect: Z = 2.12 (P = 0.03) Favours McGrath Favours Macintosh	Total (95% Cl) 699 686 100.0% $0.37 [0.18, 0.77]$ Total events 8 22 Heterogeneity: Chi ² = 2.67, df = 4 (P = 0.61); l ² = 0% $0.1 0.2 0.5 1 2 5$ Test for overall effect: Z = 2.67 (P = 0.007) Favours C-MAC
	McGrath Macintosh Peto Odds Ratio Peto Odds Ratio Study or Subgroup Events Total Events Total Weight Peto Eixed 95% Cl Peto Eixed 95% Cl	C-MAC Macintosh Peto Odds Ratio Peto Odds Ratio Study or Subgroup Events Total Events Total Weight Peto Fixed 95% Cl Peto Fixed 95% Cl
	Colak 2019 0 45 0 45 Not estimable	$\frac{6444961644591649}{2461649} = \frac{16441}{246164} = \frac{16441}{164914} = \frac{16461}{164914} =$
Feanhagaal	Ing 2017 $0 11 0 16$ Not estimable	Bhat 2015 0 50 0 50 Not estimable
LOUPHAYEA	Thion 2018 1 65 4 57 82.8% 0.25 [0.04. 1.50]	Teoh 2010 0 100 0 100 Not estimable
	Yoo 2018 0 22 1 22 17.2% 0.14 0.00, 6.82	
intubation		Total (95% CI) 195 195 Not estimable
Intuoation	Total (95% CI) 143 140 100.0% 0.23 [0.04, 1.15]	Total events 0 0
	Total events 1 5	Heterogeneity: Not applicable

Figure 1 Evaluation of clinical outcomes for Macintsoh* DL compared to McGrath MAC* VL and C-MAC* VL respectively.

Methodology

- We reviewed the studies included in a 2022 Cochrane review comparing VL versus DL.¹
- Only studies that compared McGrath MAC* VL or C-MAC* VL with Macintosh* DL in perioperative care were selected.
- Outcomes assessed were:
 - First-pass success
 - Failed intubation
 - Esophageal intubation
- Meta-analyses were performed using RevMan 5.4.
- Failed and esophageal intubations as rare events were assessed using the Peto odds ratio (OR).

Results

- First-pass success was significantly improved using either VL in ightarrowcomparison to DL:
 - McGrath MAC*: RR 1.07 [1.01,1.15]
 - C-MAC*: RR 1.04 [1.00, 1.09]
- Failed intubations were significantly decreased:
 - McGrath MAC*: OR 0.33 [0.12, 0.92]
 - C-MAC*: OR 0.37 [0.18, 0.77]
- There was no significant difference between meta-analyses for ulletMcGrath MAC* and C-MAC* for both outcomes.

- The risk ratio (RR) was used for first-pass success.
- The Metafor R package for comparing estimates of independent meta-analyses was used to assess whether the outcomes for McGrath MAC* and C-MAC* were statistically different.

References

1. Hansel, J., Rogers, A. M., Lewis, S. R., Cook, T. M., & Smith, A. F. (2022). Videolaryngoscopy versus direct laryngoscopy for adults undergoing tracheal intubation. The Cochrane database of systematic reviews, 4(4), CD011136.

Reference number: US-RE-2200583

A non-significant reduction for esophageal intubation was identified for McGrath MAC* with OR 0.23 [0.04, 1.15], however, no overall effect could be estimated for C-MAC*.

*Risk statement

For trained personnel only. For specific indications and instructions for use, please refer to the product manual.

Disclosures

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