

The use of valium in alcohol withdrawal

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Abstract

Background: Benzodiazepines are the primary medical intervention used in the hospital for inpatients suspected of acute alcohol withdrawal during their admission. Per Shu et al. (2015) a study completed in the 1960 compared Librium with placebo as well as other drugs which showed the therapeutic efficacy of benzodiazepines in alcohol withdrawal. "Alcoholism has been reported in 20% to 50% of hospitalized medical patients" (Maldonado, 2012), moreover, the data indicate that 39% of ICU admission are alcohol-related (Muzyk et al., 2011). This is noted in an inpatient unit where alcohol withdrawal is common, Ativan is the benzodiazepine of choice along with assessment using the CIWA-ar. ~~However, there~~ is another benzodiazepine that provides the same benefit of preventing severe alcohol withdrawal and delirium tremens without oversedation which can occur with escalating lorazepam dosing.

Methods: Lewin's change model for quality improvement was utilized for this project. The QI implementation project was conducted from January 25 through March 3, 2022. During the same four weeks of 2021, hospital admission records were reviewed for the diagnosis of alcohol withdrawal in the same unit. CIWA-ar scores, type of benzodiazepine used, and the total amount of benzodiazepine used were compared.

Intervention: Valium, a benzodiazepine, is a rapid onset and long-acting medication used in alcohol withdrawal. It was prescribed to patients with a high likelihood of experiencing moderate to severe alcohol withdrawal during their hospitalization. Oral medications were used as IV medications are not prescribed in this unit. Oral valium, with dosing between 10 mg and 20 mg, was administered every hour for up to 3 hours based on the continued symptomology of the

patient. This treatment plan followed with CIWA-ar for the duration of the withdrawal to ensure adequate treatment of symptoms for the patient. This method has been proven effective in preventing severe alcohol withdrawal, seizure activity and delirium tremens. This treatment plan also positively affects the length of stay, comorbid events, and the patients' discomfort during the withdrawal process.

Results: A literature review indicated that there is no significant difference in the amount of benzodiazepine used with the symptom-based approach versus front-loading. There was, however, anecdotal findings noted difference in the level of sedation, reduced aggression, and ability to participate in a group. Also, patients in the QI project did not require escalation to a higher level of care due to progression of symptoms.

Conclusions: Provided benzodiazepines are available to patients withdrawing from alcohol, who can be closely monitored, the adverse events associated with alcohol withdrawal should be limited. The severity of alcohol withdrawal varies among individuals which should indicate a need for individualization of treatment. However, this is not the case, some patients risk not receiving adequate treatment for symptoms, risking worsening symptoms, seizure, and DTs while others may be over sedated or prescribed medication that they don't need creating a dependence to benzodiazepines (Day et al. 2018).

Introduction

Clinicians may not consider alcohol use as a reason for their presentation to the Emergency Department as patients present with many common complaints like abdominal pain,

a fall or anxiety. All these issues can be attributed to alcohol use, but it must be assessed in order to take action. Alcohol withdrawal symptoms can occur as soon as 6-12 hours following the last alcohol intake, with the onset of symptoms ranging from tremor, agitation, hypertension, irritability, and tachycardia that can advance to delirium tremens (DTs), seizure, electrolyte abnormalities, and death (Muzyk et al., 2011). These patients require close monitoring, daily labs, and frequent assessment for the escalation of alcohol withdrawal symptoms at least every three (3) hours, with the goal of preventing DTs and seizures. Oral administration of a loading dose of Valium can prevent the acute onset of withdrawal symptoms and provide long-acting coverage. The pharmacokinetics of Valium short action time with 90% absorbed with peak plasma concentration of 1 to 1.5 hours (fda.gov). Per Maldonado et al. (2017), there are conflicting opinions concerning the choice of benzodiazepine, but they are found to be useful in minimizing morbidity and mortality. When comparing IV Valium with rectal paraldehyde, the time to adequate sedation was significantly shorter with valium at 1.1 versus 3 hours. Adequate sedation is defined by Mayo-Smith et al. (2017) as the patient being quiet but awake or easily roused.

