2020

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

Zsanett Kormanyos PharmD

Dustin D. Linn PharmD, BCPS, BCCCP

Jillian Coons PharmD, BCPS

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

Zsanett Kormanyos, PharmD; Dustin Linn, PharmD, BCPS, BCCCP; Jillian Coons PharmD, BCPS
Parkview Regional Medical Center
Fort Wayne, Indiana

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 vasoressor use 24 hours before and after dexmedetomidine use

RESULTS

Objective and subjective assessment: 

- Temperature
- Respiratory rate, Heart rate
- Blood pressure
- Nausea/Vomiting
- Tremor, sweating
- Tachy/brady/auditory/visual disturbances
- Orientation, attention span
- Anxiety/Agitation
- Nystagmus, dysoria

<table>
<thead>
<tr>
<th>Withdrawal (WASP) Scoring system</th>
<th>Stage</th>
<th>WASP Score</th>
<th>Benzzodiazepine Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective and subjective assessment:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Stage I</td>
<td>10-14</td>
<td>Lorazepam 1 mg PRN every 4 hours</td>
</tr>
<tr>
<td>Respiratory rate, Heart rate</td>
<td>Stage II</td>
<td>15-30</td>
<td>Lorazepam 2 mg PRN every 4 hours</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Stage III</td>
<td>31-65</td>
<td>Lorazepam 4 mg PRN every 4 hours</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>Stage IV</td>
<td>66-107</td>
<td>Lorazepam 8 mg PRN every 2 hours</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>mc134</th>
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<tbody>
<tr>
<td>Age (mean age in years ± SD)</td>
<td>49.5 ± 12.5</td>
</tr>
<tr>
<td>Male (n, %)</td>
<td>113 (84%)</td>
</tr>
<tr>
<td>Admission unit (n, %)</td>
<td></td>
</tr>
<tr>
<td>ICU Medical</td>
<td>84 (63%)</td>
</tr>
<tr>
<td>Other</td>
<td>42 (32%)</td>
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<tr>
<td>Establishing diagnosis of alcohol withdrawal syndrome (n, %)</td>
<td></td>
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<tr>
<td>On admission</td>
<td>70 (53%)</td>
</tr>
<tr>
<td>During admission</td>
<td>64 (47%)</td>
</tr>
<tr>
<td>Median time from hospital admission to ICU admission (hours, IQR)</td>
<td>6.82 (IQR 2.55 – 36.18)</td>
</tr>
<tr>
<td>Median length of stay (days, IQR)</td>
<td></td>
</tr>
<tr>
<td>Hospital ICU</td>
<td>7 (4-11.5)</td>
</tr>
<tr>
<td>ICU</td>
<td>4 (2.7-7.0)</td>
</tr>
<tr>
<td>Dexmedetomidine dosing</td>
<td></td>
</tr>
<tr>
<td>Initial bolus given (n, %)</td>
<td></td>
</tr>
<tr>
<td>Median infusion rate (mcg/kg/h)</td>
<td>36 (27%)</td>
</tr>
<tr>
<td>WASP Score at Initiation</td>
<td></td>
</tr>
<tr>
<td>Before Dexmedetomidine</td>
<td>1 day (IQR 0.51-2.34)</td>
</tr>
<tr>
<td>After Dexmedetomidine</td>
<td>3 hours (IQR 0.89-32.54)</td>
</tr>
<tr>
<td>Length of ICU Stay Before Dexmedetomidine Initiation</td>
<td></td>
</tr>
<tr>
<td>Before Dexmedetomidine</td>
<td>3.5 days (IQR 2.3 – 5.0)</td>
</tr>
<tr>
<td>After Dexmedetomidine</td>
<td>5 days (IQR 3.0-10.0)</td>
</tr>
<tr>
<td>Length of Hospital stay after Dexmedetomidine initiation</td>
<td></td>
</tr>
<tr>
<td>Before Dexmedetomidine</td>
<td>24 Hours Before Dexmedetomidine</td>
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<tr>
<td>After Dexmedetomidine</td>
<td>WASP Score at Initiation</td>
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<tr>
<td>WASP Scores 24 Hours Before</td>
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<tr>
<td>WASP Scores 24 Hours After</td>
<td></td>
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<tr>
<td>WASP Score at Initiation</td>
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<tr>
<td>Before Dexmedetomidine</td>
<td>27</td>
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<tr>
<td>After Dexmedetomidine</td>
<td>50</td>
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<td>T</td>
<td>113 (84%)</td>
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</table>

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.
• Dixmedetomidine 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.

REFERENCES
