Title of Abstract:

Heliox Adjunct Therapy for Neonates with Congenital Diaphragmatic Hernia

Name of Abstract Submitter:

Audra Wise, MD - Neonatologist

Organization:

UCSD/Rady Children's Hospital

Co-Author / Co-Investigators:

Mallory Boutin, MPH; Ellen Knodel, RCP; James Proudfoot, M.Sc; Brian Lane, MD; Marva Evans, MD; Denise Suttner, MD; Amy Kimball, MD

Abstract Description:

Heliox Adjunct Therapy for Neonates with Congenital Diaphragmatic Hernia

Audra Wise, MD; Mallory Boutin, MPH; Ellen Knodel, RCP; James Proudfoot, M.Sc; Brian Lane, MD; Marva Evans, MD; Denise Suttner, MD; Amy Kimball, MD

Introduction: Congenital diaphragmatic hernia (CDH) remains a complex disease with significant morbidity and mortality. Hypercarbia is a common derangement in this population. By decreasing airway turbulence and enhancing CO2 removal, Heliox (inhaled helium-oxygen mixture) has the potential to improve ventilation.

Objective: Analyze the effect of Heliox on blood gas parameters and ventilator settings for patients with CDH.

Methods: Retrospective chart review of patients with CDH treated at Rady Children's Hospital San Diego during 2011-2015. Changes in pCO2, pH, FiO2, and ventilator settings during 24 hours of Heliox administration were analyzed with paired t-tests.

Results: During the study period, 45 patients with CDH were admitted, 28 received Heliox, and 27 were analyzed. Several had multiple exposures, giving a total of 41 episodes. During Heliox treatment, pCO2 levels decreased from 68 to 49 ($p < 0.001$), amplitude decreased from 33 to 23 ($p < 0.001$), ventilator rate decreased from 28 to 23 ($p = 0.015$), FiO2 decreased from 0.52 to 0.40 ($p < 0.01$), and pH increased from 7.3 to 7.4 ($p < 0.001$).

Conclusion: The addition of Heliox to the standard practice of minimized ventilation and permissive hypercapnia allows for further improvement in gas exchange while limiting the risk of

ventilator associated lung injury and oxygen toxicity. A prospective trial utilizing a defined protocol is needed to more clearly define the acute and long term impacts of this promising treatment.

Funding Acknowledgement (if applicable):

The project described was partially supported by the National Institutes of Health, Grant UL1TR000100 of CTSA funding prior to August 13, 2015 and Grant UL1TR001442 of CTSA funding beginning August 13, 2015 and beyond. The content is solely the responsibi