Problem Description

Individuals that meet criteria for Alcohol Use Disorder have a higher likelihood of experiencing alcohol withdrawal. Consistent alcohol use can result in a physical dependence that, when use is disrupted, can increase the likelihood of medical complications (Barnett et al., 2016). A patient must meet at least two of eleven established DSM-5 criteria in the past year to be diagnosed with Alcohol Use Disorder (AUD). AUD causes disruption in the patients work and academic performance, personal relationships, and results in medical and/or legal consequences,

all which have been identified by the DSM-5 as diagnostic criteria (DSM-5). Measures are taken with elective surgeries to keep disruption to a minimum by maintaining alcohol intake during the inpatient stay. However, when patients present to the emergency department for an acute illness or trauma, these habits are not addressed as it is not the primary concern or even considered. The disruption of alcohol-related habits or regimens increases the likelihood of serious consequences shortly thereafter. When patients develop alcohol withdrawal as an inpatient, their morbidity, mortality, and length of stay in the hospital increase (Pace, 2020). Treatment modalities vary widely between clinicians and hospitals, without significantly different outcomes. There is no significant difference between the benzodiazepines used to assist with alcohol withdrawal when considering the amount needed to manage symptoms, adverse effects from the medication, or the length of hospitalization. There is compelling evidence that when a patient presents with active symptoms of withdrawal, Valium, also known as diazepam, is a more appropriate choice as it has a peak plasma time of 30 to 90 minutes. When using Valium in the loading method the medication is given until there is significant improvement in symptoms observed, at that time the medication is then allowed to self-taper due to its long half-life and active metabolites (Shu et al., 2015).

Available knowledge

Approximately 16 million adult Americans meet the criteria necessary for a diagnosis of Alcohol Use Disorder, making it the third leading cause of preventable death in the country (Elliot, 2019). Around the world, alcohol misuse is ranked seventh for premature death and disability (NIH, 2020). Statistics available between 2011 and 2015 for the state of New Mexico has the highest rate of alcohol-related fatalities in the country, with 52.3 deaths per 100,000 individuals. This amount is near twice the national average (AP, 2020). Due to the severity of

alcohol use, withdrawal symptoms are regularly treated in the rural New Mexico hospital where the implementation of front-loading valium took place. In 2021, there were 187 admissions to the hospital related to alcohol; 14 of these admissions required intubation for protection of the airway due to the need to increase the dosage of intravenous benzodiazepines during withdrawal. Unfortunately, three of these admissions resulted in death due to the severity of withdrawals.

Clinicians providing treatment in the acute care setting need to be knowledgeable of the different levels of alcohol withdrawal to promptly intervene to prevent negative outcomes such as progression to severe alcohol withdrawal, seizure, and DTs. The symptoms of alcohol withdrawal can be difficult to recognize, as they are quite like those routinely assessed in emergency departments. These include anxiety, agitation, restlessness, insomnia, tremor, diaphoresis, headache, altered mental status, and blatant acute alcohol withdrawal. Patients may also experience nausea, loss of appetite, and vomiting. Should these symptoms progress from mild to moderate or severe alcohol withdrawal, the symptoms previously mentioned may progress to hallucinations, seizures, and DTs if not identified and treated appropriately. It is estimated that 20% of patients progress to the advanced stages; however, with appropriate medical management, the rate is diminished to between 1 and 4% (Pace, 2018).

Benzodiazepines are the primary treatment choice for alcohol withdrawal in both acute and outpatient care settings as they have been validated against placebo since 1960's. The benzodiazepines utilized for alcohol withdrawal are Ativan, Valium, Librium, and Serax for those with severe liver disease. Ativan is an intermediate-acting benzodiazepine due to its short half-life (10-20 hours) and is metabolized through conjugation and has no active metabolites. For many providers, this makes Ativan appealing as it is effectively cleared from the body in a short period. There are negative aspects that clinicians should consider, such as the risk of developing

withdrawal seizures if the frequency of administration is delayed due to nursing assessment of the CIWA-as. Beyond the concern for breakthrough symptoms and seizure activity, its short half-life can make discontinuing lorazepam difficult. Lorazepam often requires tapering even after withdrawal symptoms have subsided (March et al., 2019).

