MIST/LIST – Minimally/Less Invasive Surfactant Therapy

Background:

Dargaville (1) and Gopel (2) described the use of rescue surfactant administered in spontaneously breathing infants, via a fine tube placed into the trachea without the use of sedative or paralysing drugs. Whilst a variety of tubes and administration rates have been described, this guideline is based on personal experience of the technique. The original studies described improvements in need for rescue intubation and shorter duration of oxygen therapy. The authors felt that this was a gentler technique, although comments in the literature queried that view, as there was still a need for laryngoscopy (3,4)

Our experience to date has been that this technique needs to be performed in a gentle and unhurried way by an operator experienced in visualising the vocal cords. For those who have not performed the procedure before or who require more experience, there should be consultant/senior doctor supervision. Intubation simulation training can be arranged (contact Dr. Lawson for details – see pictures)

Indication for MIST: The indication for MIST is similar to that for intubation and surfactant - that is worsening hyaline membrane disease in a baby on non-invasive support (in our unit this will normally be Vapotherm high flow) with evidence of increased work of breathing (WOB – respiratory rate, recession, apnoea, cardiovascular stability) and increasing oxygen requirement (FiO2) (normally over 50% but sometimes lower if WOB high and higher if WOB less pronounced).

Pneumothorax should be excluded by transillumination, there is no absolute need to perform X-ray unless diagnosis is uncertain.

Equipment:

(1) Laryngoscope with appropriate sized blade
(2) Surfactant administration pack – syringe, needle and administration tube
(3) Magill forceps
(4) 5ml syringe
(5) Warmed surfactant (rub vial in hands to ensure not chilled), prescribed on drug chart

Procedure:

Wash hands and wear sterile gloves. Place baby supine, wrapped in blankets to minimise heat loss, flat so that door can be lowered on incubator and laryngoscopy performed without obstruction. There is no need to remove the high flow prongs / nCPAP and this is a useful way to increase the FiO2 if necessary. The baby should be stable and saturating well before laryngoscopy. This is a 2 person procedure, and the assistant can observe the baby for signs of distress.
Draw up the surfactant with some extra air and attach syringe to administration tube. Don’t touch the tube – keep it clean. Keep the laryngoscope blade clean as well.

Gently insert the laryngoscope and visualise the cords, there will normally be a nasogastric tube in place which will help identify the oesophagus. Some gentle cricoid pressure may be needed (using little finger of hand holding laryngoscope) if cords are anterior.

Using the Magill forceps, hold the administration tube about 2 cm from the end and gently insert the tip of the tube into the trachea. Your assistant needs to hold the syringe to help move it towards the baby. No force should be needed, place the tube about 1.5cm below the cords. Remove the Magill forceps and laryngoscope gently.

Hold the administration tube in place at the corner of the lips with a finger applying gentle pressure and pause. The baby should be comfortably breathing.

Begin to inject surfactant in small amounts, slowly, aiming to complete the procedure over about 2-3 minutes. The baby should tolerate the procedure well. Remove the tube once completed, remembering to flush all the surfactant down the tube with the air in the syringe (surfactant is expensive!)

Some babies seem to respond very quickly, in others the effect may take up to 30 minutes to be seen.

Document the procedure in the notes

Note that this route of administration of Curosurf is an “off-label” route.

Guideline Details
Written by Dr. Peter Reynolds, Neonatal Consultant
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References:

3. Barbosa RF, Marcotto J, eSilva YP, Universidade Federal de Minas Gerais. Minimally-invasive (and painful?) surfactant therapy. Archives of Disease and Childhood Rapid response 25th February 2013 fn.bmj.com
4. Biban P, Director Neonatal and Paediatric Intensive Care Unit, Azienda Ospedaliera Universitaria Integrata Verona, Italy. Minimally, moderately, or equally invasive surfactant therapy? Rapid response 5 September 2012 fn.bmj.com