Appraisal of the Glasgow assessment and management of alcohol guideline: a comprehensive alcohol management protocol for use in general hospitals

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Received 19 September 2011 and in revised form 11 January 2012

Summary

Background: Guidelines exist for the management of alcohol withdrawal syndrome (AWS) but few have been assessed as to their suitability for general hospitals. The Glasgow Assessment and Management guideline for alcohol has been specifically developed for use in this context.

Aim: To determine if this alcohol assessment guideline aids the management of AWS in general hospitals.

Design: The four components of the Glasgow Assessment and Management of Alcohol guideline were evaluated. This included the use of the Fast Alcohol Screening Test (FAST) to identify at risk patients, a risk stratification strategy to indicate fixed dose or symptom-triggered benzodiazepine treatment, the Glasgow Modified Alcohol Withdrawal Scale (GMAWS) for symptom-triggered treatment and a clear recommendation for vitamin prophylaxis of Wernicke's encephalopathy.

Methods: FAST scores were assessed along with the CAGE (cut down, annoyed, guilty and eye-opener) screening tool to ascertain if a single screening tool could identify hazardous and dependent drinking. The GMAWS and Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) were compared between two medical units. A staff survey of the two AWS tools was also carried out.

Results: FAST was able to identify both probable hazardous and dependent drinking. The GMAWS was reliable and gauged both physical and cognitive aspects of AWS. Staff generally preferred the GMAWS-based treatment as opposed to CIWA-Ar management and welcomed the Guideline as a whole.

Conclusions: The Glasgow Guideline aids the management of patients with AWS in an acute hospital setting. It allows early identification of at risk patients and directs effective therapeutic intervention.

Introduction

Alcohol-related admissions are increasing in the UK.¹ Not only are these admissions directly related to alcohol misuse, but also the prevalence of alcohol misuse among patients admitted primarily with non-alcohol-related illness is also rising.² The consequence of this is that a greater number of patients are at risk of developing significant alcohol withdrawal. Not only may this be detrimental to the health of these patients, but also the care of other patients may be compromised. There is also the risk of aggression or violence towards members of hospital staff.

While guidelines for the management of alcohol withdrawal exist in many hospitals, it has been observed that different guidelines may be used within any one hospital site and that adherence to any such guidelines is variable.³,⁴ Many of the guidelines are derived from the management of...
patients with alcohol withdrawal syndrome (AWS) in specific alcohol detoxification centres. Only a limited number of studies have assessed such guidelines in the context of acute general hospitals. In this environment, the patient with AWS may be suffering from concomitant co-morbidity, and the nursing staff are likely to have other severely ill patients to manage and assess. To be effective in general hospitals, an alcohol guideline has to recognize and manage patients at risk of AWS who may present with non-alcohol-related illness.

Several scores for the assessment of harmful drinking also exist. The fast alcohol screening test (FAST) screening tool is based on four items derived from the alcohol use disorders identification test (AUDIT). This is a brief alcohol screening tool that is used to classify alcohol use into probable hazardous or harmful drinking. In many cases, this can be achieved by administration of the first question only. FAST is an effective first filter and was originally designed for use in accident and emergency departments and other medical environments where there is a need to promptly assess patients for alcohol use. Although AUDIT can predict the risk of AWS, the role of FAST in this regard has never been tested.

AWS is characterized by tremulousness, sweating, nausea, vomiting, anxiety, psychosis, agitation, tachycardia and hypertension within 6–24 h after the last drink. In general, these symptoms are proportionate to the amount of alcohol consumed and the length of the patient’s current drinking pattern. Although symptoms of AWS may be mild, more severe forms, such as delirium tremens may be fatal. In severe AWS administration of neuroleptic drugs, such as haloperidol or risperidone may be required.

