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Pitfalls in the triage and evaluation of patients with suspected acute ethanol intoxication in an emergency department

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Abstract

Acute ethanol intoxication (AEI) is frequent in emergency departments (EDs). These patients are at risk of mistriage, and to leave the ED without being seen. This study's objective was to describe the process and performance of triage and trajectory for patients with suspected AEI. Retrospective, observational study on adults admitted with a suspected AEI within 1 year at the ED of an urban teaching hospital. Data on the triage process, patients' characteristics, and their ED stay were extracted from electronic patient records. Predictors for leaving without being seen were identified using logistic regression analyzes. Of 60,488 ED patients within 1 year, 776 (1.3%) were triaged with suspected AEI. This population was young (mean age 38), primarily male (64%), and professionally inactive (56%). A large proportion were admitted on weekends (45%), at night (46%), and arrived by ambulance (85%). The recommendations of our triage scale were entirely respected in a minority of cases. In 22.7% of triage situations, a triage reason other than "alcohol abuse/intoxication" (such as suicidal ideation, head trauma or other substance abuse) should have been selected. Nearly, half of the patients (49%) left without being seen (LWBS). This risk was especially high amongst men (OR 1.56, 95% CI 1.12–2.19), younger patients (< 26 years of age; OR 1.97, 95% CI 1.16–3.35), night-time admissions (OR 1.97, 95% CI 1.16–3.35), and patients assigned a lower emergency level (OR 2.32, 95% CI 1.58–3.42). Despite a standardized triage protocol, patients admitted with suspected AEI are at risk of poor assessment, and of not receiving optimal care.

Keywords Alcoholic intoxication · Emergency service (Hospital) · Triage · Left without being seen

Introduction

Excessive alcohol consumption is a major public health issue associated with increased morbidity and mortality [1, 2]. Emergency department (ED) admissions for acute ethanol intoxication (AEI) are a growing concern [3]. AEI may lead to traffic or leisure accidents, violence, or altered consciousness associated with high risk of aspiration. Such AEI may conceal or be confused with other somatic or psychiatric conditions, thus delaying or preventing appropriate care [4]. Moreover, AEI patients appear particularly at risk of leaving without being seen (LWBS) [5]. Such patients must, therefore, be thoroughly assessed upon admission.

The first step of assessment consists of triage. Triage aims to briefly assess the patient's risk to determine the place of care and acceptable timeframe until medical evaluation. No study to date has specifically analyzed triage of alcohol-intoxicated patients in an ED. Our hypotheses are that despite a standardized triage protocol, patients with

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suspected AEI are at risk of incomplete or inappropriate evaluation at triage, and that these patients are also at risk of LWBS. Undertriage may lead to delayed evaluation, which might have a negative impact on the patient's outcome.

The primary objective of this study is to evaluate the process and performance of triage performed with a standardized triage protocol for patients with suspected AEI. The secondary objective is to describe this population's trajectory in the ED, with a focus on LWBS patients.

Methods

This is an observational, retrospective study.

Study framework

The Geneva University Hospitals is the only public teaching and referral hospital for a metropolitan region with 500,000 inhabitants. Over 60,000 patients are admitted each year from the ED. All patients are assessed by a nurse at arrival using the Swiss Emergency Triage Scale (SETS) [6–8]. Triage nurses have at least 1-year experience in emergency medicine. They then follow a two-day training session in triage including theory and triage workshops. After this formal training, they are supervised in the triage area during two other days. They are then allowed to perform triage alone, but always work with another more experienced triage nurse for at least one month. Assessment of patients' main complaint, vital sign measurement, and answers to specific questions allows assignment of a triage reason and of an emergency level. This SETS has four emergency levels: (1) life-threatening emergency (immediate medical evaluation); (2) urgent situations requiring rapid care (medical evaluation within 20 min); (3) semi-urgent situations (medical evaluation within 2 h); and (4) non-urgent conditions.

