

Neonatal Guidelines 2019–21



**The Bedside Clinical Guidelines Partnership
in association with the
West Midlands Neonatal Operational Delivery Network**



SURFACTANT REPLACEMENT THERAPY – INCLUDING LESS INVASIVE SURFACTANT ADMINISTRATION (LISA) TECHNIQUE • 2/4

- Early administration of natural surfactant decreases the risk of acute pulmonary injury and neonatal mortality
- Early CPAP and selective administration of surfactant is preferable to routine intubation and prophylactic surfactant
- Natural surfactant preparations are superior to protein-free synthetic preparations containing only phospholipids for reducing mortality and air leaks
- Poractant alfa ([Curosurf®](#)) at 200 mg/kg shows survival advantage compared to beractant or poractant alpha in a dose of 100 mg/kg
- Multiple rescue doses result in greater improvements in oxygenation and ventilatory requirements, a decreased risk of pneumothorax and a trend toward improved survival
- Use of Intubate–Surfactant–Extubate (INSURE) to CPAP or LISA (less invasive surfactant administration) or minimally invasive surfactant treatment (MIST) techniques for early surfactant administration reduce the need for ventilation and improve survival
- [see LISA section below](#)

INDICATIONS

Prophylaxis (administration ≤15 min of birth)

Babies born <28 weeks' gestation

- **Routine intubation of these babies solely for the purpose of administration of surfactant is not necessary, and a policy of early CPAP with selective surfactant administration is preferred**
- If requiring intubation for respiratory support during resuscitation or if mother has not had antenatal steroids, give surfactant as prophylaxis
- Otherwise, institute early CPAP and administer surfactant selectively as per **Early rescue treatment**

Early rescue treatment

[Preterm babies who require invasive ventilation for stabilisation should be given surfactant](#)

Babies born ≤33 weeks' gestation who are not ventilated

- If $FiO_2 > 0.30$, give surfactant [using minimally/less invasive technique or after invasive ventilation](#)

Other babies that can be considered for surfactant therapy (after discussion with consultant)

- Ventilated babies with meconium aspiration syndrome (may need repeat dose after 6–8 hr)
- Term babies with pneumonia and less compliant lungs

EQUIPMENT

- Natural surfactant, poractant alfa ([Curosurf®](#)) 200 mg/kg (2.5 mL/kg) round to the nearest whole vial (prophylaxis and rescue doses can differ)
- Sterile gloves
- TrachCare Mac™ catheter (do not cut [NGT](#)) or specific surfactant administration set

PROCEDURE

Preparation

- Calculate dose of surfactant required and warm to room temperature
- Ensure correct endotracheal tube (ETT) position
 - check ETT length at lips
 - listen for bilateral air entry and look for chest movement
 - if in doubt, ensure ETT in trachea using laryngoscope and adjust to ensure bilateral equal air entry
 - chest X-ray not necessary before first dose
- Refer to manufacturer's guidelines and **Neonatal Formulary**
- Invert surfactant vial gently several times, without shaking, to resuspend the material
- Draw up required dose
- Administer via TrachCare Mac™ device or specific surfactant administration pack

Instillation

- With baby supine, instil prescribed dose down ETT
- Wait for recovery of air entry/chest movement and oxygenation between boluses

Post-instillation care

- Do not suction ETT for 8 hr [following instillation of surfactant](#)

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- Be ready to adjust ventilator/oxygen settings in response to changes in chest movement, tidal volume and oxygen saturation. Use of volume-target ventilation can facilitate responsiveness to rapid changes in lung compliance following surfactant instillation. Be ready to reduce FiO₂ soon after administration of surfactant to avoid hyperoxia
- Take an arterial/capillary blood gas within 30 min

SUBSEQUENT MANAGEMENT

- If baby remains ventilated at FiO₂ >0.3 with mean airway pressure >7 cm H₂O, give further dose of surfactant 6–12 hr after first dose
- Third dose should be given only at request of attending consultant