Symptom-triggered benzodiazepine treatment for AWS is considered safe and is associated with a shortened length of stay in hospital for patients and a decrease in the quantity of medication used. A number of previous studies have considered symptom-triggered versus fixed-dose benzodiazepine use to manage alcohol withdrawals. Symptom-triggered benzodiazepine regimes together with a front loading dose of the drug may also be a suitable treatment regime in patients experiencing delirium tremens. Despite this, the majority of hospitals in the UK would appear to use fixed-dose regimens.

One study which looked at a number of different AWS severity scales found that there was a lack of agreement as to what constituted the most significant markers of alcohol withdrawal. Moreover, 30 separate signs and symptoms of alcohol withdrawal were recognized from the 18 rating scales studied.

A recent review of the use of the most common symptom-triggered treatment tool, the Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar), revealed that it was used inappropriately in >50% of cases.

It is in this context that the Glasgow Assessment and Management of Alcohol Guideline has been developed. This is a comprehensive guideline that encompasses screening for alcohol misuse and dependence, clear guidance for fixed-dose or symptom-triggered treatment of AWS, a simple score to assess AWS and guidance for vitamin prophylaxis of Wernicke–Korsakoff syndrome.

**Aims**

This study aimed to ascertain if a new Glasgow alcohol guidance protocol with its four components aided the management of patients with AWS in general hospitals.

**Methods**

**Setting and patients**

The Glasgow Assessment and Management of Alcohol guidance protocol with its four component parts was studied in two acute medical admission units.

Data were collected over a 3 months period between February 2009 to April 2009 from the two acute medical units at the Western Infirmary, Glasgow and Glasgow Royal Infirmary (GRI).

All patients presenting to these clinical areas were assessed, and those with evidence of harmful drinking (FAST score ≥ 3) were studied further.

**Assessment of harmful and dependent drinking**

All those with a FAST score of ≥ 3 went on to be studied further and were also scored using the CAGE questionnaire (cut down, annoyed, guilty and eye-opener). A CAGE score of ≥ 2 is associated with dependent drinking. CAGE and FAST scores were able to be compared.

**Alcohol withdrawal management tools**

The Glasgow Modified Alcohol Withdrawal Scale (GMAWS) is a modification of two existing AWS scores. In this study, GMAWS included the patient’s temperature as a variable. However, in light of the results, temperature has been removed, with a resultant adjustment of the score thresholds for treatment. The GMAWS score chart now in use...
throughout the general hospitals in Greater Glasgow and Clyde is shown in Figure 1.

The management guidance at each hospital site was identical except for the symptom-triggered treatment tool used: at GRI, the GMAWS was used whereas the CIWA-Ar score was used at the Western Infirmary, Glasgow.

Nurses were questioned regarding their use of the alcohol withdrawal scales. GMAWS individual scores were studied for internal consistency reliability using split-half method. Cronbach’s \( \alpha \) was utilized as a measure to determine this. Principal components analysis (PCA) was also carried out on GMAWS scores.

**Risk stratification of AWS severity and recommendation for Benzodiazepine treatment**

The Glasgow guideline for the management of AWS allows risk stratification for anticipated severity of AWS to determine the method of benzodiazepine administration (Figure 2). It provides guidance on the use of fixed dose diazepam plus symptom-triggered treatment for those deemed to be at high risk and symptom-triggered treatment only for those at lower risk. High risk was determined by the presence of two or more of the following factors: current or previous presentation with withdrawal seizures, previous severely agitated withdrawal or delirium tremens, a high alcohol screening score (FAST > 12) and a high initial symptom score (GMAWS > 9 or CIWA > 20).

The guideline also gave indications and guidance for the use of parenteral administration of medication (benzodiazepines or haloperidol) if necessary. Patients at high risk of complications of benzodiazepines were identified (such as elderly patients or those with advanced liver disease). Lorazepam administered on a symptom-triggered basis was recommended for these high-risk patient groups.

**Vitamin prophylaxis and treatment of Wernicke’s encephalopathy**

Incorporated into the guideline are recommendations for the prevention and treatment of Wernicke’s encephalopathy. This guidance is in accordance with that provided by the Royal College of Physicians.

