Management of alcohol withdrawal in acutely ill hospitalized patients with a critical illness is challenging for pharmacists, nurses, and practicing physicians. Alcohol withdrawal is often a diagnosis considered in patients admitted with trauma; however, it can be confused with other conditions in the list of differential diagnoses of patients admitted with nontrauma diagnoses. Investigators estimate that up to 1 in 4 patients admitted to general hospitals meet diagnostic criteria for alcohol dependence.

Alcohol-dependent patients have a risk of withdrawal, with symptoms including altered concentration, tremulousness, autonomic hyperarousal, psychosis, seizures, and delirium tremens. Alcohol withdrawal delirium, commonly known as delirium tremens or “DTs,” is the most serious manifestation of alcohol withdrawal syndrome (AWS) and is characterized by hallucinations, disorientation, tachycardia, hypertension, low-grade fever, agitation, and diaphoresis. Delirium tremens or seizures develop in up to 20% of hospitalized patients who experience AWS if the symptoms of withdrawal are not treated. Given the seriousness of alcohol withdrawal delirium and the value of appropriate treatment, a symptom-based alcohol withdrawal protocol was developed for use in the critical care and medical wards of a community teaching hospital. This article presents the results of the development of an evidence-based standing order set for alcohol withdrawal.

**PRIME POINTS**

- One in 4 patients admitted to general hospitals are estimated to meet diagnostic criteria for alcohol dependence.
- The signs and symptoms of alcohol withdrawal may be confused with other problems common in critical care patients such as electrolyte imbalances, pain, and infection.
- Patients in alcohol withdrawal may need less medication for less time with the use of a symptom-based standing order set.

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Pathophysiology of AWS

AWS occurs when a person who has become dependent on alcohol stops drinking the amount that he/she has been accustomed to drinking. The autonomic nervous system becomes hyperactive, releasing catecholamines, which lead to physiological changes such as diaphoresis, insomnia, tachycardia, anxiety, and tremors. The complex mechanisms of alcohol intoxication, tolerance, dependence, and withdrawal are not completely understood, but a clear relationship exists between alcohol and alterations in neurotransmission in the brain.

The brain functions by maintaining a balance of neurochemicals through inhibitory and excitatory neurotransmitters. The major inhibitory neurotransmitter in the brain is γ-aminobutyric acid (GABA), which works through the GABA<sub>A</sub> receptor complex. The GABA<sub>A</sub> receptor complex regulates the passage of chloride ions into cells. GABA binds to GABA<sub>A</sub> receptors, a family of chloride ion channels, changing their formation so as to allow chloride ions to pass down an electrochemical gradient. This movement of chloride ions hyperpolarizes the membrane, which leads to neuronal inhibition. Alcohol passes inhibitory effects on the GABA<sub>A</sub> receptors, causing a down-regulation or a decrease in the number of GABA<sub>A</sub> receptors. This down-regulation is responsible for insufficient central inhibition during alcohol withdrawal, leading to symptoms of hyperexcitability.

A second neurotransmitter of importance in alcohol withdrawal is the excitatory neurotransmitter N-methyl-D-aspartate (NMDA). NMDA controls excitability by increasing depolarization of the neuronal membrane through the regulation of the flow of calcium into the neuron. The influx of calcium through voltage-gated calcium channels modulates neurotransmitter release and the expression of genes that regulate the production of NMDA and GABA receptor proteins. The continued presence of alcohol increases the calcium channel expression and contributes to alcohol tolerance and AWS. Alcohol inhibits the NMDA receptor, which causes a hyperexcitable state and altered anxiety-like behavior.

Abrupt cessation in the intake of alcohol or withdrawal produces a rebound stimulatory effect, resulting in adrenergic hypersensitivity of the limbic system and brain stem, which can lead to irritability (manifested as aggressive behavior), tremors, and seizures. Abrupt cessation of alcohol exposure results in brain excitability because receptors previously inhibited by alcohol are no longer inhibited. The mortality rate has been found to be in the range of 5% to 15%, with an early study showing mortality rates from alcohol withdrawal delirium to be as high as 20%. With advances in treatment, mortality rates have decreased drastically, with more recent studies indicating mortality rates in the range of 1%.