DOCUMENTATION

- For every dose given, document in case notes:
 - indication for surfactant use
 - time of administration
 - dose given
 - condition of baby pre-administration, including measurement of blood gas unless on labour ward when saturations should be noted
 - response to surfactant, including measurement of post-administration blood gas and saturations
 - reason(s) why second dose not given, if applicable
 - reason(s) for giving third dose if administered
- Prescribe surfactant on drug chart

LISA

Definition

- Method using a thin catheter to deliver surfactant in spontaneously breathing preterm infant with respiratory distress syndrome receiving non-invasive ventilator support
- continue non-invasive ventilator support during procedure

Indication

- Suspected surfactant deficiency leading to respiratory distress syndrome on non-invasive respiratory support as evidenced by:
 - rapidly increasing oxygen requirements
 - FiO₂ >0.3
 - increased work of breathing (exclude pneumothorax by transillumination of chest)
 - <33 weeks' gestation
 - aged <48 hr

Exclusion

- Persistent/worsening respiratory acidosis despite optimal non-invasive ventilation

Equipment

- Laryngoscope/video laryngoscope
- Suction
- Sterile gloves
- LISA catheter (LISAcath®)
- Surfactant, and syringe and needle to draw up surfactant

Drugs

- Fentanyl 0.7 microgram/kg (awake sedation)
- Atropine 20 microgram/kg
- Naloxone 100 microgram/kg (if poor respiratory effort after procedure)

Emergency equipment

- Bag/valve/mask/T-piece
- Oxygen and air
- Stethoscope
- ETTs

SURFACTANT REPLACEMENT THERAPY – INCLUDING LESS INVASIVE SURFACTANT ADMINISTRATION (LISA) TECHNIQUE • 4/4

Procedure

- Determine and document indication for LISA
- Ensure baby is loaded/on caffeine (spontaneous breathing extremely important for LISA)
- Inform parents (if present)
- Ensure venous access (peripheral cannula)
- Ensure team of 3 for procedure (including at least 1 nurse and 1 doctor)
- Draw up surfactant 200 mg/kg
- Attach T-piece to end of syringe with Luer-lock system
- Wash hands
- Use sterile gloves
- Place baby supine, ensuring incubator doors do not limit movement of laryngoscope
- Minimise heat loss
- if necessary increase incubator temperature, use blankets, swaddling and transwarmer
- Baby will remain on non-invasive ventilation support (CPAP/HFNC) during procedure – have naso-/orogastric tube *in situ* to help identify oesophagus
- Administer sedation: atropine and fentanyl IV
- Visualise vocal cords using laryngoscope/video laryngoscope (some gentle cricoid pressure may be necessary)
- Insert LISAcath® until required markings (see **Table 1** and **Image 1**)
 - tip should be 1.5 cm below vocal cords
- Other guidance according to gestational age and weight

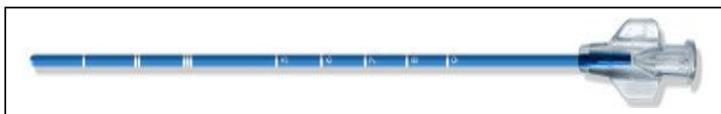
Table 1

Gestational age (weeks)	Current weight (kg)	LISAcath® length at lips (cm)
23–24	0.5–0.6	5.5
25–26	0.7–0.8	6.0
27–29	0.9–1.0	6.5
30–32	1.1–1.4	7.0
32–33	1.5–1.8	7.5

- Close mouth around LISAcath® with your fingers, ensuring not to apply any pressure on soft tissue
- Maintain LISAcath® in midline position to avoid traumatising mucosal lining of trachea

This is not an emergency procedure. Stop if you are having difficulty and consider alternatives

Image 1



- Ask helper to administer surfactant in 4 aliquots very slowly (with gaps of 30 sec over 3–5 min), to avoid surfactant coming back up
- Remove LISAcath® and ensure baby clinically stable with normal cardiorespiratory parameters before repositioning baby and closing incubator
- Following procedure, document:
 - procedure
 - tolerance
 - FiO₂