

REUE | Original Article

## Experience using the Balearic Islands Risk of Alcohol Poisoning Scale (EBRIA)

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**BACKGROUND.** Alcohol abuse is common in our community. It can lead to acute alcohol poisoning (AAP) and generate serious problems of emergency department overcrowding in certain seasons, mainly in areas where tourism and leisure opportunities are concentrated.

**OBJECTIVE.** To assess the ability of a risk scale to discriminate between mild and serious cases of AAP attended in a hospital emergency department.

**METHODS.** Prospective analysis of the performance of the Balearic Islands Risk for Alcohol Poisoning Scale (EBRIA, the acronym for the Spanish name) in patients with AAP between June 1 and August 31, 2015. Clinical variables of patients with EBRIA scores of 0 and more than 0 were compared to determine whether the area under the receiver operating characteristic curve (AUC) could identify mild cases.

**RESULTS.** A total of 490 patients were included. Their mean (SD) age was 28.6 (14.31) years, 8.77% were underage drinkers, 211 (43.1%) were British, and 188 (38.3%) were Spanish. Two hundred fifty-one (51.3%) had EBRIA scores over 0 (2.17% of all patients attended for any reason). On average, patients with EBRIA scores over 0 had longer stays than those with scores of 0 (6 hours 36 minutes vs 2 hours 18 minutes, respectively), and they were more often hospitalized (15 patients vs none) or had computed tomography brain scans ordered (32.6% vs 0.4%) ( $P < .0001$ ). The correlation between EBRIA scores and the studied variables was high and the AUC reflecting the score's ability to discriminate mild cases was 0.876 (95% CI, 0.83-0.92).

**CONCLUSIONS.** The EBRIA scale can help to distinguish between AAP cases of lesser (EBRIA, 0) and greater (EBRIA score over 0) complexity, helping to predict resource requirements.

**Keywords:** Alcohol poisoning. Severity scale. Prognosis. EBRIA (Balearic Islands Risk for Alcohol Poisoning scale).

## Experiencia en el empleo de escala de riesgo de complicaciones ante una intoxicación alcohólica aguda (EBRIA)

**INTRODUCTION.** El uso de alcohol es habitual en nuestra sociedad, provocando en casos de abuso intoxicaciones agudas, que genera problemas asistenciales, debido a la saturación de los recursos sanitarios, principalmente en zonas turísticas y de ocio.

**OBJETIVO.** Comprobar la capacidad de discriminar los casos leves de intoxicación aguda por alcohol (IAA) de los graves, aplicando una escala de gravedad pronóstica, en los intoxicados atendidos en un servicio de urgencias hospitalario (SUH).

**MATERIAL Y MÉTODOS.** Análisis prospectivo de la escala EBRIA (Escala Balear del Riesgo en la Intoxicación Alcohólica) aplicada a pacientes con IAA, comparando las variables clínicas de pacientes con valores de EBRIA = 0 y > 0 y estimación de su capacidad para detección de los casos más leves mediante curvas ROC.

**RESULTADOS.** Se incluyeron 490 pacientes. La media de edad fue de 28,6 ( $\pm 14,31$ ) años, 8,77% menores de edad, 211 británicos (43,1%) y 188 españoles (38,3%). Doscientos cincuenta y uno (51,3%) tuvieron un EBRIA > 0 (2,17% del total de asistencias en el SUH). En este grupo, la estancia media, porcentaje de ingresos, la solicitud de exploraciones complementarias fue mayor que las de los que tuvieron EBRIA = 0 (6:36 y 2:18 horas, 15 y 0, 40,6 y 8,3%, 32,6 y 0,4%, respectivamente) ( $p < 0,0001$ ). La correlación entre las puntuaciones en EBRIA y los parámetros estudiados fue alta y la capacidad discriminante de EBRIA fue de 0,876 (IC 95%: 0,83-0,92).

**CONCLUSIONES.** La escala EBRIA puede discriminar con seguridad a las IAA con mayor complejidad y gravedad (EBRIA > 0) de las de menor (EBRIA = 0), y su puntuación numérica final ayuda a establecer un pronóstico sobre la de necesidad del uso recursos asistenciales en los casos más complejos.

