LISA: Surfactant administration in spontaneous breathing. Which evidence from the literature?

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Summary. Recent human and animal studies demonstrated that surfactant can be delivered intratracheally without traditional intubation and bagging, but using a fine catheter inserted into the trachea of spontaneously breathing preterm infants on CPAP. This strategy, known as LISA (less invasive surfactant administration) or MIST (minimal invasive surfactant therapy), seems to reduce failure of non-invasive respiratory approach. Avoiding mechanical ventilation and manual inflation it is possible to reduce lung injury due to baro-volutrauma. Moreover leaving the infants supported by N-CPAP during the maneuver, it is possible to reduce the risk of lung derecruitment. Further studies are needed to confirm the promising effects due to this strategy to deliver surfactant. (www.actabiomedica.it)

Key words: surfactant, spontaneous breathing, preterm infants, RDS

Introduction

Surfactant administration is a well recognized management for respiratory distress syndrome (RDS) (1); N-CPAP and Non Invasive Ventilation (NIV) are often used to reduce the occurrence of mechanical ventilation (2-3) and so to minimize the risk of lung injury and the evolution towards bronchopulmonary dysplasia (BPD).

INSURE procedure (transient intubation for surfactant administration, followed by a brief ventilation with final extubation to restore the non-invasive respiratory support in spontaneous breathing preterm infants) used in some recent RCTs (4-6), it has been recognized to reduce the need of mechanical ventilation (MV) (7).

Anyway in order to reduce the potential risk of tracheal intubation and lung injury due to the ventilation even if for a short period during INSURE procedure, a new method to give exogenous surfactant without tracheal intubation and MV has been studied since 2001; this method leaves the baby spontaneously breathing on CPAP during the procedure. The glottis is visualized with the laryngoscope and the surfactant is introduced in the trachea using different thin catheters. The procedure is called LISA (less invasive surfactant administration) or MIST (minimal invasive surfactant therapy).

In literature many important experiences are described about the use of this “less or minimal” invasive modality for surfactant replacement therapy in spontaneously breathing preterm infants on non-invasive respiratory support.

In Germany, Angela Kribs documented as a single center experience that this procedure is feasible with rare early complications and able to reduce the rate of N-CPAP failure (from 46% to 25%) with an increased survival rate (from 76% to 90%) and survival without BPD (from 65% to 80%) (8-11).

After this single center experience, in Germany was planned the “AMV trial” (Avoiding Mechanical Ventilation): a RCT (19 NICUs) that enrolled 220 preterm infants (26.0-28.6 wks’GA) who were randomized to standard treatment (INSURE) or to inter
Surfactant in spontaneous breathing: evidence from the literature

Surfactant administration to spontaneously breathing preterm infants (LISA or MIST procedure) seem to be safe, well tolerated and associated with reduced NIV failure and less need of mechanical ventilation.

Actually there is not a universal consensus about the best choice of the catheter to use for the procedure,
the length of manoeuvre, the need for Magill forceps and for an eventual pre-medication, the safety for all the spontaneously breathing preterm infants in non-invasive respiratory support, independently from the GA and birth weight, whenever the surfactant administration is considered necessary.

Moreover it could be important to evaluate (e.g. in animal experiment) if this procedure could be enhanced by a preliminary maneuver to recruit the lungs and so to allow a better distribution of surfactant in course of spontaneous breathing only supported by N-CPAP.

Anyway, even if BPD is a multifactorial disease, LISA/MIST procedure for surfactant administration because seems to improve short term respiratory outcomes (e.g. need of mechanical ventilation and length of respiratory support) could reduce the risk of lung injury and so the evolution towards BPD. More larger RCT are needed to confirm this hypothesis.

References


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