One triage reason according to the SETS is "alcohol abuse/intoxication". This reason allows classification in emergency level 2 or 3. According to SETS triage recommendations, the triage reason "alcohol abuse/intoxication" can be selected only once a complete triage assessment is performed by the triage nurse. This assessment includes the patient's medical history taken through a number of key questions, the measurement of vital signs, and the exclusion of other conditions, such as traumas, risk of suicide, or withdrawal syndrome.

Study population

All adult patients (≥16 years) admitted to our ED for one year for the triage reason "alcohol abuse/intoxication" according to the SETS were included. Patients who were alcohol-intoxicated but admitted for any other reason were not included as another triage reason was selected by the triage nurse.

Data collected

To fulfill the primary objective (to evaluate the process and performance of triage performed with a standardized triage protocol for patients with suspected AEI), the following data were analyzed: (1) triage details (month, day, hour of admission, means of arrival, emergency level, medical history details gathered at triage, vital signs, key questions documentation); and (2) diagnoses at ED discharge. The files were reviewed by the principal investigators to assess the pertinence of the selected triage reason. The reason was deemed inappropriate, if triage data explicitly indicated a different consultation reason (for instance, trauma, withdrawal, or suicidal thoughts). Diagnosis at discharge was used to support the investigators' findings.

For the secondary objective (to describe this population's trajectory in the ED, with a focus on LWBS patients), the following data were analyzed: (1) demographic characteristics (age, sex, and profession); and (2) data regarding care (objective measure of alcohol intoxication, trajectory and length of stay in ED and hospital, percentage of patients LWBS, rate of return visits within 48h).

All data were extracted from electronic medical records and anonymised.

Analyses

The data were analyzed using SPSS for Windows (Chicago, IL, Version 18.0.0). Descriptive statistics (proportions, mean, median, interquartile range) were generated for each of the patients' characteristics.

To identify the predictive risk factors for LWBS patients, LWBS characteristics were compared with those having undergone medical examination, using univariate analyzes and a logistic regression model calculating adjusted odd ratios (OR) with 95% confidence intervals (95% CI).

Results

Patient population

During 1 year, 776 patients (1.3% of the 60,488 admissions) were suspected of AEI during triage and assigned the triage reason "alcohol abuse/intoxication".

The population was young (mean age 38 years, range 16–78), primarily male (64% men), and professionally inactive (56% unemployed, retired, or dependent upon social insurance) or students (16%).

The vast majority of patients arrived via ambulance (85%). Nearly half (45%) of admissions occurred on weekends, primarily at night.

Triage process

Medical history at triage

The SETS recommends asking seven key questions during triage (Table 1). These questions explore event circumstances, location of alcohol consumption, type and quantity of alcohol consumed, timeframe, and concomitant ingestion of further substances. Moreover, the triage nurse must explore the possibility of traumas and suicidal thoughts.

Event circumstances and location constituted the best-documented history details (Table 1). In contrast, the type and quantity of alcohol consumed, and timeframe, were recorded in less than a quarter of files. In 36% of cases, patients were asked whether they had taken other substances. When queried, 36% ($n=100$) of respondents reported concomitant ingestion of another substance. Cannabis was reported in 38% ($n=38$) of those cases. In only 5 patients (< 1%), all key questions were documented.

Documentation of traumas and suicidal thoughts was recorded in only 45% and 7% of files, respectively.

Vital signs at triage

The SETS recommends taking eight vital signs (Glasgow Coma Scale, pupils, heart rate, blood pressure, respiratory rate, oxygen saturation, blood glucose levels, and temperature).

The most frequently recorded vital signs were heart rate, blood pressure, Glasgow Coma Scale, and oxygen saturation (Table 1). Pupils and respiratory rate were documented in less than half of cases. At least six recommended parameters were documented in 81% ($n=630$) and all of them in 30% ($n=234$) of files.

Emergency levels

SETS emergency level 3 (semi-urgent situations requiring medical evaluation within 2 h) was assigned to 74% ($n=577$) of patients, and emergency level 2 (urgent situations requiring medical evaluation within 20 min) to 26% ($n=199$).