**Palabras clave:** Intoxicación alcohólica. Escala de gravedad. Pronóstico. EBRIA.

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## Introduction

Alcohol consumption is widely prevalent and accepted in our society, and its use is common in any social, family, or even cultural event. This accessibility entails the risk of abusive consumption and, therefore, the risk of developing acute and chronic health problems among those who engage in it, with a clear upward trend in all patterns of consumption and abuse in recent years.<sup>1</sup>

This increase in alcohol consumption is concerning, among other reasons, because of its association with earlier onset of consumption—and abuse—despite regulations or laws aimed at preventing it, and the consolidation of some high-risk drinking patterns, such as binge drinking.<sup>1-3</sup>

In all recent series on poisonings treated in emergency departments (EDs), acute alcohol intoxication (AAI) is the most prevalent,<sup>4</sup> regardless of sex or origin.<sup>5,6</sup> In addition to abusive use, alcohol is the most common substance involved in cases of intoxication by more than one xenobiotic, which account for 60% of all drug abuse poisonings.<sup>7</sup>

The tourism sector, deeply rooted and traditional in our country, has not been immune to this “social demand,” offering recreational activities (booze excursions, party boats, new forms of consumption such as “oxy-shots,” etc.) concentrated in specific tourist areas where alcohol consumption takes center stage and serves as one of the main attractions for visitors—most of whom come from northern European countries. Thus, so-called “booze tourism” has found in certain highly localized areas of our geography its particular mecca.

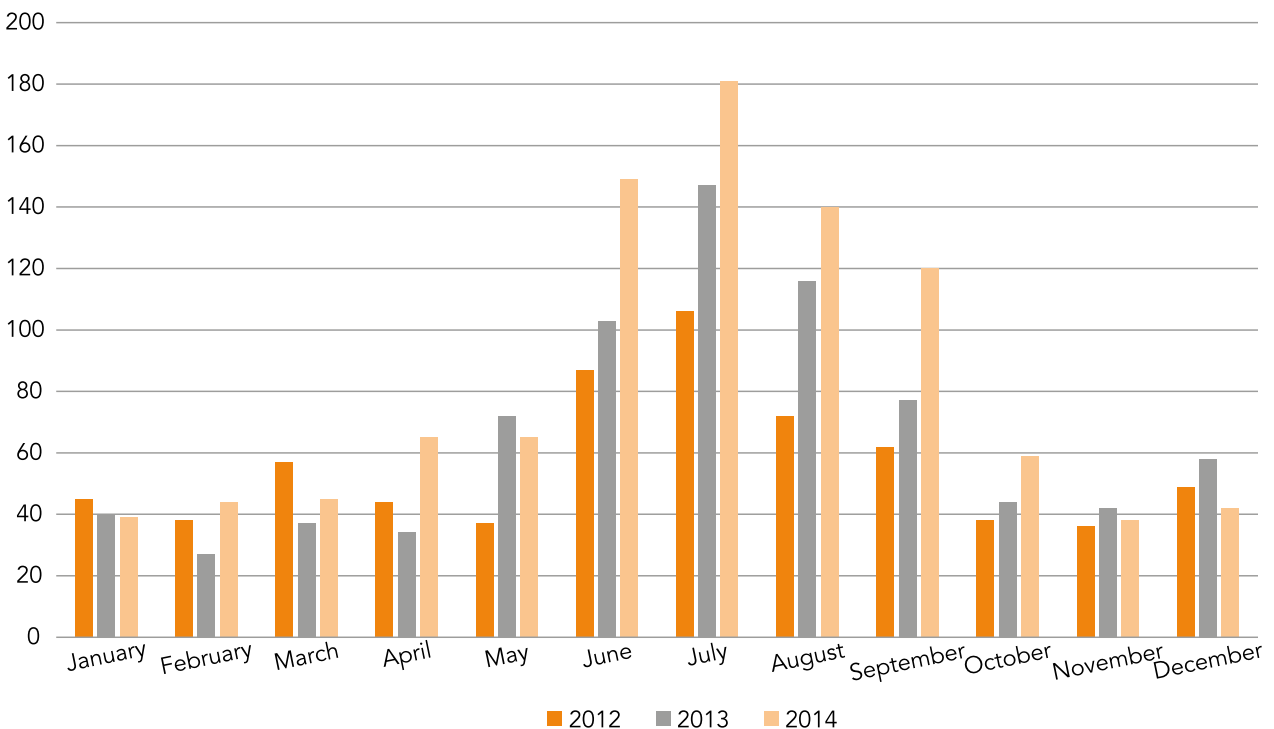
Furthermore, there is periodic abusive consumption