Clinical Problems and Treatment of AWS

The symptoms of AWS can include visual, auditory, and/or tactile hallucinations. Severe symptoms include seizures and delirium tremens, disturbances of consciousness, and change in cognition. Often medical and surgical comorbid conditions mask withdrawal symptoms, which can result in inadequate treatment. Such comorbid conditions include dehydration, infection, respiratory disease, thyrotoxicosis, anticholinergic drug poisoning, amphetamine or cocaine use, hemorrhage, and withdrawal from sedative-hypnotic agents.

The signs and symptoms of alcohol withdrawal may be confused with other problems common in critical care patients such as electrolyte imbalances, pain, and infection. Delirium tremens typically begin between 2 and 4 days after the last drink and last less than a week.

Treatment of alcohol withdrawal begins with appropriate assessment of the patient for signs and symptoms of alcohol withdrawal delirium. Patients experiencing serious withdrawal symptoms, seizures, and delirium tremens should receive pharmacotherapy to treat their symptoms. Benzodiazepines are the drugs of choice for

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the management of alcohol withdrawal. Benzodiazepines not only ameliorate the symptoms of alcohol withdrawal but prevent seizures and delirium tremens.

Different benzodiazepines all appear similarly effective in reducing signs and symptoms of withdrawal. However, some evidence indicates that longer acting agents may be more effective in preventing seizures. Pharmacological data and clinical experience suggest that longer acting agents can pose a risk of excess sedation in selected groups, including elderly persons and persons with marked liver disease. Longer acting agents, however, contribute to an overall smoother withdrawal course with less breakthrough or rebound symptoms.

Some of the most commonly used benzodiazepines are diazepam, chlor Diazepoxide, and lorazepam. A literature review suggested that symptom-based treatment was more beneficial than scheduled dosing. However, few controlled studies of treatment exist, and even fewer treatments have been developed and tested in acutely ill patients. The literature supports a need to identify and treat alcohol withdrawal early. Therefore a need was identified in our institution to develop an evidence-based standing order set for alcohol withdrawal.

**Methods**

A multidisciplinary committee, including nurses, pharmacists, physicians, and dieticians, was formed to develop a standing order set that could be used to identify and treat alcohol withdrawal in both patients who are critically ill and patients who are not. Furthermore, we wanted to determine if symptom-based treatment was more effective than dose-scheduled treatment of alcohol withdrawal. A critical care nurse and clinical pharmacist were given the task of researching the literature and developing an evidence-based standing order set that could be used for both patients who are critically ill and patients who are not.

**Development of the Standing Order Set**

Both scheduled dosing and symptom-based treatment use benzodiazepines for treatment of alcohol withdrawal. Studies have shown that symptom-based treatment requires less benzodiazepine use. These studies suggest that symptom-triggered therapy allows more flexibility in dosing with fluctuations in scores on the Clinical Institute Withdrawal Assessment for Alcohol, revised (CIWA-Ar) and level of sedation, which results in less medication being required. Lower doses of benzodiazepine decreased the chance for adverse effects, oversedation, and respiratory depression. Less medication also lowers the cost for treatment of alcohol withdrawal.

Benzodiazepines possess better efficacy, a greater margin of safety, and lower abuse potential compared with barbiturates. Long-acting benzodiazepines, such as chlordiazepoxide, are used for alcohol withdrawal because they have the advantage of self-tapering after stabilization. The medication is administered in decreasing doses and/or frequency until no medication is taken. It was also suggested that an intermediate-acting benzodiazepine should be used to supplement treatment with a long-acting medication.