Librium is metabolized through hepatic enzymes to produce active metabolites. It has a longer half-life of 24-48 hours associated with a metabolism that allows for a steady state of medication availability without concerns of tapering when treatment is no longer needed. Like other long-acting medications, the longer half-life does not allow for significant changes in the drug levels, which should reduce seizure activity (March et al., 2019).

Valium quickly reaches maximum concentration within the central nervous system because of its lipophilic nature (March et al., 2019). It is metabolized by the liver, which produces the active metabolite desmethyldiazepam that is slowly eliminated from the body (FDA Drug Guide, 2016). These properties allow immediate and sustained symptom control (Muzyk et al., 2013). The elimination of valium is biphasic, with an initial distribution phase lasting roughly 48 hours and a terminal distribution phase that can last up to 100 hours (FDA Drug Guide, 2016). Clinicians should also consider equivalence dosing of these medications. When compared, 5 mg of Valium is equivalent to 25 mg of Librium and 1 mg of Ativan.

Rationale

Benzodiazepines are the preferred treatment method for alcohol withdrawal, with four primary medications used. There is no consensus among clinicians when reviewing literature concerning the superior type of benzodiazepine used in alcohol withdrawal as long as one is used. “Oral benzodiazepines are the best assessed drugs for preventing severe alcohol withdrawal syndrome, particularly the risk of seizure” (Jose et al. 2015). According to the

literature, Valium is preferred by many clinicians due to its minimal onset of action time, which provides quick control of the patients' acute symptoms, making front-loading method appropriate in an ambulatory inpatient setting.

Patients are screened upon admission with both an interview and lab work for confirmation, more specifically blood alcohol levels, Gamma-Glutamyl transferase (GGT) concentration which is a commonly used biomarker in alcohol abuse that will identify increased use within the past month (Allen et al., 2004). Another marker to be considered is a common lipid panel as alcohol has been shown to increase the transfer rate of apoA-I and apoA-II in a dose dependent fashion, which means the higher HDL-C the greater amount of alcohol consumed (De Oliveira e Silva, et al. 2000).

Specific Aims

Hospitalized patients are at a much higher risk of complications during alcohol withdrawal as there is a greater likelihood of comorbid conditions that may be exacerbated by acute withdrawal. These patients risk missed diagnosis, including possible missed head injury, dehydration, and electrolyte abnormalities (Mayo-Smith et al., 2004). Implementation of Valium versus Ativan, Librium, or Serax is supported in controlling the symptoms of alcohol withdrawal in an inpatient setting due to its short onset of action, long half-life, and efficacy in preventing alcohol withdrawal-induced seizure. With appropriate monitoring, this medication can be used as soon as the patient is diagnosed with an increased likelihood of alcohol withdrawal. Therapy can be continued without fear of treatment interruption when the patient has reached the intended medical floor. Monitoring should be continued with CIWA-ar and follow-up dosing with Ativan as needed. In addition, because the appropriate level of sedation is sleepy but rousable, the

patient can ambulate independently, thus reducing the risk of oversedation, venous thromboembolism, pneumonia, and bedsores.

Methods

Context

The quality improvement implementation project was completed in an ambulatory inpatient hospital unit that commonly treats psychiatric disorders in a 99-bed rural community hospital in New Mexico. Upon review of my 10-day reflective practice, I noted there was an expectation that newly admitted patients with a secondary diagnosis of alcohol withdrawal would be in bed for at least the first 24 hours after admission due to medications received for withdrawal symptoms. The literature review completed identified valium as a front-loading medication to assist with alcohol withdrawal with reduced risk for oversedation due to its rapid onset of action, which facilitates determining need for further doses to control symptoms. A literature search for studies published between 2000 and 2022 from CINAHL yielded five articles, Embase 13 articles, and PubMed 90 articles. Keywords: diazepam, valium, alcohol withdrawal, inpatient treatment.

