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Evaluation of dexmedetomidine use as an adjunctive therapy in the management of alcohol withdrawal syndrome

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OBJECTIVE

- The objective of this medication use evaluation (MUE) was to assess the utilization and outcomes associated with dexmedetomidine in the treatment of alcohol withdrawal syndrome.

BACKGROUND

- Dexmedetomidine is a α2-agonist used primarily in an ICU setting as a sedative agent. In alcohol withdrawal syndrome it is used to control agitation, anxiety, tachycardia, and hypertension.[1]
- Dexmedetomidine lacks GABA receptor activity. For this reason it is usually added as an adjunct agent to symptom-triggered benzodiazepine dosing regimens.[1]
- Patients requiring high doses of benzodiazepines are at an increased risk of developing respiratory depression, oversedation, and delirium.[2]
- Dexmedetomidine has been shown to decrease benzodiazepine requirements in the short term[3], which should also result in the decrease of the incidence of side effects associated with benzodiazepine use.
- Dexmedetomidine can cause bradycardia and hypotension by increasing parasympathetic tone and decreasing circulating norepinephrine. These hemodynamic effects are more pronounced when bolus doses are given.[1]
- Recent literature shows that dexmedetomidine can lead to a prolonged hospital and ICU length of stay regardless of the severity of the withdrawal. This can significantly increase resource utilization, and health care costs.[4,5]

METHODS

- A retrospective chart review was conducted at a tertiary care medical center and included patients who received dexmedetomidine for alcohol withdrawal syndrome between March 1st, 2019 and March 1st, 2020.
- **Outcomes:**
  - **Primary outcome**: difference in benzodiazepine requirements 24 hours before and after dexmedetomidine initiation
  - **Secondary outcomes**: ICU and non-ICU length of stay, difference in withdrawal scores (WASP), utilization of adjunctive medications
  - **Safety outcomes**: incidence of respiratory depression (respiratory rate < 20), hypotension (mean arterial pressure < 65 mmHg or systolic blood pressure < 90 mmHg), bradycardia (heart rate < 50 bpm), intubation, and vasopressor use 24 hours before and after dexmedetomidine use

Withdrawal (WASP) Scoring system	Stage	WASP Score	Benzodiazepine Dose
Objective and subjective assessment: • Temperature • Respiratory rate, Heart rate • Blood pressure • Nausea/Vomiting • Tremor, sweating • Tactile/auditory/visual disturbances • Orientation, attention span • Anxiety/Agitation • Nystagmus, dystaxia	Stage I	10-14	Lorazepam 1 mg PRN every 4 hours
	Stage II	15-30	Lorazepam 2 mg PRN every 4 hours
	Stage III	31-65	Lorazepam 4 mg PRN every 4 hours
	Stage IV	66-107	Notify provider Lorazepam 4 mg PRN every 2 hours

RESULTS

Baseline Characteristics	n=134
Age (mean age in years ± SD)	49.5 ± 12.5
Male (n, %)	113 (84%)
Admission unit (n, %) ICU Medical Other	 84 (63%) 42 (32%) 7 (5%)
Established diagnosis of alcohol withdrawal syndrome (n, %) On admission During admission	 50 (37%) 84 (63%)
Median time from hospital admission to ICU admission (hours, IQR)	6.62 (IQR 2.55 – 35.18)
Median length of stay (days, IQR) Hospital ICU	 7 (4.3 -11.5) 4 (2.7 -7.0)
Dexmedetomidine dosing Initial bolus given (n, %) Median infusion rate (mcg/kg/h)	 36 (27%) 0.54 (IQR 0.40 – 0.73)

Figure 1. Total Mean Benzodiazepine Dose (Lorazepam Equivalents - mg)

