Less Invasive Surfactant Administration (LISA) UHL Neonatal Guideline

NHS University Hospitals of Leicester NHS Trust

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1. Introduction and Who Guideline applies to

Preterm infants often develop respiratory problems, which may require respiratory support and surfactant administration. Surfactant therapy for prophylaxis or treatment of respiratory distress syndrome (RDS) has been shown to reduce the risk of neonatal morbidity and mortality. The standard approach for delivery of surfactant in the preterm infant has been endotracheal intubation with or without a subsequent period of mechanical ventilation. It is known that mechanical ventilation may cause adverse effects, particularly for the preterm infant and increase the risk of acute lung injury and chronic lung disease.

The use of less invasive techniques for surfactant administration in spontaneously breathing infants may reduce the incidence of mortality and bronchopulmonary dysplasia (BPD). The Less Invasive Surfactant Administration (LISA) technique allows for uninterrupted non-invasive respiratory support during the delivery of surfactant, preventing lung injury which could result from the temporary loss of functional residual capacity and atelectasis during the process of intubation. LISA depends on the spontaneous breathing effort of the newborns to distribute the surfactant in the lungs, resulting in more rapid and complete tissue incorporation of surfactant in the neonatal lung.

This guideline applies to all health care professionals involved in the care of infants within the Neonatal Service.

Aim

To provide guidance for the safe and effective use of less invasive surfactant administration (LISA).

Key Points

- Neonatal clinicians who are who are competent in airway management and able to visualise vocal cords and intubate should carry out or supervise this procedure.
- LISA may be used in a baby of any gestational age, but will be most appropriate for stable babies born at ≥27 weeks of gestation.
- Babies must be spontaneously breathing with or without non-invasive respiratory support.
- LISA is a two person procedure.
- Monitor heart rate and oxygen saturation before, during and after the procedure.
- Use Fentanyl 1-2 microgram/kg IV for premedication *(NB: This is one third of the dose used for endotracheal intubation)*

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2. Guideline Standards and Procedures

Laryngoscopy is known to be a painful procedure, and premedication is routinely given prior to endotracheal intubation. The evidence for using premedication for LISA is limited, and practice varies considerably. Where premedication is given, the most commonly used drug is fentanyl. Opioid medication can cause respiratory depression, but spontaneous breathing is a prerequisite for LISA. The dose of fentanyl used for LISA is, therefore, smaller (one third) of that used for intubation. To ensure the baby's comfort, this should be combined with swaddling and containment. For a smooth and uncomplicated procedure, it is essential that an additional person is available both to assist the clinician performing the procedure and to attend to the baby's comfort.

LISA may be used in a baby of any gestational age, but will be most appropriate for stable babies born at ≥27 weeks of gestation. This guideline is intended to provide guidance for the safe and effective use of LISA.

Applicable patients:

Consider LISA in preterm (< 37 weeks of gestation) or early term (37+0 – 38+6 weeks of gestation) infants:

- Spontaneously breathing
- With a clinical or radiological diagnosis of RDS
- Who can be managed with non-invasive invasive ventilation

LISA may be contraindicated when there is:

- Imminent need for invasive ventilation as judged by a senior clinician

- An alternative cause for respiratory deterioration
- Known maxillo-facial, tracheal or pulmonary malformations
- No appropriately trained staff present to carry out the procedure

Preparation:

Patient:

- Position the baby as for intubation
- Swaddle the baby
- Continuous monitoring of heart rate and oxygen saturation
- Obtain IV access
- Site orogastric tube and aspirate stomach contents
- Inform parents about the procedure where possible

Equipment:

- LISAcath™ (The LISAcath™ is a trademark of Chiesi Pharmaceuticals)
- Videolaryngoscope/laryngoscope with appropriately sized blade
- Magills forceps
- Neonatal resuscitation equipment including suction, appropriately sized mask and endotracheal tube and NeoPuff should be easily accessible
- Ensure that an assistant is available

Surfactant:

- Pre-warm Curosurf to room temperature
- Drawn up Curosurf 100-200mg/kg
- Round up dose to nearest full vial
- *Premedication:*
- Fentanyl 1-2 microgram/kg IV
- Have available atropine 15 micrograms/kg IV; naloxone 10micrograms/kg IV; further dose of fentanyl 1microgram/kg IV.

Procedure (Two-person technique):

Neonatal clinicians who are who are competent in airway management and able to visualise vocal cords and intubate should carry out or supervise this procedure

- Maintain nasal CPAP
- Ensure the baby is stable; monitor and record baseline observations
- Wash hands and adopt non-touch technique
- Administer fentanyl 1 microgram /kg IV *slowly over 2-3 minutes. If needed can administer 1microgram/kg IV dose more.*
- Gently insert the laryngoscope and visualise the cords
- Insert LISACath™ 1-2cm below the cords using the numbers of the catheter as a guide
- Hold the catheter in place securely
- Carefully remove the laryngoscope, while the LISACath™ remains in-situ
- Close the mouth

- Reassess the baby's condition
- Ask assistant to carefully connect the syringe containing surfactant to the LISAcath™
- Administer surfactant *slowly in small aliquots over 2-5 minutes* in coordination with the infant's breathing if possible.
- Inject the 1ml surplus air to ensure that the complete dose of surfactant is given.
- Remove the LISACath™
- Observe and record the baby's condition and observations
- Document the procedure
- Document the surfactant batch number and dose given

Some surfactant reflux into the oropharynx is expected during the procedure and is not a cause for concern.
Atropine may be given for bradycardia.
Naloxone may be given if the baby is apnoeic or breathing remains shallow despite stimulation. If apnoea, bradycardia or hypoxia persist following the LISA procedure, consider intubation.

Post-procedure:

Following the LISA procedure, the baby should remain on non-invasive respiratory support with continuous monitoring and be nursed in an incubator. Prone positioning may be helpful if not contraindicated.

A reduction in the baby's oxygen requirements in the following minutes to hours indicates that the procedure has been successful

Should the baby's oxygen requirement worsen, exclude other problems such as pneumothorax. Further doses of surfactant can be considered, and the method of administration should be determined by the clinical condition of the baby.

3. Education and Training

None

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Documentation of surfactant administration	Audit of medical records	Neonatal Consultant	Yearly	Q&S, Audit Meetings

5. Supporting References

Sweet, D et al (2019). European Consensus Guidelines on the Management of Respiratory Distress Syndrome – 2019 Update. *Neonatology*, 115(4), pp.432-450.

Herting, E et al. (2019). Less invasive surfactant administration (LISA): chances and limitations. *Archives of Disease in Childhood - Fetal and Neonatal Edition*, 104(6), pp.F655- F659.

NICE (2020). *Specialist neonatal respiratory care for babies born preterm | Guidance | NICE*. [online] Available at: https://www.nice.org.uk/guidance/ng124 [Accessed 8 Jan. 2020].

6. Key Words

Invasive Surfactant Administration, LISA, neonatal, neonatal unit, preterm,

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The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs. As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

Contact, Review & Development Details	
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Guideline Development

September 2020 – New guideline	Neonatal Guidelines
September 2020	Neonatal Governance (ratified)
July 2021 V2	Neonatal Guideline and Governance meeting (reviewed and ratified)

Details of Changes made during review: July 2021 V2;
Preparation of Pre-procedure medication dose of Fentanyl changed from 1microgram/kg to 1-2microgram/kg