**Survey of nursing staff**

Nursing staff were asked to complete questionnaires detailing their experience of the guideline. In particular, questions were asked regarding the ease of use of the guideline as a whole and the use of the AWS scoring system.

**Results**

**Patient population**

Over the course of the study period, 6478 patients were admitted to the two acute medical units. Of these, 390 (6%) patients were screened and had a FAST \( \geq 3 \) and were analyzed. In GRI, the proportion of patients with a positive FAST score was greater compared with the Western Infirmary, Glasgow [270 out of 3404 admissions (8%) compared with 120 out of 3074 admissions (4%)]. The majority of the patients were male (293; 75%). The
The greatest proportion of patients belonged to the 40- to 49-year-old age group (121; 31%). Sixty-four percent of the patients described themselves as ‘binge drinkers’ (‘Do you have extended periods of alcohol use/abstinence?’) and 78% drank more than five units of alcohol per day. Seventy-nine percent of the patients felt their admission was related to alcohol, and 81% of the patients had experienced symptoms of alcohol withdrawal previously.

Use of the FAST and the CAGE screening tools

FAST and CAGE alcohol screening tools were analyzed together to ascertain their performance in
underscoring hazardous or dependent alcohol use. Three-hundred and ninety patients were initially assessed for alcohol misuse using both the FAST and CAGE alcohol screening tools. Data were incomplete in 85 cases, leaving 305 patients to be studied.

Ninety-four percent of the patients with a FAST score $\geq 3$ were CAGE positive. Patients who were CAGE positive had higher FAST scores than CAGE negative patients (Figure 3). On ROC analysis, the FAST score had an AUC of 0.831 (95% CI 0.784–0.871) with an optimal cut-point of 9 for CAGE positivity (indicative of dependent drinking). Within the first 24 h of admission, 51% of the patients with FAST $\geq 9$ had required $>40$ mg of oral diazepam for alcohol withdrawal symptoms, compared with only 23% with a FAST $< 9$ ($P=0.007$; 95% CI 14.5–41.5). More patients with a FAST $\geq 9$ needed $>100$ mg of diazepam during their hospital stay (31%) compared with those with a FAST $< 9$ (8%; $P=0.002$; 95% CI 13.4–32.6).

### Reliability analysis and principal components analysis of GMAWS

A total of 1040 GMAWS scores were individually studied from the 221 patients at the GRI but only 929 scores were deemed suitable for analysis. On review, only 3% scored on temperature which affected the treatment in only 0.5% of cases. On the basis of this, temperature was dropped from the GMAWS.

The resultant Cronbach’s $\alpha$ for the GMAWS five items based on standardized scores was $\alpha=0.71$. This demonstrates good internal consistency reliability in a general hospital population.\(^{22}\)

The data were also analyzed by means of a PCA with direct varimax rotation. The various indicators of factorability were good, and the residuals indicate that the solution was a good one. Two components with eigen values $>1.0$ were found (Table 1); the screen plot also indicated two components (Figure 4). The first component that we interpreted as ‘physical’ includes the items; tremor, sweating and agitation. This accounted for 47% of the total variance. The second component that we interpreted as ‘cognitive’ includes the items: hallucination and orientation. This accounted for 20% of total variance. The components and the variables that load on them are shown in Table 2.

### Use of risk stratification to determine AWS management

Of the 221 patients at GRI who were managed for AWS, 116 (52%) were assessed as being at low risk and received symptom-triggered treatment alone as first line management of AWS. Of the 83 patients at

![Figure 3.](https://example.com/image.png)

**Figure 3.** FAST scores in CAGE-positive and -negative patients. $P<0.001$ on comparison of CAGE-negative and -positive patients.