Eleven patients met the inclusion criteria; acutely intoxicated upon admission, history of alcohol abuse, and previous inpatient treatment for withdrawal. Six female and five male patients were identified, and all received initial treatment with oral valium. EHRs were reviewed for these 11 patients to assess CIWA-ar scores, length of treatment, and the total amount of benzodiazepines needed by the patient to achieve and maintain symptom control, including initial dosing and follow-up treatment with a short-acting benzodiazepine.

The QI project took place over four weeks in an inpatient unit of a rural community hospital. Oral Valium replaced Ativan as the primary treatment choice for alcohol withdrawal. The average census during this time was 16, and nurse practitioners managed all primary medical needs. Labs were obtained daily to monitor for electrolyte disturbance and changes in kidney and liver function. CK was evaluated daily until the threat of rhabdomyolysis was ruled out. CIWA-ar was completed by nursing staff for continued assessment of withdrawal symptoms and the need for follow-up treatment. Oral Ativan was available as needed for scores greater than 10. Patients were able to maintain their activities of daily living, consume meals, and participate in group therapy.

Interventions

Valium is the only intervention during this implementation process. Dosing is determined based on risk factors for developing DTs, comorbidities, and age (Hoffman et al., 2021). 10 to 20 mg of valium was ordered for patients who presented to the unit with a high likelihood of alcohol withdrawal, a history of DTs, and/or withdrawal seizures. All valium dosing was administered orally. Each dose was given at least one hour apart with the assessment of patients' withdrawal symptoms using the CIWA-ar and the appropriate level of sedation associated with valium, which was continually monitored by nursing staff.

Several staff members were involved in the implementation of this project. The intake coordinator for the unit assesses the patient in the emergency department for appropriateness of admission to the unit and reports the patient's needs to the admitting provider, who either accepts or declines admission. The nursing staff completes CIWA-ar assessment as ordered every 3 hours and vital signs with rounding completed every 15 minutes to ensure patient safety.

Study of the Interventions

All patients included in the QI project received one to three doses of valium based on their presentation of symptoms of alcohol withdrawal during the admission assessment. “...Diazepam (valium) has the shortest time to peak effect, which facilitates both rapid control of symptoms and accurate titration to avoid over-sedation” (Weintraub, 2017). CIWA-ar monitoring is a standard order for patients if there is a concern for alcohol withdrawal during their admission. The CIWA-ar is a revised version of the CIWA-A that measures the signs and symptoms commonly associated with alcohol withdrawal. It has been shortened from 15 to 10 items and is noted to have increased application efficiency while maintaining its clinical validity and reliability (Patel et al., 2021). At this facility, the alcohol withdrawal order set includes daily lab work to monitor for electrolyte abnormalities, kidney and liver function, rhabdomyolysis, fall precautions, and seizure precautions. Patients are monitored in this manner for 72 hours. The data gathered were analyzed to validate the intervention's direct effect on the expected result. Nursing notes completed every shift were asked to include any need for short-acting benzodiazepine following the initial loading dose for persistent symptoms.

Measures

Objective measures used to validate the outcomes based on the interventions are the CIWA-ar, a validated tool used to assess the severity of alcohol withdrawal among inpatients. This assessment tool is the gold standard for evaluating acutely withdrawing patients. The individual patient MAR (medication administration record) was assessed for medication administration based on the CIWA-ar score.

CIWA-ar is a tool that is used hospital-wide for the assessment of alcohol withdrawal. There was no change in the usefulness of this tool for the implementation of this project. The benzodiazepines used are on the hospital formulary and did not require any special purchase or

permission for use. It should be noted that prior to QI implementation, Ativan was the primary benzodiazepine used in withdrawal at this facility for both oral and IV administration.