Diazepam and chlordiazepoxide are the long-acting drugs of choice, and lorazepam and oxazepam are the intermediate-acting drugs of choice typically used to treat AWS. Carbamazepine was evaluated, but evidence that it prevented seizures and delirium was insufficient. Haloperidol was not recommended because it lowered the seizure threshold and prolonged the QT interval. Oral chlordiazepoxide and/or intravenous lorazepam were chosen as the drugs to be incorporated into the standing order set.

In addition to the use of lorazepam and chlordiazepoxide, the standing order set included the use of antiemetics and vitamins. Vitamin deficiency is often seen in patients with alcoholism. Patients who abuse alcohol are more likely to have poor nutrition due to poor diet and/or impaired absorption of nutrients, especially the B vitamins. Folic acid is important in formation of red blood cells and protein metabolism. Wernicke syndrome (characterized by cognitive impairment, delirium, abnormal gait, and paralysis of eye muscles) and Korsakoff syndrome are both caused by thiamine deficiency. Thiamin is also needed for the metabolism of glucose. As a result, thiamine, folic acid, and multivitamins were included in the standing order set.

Treatment of alcohol withdrawal includes fluid replacement, correcting electrolyte imbalances, treating acute infections, and treating fevers. Patients with AWS...
experience electrolyte imbalances in potassium, magnesium, and phosphate due to changes in renal function, altered absorption/reabsorption, poor dietary intake, and vomiting. Alcohol also induces a diuretic effect that leads to dehydration. If the patient’s glycogen stores are low, such as in chronic alcohol abuse, the intake of high doses of alcohol can induce hypoglycemia by decreasing hepatic glycogenogenesis. These patients are also at a higher risk of infection, particularly pulmonary infection, because alcohol causes a change in the immune system and often causes a dysfunction of protective barriers in the respiratory tract. These patients also experience nausea, vomiting, and headaches among other complaints. Therefore, the ability to order laboratory studies and treat these complaints was included in the order set.

The order set was formatted to follow a symptom-based method, with the intent to decrease the amount of drug used and time required to treat alcohol withdrawal (Figure 1). In symptom-based treatment, medications are administered in response to the development of symptoms of alcohol withdrawal. In scheduled-dose treatment, medications are administered at scheduled times. The format followed similar symptom-based approaches found in the literature.

**Clinical Institute Withdrawal Assessment for Alcohol Scale**

In order to use the order set, consistent symptom-based assessment of the patient was needed. To do this, the CIWA-Ar was included as part of the order set. The CIWA-Ar is used to assess patients to determine the need to treat alcohol withdrawal. The CIWA-Ar is a 10-item, easily administered scale. The scale consists of 10 signs and symptoms: nausea and vomiting, tremor, paroxysmal sweats, anxiety, agitation, tactile disturbances, auditory disturbances, visual disturbances, headache, and orientation. Patients are asked a question or evaluated on each sign and symptom. Each sign and symptom is evaluated on a 7-point Likert scale except for orientation, which is scored on a 4-point Likert scale. Scores on the CIWA-Ar range from 0 to 67. A score of 8 points or less indicates mild withdrawal. A score of 9 to 15 points indicates moderate withdrawal. A score greater than 15 points indicates severe withdrawal.

The CIWA-Ar has been used by several authors to assess alcohol withdrawal in patients. The CIWA-Ar was examined for validity and reliability. Scores on the revised scale were regressed on the original CIWA-A. Beta was .99 and R² was 0.98. The scale should be used 1 to 3 times daily, more frequently when patients are symptomatic and as frequently as hourly when making decisions about medication dosing on the basis of symptoms. The CIWA-Ar provides clinicians with an appropriate scale for dosing medications, evaluating effectiveness of therapy, and evaluating the severity of withdrawal more objectively.