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial eigenvalues</th>
<th>Extraction sums of squared loadings</th>
<th>Rotation sums of squared loadings</th>
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<td>Total</td>
<td>Percentage of variance (%)</td>
<td>Cumulative</td>
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<td>0.477</td>
<td>9.538</td>
<td>100.000</td>
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</tbody>
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Extraction method: PCA.

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1. Underline the text to highlight important points.
2. Use bullet points to list major findings or conclusions.
3. Ensure coherence by connecting sentences and paragraphs.
4. Accurately represent tables and figures.
5. Maintain a natural flow of reading by adjusting sentence structure and length.
the Western Infirmary, Glasgow who were managed for AWS, 55 (66%) were assessed as low risk. Only four patients commenced on a symptom-triggered only regimen required to be changed to a combined regimen. Information to allow risk stratification was documented in 87% of cases, and the Guideline was appropriately followed in 75% of occasions.

Comparison of GMAWS and CIWA-Ar

Two-hundred and seventeen patients (80% of total; 98% of AWS managed patients) who were managed with the GMAWS management tool at GRI received benzodiazepines during their hospital stay. This compared with 81 (68% of total; 98% of AWS managed patients) using CIWA-Ar at the Western Infirmary, Glasgow (comparison of total population \( P = 0.001; 95\%\; \text{CI} \; 2.86–22.14 \)). For those receiving diazepam, the median dose of diazepam used in the first 24 h was 60 mg (range 7–190 mg) for GMAWS managed patients and 80 mg (range 10–380 mg) for CIWA-Ar managed patients (\( P = 0.0012 \)).

The median dose of diazepam used during the whole of the patient’s hospital stay was 100 mg (range 10–750 mg) for GMAWS managed patients and 130 mg (10–1130 mg) for CIWA-Ar managed patients. This difference was not statistically different (Figure 4). More GMAWS scores were assessed ‘on time’ compared with CIWA-Ar scores: 46% opposed to 30% of CIWA-Ar scores (\( P < 0.0001; 95\%\; \text{CI} \; 12.2–18.8 \)) (Figure 5).

A total of 37 (10%) patients required additional or alternative medication other than diazepam: 25 (13%) patients managed with GMAWS and 12 (10%) with CIWA-Ar. Additional parenteral (IV or IM with diazemuls, lorazepam or haloperidol) treatment was required for 18 (7%) of the GMAWS-treated patients and 8 (7%) of the CIWA-Ar-treated patients. One patient managed with CIWA-Ar required intensive care treatment partly on account of excessive benzodiazepine administration.

Adherence to vitamin prescription guidelines

Retrospective analysis of patients’ records determined that vitamin treatment was administered according to the protocol in 48% of patients at GRI and 37% of patients at the Western Infirmary, Glasgow. Overall thiamine was prescribed to 93% of patients at GRI and 85% of patients at the Western Infirmary, Glasgow.

Staff evaluation of the guideline

A staff evaluation of the GMAWS and CIWA-Ar was carried out as part of the study. A total of 240 forms were distributed across GRI (130) and the Western Infirmary, Glasgow (110). The response rate for GRI was 35%, and the rate for the Western Infirmary, Glasgow was 36%. Ninety percent of the staff from GRI and 84% of the staff from the Western Infirmary, Glasgow found the documentation for the protocol to be ‘excellent’, ‘very good’ or ‘good’. Seventy-five percent of the staff at GRI felt that the GMAWS was ‘very easy’ or ‘quite easy’ to use, and no staff felt that the GMAWS was difficult to use. Sixty-seven percent of the staff at the Western Infirmary, Glasgow found the CIWA-Ar ‘very easy’ or easy’ to use, but 8% of staff found it ‘quite difficult’ to use. A question relating to staff having enough time to complete the GMAWS and CIWA-Ar was asked. With regard to GMAWS, 75% of the staff felt that there was enough time to complete it. This contrasts with only 45% of staff at the Western Infirmary, Glasgow, who felt that there was enough time to complete CIWA-Ar.
Discussion