linked to local or patron saint festivals. However, in some tourist areas, such consumption is not limited to specific festivities but extends much longer—throughout the entire summer season, as occurs in our hospital. During these periods, in a repeated and predictable pattern, among other problems, the daily influx of numerous patients with AAI generates clear competition for the limited health care resources available, alongside other patients visiting the emergency department for different health issues (Figure 1).

Another additional problem in cases of AAI among foreign patients is the logistical difficulty at discharge, since they often stay in apartments or hotels far from the hospital. The language barrier, the absence of companions or relatives to assist at discharge, the lack of money or clothing, or simply total ignorance of the hotel where they are staying are among the most frequent challenges encountered.

Our tertiary-level hospital, a referral center of a Spanish Autonomous Community, is located in a tourist area that receives more than 13 million visitors per year (data from 2019), most of them concentrated during the summer months.<sup>8</sup> In 2022, the hospital handled more than 160,000 emergency visits, of which 1.3% were acute intoxications, and alcohol was involved (as the only toxic agent or in combination with others) in 63% of all poisoning cases.

The objective of the study was to apply a risk scale in cases of AAI to identify mild AAI cases and tailor the health care response to their needs, thereby optimizing available resources.



**Figure 1.** Evolution of the number of acute alcohol intoxication cases treated in the adult emergency department (> 15 years) of Hospital Universitario Son Espases (Balearic Islands, Spain) from 2012 through 2014. Source: Clinical Toxicology Unit, Poisoning Registry Data.

## Material and methods

In the spring of 2015, a severity scale (EBRIA: Balearic Risk Scale for Alcohol Intoxication) was designed as a checklist defining 13 items to be assessed when a patient is suspected of having AAI (Table 1). The scale can be applied in any health care setting, as it does not require any complementary hospital-based tests. For item #13 ("other considerations"), physicians completing the form were asked to specify in writing any criteria not previously included.

The scale, with 2 possible results determining subsequent action (EBRIA = 0 and EBRIA > 0), was distributed to ED professionals. EBRIA = 0 was accompanied by a clinical protocol defining: the specific area within the department for patient care, monitoring procedures for clinical parameters during stay (vital signs and level of consciousness), and the indication for basic supportive measures if needed (Table 2). The decision to perform additional tests in these cases was left to the discretion of the attending physician. All complications were to be recorded, as well as any change in patient location.

For EBRIA > 0, action was to be taken according to the symptoms or associated circumstances presented by the intoxicated patient.

Between June 1<sup>st</sup> and August 31<sup>st</sup>, 2015, the EBRIA scale was prospectively applied to patients treated for suspected AAI in the adult ED (age > 15 years), classifying them into 2 groups: EBRIA = 0 and EBRIA > 0. The following variables were analyzed: age, sex, origin (2 groups: British/Irish and Spanish), mean length of ED stay, outcome (discharge, admission, voluntary discharge/escape, death), and readmission within 72 hours.

Measures of central tendency and dispersion were calculated for all variables. Percentages were compared using the chi-square test, and means were compared using the Wilcoxon test, setting the level of statistical significance at 0.05 for both. The discriminative capacity of EBRIA to pre-

dict whether an AAI patient might develop complications requiring admission, a mean stay longer than the overall mean, or the need for additional diagnostic tests was estimated using the area under the curve (AUC) of a ROC curve, along with its 95% confidence interval (95% CI).

