SURFACTANT REPLACEMENT THERAPY

Supporting information

This guideline and supporting information have been prepared with reference to the following:
British Association for Perinatal Medicine. Guidelines for surfactant administration

Does the routine administration of antenatal steroids impact on the need for prophylactic surfactant?
A placebo-controlled randomised double-blind study in 157 pregnant women (Kari, 1994) found that dexamethasone 6 mg 4 times at 12-hour intervals resulted in a lower incidence of RDS (44% vs 79%, P<.01), lower requirement for surfactant (22% vs 59%, P<.01), and shorter duration of ventilatory support (2.0 days vs 5.3 days, P<.05) and oxygen therapy (2.0 days vs 7.0 days, P<.01) compared to the placebo group. Mortality was also lower (6 vs 9, P<.05). An earlier retrospective study using data from 2 randomised trials in a total of 1223 infants came to similar conclusions (Jobe, 1993).


Evidence Level: II

What surfactant preparations are recommended?
Although natural and synthetic surfactants are both effective, a Cochrane review of 11 trials (Soll, 2001) concluded that natural surfactant rather than synthetic surfactant resulted in a significant reduction in the risk of pneumothorax (typical relative risk 0.63, 95% CI 0.53, 0.75; typical risk difference -0.04, 95% CI -0.06, 0.03) and the risk of mortality (typical relative risk 0.87, 95% CI 0.76, 0.98; typical risk difference -0.02, 95% CI -0.05, 0.00). Natural surfactant extract is associated with a marginal increase in the risk of intraventricular hemorrhage (typical relative risk 1.09, 95% CI 1.00, 1.19; typical risk difference 0.03, 95% CI 0.00, 0.06), but no increase in grade 3 to 4 intraventricular haemorrhage (typical relative risk 1.08, 95% CI 0.92, 1.28; typical risk difference 0.01, 95% CI -0.01, 0.03). The meta-analyses supported a marginal decrease in the risk of bronchopulmonary dysplasia or mortality associated with the use of natural surfactant preparations (typical relative risk 0.95, 95% CI 0.90, 1.01; typical risk difference -0.03, 95% CI -0.06, 0.00).

Soll RF, Blanco F. Natural surfactant extract versus synthetic surfactant for neonatal respiratory distress syndrome. The Cochrane Database of Systematic Reviews 2001, Issue 2. Art. No.: CD000144

Evidence Level: I

What advantages and disadvantages does surfactant have?
The benefits of surfactant administration (particularly natural preparations as opposed to synthetic) have been demonstrated in several Cochrane reviews (Stevens, 2007; Yost, 1999; Soll 1997). RCPCH guidance (Anon, 2000), which does not seem to have been recently updated, states that “The benefits of surfactant treatment for babies as small as 500g is thought to outweigh the risks”. A systematic review of 13 RCTs in a total of 2218 treated and 2090 control infants (Sinn, 2002) found a lower rate of mild disability in the treated group at follow-up at 1 year (OR 0.79; 95% CI 0.66-0.95). The treated group also showed a reduction in combined adverse outcome (death or severe disability) at 1 year (OR 0.8; 95% CI 0.72-0.89). Surfactant treatment has, however, failed to have a significant impact on the incidence of chronic lung disease in survivors (Ainsworth, 2002).

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Recorded side effects of surfactant treatment include increased cerebral blood flow velocity, which, due to the lack of cerebral vascular autoregulation in many sick preterm infants, can lead to intraventricular haemorrhage or periventricular leukomalacia. Evidence for this is, however, equivocal (Hentsche, 2002).


Soll RF. Prophylactic natural surfactant extract for preventing morbidity and mortality in preterm infants. The Cochrane Database of Systematic Reviews 1997, Issue 4. Art. No.: CD000511


Yost CC, Soll RF. Early versus delayed selective surfactant treatment for neonatal respiratory distress syndrome. The Cochrane Database of Systematic Reviews 1999, Issue 4. Art. No.: CD001456

Evidence Level: I

How many doses of surfactant are recommended?

A Cochrane systematic review (Soll, 1999) of 2 RCTs comparing single with multiple doses of surfactant showed a reduction in the risk of pneumothorax (RR 0.51, 95% CI 0.30-0.88) and a trend towards a reduction in mortality (RR 0.63, 95% CI 0.39-1.02) associated with the use of multiple doses.

The OSIRIS (Open Study of Infants at High Risk of or with Respiratory Insufficiency – the role of Surfactant) trial (Anon, 1992) randomised 2690 infants to either 2 doses of surfactant 12 hours apart, or the option of third and fourth doses at 12-36 hour intervals if signs of RDS persisted or recurred. 4067 infants who later developed RDS were also added, giving a total of 3376 infants allocated up to four doses (45% of whom received more than two). No evidence of improved outcomes associated with more than 2 doses was found.


Soll RF. Multiple versus single dose natural surfactant extract for severe neonatal respiratory distress syndrome. The Cochrane Database of Systematic Reviews 1999, Issue 2. Art. No.: CD000141

Evidence Level: I

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