It has been recognized that there is a need for a universal guideline for the management of alcohol withdrawal in the UK as current practice is highly variable. The guideline for the management of AWS in secondary care, which we describe, provides comprehensive recommendations for the assessment and treatment of this condition. The guideline was notable for its relative ease of use and applicability in the context of acute admissions. The use of a single screening tool proved effective in detecting hazardous and/or dependent drinking. FAST is an abbreviated form of the AUDIT questionnaire. While AUDIT has been shown to indicate dependence as well as hazardous drinking, this is the first study to indicate that FAST may be used to identify dependent alcohol misuse and risk of clinically significant withdrawal. This easily applied and rapid assessment tool can inform the level of intervention required. Patients with hazardous drinking can be offered advice on the ward; patients with an alcohol dependence can be offered specialist alcohol intervention and monitored for development of AWS. The anticipation of AWS allows for its more effective management, particularly in patients admitted to hospital for other medical reasons.

Stratification of risk of severe AWS allowed for a targeted use of fixed-dose and symptom-triggered treatment regimens. While studies based in specific alcohol treatment units suggest some benefit with symptom-triggered management, the difference between these approaches is not so clear in a medical inpatient environment. Clinical experience indicates that some patients need more intensive regular benzodiazepine treatment, whereas others can be managed with treatment on an ‘as-required’ basis. The guideline described in these studies allows for patients to be started upon an appropriate treatment strategy depending upon their FAST score, initial GMAWS value, a history of previous agitated AWS or a current or previous history of alcohol withdrawal seizures. Previous severe AWS and alcohol withdrawal seizures have both been associated with an increased risk of delirium tremens. The use of a high FAST score and a high symptom score would seem like reasonable indicators of severe AWS risk and the need for a more pro-active therapeutic strategy.

The GMAWS was seen to be as effective as the commonly used CIWA-Ar scoring system in these studies. Its greatest advantage over the CIWA-Ar was its ease of practical application for nursing staff with improved compliance. Shortened AWS scores have previously been noted to be associated with good compliance and acceptability by staff. The GMAWS is similar to one of these scores. Initially, the GMAWS included temperature as one of its variables. However, experience in the study indicated that temperature had very little influence upon the recorded scores. Interestingly, it was found that temperature was the most common variable of the Swift and colleagues’ score to be omitted during assessment. In addition, the use of temperature as a cardinal feature of AWS in the context of a general hospital may cause difficulties among patients who have co-morbidity such as sepsis. Therefore, it would appear that temperature measurement for AWS assessment in this context is redundant, hence the five variable GMAWS. This score was demonstrated to have good internal consistency. It was also shown to underscore both the physical and cognitive features of AWS.

Although the Glasgow management protocol appears to be successful in managing patients with AWS, data also revealed that adherence to the protocol was not always ideal. Such difficulties in ensuring compliance with AWS treatment protocols have been previously noted. This is a risk with any guideline and to be of use, the recommendations have to be supported by effective education of...
nursing and medical staff. This training and development of staff are essential for successful implementation of an AWS guideline.

This study has limitations. Most importantly, it was carried out in two medical units. The applicability of the guideline in other hospital environments was not investigated in this study. However, subsequent experience has shown that the Glasgow guideline is transferable to surgical and other specialist areas (results not shown).

Associated with the introduction of this AWS guideline, reductions in the length of hospital stay and the number of alcohol-related violent incidents were observed compared with the same period of time 1 year previously. As the study was not designed to assess these outcomes specifically, the results are not presented. However, these trends noted after the introduction of the Guideline were encouraging. As a result, the Guideline has been ratified for use in the Greater Glasgow & Clyde Health Board acute hospitals.

In conclusion, the study tested a comprehensive AWS guideline that identifies patients at risk of AWS, advises upon the most appropriate treatment regimen and uses a new abbreviated AWS score to guide symptom-triggered therapy. This GMAWS was as effective as the CIWA-Ar but more practical and acceptable to staff.

Conflict of interest: None declared.

References