ICU
MANAGEMENT & PRACTICE

Guidelines for Ventilator Use Help Premature Infants Breathe Easier

Guidelines that reduce the use of mechanical ventilation with premature infants in favor of a gentler form of respiratory support can profoundly affect those children's outcomes while reducing the cost of care, according to a team of researchers at Children's Hospital Boston.

The team, led by Bernadette Levesque, MD, of the Division of Newborn Medicine at Children's Hospital Boston and the Neonatal Intensive Care Unit (NICU) at St. Elizabeth's Medical Center in Boston, published their findings online in Paediatrics on June 13. Children's operates the NICU at St. Elizabeth's as part of its efforts to promote community access to paediatric care.

Babies born prematurely are often placed promptly on a mechanical ventilator with a tube in the airway (intubation) and with supplemental oxygen to help their immature lungs breathe. The excess pressure placed on the infant's lungs can lead to ventilator-induced inflammation, scarring, and potentially bronchopulmonary dysplasia (BPD), a disabling chronic lung disease."While they are sometimes necessary, both supplemental oxygen and mechanical ventilation are essentially toxic to premature babies' lungs," said Levesque, who is also an instructor in pediatrics at Harvard Medical School. "These guidelines really represent five different interventions aimed at limiting those exposures."

The study centered on five care guidelines intended to encourage the use of a "bubble" continuous positive airway pressure (bCPAP) system, rather than mechanical ventilators, and limit exposure to supplemental oxygen. The bCPAP system delivers warmed, humidified oxygen in a way that inflates a premature infant's lungs more gently. The five guidelines -- exclusive use of bCPAP, provision of bCPAP in the delivery room, strict intubation criteria, strict extubation criteria, and prolonged CPAP with avoidance of nasal cannula oxygen before 35 weeks of age -- were implemented in the St. Elizabeth's NICU by Children's staff in 2007."There is a long-standing but growing movement away from the use of mechanical ventilators with these children, and while there have been other large studies, they have only focused on provision of CPAP in the delivery room," Levesque noted. "That's not the whole story, and we think that by putting all five in place at the same time we are giving these children more complete support."

The researchers compared the outcomes of 60 infants born between seven and 16 weeks premature and admitted to the St. Elizabeth's NICU after the bCPAP guidelines were put in place with those of 61 similar infants admitted in the year before. Their analysis showed that those treated according to the new guidelines were less likely to be intubated or to need mechanical ventilation or surfactant (which can help keep a premature infant's lungs open), and needed fewer days on supplemental oxygen overall. They also saw downward trends in the numbers of children treated for BPD and low blood pressure (hypotension).In addition, the team noted reductions in the equipment costs associated with care for the children treated under the new guidelines, as well as in medication costs related to surfactant treatment.

"We would love to see all premature babies receive the benefits of bCPAP-based care," Levesque concluded. "We are already seeing expanded interest in these guidelines at other area hospitals, and are working with some of the hospitals that refer premature babies to us to use bCPAP as early as possible, particularly in the delivery room.

The above story is reprinted (with editorial adaptations by ScienceDaily staff) from materials provided by Children's Hospital Boston.

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