Pertinence of triage

The reason selected was deemed correct for 600 patients (77.3%). For 176 (22.7%) admissions, a different triage reason should have been selected based on patients' complaints or clinical conditions. The most frequently overlooked reasons were suicidal thoughts (4.9% of total admissions, $n=38$), head traumas (5.1%, $n=40$), non-ethanol substance abuse/intoxication (2.3%, $n=18$), agitation (2.1%, $n=16$), confusion (1.7%, $n=13$), and alcohol withdrawal (1.4%, $n=11$). In 47 patients (6.1% of all patients), the emergency level selected was underestimated (level 3 chosen, whilst the clinical situation called for level 2).

Objective measure of blood alcohol in ED

Objective measurement for confirmation of suspected alcohol abuse (breathalyzer and/or blood test) was performed in 187 patients (24%). When measured, the blood alcohol varied between 0 and 115 mmol/L, with 14 patients below the legal limit for driving a motor vehicle in Switzerland (≤ 11 mmol/L), and seven showing no alcohol detectable in their blood. These measurements occurred mostly post-triage.

For 95 patients (12.2%), the only factor for selecting the reason "alcohol abuse/intoxication" was the presence of an alcoholic foetor during triage.

Table 1 Medical history details (key questions) and vital signs recommended and documented during triage

Medical history details recommended at triage	Number (%) of documented cases	Vital signs recommended at triage	Number (%) of documented cases
Overall circumstances	773 (99.6)	Glasgow coma scale	659 (85)
Place of occurrence	476 (61)	Pupils	372 (48)
Presence of a witness	330 (42.5)	Heart rate	705 (91)
Type of alcohol consumed	253 (36)	Blood pressure	685 (88)
Amount of alcohol consumed	172 (22)	Respiratory rate	372 (48)
Timeframe	19 (2)	Oxygen saturation	654 (84)
Ingestion of other substances	280 (36)	Blood glucose	608 (78)
Trauma	348 (45)	Body temperature	532 (69)
Suicidal thoughts	58 (7)		

Care trajectories

Nearly half of patients (49%, $n=377$) were LWBS. After adjustment in a multivariate model, the only factors associated with increased risk of LWBS included male gender, young age, night-time admission, and classification in a lower emergency level (Table 2).

The mean length of ED stay (± SD) was 8.0 h (± 7.8). Patients having undergone medical examination stayed significantly longer than those LWBS (11.5 h vs. 4.2h, $p<0.001$). For patients with confirmed AEI, this time was mostly attributed to time to reach sobriety.

After their ED stay, 19% of patients ($n=74$) were hospitalized, 37 of whom were in a somatic, 32 in a psychiatric, and 5 in an intensive care unit. Amongst all study patients, 47% ($n=362$) had returned to the ED at least once within 1 year. In 38 cases (4%), patients returned within 48h after discharge. These visits primarily concerned ethanol or other intoxications ($n=13$), head traumas ($n=10$), and psychiatric disorders ($n=8$).

Diagnoses at discharge

For 29% ($n=109$) of patients having undergone medical examination, the discharge diagnosis did not mention AEI. The primary diagnoses of these patients were somatic in 51% of cases ($n=56$) and psychiatric in the rest ($n=53$).

Discussion

During a 1-year observational period, 776 patients with suspected AEI were identified upon arrival at the ED, representing 1.3% of admitted patients which is similar to previous reports (0.8% to 1.2% of total ED admissions) [9].

The population was primarily male (64%) and young (mean age of 38 years) compared to the overall ED population (mean age of 45 years) [5]. The youngest patients (16–25-year olds) were particularly concerned (31%). These young adults arrived primarily on weekends and at night. Although our study design did not allow us to specifically

Table 2 Characteristics of patients LWBS and of those having undergone medical examination