Finally, the numerical result of the EBRIA and its relationship with the same severity indicators (hospital admission, need for complementary diagnostic studies, or a longer-than-average stay) were analyzed.

Patients with AAI treated in the pediatric area (up to 14 years of age) and those whose hospital visit stemmed from administrative or legal reasons (e.g., traffic control) were excluded, even if their blood ethanol levels were high.

The study project was approved by the Research Committee of HUSE (file No. CI-56-15, dated May 15, 2015).

## Results

A total of 490 episodes of AAI were included, representing 69% of all poisonings treated during the same period and 2.17% of adult ED visits. The mean was 5.3 AAI cases per day, with a maximum of 14 cases on the night of July 27<sup>th</sup>. In July, a total of 200 cases were treated, 174 in June, and 116 in August, representing 2.2%, 2.15%, and 1.3% respectively, of all adult ED visits during those months.

Between 00:00 and 07:00 hours, 321 patients (65.5%) arrived at the ED; 389 (79.3%) arrived by ambulance, 11 (2.24%) by mobile ICU, and 26 were escorted by law enforcement due to disturbances or incidents.

The mean age was 28.6 years (SD, 14.31, range 15–89 years), and 43 (8.77%) were minors (aged 15–17 years). Males accounted for 69.1% of the total. The most frequent nationalities were British and Irish (211, 43.1%), followed by Spanish (188, 38.3%). The 211 British and Irish patients represented 39.7% of all emergency visits from this demographic during the study period.

A total of 239 patients (48.77%) had EBRIA = 0 and 251 (51.23%) had EBRIA > 0. Table 3 illustrates the distribution of analyzed variables according to EBRIA results as a discriminator. In the apparently milder cases, the population was much more homogeneous overall (generally younger, British or Irish, transported by ambulance to the ED, with better outcomes and shorter mean stays).

**Table 1.** Balearic Risk Scale for Alcohol Intoxication (EBRIA): checklist of signs and symptoms to assess in cases of acute alcohol intoxication

	No (0)	Yes (1)
1. Associated head trauma		
2. Associated trauma or open wound		
3. Agitation, aggressiveness, or violence		
4. Active seizure or seizure prior to arrival at the ED		
5. Suspected bronchial aspiration		
6. Fever (T > 37.5°C)		
7. Administration of sedative medication or use of physical restraints		
8. Presence of neurological focal signs (excluding dysarthria, nystagmus, ataxia, or coma)		
9. Suspected co-ingestion of other toxic substances in the same episode		
10. Verbalization of suicidal intent or ideation		
11. Respiratory rate < 10/min or oxygen saturation (SatO <sub>2</sub> ) < 90%		
12. Associated somatic pathology (chest pain, abdominal pain, dyspnea, etc.)		
13. Other relevant consideration (specify)		
(Sum of the above) TOTAL EBRIA		

T: temperature; SatO<sub>2</sub>: oxygen saturation.; ED: emergency department.

**Table 2.** Planned treatment protocol, according to the internal guidelines, for patients presenting to the emergency department with AAI and EBRIA = 0

1. Non-invasive monitoring of respiratory function (respiratory rate and/or oxygen saturation [SatO <sub>2</sub> ]) and vital signs (T, BP, HR, and bedside glucose [BM test]) every 3 hours
2. Recovery position (lateral safety position)
3. Observation in a safe and quiet area (stretchers with side rails to prevent falls)
4. Administration of metoclopramide (one intramuscular ampoule) in case of vomiting
5. Initiate oral intake tolerance before discharge from the ED
6. Record any complications during observation and any incidents occurring in a patient with EBRIA = 0

ED: emergency department; AAI: acute alcohol intoxication; SatO<sub>2</sub>: oxygen saturation; T: temperature; BP: blood pressure; HR: heart rate; BM test: capillary blood glucose; IM: intramuscular.