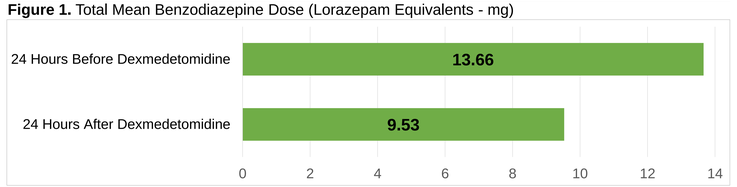


Figure 2. Median Length of Stay Before and After Dexmedetomidine Initiation

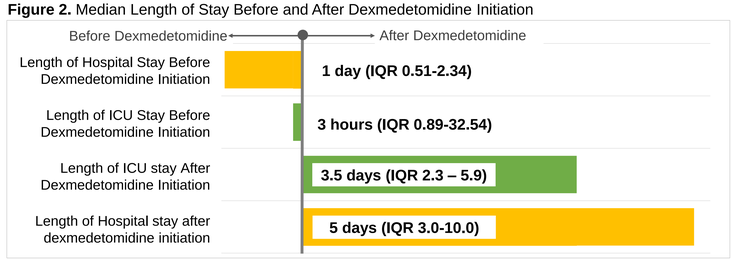


Figure 3. Median Withdrawal (WASP) Scores with IQR, Minimum and Maximum Values 24 Hours

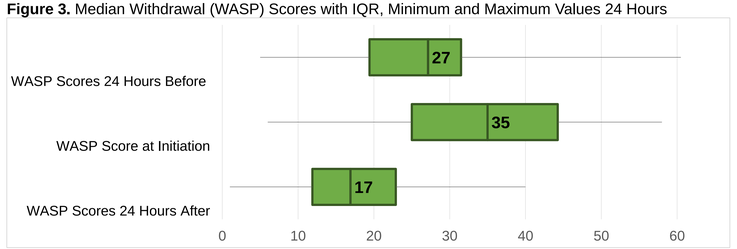
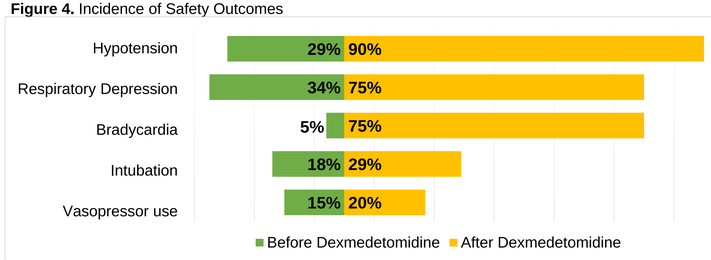
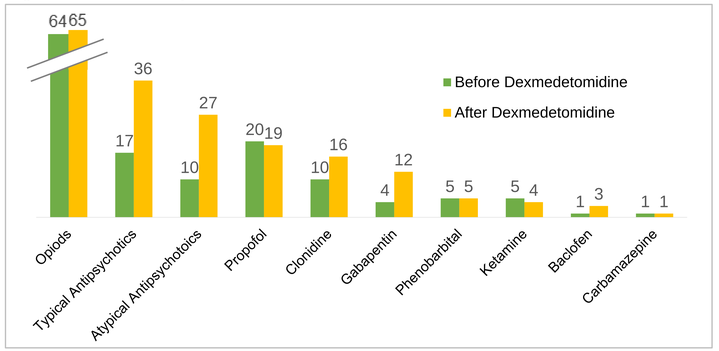


Figure 4. Incidence of Safety Outcomes



RESULTS

Figure 5. Incidence of Adjuvant Medication Use



DISCUSSION & CONCLUSIONS

- There was a non-significant decrease in benzodiazepine requirements after dexmedetomidine use (p=0.097), and a statistically significant decrease in the recorded withdrawal scores within 24 hours post dexmedetomidine initiation (p<0.001).
- Patients had a median ICU length of stay of 3.5 days following dexmedetomidine initiation. Without a control group it's not possible to determine if this length of stay would have been different had other medications been utilized.
- Dexmedetomidine was initiated shortly after ICU admission (median: 3 hours) which may suggest that the main reason for the ICU transfer was to allow the administration of dexmedetomidine. This raises the question of what other treatment options can be used prior to a continuous sedative infusion in order to prevent the need for an ICU level of care.
- The limitation of the study is that the Parkview Health System hospitals use WASP scores instead of Clinical Institute Withdrawal Assessment for Alcohol (CIWA) scores, which reduces the external validity of the results.
- A future direction would be to evaluate the role of phenobarbital, a different adjunctive medication in treatment of alcohol withdrawal. With its long half-life, and GABA and glutamate receptor activity, it might have a role in reducing the need for ICU admission by better controlling withdrawal in this patient population.

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Disclosure
The authors of this presentation have the following 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: Zsanett Kormanyos: Nothing to disclose | Dustin Linn: Nothing to disclose | Jillian Coons: Nothing to disclose
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