Patient MARs were assessed to determine the initial dosing of valium and to determine if there was any need for follow-up dosing with Ativan due to continuing symptoms. Discrepancies concerning the use of Ativan for symptoms of anxiety were noted.

Analysis

Eleven patients met inclusion criteria during the implementation phase of the QI project, six females and five males with an age range between 29 and 60 years. Two male and one female subject had a documented history of withdrawal seizures. All patients included in the project had required alcohol withdrawal assistance as an inpatient in the past. Nine of the 11 patients had concomitant drug use, with marijuana being used most often. All patients received at least one dose of 10 mg valium, six patients received three 10 mg doses, and two received three 20 mg doses. Eight patients received maintenance dosing of Ativan after the loading phase. Seven of these patients received the partial protocol of one to two doses of valium rather than the three full doses of the loading phase. The two patients that received 20 mg dosing for three doses still required maintenance Ativan, which possibly indicates the need for higher doses of valium in the loading phase.

Medical records were reviewed for the same time frame in 2021, during which ten patients (4 female and six male) were admitted with a secondary diagnosis of alcohol withdrawal. The age range was between 22 and 59 years, and concomitant drug use was present in 5 of the ten patients again, with marijuana being the primary substance. Ativan dose varied greatly between 0 mg (after treatment in the Emergency Department) and 22.5 mg. The patient remained on the CIWA protocol for an average of 3 days.

Valium was transitioned to equivalent dosing of lorazepam to compare dosing between the two groups. In the group front-loaded with valium, the patients cumulatively received 68 mg of Ativan, and in the symptom-based treatment group, a total of 57.5 mg of lorazepam was administered.

Ethical Considerations

Ethical considerations for the implementation of the QI project were framed from the IRB application. Elderly patients (greater than 70), those with severe liver disease and patients who were not able to consent to participation were excluded from the project. There were no photos, audio or video recordings of the patients pertaining to the project. There was not an increased risk to patients participating in the project due to the medication change as it was still a benzodiazepine. The data mined from the patient charts did not contain any patient specific identifiers. Patients need to have the appropriate treatment of their symptoms, avoiding under sedation as well as over sedation. With the appropriate level of sedation, patients can experience a tolerable withdrawal with a significant decrease in the likelihood of progressing to severe withdrawal, experiencing withdrawal seizures, DTs, and escalation in care with the possibility of requiring restraints, both chemical and physical, thus increasing the instance of pneumonia, bedsores, and venous thromboembolism.

Results

Prior to the implementation of this project, I spoke with my program director, managers of patient safety and compliance, and the executive director of the unit. All agreed that this was an appropriate implementation project and were interested in the outcome. I then spoke with the providers in the unit to inform them of the inclusion and exclusion criteria, medication dosing,

and patient assessment. The nursing staff was educated on the process and necessary documentation. An email was sent to those who were absent and the night-shift staff. All questions were answered to their satisfaction.

Patients that presented to the Emergency Department with qualifying criteria for admission were assessed for appropriateness for the ambulatory unit. As per admission protocol initial blood alcohol levels along with CBC, CMP, and TSH were obtained in the Emergency Department IV fluids were administered prior to admission. Once patients arrived at the unit, CIWA-ar was completed to determine the severity of withdrawal symptoms, which determined the initial dose of Valium. Following the initial dose, patients were reassessed 1 hour later to determine the need for additional dosing. This process occurred up to three times in total. CIWA-ar assessment continued every three hours for 72 hours. During the intervention, the symptoms resolved in less than 72 hours.

Contextual elements can have a significant impact on the ability to implement best practices at different facilities. “Successful healthcare quality improvement (QI) initiative frequently fails to transfer to different settings, with local contextual factors often cited as the cause” (Coles et al., 2017). The brief education provided to the staff prior to implementation was deemed effective. In addition, I was available in person when I was on duty and available via text and email when off-site, keeping lines of communication open.

