Editorial

The use of narcotics and sedatives in mechanically ventilated neonates

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In the last 50 years or so, neonatal-perinatal medicine has seen a tremendous explosion of very important and informative publications in various fields that had been influential to better care practice in all areas of neonatal care. As a first generation neonatal-perinatal specialist who was responsible for their care in more than 40 years, I was able to use that knowledge and improve their care. As one can imagine, it is natural that problems may also can arise as information accumulates. As more and more information accumulates, it needs to be digested and crystallized to form knowledge and eventually to wisdom. In that scenario I would love to share a case with you all, which might help in the understanding of that process.

A few years ago, I was asked to review the care practices of a female near-term infant who was in a vicious circle of care practices, and remained on prolonged mechanical ventilation. She was born to a recent immigrant mother from the Philippines who arrived in Canada during her early pregnancy. Our perinatologist diagnosed that the fetus was suffering from non-immune hydrops. An elective C-section delivered the infant at 36 weeks gestation because of the rapid progression of hydrops. As the infant was heavily waterlogged, she was placed on mechanical ventilation with very high positive end expiratory pressure (PEEP) and relatively high mean airway pressures. She was also on high dose of narcotics and sedatives to stop her from fighting the ventilator and prevent air leak. To cut the story short, when I saw her, she was almost 3-month-old on high doses of narcotics and sedatives, remained on ventilator on high pressures and still nothing receiving orally and on total parenteral nutrition. The high pressures on the ventilator prevented the caregivers from reducing the narcotics for fear of pneumothorax and from increased fighting. The intestinal motility problem from the narcotics obviously prevented from feeding. There was also a thought that the lung condition may be the root cause of non-immune hydrops and was contemplating of a possible lung biopsy, that also contributed to the high ventilatory pressures. So you can understand the conundrum. It was rather obvious that one needed to break the vicious circle in order to proceed further. The first thought was to assume that the root cause of non-immune hydrops was from a rouge virus that was not listed in the book as a cause of non-immune hydrops and the infant is on recovery mode from its infestation. With that in mind, a family conference was called and after a long and tedious discussion, it was decided that the mother will spend at least 8 to 10 h a day with the infant wrapped and held by the bedside. The arrangement was made for mother to stay by the side of NICU in a hospital bed so she can carry out the decision. Once the baby was on mother's lap holding, miraculously baby settled down and started sleeping. This prompted us to slowly wean intravenous narcotics and sedatives. We used that opportunity also to feed expressed breast milk via orogastric tube. Once the feeding was established, we were able to stop intravenous drugs and give oral hypnotics. Over a period of 3 to 4 weeks the ventilator pressures were reduced and the infant was extubated on to nasal prongs. X-rays of chest and lung showed rapid improvement so the rogue virus theory was accepted, hence the plan to biopsy lung was abandoned. This experience

helped me to research and publish a series of articles on this subject (1,2). You see, several interesting points emerge out of this case. There are alternative ways to calm the distressed infant. Intubation may be uncomfortable but not necessarily painful. There are other avenues that may be available if one stops and looks for them. Once you are on a dead-end path you need to look for innovative alternate paths.

"*Risk factors for prolonged mechanical ventilation in neonates following gastrointestinal surgery*" published in this journal by Wang *et al.* is a welcome addition to the rapidly growing information in this regard (3). The earlier publications did not include surgical infants in this group for obvious reasons. Wang *et al.* broke the barrier and showed us that similar problems exist in this group of infants also. They advocate rightly so, for innovative research and solutions in prolonged ventilated post surgical infants. Congratulation to *Translational Pediatrics* journal for recognizing this and publication. It is becoming clearer and clearer that alternate methods are necessary to calm distressed and uncomfortable babies on ventilator. Future research has to focus on these ideas and beyond so our little babies can comfortably and safely work through their sojourn on a ventilator. It is rather clear that high dose narcotics, sedatives and in combination are harmful to the mind and body of our growing young ones. One other thing to keep in our minds is that what are the long-term implications to these approaches. The knowledge in this area is still slow in forthcoming. We need controlled prospective long term studies.

As I stated, it is becoming increasingly clear that prolonged and protracted use of any narcotics or sedatives in mechanically ventilated neonates for the purpose of controlling irritability and preemptive prevention of complications is not a good idea. An alternative method for management strategy with less or no side effects has to be sought and investigated. It is very gratifying for me to see the younger investigators working on this issue. A piece of small advice to our budding neonatologists is to look into and research further on the alternative drug-free approach to mechanically ventilated neonates and long-term outcomes.

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