**Procedure**

The preliminary order set was then presented to the multidisciplinary committee, where there was discussion and minor changes were made. The order set was then presented to the institutional review board of the hospital, the pharmacy and therapeutics committee, and the medical council for approval. The multidisciplinary committee then recommended a performance improvement project be conducted on both a critical care unit and a non–critical care unit. The units selected were the trauma intensive care unit (ICU) and the step-down medical/surgical trauma unit. The step-down medical/surgical trauma unit was selected because most patients in the ICU are transferred to that unit.

At this point, training of the nursing and pharmacy staff began. The ICU nurse educator trained the ICU staff and the clinical nurse leader from the step-down unit on the implementation of the standing order set. This training was done by one-to-one education and the use of a poster board. The clinical nurse leader then conducted the education of the staff on the step-down unit. The in-service training was validated by a 5-item test given to the nursing staff to ensure that they understood the process and the documentation required. Staff members who did not achieve 100% were given further instruction. The pharmacist educated the pharmacy staff on the medications to be used from the standing order set. The pharmacy staff were not tested because they do not implement the standing order set.

The project then began on the 2 identified units, the trauma ICU and the step-down medical/surgical trauma unit. Patients who had a history of alcohol abuse, were intoxicated on admission, or were thought to be going through delirium tremens as determined by physician assessment were identified on the 2 units.
### Bayfront Medical Center
#### Alcohol Withdrawal Standing Order

**Allergies:**

**Date/Time:**

**Bulleted orders will automatically be implemented. Any order can be deleted by drawing a single line through the entire order and initialing. Fill in blanks and checks (√) to select orders.**

**Nursing Orders**
- Use the CIWA-Ar Alcohol Withdrawal Assessment Tool (located on back of standing order) to assess the patient’s need for symptom-based treatment
- **Document Alcohol Withdrawal Score** and treatment and reassessment on PRN MAR/Powerchart
- Assess the need for seizure and aspiration precautions
- **Vital signs per unit routine and with each CIWA-Ar Alcohol Withdrawal Assessment**

**Pharmacy Orders**
- Discontinue all sedation orders

### Symptom-Based Treatment

#### Mild Symptoms (Alcohol Withdrawal Score ≤ 8)
- No treatment, reassess patient in 4 hour and document and score on MAR

#### Moderate Symptoms (Alcohol Withdrawal Score 9-15)
- **Chlordiazepoxide** 25-50 mg PO q 2 hour PRN. Reassess patient in 2 hours and treat based on Alcohol Withdrawal Score. Maximum daily dose, 300 mg/24 hours.
- **If unable to take PO or symptoms inadequately controlled on above:**
  - **Lorazepam** 1-2 mg IVP q 4 hour PRN. Reassess patient in 2 hours and treat based on Alcohol Withdrawal Score. Maximum daily dose, 24 mg/24 hours.

#### Severe Symptoms (Alcohol Withdrawal Score >15)
- **Chlordiazepoxide** 50-100 mg PO q 1 hour PRN. Reassess patient in 1 hour and treat based on Alcohol Withdrawal Score. Maximum daily dose, 300 mg/24 hours.
- **If unable to take PO or symptoms inadequately controlled on above:**
  - **Lorazepam** 2-4 mg IVP q 2 hour PRN. Reassess patient in 1 hour and treat based on Alcohol Withdrawal Score. Maximum daily dose, 24 mg/24 hours.

### Other
- **Ondansetron** (Zofran) 4 mg IV q 4 hours PRN nausea
- **Promethazine** 25 mg PO q 6 hours PRN nausea
- **Acetaminophen** 500 mg PO q 6 hours PRN temperature >101.1°F or headache
- If patient receiving maintenance IVF, add:
  - Thiamine 100 mg daily × 3 days
  - Folic acid 1 mg daily × 3 days
  - MVI 10 mL daily (if unable to take PO)
- If no IV access administer:
  - Thiamine 100 mg IM daily × 3 days
  - Folic acid 1 mg PO daily × 3 days
  - MVI 1 tablet PO every day. Administer in IVF once daily if unable to take PO.

