

Molly Seshia
Professor of Pediatrics, University of Manitoba
WS012 Women's Hospital,
735 Notre Dame Ave.,
Winnipeg,
Manitoba R3E 0L8
Ph:204-787-1827
Fax:204-787-1587

LARGE VOLUME SURFACTANT ADMINISTRATION IN PRETERM INFANTS USING A MINIMALLY INVASIVE TECHNIQUE (ECALMIST; Early CPAP And Large Volume Minimal Invasive Surfactant Therapy)

Y Al Ethawi, MD, Department of Pediatrics, University of Manitoba, Winnipeg, Manitoba, Canada
A Hussain, MD, Department of Pediatrics, Winnipeg, Manitoba, Canada
J Minski, RT, Respiratory Therapy, Health Sciences Centre (HSC), Winnipeg, Manitoba, Canada
J Miller, RT, Respiratory Therapy, St Boniface General Hospital, Winnipeg, Manitoba, Canada
Ruben Alvaro, MD, Department of Pediatrics, University of Manitoba, Winnipeg, Manitoba, Canada

Background:

Surfactant is usually given by endotracheal tube to treat RDS. Recent studies have shown surfactant (1.25 -2.5ml/kg) can be successfully administered endotracheally to spontaneously breathing preterm infants without premedication using a narrow-bore vascular catheter inserted into the trachea under direct vision. It is not known whether this technique can be effectively and safely used while NCPAP is maintained and where the surfactant preparation requires a higher volume (5ml/kg) for equivalent phospholipid dosing.

Objective:

To investigate the feasibility of administration of large volume surfactant (5ml/kg) in spontaneously breathing preterm infants on NCPAP using a 17-gauge vascular catheter.

Design/Methods:

Non-randomized interventional feasibility study of spontaneously breathing preterm infants between 24 and 34 weeks GA on NCPAP requiring surfactant in the first 24 hours of life. While maintaining the NCPAP in place, without premedication, a 17-gauge, 133 mm length vascular catheter was inserted through the vocal cords under direct vision by laryngoscope; the laryngoscope was removed and bovine surfactant (Bles 5 ml/kg) was administered

Results:

We enrolled 21 preterm infants [BW 1474±575 g (Mean±SD); 700 to 1800 g (range); GA 29±3 wk; PNA 30±10 min]. Surfactant was successfully administered in 20/21 (95%). There was a clear surfactant effect, with lower FiO₂ requirement (0.34±0.11 pre vs 0.26±0.08 within one hour post-ECALMIST; p=0.001). NCPAP pressure was reduced from 7.2±0.5 pre to 6.3±0.9 cmH₂O within four hours post-ECALMIST (p<0.0001). The mean ECALMIST index (% inspired O₂ x NCPAP/SpO₂) decreased from 2.5±0.8 to 1.4±0.2 (p=0.001). The mean duration of surfactant administration was 8.3±3.4 minutes. The procedure was temporarily interrupted in 3/21 (14.3%) cases due to bradycardia, apnea, and desaturations. Six infants (28%) required ventilation for 2.8±4.6 h (range 0.5-10 h) within PNA< 12h due to apneas (4) and query sepsis (2). Only 1 infant required a second dose of surfactant at 24 hrs of age. Coughing and reflux of surfactant were transiently observed in 4 cases.

Conclusions:

A large volume surfactant (BLES) can be effectively and safely delivered without interrupting NCPAP via a small vascular catheter to preterm infants less than 35 weeks with RDS. This technique deserves further investigation in clinical trials.