Associations between the interventions and the outcomes for this quality improvement project are defined by one another. The intervention is a single medication addition to a protocol that is generally well known in this facility and across the United States; the only difference is the benzodiazepine of choice for that facility. I do not believe there to be significant contextual

elements that would influence the implementation of this project elsewhere, as acute alcohol withdrawal is a well-known problem among hospital clinicians.

Patients were able to withdraw safely and effectively from alcohol in a manner that allowed them to maintain their own ADLs, participate in care, and display a reduced level of agitation, allowing the nursing staff to perform their duties in a safe and effective manner

Discussion

Summary

There is no right or wrong answer in the treatment of alcohol withdrawal, if it is recognized and treated. Depending on the population, one benzodiazepine may be preferred over another, but if the patient is treated effectively, there should not be a progression to severe alcohol withdrawal, seizure, or DTs. Front-loading valium is an effective choice for the ambulatory unit as the effectiveness of medication is noted quickly. As such, further administration can be determined without the likelihood of oversedation which would further complicate the patient's admission.

The focus of this project was to determine if front-loading valium is an effective treatment option for patients with less benzodiazepine use. There was a negligible difference in the total benzodiazepine requirements for the patients in the application group. Many patients required maintenance dosing with Ativan following the initial loading phase with a total requirement of 32 mg over 11 patients. The total use of Ativan was notably reduced in this group as well. I did note that during the quality improvement project completed this year, it was much easier for me to assess the patients throughout their stay. They were found awake in the day room, interacting with their peers, eating, and attending group therapy. Previously, treatment

with Ativan provided on a symptom-based design would treat symptoms too aggressively and they would be found in their rooms sleeping rather than getting well, attending group and preparing for rehab.

Interpretation

Oral valium is an effective treatment option for acute alcohol withdrawal, similar to the other benzodiazepines used. Each medication has differing modalities that appeal to clinicians based on their patients' needs. As would be expected, IV administration of Valium and Ativan has an expedited onset of action versus oral treatment. Oral dosing does take longer to indicate effectiveness; however, valium is faster than Ativan making it more appropriate to treat acute symptoms. Patients with significant liver impairment would benefit from Serax as there are no active metabolites in this benzodiazepine (Hofman & Weinhouse, 2021). A study completed by Levine et al. in 2019 found there was no significant difference in the CIWA-ar measurement tool when comparing front loading of Ativan vs. Valium. They did find that front loading with Ativan had a higher instance of ICU delirium as well as increased risk for over sedation, but it was not found to be statistically significant with a p value of 0.063.

CIWA-ar is the gold standard for withdrawal assessment; however, the assessment tool needed to identify patients with a high likelihood of problem drinking and, as a result, experiencing withdrawal is the AUDIT-C. This tool is a three-question survey that can be incorporated into the admission survey. Having this knowledge can assist the clinician in the identification and treatment of withdrawal prior to it becoming uncontrolled.

Limitations

Perceived limitations for this project included the limited implementation timeline for gathering data. I was not able to assess vital signs from the control group due to EMR limitation. I found there was not a specific training for nursing staff for completing the CIWA-ar, thus causing inconsistency in scoring. The final consideration is the facility used for the implementation project is not a teaching hospital, and the staff is not accustomed to implementing new processes.

Conclusions

Benzodiazepines are the backbone of treatment for those with alcohol withdrawal syndrome. The patients' symptoms should be the determining factor for the benzodiazepine ordered. As shown, front-loading oral Valium is an effective treatment option for patients admitted to the ambulatory unit of the hospital for the fast, long-lasting, effective control of their withdrawal symptoms. Initial front-loading dose should be based on patient symptomology and should continually be assessed as it would be a viable option for continued treatment. Front-loading Valium regimen should be considered when assessing patients who are identified after symptoms have presented, as it has the potential to alleviate symptoms quickly and provide control of symptoms for several days.

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