### Laboratory
- **CBC with Met-C**
- **Urine Drug Screen**
- **Blood Alcohol Level**
- **Magnesium and Phosphorus**

**Physician Signature Date/Time:**

**Symptom-Based Alcohol Withdrawal Standing Order**

**89999138 09/06**

**PO Physicians Orders**

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**Figure 1** Standing orders for alcohol withdrawal at Bayfront Medical Center.

Abbreviations: CBC, complete blood cell count; CIWA-Ar, Clinical Institute Withdrawal Assessment for Alcohol, revised; IV, intravenous; IVF, intravenous fluids; IVP, intravenous bolus; MAR, medication administration record; Met-C, metabolic panel, comprehensive; MVI, multivitamin; PO, by mouth; PRN, as needed; q, every.

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identify patients treated for alcohol withdrawal before the order set was developed. The patients were identified from their current history provided by the patient or the patient’s family or from their blood alcohol level. The comparison group included only those patients receiving oral chlordiazepoxide and/or

```text
<table>
<thead>
<tr>
<th>Nausea and vomiting—Ask “Do you feel sick to your stomach? Have you vomited?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   No nausea and no vomiting</td>
</tr>
<tr>
<td>1   Mild nausea with no vomiting</td>
</tr>
<tr>
<td>4   Intermittent nausea with dry heaves</td>
</tr>
<tr>
<td>7   Constant nausea, frequent dry heaves, and vomiting</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Tremor—Ask patient to extend arms and spread fingers apart</th>
</tr>
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<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   No tremor</td>
</tr>
<tr>
<td>1   Tremor not visible but can be felt, fingertip to fingertip</td>
</tr>
<tr>
<td>4   Moderate tremor with arms extended</td>
</tr>
<tr>
<td>7   Severe tremor, even with arms not extended</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Paroxysmal sweats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   No sweats visible</td>
</tr>
<tr>
<td>1   Barely perceptible sweating; palms moist</td>
</tr>
<tr>
<td>4   Beads of sweat obvious on forehead</td>
</tr>
<tr>
<td>7   Drenching sweats</td>
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<tr>
<th>Anxiety—Ask “Do you feel nervous?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   No anxiety (at ease)</td>
</tr>
<tr>
<td>1   Mildly anxious</td>
</tr>
<tr>
<td>4   Moderately anxious or guarded, so anxiety is inferred</td>
</tr>
<tr>
<td>7   Equivalent to acute panic states as occur in severe delirium or acute schizophrenic reactions</td>
</tr>
</tbody>
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<tr>
<th>Agitation</th>
</tr>
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<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   Normal activity</td>
</tr>
<tr>
<td>1   Somewhat more than normal activity</td>
</tr>
<tr>
<td>4   Moderately fidgety and restless</td>
</tr>
<tr>
<td>7   Paces back and forth during most of the interview or constantly thrashes about</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tactile disturbances—Ask “Do you have any itching, pins-and-needles sensations, burning or numbness, or do you feel like bugs are crawling on or under your skin?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   None</td>
</tr>
<tr>
<td>1   Very mild itching, pins-and-needles sensation, burning, or numbness</td>
</tr>
<tr>
<td>2   Mild itching, pins-and-needles sensation, burning, or numbness</td>
</tr>
<tr>
<td>3   Moderate itching, pins-and-needles sensation, burning, or numbness</td>
</tr>
<tr>
<td>4   Moderately severe hallucinations</td>
</tr>
<tr>
<td>5   Severe hallucinations</td>
</tr>
<tr>
<td>6   Extremely severe hallucinations</td>
</tr>
<tr>
<td>7   Continuous hallucinations</td>
</tr>
</tbody>
</table>

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<tr>
<th>Auditory disturbances—Ask “Are you more aware of sounds around you? Are they harsh? Do they frighten you? Are you hearing anything that is disturbing you? Are you hearing things you know are not there?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation:</td>
</tr>
<tr>
<td>0   Not present</td>
</tr>
<tr>
<td>1   Very mild harshness or ability to frighten</td>
</tr>
<tr>
<td>2   Mild harshness or ability to frighten</td>
</tr>
<tr>
<td>3   Moderate harshness or ability to frighten</td>
</tr>
<tr>
<td>4   Moderately severe hallucinations</td>
</tr>
<tr>
<td>5   Severe hallucinations</td>
</tr>
<tr>