**Table 3.** Comparison of the 2 series of acute alcohol intoxication, cases according to EBRIA result

Analyzed variable	EBRIA = 0	EBRIA > 0	P
Number of intoxicated patients (%)	239 (48.77)	251 (51.23)	–
Male (%)	148 (61.9)	191 (76.1)	0.0005 <sup>2</sup>
Mean age (years)	23.4	33.5	0.0001 <sup>1</sup>
Spanish nationality (%)	70 (29.2)	118 (47)	0.0001 <sup>2</sup>
British/Irish nationality (%)	120 (50.2)	91 (36.2)	0.001 <sup>2</sup>
Arrival by NMT (%)	191 (82.6)	182 (72.5)	0.006 <sup>2</sup>
Arrival by mobile ICU	1	10	–
Arrival at night (00:00–07:00) (%)	190 (79.5)	129(51.4)	0.0001 <sup>2</sup>
Blood ethanol test performed (%)	20 (8.3)	102(40.6)	0.0001 <sup>2</sup>
Mean blood ethanol level (g/L)	1.99	1.78	–
Cranial CT performed (%)	1 (0.4)	82 (32.6)	0.0001 <sup>2</sup>
Mean length of stay (hours)	4:18	6:36	0.0001 <sup>1</sup>
Hospital admission (%)	0	15	0.0001 <sup>2</sup>
Readmission within 72 hours	1	7	0.392

<sup>1</sup>Wilcoxon test.

<sup>2</sup>Chi-square test.

NMT: non-medical (personal) transportation; ICU: mobile intensive care unit; CT: computed tomography.

Among patients with EBRIA = 0, 8.3% had a blood ethanol test, and one underwent a cranial computed tomography (CT) scan to rule out neurological injury. Two patients with EBRIA = 0 (0.84%) experienced mild complications during the observation period after the initial evaluation, requiring an intervention not foreseen in the protocol (Table 2), but 0 required hospital admission. Only 1 EBRIA = 0 patient was readmitted within 72 hours of discharge—a Spanish patient with a history of chronic alcoholism who returned for another episode of acute intoxication.

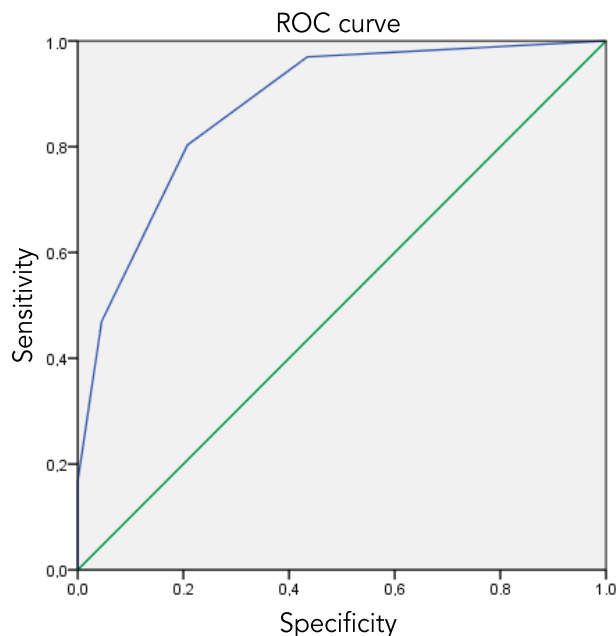
The discriminative ability of EBRIA for situations potentially involving severity, estimated by the area under the curve (AUC), was 0.876 (95% CI, 0.83–0.92) (Figure 2).

The relationship between the final numerical EBRIA result and the different parameters indicative of severity was linear and progressive in all four analyzed aspects: an increase in mean length of stay, hospital admission rate from the ED, and the need for ethanol testing and CT scanning (Figures 3–6).

