

Heliox Use in Ventilation of Preterms

The recent randomized controlled trial by Xue, *et al.* [1] aims at reducing the length of ventilation as primary aim. The authors have also looked into lung inflammatory markers like Interleukin-6, which was positively correlated with the length of ventilation but was not proved significant.

Heliox gas flows in laminar fashion creating less resistance because of its property of low density and lower Reynolds number which thereby helps in gas exchange and reduced work of breathing, particularly in disease states where there is evidence of airway obstruction [2,3]. It is still unclear how heliox helps in improving outcome in respiratory distress syndrome; the possible explanation other than reducing lung inflammation is improving oxygenation and carbon dioxide elimination and thereby improving the blood pH and reducing pulmonary hypertension.

The participants in this study were mid-late premature infants (mean gestation 34 weeks); many ongoing/completed trials aim to assess interventions for reducing morbidity, particularly chronic lung disease, in preterm cohorts born earlier than 34 weeks. Reduction in length of ventilation in this study cohort may not be too great as these babies generally require short term ventilation. Moreover, heliox is likely to be a costly intervention; the reported cost is 750• for 12 hours of treatment [4].

The authors have concluded that nasal intermittent positive pressure ventilation might have increased the efficacy of delivering heliox, as an earlier study [4] failed to show reduction in length of ventilation when CPAP was used. The population in the earlier trial was more premature (30 weeks) and the reduction in the length of ventilation was not the primary objective. Practically, heliox reduces the increasing oxygen requirement by effective delivery of gas thereby decreasing the threshold for surfactant/ventilation and is unlikely to affect the length of ventilation. We suggest that the utility of heliox should be tested in more immature infants with the objective to reduce chronic lung disease and other morbidity.

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Heliox Use in Ventilation of Newborns: Authors' Reply

Even though the distinct mechanisms of helium-induced organ protection have not been completely unraveled, several signaling pathways have been identified [1]. It has been shown that heliox could decrease neutrophil infiltration, intra-alveolar edema, perivascular hemorrhage and hyaline membrane formation of acute respiratory distress syndrome in rats [2]. Nawab, *et al.* [3] reported that heliox attenuated lung inflammation and structural alterations of piglets in acute lung injury. In our study, serum IL-6 at baseline was found to be positively and significantly correlated with the length of ventilation (LoV) [4], which supported the speculation that helium might have anti-inflammatory effect in humans *in vivo*. Thus, we speculated that there might be other mechanisms of action of heliox, besides its physical effects in respiratory diseases.

Heliox has been demonstrated to decrease the threshold for surfactant and ventilation by reducing the increasing oxygen requirement in Colnaghi's study [5], which has important practical application. It is very important that the utility of heliox in reducing chronic lung disease should be expanded in more immature infants. However, one purpose of our study was to assess the effectiveness of heliox on lung inflammation cytokines. We tried to explain the reason why heliox could improve the outcome of RDS from another perspective.

Infants born before 32 weeks contribute to high occurrence of complications of prematurity such as