<td>6   Extremely severe hallucinations</td>
</tr>
<tr>
<td>7   Continuous hallucinations</td>
</tr>
</tbody>
</table>

*Figure 1  Continued*
intravenous lorazepam because these were the drugs used in the standing order set.

Data were collected for 18 months. Data on all patients included length of stay, demographics, days on medication with protocol, days on medication without protocol, amount of lorazepam administered, amount of chlordiazepoxide administered, reversal agent required, history of seizures, use of restraints, sitter present, other pertinent medications used, and blood alcohol level score.

Results

Patients in the critical care and non–critical care areas of the hospital were compared. The comparisons were further broken down to patients who used the order set (symptom-based treatment) versus patients who did not use the order set (scheduled-dose treatment).

Symptom-Based Treatment (Order Set Used)

A total of 31 patients were in the symptom-based group, which used the order set: 14 patients (45%) in the non–critical care area and 17 patients (55%) in the critical care area. Other demographic data were similar. The mean age of the patients was 49 years (range, 24-62 years) in the non–critical care area and 51 years (range, 34-66 years) in the critical care area. The mean length of stay was 14.9 days in the non–critical care area and 14.0 days in the critical care area. The mean number of days that the standing order set was used was 3.0 days for the non–critical care patients and 2.7 days for the critical care patients.

The amount of drug used varied between the critical care and non–critical care groups. The mean amount of lorazepam used for the non–critical care patients was 14.8 mg, with a range of 0 to 68 mg. The mean amount of lorazepam used for the critical care patients was 10.9 mg, with a range of 0 to 45 mg. The non–critical care patients used a mean of 164 mg of chlordiazepoxide, with a range of 0 to 850 mg. The critical care patients used a mean of 142 mg, with a range of 0 to 375 mg.
No patients in either group used a reversal agent. Three patients in the critical care group and 2 patients in the non–critical care group required physical restraints. A sitter was used twice in the non–critical care group.

Scheduled-Dose Treatment (No Order Set Used)

Charts for 25 patients, 16 (64%) in the non–critical care area and 9 (36%) in the critical care area, who did not use the order set and received scheduled-dose medications for alcohol withdrawal were reviewed. Other demographic data were similar. The mean age of the patients was 52 years (range, 34-85 years) in the non–critical care area and 55 years (range, 22-75 years) in the critical care area. The mean length of stay was 6.6 days in the non–critical care area and 6.5 days in the critical care area. The mean number of days taking withdrawal medication was 5.4 days for the non–critical care patients and 4.8 days for the critical care patients.

The amount of lorazepam used was similar between the groups, with a mean of 6.5 mg (range, 0-36 mg) for the critical care patients and 6.7 mg (range, 0-28 mg) for the critical care patients.

The amount of chlordiazepoxide used varied between the 2 groups: 372 mg (range, 0-1800 mg) for non–critical care patients versus 303 mg (range, 0-875 mg) for the critical care patients.

A reversal agent was not used in the non–critical care group but used once in the critical care group. Physical restraints were needed 3 times in the non–critical care group and twice in the critical care group. A sitter was required once in the non–critical care group.

Symptom-Based (Order Set) Versus Scheduled-Dose (No Order Set) Treatment

A comparison was made between all 31 patients using the order set (symptom-based treatment) and the charts of the 25 patients not using the order set (scheduled-dose treatment; Figure 2). The mean age for patients with the order set was 50 years (range, 24-66 years) and the mean age for patients without the order set was 53 years (range, 22-85 years). The mean length of stay was 14.7 days for patients using the order set and 6.8 days for patients not using the order set. The mean number of days that medication was required to treat alcohol withdrawal was 3.2 days for patients with the order set and 5.2 days for patients without the order set. The mean amount of lorazepam used was 13.8 mg (range, 0-68 mg) for patients using the order set and 6.6 mg (range, 0-36 mg) for patients not using the order set. The mean amount of chlordiazepoxide used was 150.8 mg (range, 0-850) for patients using the order set and 349 mg (range, 0-1800 mg) for patients not using the order set.

