University Hospitals of Derby and Burton NHS Foundation Trust

Respiratory Distress Syndrome (RDS) Surfactant Therapy for the Newborn - UHDB Joint Guideline

Reference no.: NIC RC 08

1. Introduction

To ensure the timely and safe administration of surfactant, to those newborn infants in the Neonatal Intensive Care Unit who require treatment for RDS.

2. Aim and Purpose

For medical staff to:

- Identify infants requiring surfactant
- Guidance on the dose and administration of surfactant

3. Definitions

Respiratory distress syndrome (RDS) occurs due to surfactant deficiency and lung immaturity in preterm infants. Surfactant treatment has been used in over 15,000 infants as part of randomised trials to prevent morbidity and mortality related to RDS and its benefit is considered proven in this condition [1, 2].

4. Main Body of Guidelines

Natural surfactant is superior to synthetic surfactant [3] and prophylactic is better than delayed rescue treatment [4]. Therefore, the routine use of prophylactic natural surfactant in preterm infants requiring ventilation is current best practice [5].

Available evidence suggests that surfactant administration is associated with a highly significant reduction in mortality and air leaks in infants born at a gestational age of 25-29 weeks. Surfactant therapy should thus be considered in all infants within this gestational age range who are intubated for respiratory distress following delivery.

There are data that demonstrate significant clinical improvement in infants of 29-32 weeks, but there is very little randomised controlled trial evidence on more mature infants. It would seem appropriate to consider surfactant replacement therapy in an infant of a gestational age of 32 weeks or more who has been ventilated for respiratory distress and where surfactant deficiency is felt to have played a significant role in the respiratory disease. It must be remembered that surfactant-deficiency may only be small part of the problem

As some infants may not require respiratory support from birth it is appropriate to assess this need before surfactant treatment is initiated. The evidence to support the practice of intubation solely for the purpose of administering surfactant in an infant who would not otherwise be intubated is not conclusive and not sufficient to be able to recommend this practice

Other conditions in newborn infants where surfactant deficiency or inactivation are likely to play important roles include meconium aspiration syndrome (MAS), congenital pneumonia, pulmonary haemorrhage and diaphragmatic hernia. Surfactant improves respiratory outcome in MAS but not mortality [6]. There are reports of success following its use in pulmonary haemorrhage in preterm infants [7] and in congenital pneumonia [8, 9].

Re-treatment with surfactant should be flexible and determined by the baby's condition. If a baby who

is ventilated appears to deteriorate having shown improvement after a previous dose of surfactant, early re-treatment should be considered and not delayed until a set period of time has elapsed. Data sheet guidelines have not been based on evidence but the lack of evidence means that firm recommendations for the time of re-treatment cannot be made. The threshold for retreatment should be lower in infants who have RDS that is complicated by other factors such as sepsis or perinatal asphyxia.

Infants requiring surfactant

- All infants ≤27 completed weeks - this group will almost always be intubated and ventilated.
- Babies 28-32 weeks –if ventilated for symptoms of respiratory distress.
- Babies ≥ 32 weeks who require ventilation for symptoms of respiratory distress and have radiological evidence of RDS.
- Infants ventilated with meconium aspiration syndrome.
- Other infants ventilated with significant parenchymal lung disease e.g. pneumonia (discuss with Consultant).
- Preterm infants following massive pulmonary haemorrhage (discuss with Consultant).

Prophylactic and Rescue Surfactant therapy

A prophylactic, or preventive, surfactant strategy is defined as intubation and surfactant administration to infants at high risk of developing RDS for the primary purpose of preventing worsening RDS rather than treatment of established RDS; this has been operationalized in clinical studies as surfactant administration in the delivery room before initial resuscitation efforts or the onset of respiratory distress or, most commonly, after initial resuscitation but within 10 to 30 minutes after birth.

This contrasts with a rescue or treatment surfactant strategy, in which surfactant is given only to preterm infants with established RDS. Rescue surfactant is most often administered within the first 12 hours after birth, when specified threshold criteria of severity of RDS are met.

Dosage and Administration

- **Prophylactic therapy: Curosurf** recommended dose is 100-200 mg/kg. One vial contains either 120mg or 240mg, (rounded to the nearest whole vial). Prescribe on the drug chart

- **Rescue therapy**: It is preferable top use 200mg/kg (this should be rounded off to nearest whole vial to prevent wastage)

Birth weight or gestational age	***Dose of Curosurf***
≤ 27 completed weeks gestation	*One whole vial of 120mg*
≤ 1200g	*One whole vial of 120mg*
1201 – 2400g	*One whole vial of 240mg*
≥ 2401g	*One whole vial of 120mg + one whole vial of 240mg*

- *The first dose should be given immediately after intubation. The second dose of 100mg/kg may be repeated 6 to 12 hours later if the infant remains ventilated in ≥30% oxygen and/or mean airway pressure is ≥8cm H_2O.*

- In severe RDS, which has been only partially sensitive to the first two doses of surfactant, a further dose of 100mg/kg may be considered 12 hours after the 2nd dose. A maximum total

dose of 400mg/kg can be used (to discuss with consultant).

Administration

- Surfactant before first breath has theoretical advantages but there is insufficient clinical evidence that it is more beneficial [13].

- There is no reason to position the baby differently for surfactant administration or to move position during administration. It is generally given to the baby in the prone position. Pass a feeding tube through the suction port on the ETT

- Y-Manifold and instill surfactant rapidly into the trachea. It may be necessary to increase the respiratory rate transiently whilst administering the surfactant. Curosurf has a rapid action and you should see an almost immediate change in the arterial oxygen saturation (or PO_2). It may be necessary to decrease the FiO_2 and the peak inspiratory pressure to prevent over ventilation.

- Remain at bedside until you are satisfied that the clinical condition is stable.

- Measure blood gas within 15-20 minutes of giving surfactant and alter the ventilation accordingly. Record in clinical notes response to treatment and any difficulties encountered.

5. References:

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17. or more reading go to “Guideline for surfactant administration” . BAPM

5. Documentation Controls

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