## Discussion

AAI can cause both acute and chronic health problems, with the former being the reason for most ED visits—hospital or prehospital—almost always due to neurological, psychiatric, or traumatic symptoms. Except for intoxicated patients presenting with traumatic signs (traffic accidents, assaults, falls, and precipitations), most patients have a favorable short-term outcome and practically require no therapeutic interventions, or at most, only very basic measures.<sup>8,9</sup>

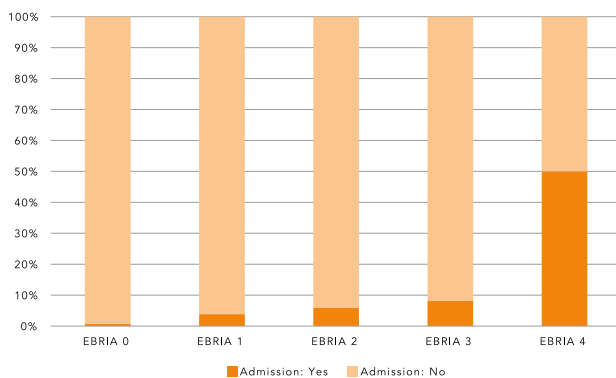
Under these conditions, it seems reasonable to assume that during predictable events, seasons, or situations involving excessive alcohol consumption, often alongside other drugs,<sup>10</sup> public health strategies should be developed to plan the safe management of all patients, optimize available health care resources, and ensure fairness toward patients treated for other illnesses. For the same



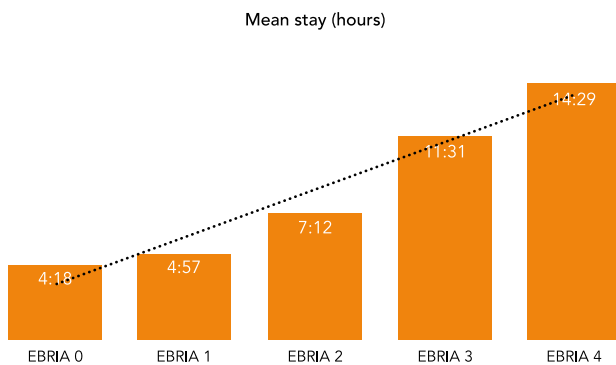
Diagonal segments are generated by ties  
**Figure 2.** ROC curve showing the discriminative ability of the 13-item EBRIA scale for detecting severity in acute alcohol intoxication, with an AUC of 0.876 (95% CI, 0.83–0.92).

reason, it seems logical, somehow, that initiatives have emerged to differentiate mild cases from severe ones, training prehospital professionals or even employees of entertainment venues where these intoxications occur to recognize and manage the more serious cases.<sup>11</sup>

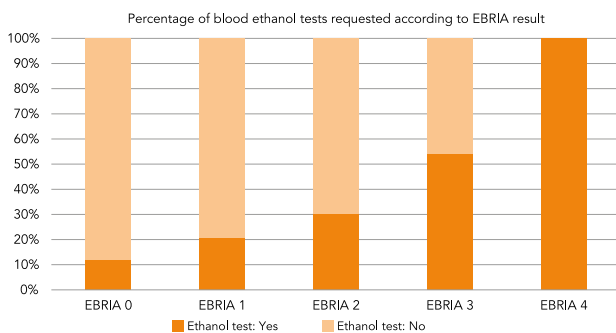
With this goal, the EBRIA scale was designed—always under the premise of prioritizing patient safety, both for severe cases (EBRIA > 0), to ensure prompt referral, and for milder cases (EBRIA = 0) eligible for basic supportive measures. Given this safety requirement, several items were included in the scale, which some clinicians considered excessive. In the future, it might be possible to remove 3 of the 13 evaluated items (fever, suspected bronchial aspiration, and neurological focality), reducing the total to 10 without diminishing its discriminative power. This potential reduction should be confirmed in future studies.



**Figure 3.** Percentage of hospital admissions after acute alcohol intoxication grouped by final numerical EBRIA score.



**Figure 4.** Mean length of stay (in hours) by groups of patients treated for acute alcohol intoxication according to final EBRIA score.

