

Cochrane Database of Systematic Reviews

Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation (Review)

endotractieat intubation for neonatal resuscitation (keview)
Qureshi MJ, Kumar M

Qureshi MJ, Kumar M.

Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation. *Cochrane Database of Systematic Reviews* 2018, Issue 3. Art. No.: CD003314. DOI: 10.1002/14651858.CD003314.pub3.

www.cochranelibrary.com



[Intervention Review]

Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation

Mosarrat J Qureshi¹, Manoj Kumar²

¹Northern Alberta Neonatal Program, Royal Alexandra Hospital, Edmonton, Canada. ²Department of Pediatrics, University of Alberta, Edmonton, Canada

Contact: Mosarrat J Qureshi, Northern Alberta Neonatal Program, Royal Alexandra Hospital, 10240 Kingsway Avenue, Edmonton, AB, T5H 3V9, Canada. Mosarrat.Qureshi@albertahealthservices.ca.

Editorial group: Cochrane Neonatal Group.

Publication status and date: New search for studies and content updated (conclusions changed), published in Issue 3, 2018.

Citation: Qureshi MJ, Kumar M. Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation. *Cochrane Database of Systematic Reviews* 2018, Issue 3. Art. No.: CD003314. DOI: 10.1002/14651858.CD003314.pub3.

Copyright © 2018 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Providing effective positive pressure ventilation is considered to be the single most important component of successful neonatal resuscitation. Ventilation is frequently initiated manually with bag and face mask (BMV) followed by endotracheal intubation if respiratory depression continues. These techniques may be difficult to perform successfully resulting in prolonged resuscitation or neonatal asphyxia. The laryngeal mask airway (LMA) may achieve initial ventilation and successful resuscitation faster than a bag-mask device or endotracheal intubation.

Objectives

Among newborns requiring positive pressure ventilation for cardio-pulmonary resuscitation, is LMA more effective than BMV or endotracheal intubation for successful resuscitation? When BMV is either insufficient or ineffective, is effective positive pressure ventilation and successful resuscitation achieved faster with the LMA compared to endotracheal intubation?

Search methods

We used the standard search strategy of Cochrane Neonatal to search the Cochrane Central Register of Controlled Trials (CENTRAL 2017, Issue 1), MEDLINE via PubMed (1966 to 15 February 2017), Embase (1980 to 15 February 2017), and CINAHL (1982 to 15 February 2017). We also searched clinical trials registers, conference proceedings, and the reference lists of retrieved articles for randomised controlled trials and quasi-randomised trials.

Selection criteria

We included randomised and quasi-randomised controlled trials that compared LMA for neonatal resuscitation with either BMV or endotracheal intubation and reported on any outcomes related to neonatal resuscitation specified in this review.

Data collection and analysis

Two review authors independently evaluated studies for risk of bias assessments, and extracted data using Cochrane Neonatal criteria. Categorical treatment effects were described as relative risks and continuous treatment effects were described as the mean difference, with 95% confidence intervals (95% CI) of estimates.

Main results

We included seven trials that involved a total of 794 infants. Five studies compared LMA with BMV and three studies compared LMA with endotracheal intubation. We added six new studies for this update (754 infants).



LMA was associated with less need for endotracheal intubation than BMV (typical risk ratio (RR) 0.24, 95% CI 0.12 to 0.47 and typical risk difference (RD) -0.14, 95% CI -0.14 to -0.06; 5 studies, 661 infants; moderate-quality evidence) and shorter ventilation time (mean difference (MD) -18.90 seconds, 95% CI -24.35 to -13.44; 4 studies, 610 infants). Babies resuscitated with LMA were less likely to require admission to neonatal intensive care unit (NICU) (typical RR 0.60, 95% CI 0.40 to 0.90 and typical RD -0.18, 95% CI -0.31 to -0.04; 2 studies,191 infants; moderate-quality evidence). There was no difference in deaths or hypoxic ischaemic encephalopathy (HIE) events.

Compared to endotracheal intubation, there were no clinically significant differences in insertion time or failure to correctly insert the device (typical RR 0.95, 95% CI 0.17 to 5.42; 3 studies, 158 infants; very low-quality evidence). There was no difference in deaths or HIE events.

Authors' conclusions

LMA can achieve effective ventilation during neonatal resuscitation in a time frame consistent with current neonatal resuscitation guidelines. Compared to BMV, LMA is more effective in terms of shorter resuscitation and ventilation times, and less need for endotracheal intubation (low- to moderate-quality evidence). However, in trials comparing LMA with BMV, over 80% of infants in both trial arms responded to the allocated intervention. In studies that allowed LMA rescue of infants failing with BMV, it was possible to avoid intubation in the majority. It is important that the clinical community resorts to the use of LMA more proactively to provide effective ventilation when newborn is not responding to BMV before attempting intubation or initiating chest compressions.

LMA was found to offer comparable efficacy to endotracheal intubation (very low- to low-quality evidence). It therefore offers an alternate airway device when attempts at inserting endotracheal intubation are unsuccessful during resuscitation.

Most studies enrolled infants with birth weight over 1500 g or 34 or more weeks' gestation. As such, there is lack of evidence to support LMA use in more premature infants.

PLAIN LANGUAGE SUMMARY

Laryngeal mask airway versus bag-mask ventilation or endotracheal intubation for neonatal resuscitation

Review questions

Among all newborns requiring positive pressure ventilation for cardiopulmonary resuscitation, is effective positive pressure ventilation and successful resuscitation achieved faster with the laryngeal mask airway (LMA) compared to bag-mask ventilation (BMV)?

When BMV is either insufficient or ineffective, is effective positive pressure ventilation and successful resuscitation achieved faster with LMA compared to endotracheal intubation?

Background

Most newborns are vigorous at birth, but a small number need to be helped with breathing (assisted ventilation) in the delivery room. Infants who do not have effective breathing soon after birth can become severely depressed. Providing rapid effective ventilation in the delivery room is very important. Ventilation is often started using a manually-pumped oxygen bag to force air into a close-fitting face mask held over the infant's nose and mouth. If breathing remains depressed after using the manual resuscitation bag, a tube is placed directly into the infant's large airway (endotracheal intubation). Bag and mask ventilation and endotracheal intubation may not be possible when infants have airway obstructions or head and face abnormalities that obstruct the normal flow of air into their lungs and/or obstructing the view of the airway by the medical personnel attempting intubation. The LMA is an alternative to bag and mask ventilation and endotracheal intubation. LMA is a small mask attached to a silicone tube fitted into the throat to provide positive pressure ventilation into the airway.

Study characteristics

We included seven trials that recruited a total of 794 infants. Our updated search (February 2017) lead to inclusion of six new studies (754 infants). Five studies compared LMA with BMV and three studies compared LMA with endotracheal intubation to provide effective positive pressure ventilation for newborns requiring heart/lung resuscitation.

Key results

LMA can achieve effective ventilation during neonatal resuscitation in a time frame consistent with current guidelines and could be more effective than BMV in resuscitation settings.

Quality of evidence

Evidence quality ranged from very low- to moderate-quality.