

# Incidence of meconium aspiration syndrome in newborns undergoing direct laryngoscopy versus those not undergoing direct laryngoscopy at birth

## Abstract

**Introduction:** Meconium aspiration syndrome (MAS) is a major cause of neonatal respiratory distress associated with meconium-stained amniotic fluid (MSAF). The utility of routine direct laryngoscopy at birth in non-vigorous neonates remains controversial, with limited evidence supporting its systematic use.

**Objective:** To determine the incidence of MAS in newborns with a history of MAF who underwent direct laryngoscopy at birth compared to those who did not, as well as to describe their morbidity and mortality.

**Materials and methods:** An observational, cross-sectional, descriptive, and retrospective study conducted at the National Institute of Perinatology. Newborns with MOL between June 2014 and June 2017 were included. Two groups were compared: those with direct laryngoscopy and those without laryngoscopy. Clinical variables were analyzed using descriptive statistics.

**Results:** A total of 11,735 births were recorded, of which 170 presented with LAM (prevalence of 144.8 per 10,000 live births). A total of 140 patients were analyzed: 40 with laryngoscopy and 100 without. SAM occurred in only one patient in the group without laryngoscopy. The group with laryngoscopy had a higher frequency of low 1-minute Apgar scores (62.5% vs. 33%), higher NICU admission rates (30% vs. 14%), and longer hospital stays (15 vs. 9 days). No deaths were recorded.

**Conclusions:** Routine direct laryngoscopy did not demonstrate a benefit in the prevention of MAS and was associated with increased intervention and resource utilization.

**Keywords:** meconium aspiration syndrome, laryngoscopy, meconium-stained amniotic fluid, neonatal resuscitation

Volume 16 Issue 1 - 2026

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## Introduction

Meconium-stained amniotic fluid (MSAF) occurs in approximately 13% of pregnancies, and of these, 7.1% of newborns develop respiratory distress.<sup>1</sup> Associated risk factors include post term pregnancy, intrauterine growth restriction, fetal distress, and placental insufficiency.<sup>1</sup> Meconium aspiration syndrome (MAS) occurs in approximately 5% of patients with MAS, with a significant proportion of severe cases.<sup>2,3</sup>

The pathophysiological mechanism is not fully understood, although it has been linked to increased parasympathetic activity and the release of factors such as corticotropin.<sup>4</sup> The management of the newborn with LAM remains controversial. Routine suctioning has not demonstrated a benefit and may be associated with complications.<sup>5</sup> Several studies have shown that direct laryngoscopy does not reduce the incidence of MAS or mortality.<sup>6,7</sup> International guidelines recommend against routine laryngoscopy due to the low quality of evidence.<sup>8,9</sup> Delay in initiating positive-pressure ventilation is associated with higher neonatal mortality.<sup>10</sup>

## Problem statement

Management of newborns with LAM is inconsistent, and controversy persists regarding the use of direct laryngoscopy. There is insufficient evidence to support its routine use, raising the need to evaluate its clinical impact.

## Rationale

SAM is associated with increased neonatal morbidity and mortality. Evaluating the utility of laryngoscopy allows for the optimization of resources and the improvement of evidence-based care.

## Objectives

### Overall objective

To determine the incidence of SAM in newborns with LAM with laryngoscopy versus without laryngoscopy.

### Specific objectives

- (i) Compare admission to the NICU
- (ii) To assess morbidity and mortality
- (iii) Compare length of hospital stay

## Materials and methods

An observational, descriptive, and retrospective study conducted at the National Institute of Perinatology. Newborns between 37 and 42 weeks of gestation with a history of LAM were included.

Two groups were compared:

- (i) With laryngoscopy (2014–2015)
- (ii) Without laryngoscopy (2016–2017)

Descriptive statistics were used for the analysis.

## Results

A total of 140 patients were analyzed:

- (i) 40 with laryngoscopy
- (ii) 100 without laryngoscopy

SAM occurred in only one patient in the group without laryngoscopy.

The group with laryngoscopy presented:

- (i) Higher incidence of low Apgar scores
- (ii) Higher rate of admission to the NICU (30% vs. 14%)
- (iii) Longer hospital stay (15 vs. 9 days)

No deaths were recorded.

Regarding demographic and clinical characteristics, Table 1 shows the distribution of mode of delivery, with a higher prevalence of cesarean sections in the group with laryngoscopy (67.5%) compared to the group without laryngoscopy (48.0%).

**Table 1** Pregnancy outcome

Mode of delivery	Frequency with laryngoscopy	Percentage	Frequency without laryngoscopy	Percentage
Delivery	9	22.5	41	41
Forceps	4	10	11	11
Cesarean	27	67.5	48	48
Total	40	100	100	100

Table 2 presents the results of umbilical cord blood gas analysis, showing a predominance of normal values in both groups; however, a higher percentage of tests not performed stands out in the group without laryngoscopy.

**Table 2** Umbilical cord blood gas analysis

Blood gas value	Frequency with laryngoscopy	Percentage	Frequency without laryngoscopy	Percentage
Normal	23	57.5	42	42
Fetal acidemia	7	17.5	7	7
Could not be performed	10	25	51	51
Total	40	100	100	100

Regarding clinical outcomes, Table 3 shows the relevant diagnoses, indicating that meconium aspiration syndrome occurred in only one patient in the group without laryngoscopy, while perinatal asphyxia was more frequent in the group with laryngoscopy.

**Table 3** Relevant diagnoses

Diagnosis	Frequency with laryngoscopy	Percentage	Frequency without laryngoscopy	Percentage
Meconium aspiration syndrome	0	0	1	1
Perinatal asphyxia	4	10	1	1

## Discussion

In the present study, the main findings were that the incidence of meconium aspiration syndrome was extremely low and was not associated with direct laryngoscopy at birth. Additionally, newborns who underwent laryngoscopy had a higher frequency of low Apgar scores, higher rates of admission to the neonatal intensive care unit, and longer hospital stays. These results suggest that routine laryngoscopy does not confer a clinical benefit in the prevention of meconium aspiration syndrome and may be associated with increased intervention and resource utilization.

The results are consistent with previous studies showing that laryngoscopy does not reduce the incidence of MAS.<sup>11,12</sup>

The higher use of interventions in the laryngoscopy group could be related to a delay in effective ventilation.<sup>13,14</sup>

This reinforces current recommendations to prioritize positive-pressure ventilation.<sup>9,10</sup>

## Strengths and limitations

This study has several strengths. First, it involves a cohort from a tertiary-care center with a high volume of births, allowing for the evaluation of real-world clinical practices in a specialized setting. Additionally, a comparative period reflecting a change in clinical practice was included, enabling an analysis of the impact of implementing international recommendations.

However, it also has limitations. Its retrospective design may be subject to selection and information biases. Furthermore, the relatively small sample size and low incidence of meconium aspiration syndrome may limit the ability to detect significant differences between groups. Finally, as this is a single-center study, generalizing the results to other populations should be done with caution.<sup>15-17</sup>

## Conclusions

Routine direct laryngoscopy does not reduce the incidence of MAS and may increase unnecessary interventions.

Its use should be limited to cases with ineffective ventilation.

## Acknowledgments

None.

## Funding

None.

## Conflict of interests

The authors declare that they have no conflict of interests to disclose.

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