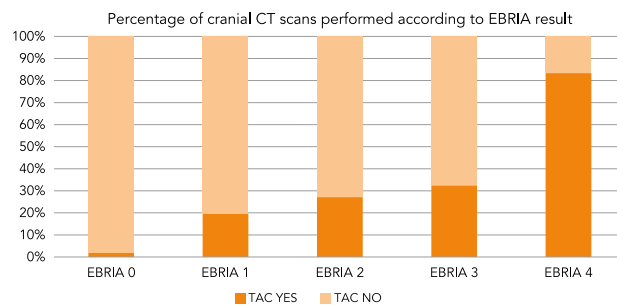


**Figure 5.** Percentage of quantitative blood ethanol determinations performed in the emergency department after treatment of patients with acute alcohol intoxication, according to final EBRIA score.

The results highlight the linear relationship observed between the final numerical score and poorer patient outcomes—a factor not initially defined as a study objective but which, based on the findings, gives the EBRIA score additional prognostic value for predicting the potential severity of each episode.

Moreover, no differences were found in mean blood ethanol levels between patients with EBRIA = 0 and EBRIA > 0. Contrary to expectations, the mean level was higher in patients with better prognosis, confirming the lack of a good correlation between blood ethanol concentration and the clinical status of AAI patients,<sup>8,13,14</sup> due to other factors (genetic, metabolic—degree of tolerance or habituation—, rate of ethanol consumption, etc.).<sup>14,16</sup> This supports the view that diagnosing AAI is primarily clinical, with blood ethanol quantification reserved for cases involving judicial or administrative implications, minors, suspected chemical submission, or uncertainty regarding the cause of impaired consciousness. In other situations, a clinical diagnosis is sufficient, given the strong correlation between clinical presentation and confirmed blood ethanol presence.<sup>12</sup>

No mention was made in the results of antidote use



**Figure 6.** Percentage of emergency cranial computed tomography scans performed during the management of acute alcohol intoxication, according to final EBRIA score. CT: computed tomography.

because none exist, despite some studies recommending routine thiamine use in comatose AAI patients. Of note, AAI has no antidote and that thiamine (administered before glucose) should be reserved exclusively for chronic alcoholics to prevent Wernicke's syndrome.<sup>17</sup>

Finally, it must be emphasized that the study does not propose withholding interventions or monitoring for EBRIA = 0 patients during the observation period—on the contrary, these should be maximized, while avoiding unnecessary actions. We advocate strict, well-defined, and clearly protocolized clinical monitoring (in our case, every 2 hours) with data recording. Given the mean stay (4.18 hours) of EBRIA = 0 patients, this would imply an average of 2 assessments per patient—upon arrival and at 2 hours. The mean stay was often prolonged due to unresolved logistical issues (contacting travel companions, obtaining money or clothing, identifying accommodation) or until patients regained an acceptable level of consciousness to ensure a safe return to their place of residence on the island.<sup>18</sup> During this period of monitored observation, as occurred in two cases during the study, changes or worsening may appear, requiring transfer to a higher level of care (Figure 1).

The study's single-center nature may introduce bias, as results could reflect local idiosyncratic factors. The study sample was notably younger than that typically treated throughout the year, which may have influenced certain clinical outcomes. Of note, the inability to follow up almost half of the cases after discharge, as they were non-residents whose stays in the country rarely exceeded one week.

Despite these limitations—which could be addressed in larger, multicenter studies excluding non-resident patients—we believe that the results obtained support the discriminative capacity of the EBRIA scale. This tool safely distinguishes patients with a higher potential for severity (EBRIA > 0) from those with lower risk (EBRIA = 0). Moreover, in the former group, the final numerical score of each episode appears to have prognostic and predictive value regarding the use of greater health care resources in AAI episodes.

