



Accesses for alcohol intoxication to the emergency department and the risk of re-hospitalization: An observational retrospective study



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HIGHLIGHTS

- Patients with multiple admissions to the EDs for AAI need an accurate evaluation for AUD.
- Several risk factors stratify the risk of re-hospitalization in patients admitted to EDs for AAI.
- Clinical informations available in ED allows the identification of those patients needing a second level evaluation.

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ABSTRACT

Background: Alcohol use disorders (AUD) are a frequent cause of admission to emergency departments (EDs) for acute alcohol intoxication (AAI). Patients with AUD present a higher risk of readmission to EDs for AAI than the general population, however, the distinction between sporadic AAI and AAI in the context of AUD in the ED setting is difficult.

Aims: To analyze the epidemiological characteristics of patients admitted to EDs because of AAI and to identify factors associated with repeated admissions in order to develop a risk stratification system for patients with AUD based on objective data that can be easily applied in an ED setting.

Methods: An observational retrospective study was performed. All patients with diagnosis of AAI at admission in 2014 were enrolled.

Results: Five hundred and sixty-five patients were enrolled, of which 92 (16%) were admitted more than once to the ED. At multivariate analysis, factors associated with readmission were past episodes of alcohol abuse, social discomfort, previous traumas and psychiatric disorders. Basing on this parameter, a risk-score for re-hospitalization was developed. This score has a high predictive power for the risk of readmission to the ED (AROC 0.837, 95%CI 0.808–0.866), moreover, the cumulative probability of readmission within one year, increased in parallel with score value, being highest in patients presenting 3 or more risk factors.

Conclusion: The present study demonstrates that several risk factors stratify the risk of re-hospitalization in patients admitted to EDs for AAI, allowing the identification of those presenting more severe conditions and who would likely benefit from multidisciplinary intervention.

1. Background

Alcohol consumption is responsible for approximately 5.9% of all

deaths and accounts for 5.1% of the global burden of disease (World Health Organization, 2014); indeed, in the age range 15–64 years, 1 out of 7 deaths in men and 1 out of 13 deaths in women can be related to

Abbreviations: AAI, acute alcohol intoxication; AUD, alcohol use disorders; BAC, blood alcohol concentration; ED, emergency department

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excessive alcohol consumption, which includes binge drinking, heavy drinking, underage drinking and pregnant drinking (Sacks, Gonzales, Bouchery, Tomedi, & Brewer, 2015). In addition, according to the new criteria of the diagnostic and statistical manual of mental disorders 5th edition (American Psychiatric Association, 2013), the life-span prevalence of alcohol use disorders (AUD) is 20–30% in men and 10–15% in women worldwide (Grant et al., 2015). AUD are characterized by several clinical features related to alcohol consumption, craving, loss of control, tolerance, and physical dependence (Connor, Haber, & Hall, 2016).

Despite AUD being a frequent cause of medical consultancy and access to emergency departments (EDs) due to acute alcohol intoxication (AAI) (Vonghia et al., 2008), alcohol withdrawal syndrome and traumas, it remain largely undiagnosed (Connor et al., 2016; Goldbeck, Asif, Sanderson, & Farquharson, 2012). As a matter of fact, < 15% of patients affected by AUD are identified and treated (Cohen, Feinn, Arias, & Kranzler, 2007). This has relevant consequences on both health and social grounds, as patients with AUD often suffer from chronic illnesses, mental health problems, drug abuse disorders and homelessness (Samokhvalov, Popova, Room, Ramonas, & Rehm, 2010). Moreover, because of their complex physical, mental and social needs, many of them seek assistance at EDs several times per year.

The risk of patients with AUD being readmitted to EDs is higher than in the general population (Goldbeck et al., 2012). Moreover, the distinction between sporadic AAI, which can represent a self-limited episode, and AAI in the context of underlying AUD in the ED setting can be difficult. Unfortunately, poor diagnosis would deny access to adequate multidisciplinary treatment for many patients (Goldbeck et al., 2012).