A reversal agent was not required for any patient using the standing orders and was required once for patients not using the order set. Physical restraints were used 5 times in each group of patients. A sitter was used twice in patients using the order set and once in patients not using the order set. Figure 3 shows a comparison of the patients using and not using the order set by type of unit.

Discussion and Implications

This project examined the use of a standing order set for the treatment of alcohol withdrawal in critical care and non–critical care patients. Most patients in the critical care and non–critical care groups were male, and the mean age was similar in both groups. The length of stay for patients who received scheduled-dose medications was shorter than that for patients who used the order set. The difference in length of stay...
is most likely related to the admission diagnoses, injuries, and/or medical history of the patients in the ICU compared with patients on the step-down unit.

Patients who used the order set used more lorazepam on average (13.8 mg) than did patients on scheduled dosing (6.6 mg). However, patients using the standing order set used lorazepam for less time because they were on the standing order set for fewer days than were patients receiving scheduled dosing of lorazepam. In addition, lorazepam was to be given if patients were unable to take oral chlordiazepoxide. Many critical care patients are not able to take oral medications and thus received intravenous lorazepam instead.

The opposite was true for the use of chlordiazepoxide. Patients who used the standing order set used less chlordiazepoxide (151 mg) than did patients on scheduled dosing (349 mg) by more than half. Lorazepam is to be given if symptoms are not controlled with chlordiazepoxide, so patients using the standing order set may have needed lorazepam to control their symptoms.

The mean length of time that patients used the order set differed from the number of days that patients received scheduled dosing of medication. Patients who used the symptom-based standing order set required fewer days (3.2 days) to treat alcohol withdrawal than did patients who received scheduled dosing of medications (5.2 days). The number of days was less for both critical care and non–critical care patients. Patients who used the symptom-based standing order set would receive medication for fewer days. Although not examined, this difference could result in less costly and less complicated hospital stays. Assessment and treatment for alcohol withdrawal would be more reliable.

A reversal agent was needed for 1 patient in the scheduled-dosing group and no patients in the group that used the standing order set. It would be important to look for trends in this information with future patients. Patient safety may be compromised with the need for reversal agents in patients being treated for alcohol withdrawal. Using the standing order set may help avoid the use of reversal agents because the order set is based on the patient’s symptoms and patients would not receive medications unless needed.

The use of physical restraints was similar in patients using the standing order set and patients receiving scheduled dosing of medications. Physical restraints may be used for several reasons, such as the patient pulling at tubes, removing essential equipment, or climbing out of bed. It is not clear if the use of restraints was solely due to alcohol withdrawal or if it was related to other problems the patients may have had.

Because this study was a performance improvement project with small samples, detailed statistical analyses were not performed. In reviewing the results, it is possible to conclude that some findings were clinically significant. Clinical significance is associated with the importance of the findings to nursing’s body of knowledge. Clinical significance should result in altered decisions or actions by the nurse.27 In reviewing the results of this project, the LOS and the amount of medication given appear to differ. These differences could be explained by the acuity of the patients and the use of intravenous rather than oral medication for treatment of symptoms. However, the difference in the amount of time the patients were receiving medications could result in action by the nurse. Patients using the order set received medication for fewer days (3.2 days) than did patients not using the order set.