## ARTICLE INFORMATION

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## REFERENCES

1. Plan Nacional Sobre de Drogas, Informe año 2014. (Accessed 10 January 2017). Available at: [http://www.pnsd.msssi.gob.es/profesionales/sistemasInformacion/informesEstadisticas/pdf/2016\\_INFORME\\_OEDT.pdf](http://www.pnsd.msssi.gob.es/profesionales/sistemasInformacion/informesEstadisticas/pdf/2016_INFORME_OEDT.pdf)
2. Organización Mundial de la Salud (OMS). Alcohol: nota descriptiva de enero de 2015. (Accessed 10 December 2016). Available at: <http://www.who.int/mediacentre/factsheets/fs349/es>
3. European Monitoring Centre for Drugs and Drug Adiction (EMCDDA). Europol 2015, Annual Report on the implementation of Council Decision 2005/387/JHA. (Accessed 10 December 2016). Available at: <http://www.emcdda.europa.eu/system/files/publications/2880/TDAS16001ENN.pdf>
4. Burillo Putze G. Tesis doctoral 2010: Urgencias hospitalarias por intoxicaciones agudas: estudio multicéntrico nacional. Universidad de La Laguna I.S.B.N : 978-84-15287-20-9.
5. Clemente C, Aguirre A, Echarte JL, Puente I, Iglesias ML, Supervía A. Diferencias entre hombres y mujeres en las características de las intoxicaciones. *Emergencias.* 2010;22:435-40.
6. Clemente C, Echarte JL, Aguirre A, Puente I, Iglesias ML, Supervía A. Diferencias en las intoxicaciones de los españoles y los extranjeros atendidas en urgencias. *Emergencias.* 2011;23:271-5.
7. Heier EC, Eyer F, Rabe C, Geith S, Dargan PI, Wood DM, et al, Euro-DEN Research Group. Clinical effect of ethanol co-use in patients with acute drug toxicity involving the use of central nervous system depressant recreational drugs. *Eur J Emerg Med.* 2022;29:291-300.
7. Instituto Nacional de Estadística (INE). Estadística de Movimientos Turísticos en Fronteras (FRONTUR) del año 2019. (Accessed 20 January 2023). Available at: <https://www.ine.es/daco/daco42/frontur/frontur1122.pdf>
8. Boba A. Management of acute alcoholic intoxication. *Am J Emerg Med.* 1999;17:431.
9. Holt S, Stewart IC, Dixon JM, Elton RA, Taylor TV, Little K. Alcohol and the emergency service patient. *Br Med J.* 1980;281:638-40.
10. Van Havere T, Vanderplasschen W, Lammerdyn J, Broekaert E, Bellis M. Drug use and nightlife: more than just dance music. *Subst Abuse Treat Prev Policy.* 2011;6:18.
11. Wood DM, Greene SL, Alldus G, Huggett D, Nicolau M. Improvement in the pre-hospital care of recreational drug users through the development of club specific ambulance referral guidelines. *Subst Abuse Treat Prev Policy.* 2008;3:14.
12. Heyerdahl F, Hovda KE, Bjornaas MA, Brørs O, Ekeberg O, Jacobsen D. Clinical assessment compared to laboratory screening in acutely poisoned patients. *Hum Exp Toxicol.* 2008;27:73-9.
13. Sullivan JB, Hauptman M, Bronstein AC. Lack of observable intoxication in humans with high plasma alcohol concentrations. *J Forensic Sci.* 1987;32:1660-5.
14. Yost DA. Acute care for alcohol intoxication. be prepared to consider clinical dilemmas. *Postgrad Med.* 2002;112:14-6, 21-2, 25-6.
15. Hack JB, Goldlust EJ, Gibbs F, Zink B. The H-impairment index (HII): A standardized assessment of alcohol-induced impairment in the emergency department. *Am J Drug Alcohol Abuse.* 2014;40:111-7.
16. Martin CS, Moss HB. Measurement of acute tolerance to alcohol in human subjects. *Alcohol Clin Exp Res.* 1993;17:211-6.
17. Hoffman RS, Goldfrank LR. The poisoned patient with altered consciousness. controversies in the use of a 'coma cocktail'. *JAMA.* 1995;274:562-9.
18. Maniaci MJ, Lachner C, Vadeboncoeur TF, Hodge DO, Rummans TA. Involuntary patient length-of-stay at a suburban emergency department. *Am J Emerg Med.* 2020;38:534-8.