	Total (776) *n* (%)	LWBS (377) *n* (%)	Not LWBS (399) *n* (%)	Adjusted OR (95% CI)
Gender, *n* (%)				
Female	283 (36)	121 (32)	162 (41)	Reference
Male	493 (64)	256 (68)	237 (59)	1.56 (1.12–2.19)
Profession, *n* (%)				
Employee	153 (20)	71 (19)	82 (21)	Reference
Student	128 (16)	81 (21)	47 (12)	1.36 (0.74–2.5)
Unemployed	254 (33)	129 (34)	125 (31)	1.07 (0.69–1.65)
Retiree	75 (10)	20 (5)	55 (14)	0.59 (0.29–1.16)
Social assistance	104 (13)	36 (10)	68 (17)	0.71 (0.41–1.24)
Age category				
16–25 years	243 (31)	161 (43)	82 (20)	1.97 (1.16–3.35)
26–46 years	286 (37)	128 (34)	158 (40)	1.52 (0.93–2.49)
> 46 years	247 (32)	88 (23)	159 (40)	Reference
Admission day				
Weekdays	428 (55)	183 (49)	245 (61)	Reference
Weekends	348 (45)	194 (52)	154 (39)	1.04 (0.73–1.49)
Admission time point				
Daytime (8–16 h)	115 (15)	36 (9)	79 (20)	Reference
Evening (16–24 h)	305 (39)	127 (34)	178 (44)	1.52 (0.93–2.49)
Night (0–8 h)	356 (46)	214 (57)	142 (36)	1.97 (1.16–3.35)
Means of arrival, *n* (%)				
Own transport	85 (11.5)	32 (9)	53 (14)	Reference
Ambulance	656 (88.5)	322 (91)	334 (86)	1.48 (0.88–2.49)
Emergency level, *n* (%)				
Level 2	199 (26)	74 (20)	125 (31)	Reference
Level 3	577 (74)	303 (80)	274 (69)	2.32 (1.58–3.42)

LWBS patients leaving without being seen, *not LWBS* patients having undergone medical examination, *OR* odds ratio, *CI* confidence interval

pinpoint the type of alcohol consumption, the observed profile suggests "binge drinking," a practice bearing risks of immediate and long-term complications [10]. Immediate complications include altered consciousness with risk of aspiration, injuries and/or inappropriate behavior. Long-term complications include alcohol use disorders, neuropsychological damages, liver diseases and may also impact negatively social and professional relationships. Appropriate management upon admission is particularly important, as this may allow early interventions, positively impacting short- and medium-term complications [11, 12]. Brief interventions can be delivered during ED stay as 20–45-min motivational interviewings.

Care must start with triage that correctly identifies patients at risk. The SETS is designed to better standardize this initial assessment through a series of key questions and vital parameters guiding the triage process. Nonetheless, its proposed criteria are applied piecemeal. The evaluation of intoxicated patients is difficult, some patients being too drunk to answer, other refusing to interact with the triage nurse. Nevertheless, variability in assessment and non-compliance with triage standards bear several potentially negative consequences. Firstly, some high-risk complaints are insufficiently documented, particularly risks of suicide or trauma associated with alcohol abuse. This may lead to overlook significant lesions [13]. Early identification of risk of suicide is likewise necessary for proper care [14]. Secondly, for 22.7% of our study patients, a different triage reason should have been selected based on triage data, primarily linked to traumas or acute psychiatric issues. And last, a high number of under-assessments were observed (6.1% undertriage).

Few other validated triage scales have a systematic approach for suspected AEI. The Manchester Triage System (MTS) proposes a specific algorithm for patients "apparently drunk." [15]. This approach emphasizes identification of neurological disorders, but does not mention the risk associated with psychiatric disorders or traumas, besides of the head. Other triage scales have even fewer or no indications for assessing such patients. For patients with alcoholic foetor or suspected intoxication, the Emergency Severity Index proposes assessment of altered consciousness and signs of trauma or behavioral disorders, but provides no specific post-assessment recommendations [16]. The Canadian Triage and Acuity Scale makes no recommendation regarding such triage [17]. The Australasian Triage Scale (ATS) lays out general recommendations suggesting consideration of a greater emergency level for such patients [18]. Finally, the French Emergency Nurses Classification in Hospital scale (FRENCH) proposes the triage reason "intoxication—drunkenness (suspicion)", placing patients into the two lowest emergency categories (four or five) [19]. That said, none of these approaches have had their performance assessed.