![Figure 3](http://ccn.aacnjournals.org/)

**Figure 3** Comparison of patients with and without the order set by unit.
benefit than scheduled doses of medications. Patients in alcohol withdrawal may need less medication for less time with the use of a symptom-based standing order set. [cci]

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Financial Disclosures
None reported.

References

Conclusions
This quality improvement project has provided useful information to improve assessment and treatment of alcohol withdrawal in both patients who are critically ill and patients who are not. Treatment of symptoms appears to be of more benefit than scheduled doses of...
Learning objectives: 1. Explain the usual pathophysiology of alcohol withdrawal syndrome (AWS) 2. Describe 3 common clinical signs and symptoms of AWS 3. Discuss the treatment benefits associated with the use of a standard order set for AWS

1. Which of the following symptoms may the hospitalized patient experiencing alcohol withdrawal syndrome (AWS) develop if the symptoms of alcohol withdrawal are not treated?
   a. Disorientation and tachycardia
   b. Low-grade fever and agitation
   c. Delirium tremens or seizures
   d. Hallucinations or disorientation

2. Which of the following statements best describes the complex mechanism of alcohol intoxication, tolerance, dependence, and withdrawal?
   a. The relationship between alcohol and alterations in neurotransmission in the brain
   b. The disrupted balance of the neurochemicals in the autonomic nervous system
   c. The disrupted balance of the electrochemical gradient in the brain
   d. The relationship between alcohol and the autonomic nervous system

3. What is the mortality rate associated with alcohol withdrawal delirium?
   a. More than 20%
   b. Between 1% and 5%
   c. More than 30%
   d. Between 5% and 15%

4. When do symptoms of delirium tremens typically begin?
   a. Between 2 and 4 days after the last drink
   b. Two weeks after the last drink
   c. Between 5 and 7 days after the last drink
   d. One week after the last drink

5. What are the drugs of choice for the management of alcohol withdrawal?
   a. Narcotics
   b. Anticholinergics
   c. Benzodiazepines
   d. Amphetamines

6. Which syndrome is associated with thiamine deficiency?
   a. Delirium tremens syndrome
   b. Wernicke syndrome
   c. Kooi syndrome
   d. Alcoholic malnutrition syndrome

7. What is the rationale for the development of an evidence-based standing order set for alcohol withdrawal?
   a. Evidence supports the early initiation of a nutritional supplement to prevent delirium tremens.
   b. Few controlled studies of treatment have been developed and tested in acutely ill patients.
   c. Scheduled dosing of benzodiazepines is more effective than symptom-based treatment.
   d. Literature supports the need for early identification and treatment of alcohol withdrawal.

8. Which benzodiazepines are the long-acting drugs of choice for the treatment of AWS?
   a. Diazepam and chlordiazepoxide
   b. Lorazepam and oxazepam
   c. Carbamazepine and haloperidol
   d. Oxazepam and diazepam

9. Why do patients with AWS experience electrolyte imbalances?
   a. Because of impaired absorption of protein, carbohydrates, and fats
   b. Because of increases intake of glucose
   c. Because of changes in renal function, poor dietary intake, and vomiting
   d. Because of fluid overload

10. Why was the Clinical Institute Withdrawal Assessment for Alcohol Scale included as a part of the order set in the study?
    a. To decrease the amount of drugs used to treat symptoms
    b. To provide a consistent symptom-based assessment of the patient
    c. To provide a standard protocol for diagnostic studies
    d. To increase the objectivity in evaluation of the severity of nutritional deficits

11. What conclusion did the investigators reach related to the use of a standard order set for the management of alcohol withdrawal?
    a. When a symptom-based order set is used, patients may need less medication for less time.
    b. Treatment of alcohol withdrawal should not be standardized to unique patient response.
    c. Scheduled doses of medication are more effective than a symptom-based order set.
    d. When a standard order set is used, patients may need more medication for a longer time.
Alcohol Withdrawal: Development of a Standing Order Set
Evanthia Riddle, Jeff Bush, Mary Tittle and Dimple Dilkhush

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