Southern Illinois University Edwardsville School of Pharmacy

Impact of Dexmedetomidine Initiation on Hemodynamics and Oxygenation in Critically Ill Preterm Neonates

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Background

- Dexmedetomidine is an alpha$_2$-adrenergic receptor agonist.
- Dexmedetomidine is FDA-approved for sedation for intubated adults in intensive care units. It is also used in neonates for sedation when they are undergoing mechanical ventilation.
- Bradycardia and hypotension are common adverse effects.
- The use of dexmedetomidine in neonates is not well studied.
- A slight oxygen desaturation following initiation of the dexmedetomidine infusion was observed in a small cohort of preterm neonate, warranting the need for a larger sample size to further analyze the effect on oxygen saturation.

Objective

- To assess the cardiovascular impact, as well as the oxygenation, on preterm neonates initiated on dexmedetomidine infusion

Methods

Study Design
- Retrospective chart review using electronic health records at St. Louis Children's Hospital

Collection Period
- March 2018 to January 2022

Inclusion Criteria
- Preterm neonates (<35 weeks gestation)
- Administration of dexmedetomidine infusion
- Valid heart rate and pulse oximetry for 24 hours prior to and 48 hours after dexmedetomidine infusion initiation

Exclusion Criteria
- No dexmedetomidine infusion administration
- Incomplete heart rate and pulse oximetry data

Primary Outcome
- Oxygen saturation, heart rate, and blood pressure following initiation of dexmedetomidine infusion

Secondary Outcomes
- Dexmedetomidine infusion dose at initiation and peak dose during infusion within 48-hours of initiation
- Concurrent medication administration (inotropes, vasopressors, antihypertensives, and sedatives) during first 48 hours following initiation

Results

- 126 neonates received dexmedetomidine during collection period
- 57 neonates were analyzed

Table 1: Demographics and baseline characteristics

Characteristics	N = 57
Gestational age, weeks	25 (24 – 27)
Male sex, n (%)	32 (56%)
Mechanical ventilation support, n (%)	57 (100%)
values reported as median (IQR), unless otherwise noted	

Results

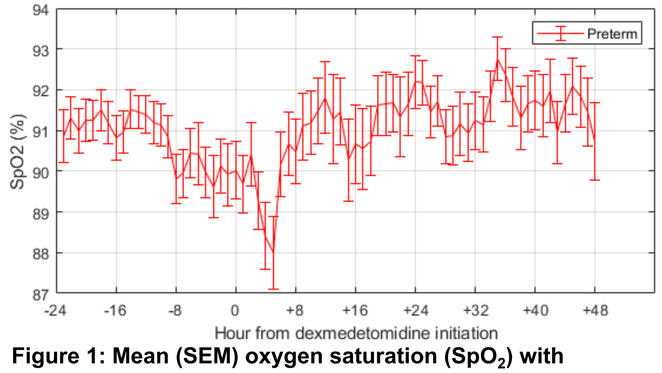

Figure 1: Mean (SEM) oxygen saturation (SpO_2) with dexmedetomidine

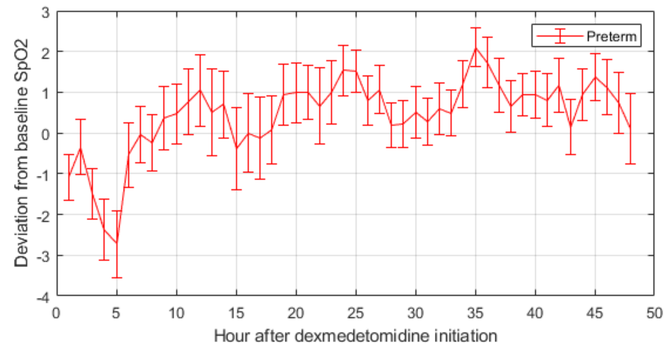

Figure 2: Mean (SEM) deviation from baseline oxygen saturation (SpO_2) with dexmedetomidine

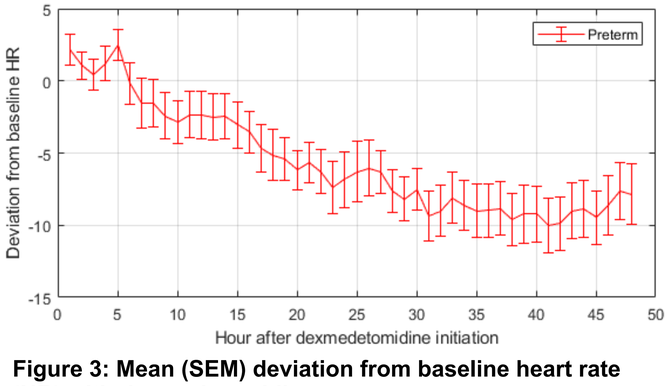

Figure 3: Mean (SEM) deviation from baseline heart rate (HR) with dexmedetomidine

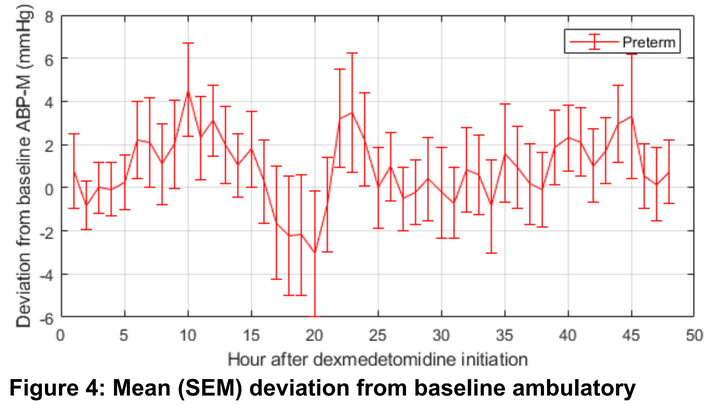

Figure 4: Mean (SEM) deviation from baseline ambulatory blood pressure monitoring (ABP-M) with dexmedetomidine

Discussion

- Oxygen saturation decreased about two hours after dexmedetomidine infusion initiation causing oxygenation instability until approximately six hours after initiation
- During the period of respiratory instability, the mean oxygen saturation was below goal of greater than 90%
- Heart rate decreases approximately 8-9 beats per minute following dexmedetomidine infusion initiation and plateaued approximately 30 hours after initiation
- Blood pressure did not change significantly following dexmedetomidine infusion initiation

Conclusion

- Dexmedetomidine is becoming a popular pharmacological treatment in neonates, especially for sedation during mechanical ventilation
- Oxygen saturation should be monitored closely especially during the first eight hours following dexmedetomidine infusion initiation
- Cardiovascular status remained relatively stable
- Limited data regarding use of dexmedetomidine in neonates shows the continued need for more research

Disclosure

- All authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.