Patients with AUD can be identified through the administration of specific questionnaires with high sensitivity and specificity, such as the 10-item alcohol use disorders identification test (AUDIT). This could also allow brief interventions to be performed during hospitalization, which are effective in reducing alcohol consumption (Cheripitel, 2013; Vonghia et al., 2008). Despite this, the time required for its administration makes difficult its routinely application in the ED settings (Richoux et al., 2011). The cut-down annoyed guilty eye-opener (CAGE), a 4-item questionnaire, although less sensitive and specific, is a briefest screening test than AUDIT (Russo, Purohit, Foudin, & Salin, 2004). Like the AUDIT, however, it is not devoid of limitations as it is non effective in detecting heavy drinking or distinguish between active and past alcohol abuse or dependence (Richoux et al., 2011). Overall, in the real-life clinical practice of EDs, where the timeframe between triage and clinical intervention is very short and/or patient compliance is often severely flawed by AAI the routine administration of screening questionnaires is difficult or even impossible (Drummond et al., 2014).

In this view, the identification of simple and more rapid tools to identify patients at risk of harmful alcohol use, based on clinical data often available within the hospital database, will allow the use of the actual screening protocols only in targeted screening interventions, leading to an optimization of time and human resources in the ED setting and to an increased identification rate of patients requiring specific evaluations.

Therefore, the aim of the present study was to analyze the epidemiological characteristics of patients admitted to EDs because of AAI and to identify the factors associated with repeated admissions in order to develop a risk stratification system, based on objective data, to identify those patients needing a second level evaluation in the post-discharge period because of a possible underlying AUD.

2. Patients and methods

2.1. Study design and definitions

We performed an observational single-center retrospective study enrolling all patients admitted to the ED of the S. Orsola-Malpighi

University Hospital (a tertiary referral Center in Northern Italy that has an annual census of ~85,000 patients and a 46-unit observation ward that includes seven intensive care unit (ICU) beds) because of AAI from 1st January 2014 to 31th December 2014.

All patients over the age of 18 years admitted to the ED because of AAI were included in the study. Their medical records were retrospectively reviewed and the diagnosis of AAI was made based on the attending physician's diagnosis at discharge. Namely, F10.0 (acute alcohol intoxication) was used according to the World Health Organization (WHO) International Classification of Diseases. When alcohol use was suspected but not confirmed by the patient or the amount of alcohol consumption was unclear, a peripheral blood samples was collected from the brachial vein for the determination of blood alcohol concentration (BAC). BAC was routinely measured at the Central Laboratory of the S. Orsola-Malpighi University Hospital by means of standard commercial kits. The frequency of visits for AAI was recorded by months, day of the week, time of day, working day and holidays.

To identify the risk factors for multiple admissions, all additional admissions to the ED for AAI within one year from the index admission were also recorded.

This study was approved by the Local Ethical Committee of the S. Orsola-Malpighi University Hospital. The retrospective data analysis was performed following the dictates of the General Authorization to Process Personal Data for Scientific Research Purpose of the Italian Data Protection Authority (Authorization no. 9/2013).

2.2. Data collection

Data were extracted from medical charts of patients using a standardized data collection form. If a patient was admitted several times with the same discharge diagnosis during the study period, each visit was considered as a separate case. For each visit, the following data were recorded: demographic data, including age, sex and nationality; referral source; time of admission, including month, day, day of the week, time of arrival and time of discharge; triage category according to the Emergency Severity Index (ESI) (Wuerz, Milne, Eitel, Travers, & Gilboy, 2000); any history of previous episodes of alcohol abuse, trauma and/or psychiatric disorder.

2.3. Statistical analysis

Continuous data were expressed as mean and standard deviation, while grouping variables were expressed as frequencies. Univariate analyses were performed by means of the Student *t*-test for continuous data while the Chi-Square test was used to investigate differences in grouping variables. Following univariate analysis, a multivariate logistic regression with backward selection method was performed in order to find anthropometric, demographic or clinical data independently associated with readmission to the ED. The Receiver Operating Characteristics (ROC) curve analysis was used to estimate the sensibility and specificity against the readmission to the ED. Finally, the cumulative risk of readmission in patients presenting none, one, two, three or more risk factors at the first admission was evaluated through the Kaplan Meier method followed by the log rank test to evaluate the differences between groups. All tests were two sided and values of $p < 0.05$ were considered to be statistically significant. The statistical analysis was performed by the Statistical Package for Social Sciences (SPSS) software version 23 (IBM corporation, Armonk, NY, USA).

3. Results

3.1. Study population

During the study period, 85,500 visits were made to the ED of our institution. Seven-hundred seventy-two (0.9%) visits involving 565 patients, were primarily related to AAI and were therefore included in

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