Post-triage patient care was also problematic, with 49% of LWBS patients, That is about 10 times the rate in the general population of patients admitted in most EDs [5]. The typical profile of a LWBS patient is a young man arriving at night and triaged as less urgent. These patients leave the ED after a mean duration of more than 4 h spent in the waiting area—ample time for medical examination. Higher emergency triage level (emergency level 2) only partially mitigates this risk, with 37% of emergency level 2 LWBS. These observations suggest trivialization or even stigmatization of AEI symptoms. Indeed, it has been shown that stigmatization of alcohol-intoxicated patients instills generally negative attitudes in medical staff, thereby rendering their behavior permissive and lax, and exposing patients to risk of inappropriate care [20]. We hereby hypothesize that the higher rate of LWBS patients may be accounted for by stigmatization and trivialization of their symptoms upon ED admission, and their medical examination, thus, does not seem to be prioritized. This hypothesis is further supported by the fact that following medical examination, the initial AEI diagnosis was changed for 27% of patients, thus underlining the importance of in-depth examination to this end. Patients for whom the AEI diagnosis was changed were affected primarily by traumas, depression, other intoxications, or alcohol withdrawal, and could have benefited from specific care. The high observed rate of patients LWBS might also be explained by the absence of downfall for the physicians if an intoxicated patient leaves our ED without being evaluated by a physician. In addition, due to long waiting times related to ED crowding, some patients certainly sobered up and felt like they no longer needed care.

Finally, following their ED stay, 4% of patients returned within 48h and nearly half within 1 year. These results confirm the risk of frequent ED visits by those affected by alcohol problems [21]. Such risk could be mitigated through appropriate care in adherence to structured recommendations [22]. Further studies should address specifically the characteristics of these returning patients and evaluate whether these characteristics are different from patients LWBS to patients who had full examination during their initial ED visit.

This study has limitations. Firstly, its retrospective design limits analysis to data available in our electronic files. Prospective collection could enable identification of other decisive factors regarding the choice of triage reason and better description of patients' consumption behavior and profile, allowing targeted interventions addressing specific issues. Secondly, the high number of LWBS patients hinders analysis of their characteristics, with no information available besides data gathered at triage. Thirdly, this study only included the analysis of a single year in a single center. This limits generalization of results to other environments and care contexts. Finally, the study did not assess attitudes

of health care professionals toward this population at risk. Improved assessment of medical staff convictions and beliefs could contribute to strategies for enhancing the care–giving process.

In conclusion, despite standardized triage recommendations, patients admitted with suspected AEI are at risk of poor assessment upon admission to triage. Comprehensive clinical documentation is rare and the frequent neglect of other conditions putting the patient at risk may cause undertriage. Moreover, patients admitted for suspected AEI are given inappropriate care, with nearly 50% LWBS. The triage process and the overall care process for such patients require improvement. Objective ethanol intoxication could be measured systematically during triage to confirm the clinical suspicion, thus better orienting such patients. Following this study, the triage process and the evaluation of patients with suspected AEI was re-evaluated. This short critical pathway includes systematic breath-or blood-ethanol measurement and psychiatric evaluation for all admitted patients. It also reinforces the importance to respect the SETS-imposed delays for medical evaluation and to measure all recommended vital signs at triage for every patient who cannot be immediately admitted in an ED evaluation room. A physician at triage is now responsible for a rapid assessment of these patients in the waiting room. The impact of this pathway will be prospectively evaluated.

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Data availability The dataset generated and analysed during the current study is available from the corresponding author on reasonable request.

Compliance with ethical standards

Conflict of interest There are no potential conflicts of interest.

Statement of human and animal rights This protocol has been approved by Geneva Central Ethics Commission (CER 14–083R) and was registered at Clinicaltrials.gov (NCT02449772). All procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent For this type of study, formal consent is not required.

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