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Additional psychoactive substance use in adolescents hospitalised with acute alcohol intoxication

Używanie substancji psychoaktywnych przez młodzież przyjętą do szpitala z ostrym zatruciem alkoholowym

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Abstract

Introduction: Simultaneous use of alcohol and drugs is associated with additional risks for adolescents' health and well-being. The aim of this study was to assess if adolescents hospitalised with acute alcohol intoxication (AAI) are at risk for additional drug use.

Material and methods: Data from adolescents with an AAI admitted to hospital was collected including results from urine sampling for drugs. Independent sample t-test and χ^2 test were used to analyse the data; $p < 0.05$, which was considered significant.

Results: A total of 101 Dutch adolescents were included in the sample, of whom 51.5% were males with a mean age of 15.8 years. The average blood ethanol concentration was 1.71‰. We observed that 10.9% of the toxicology screenings were posi-

Streszczenie

Wprowadzenie: Równoczesne używanie przez młodzież alkoholu i narkotyków wiąże się z dodatkowymi zagrożeniami dla ich zdrowia i samopoczucia. Celem pracy była ocena, czy młodzież przyjmowana do szpitala z ostrym zatruciem alkoholowym (AAI) jest również zagrożona przez używanie narkotyków.

Materiał i metody: Zebrano dane od młodzieży z AAI przyjętej do szpitala, w tym wyniki analizy moczu na obecność narkotyków. Do analizy danych wykorzystano test t dla próby niezależnej i test χ^2; $p < 0,05$ uznano za istotne.

Wyniki: Do badania włączono 101 holenderskich nastolatków, w tym 51,5% chłopców, średnia wieku 15,8 roku. Średnie stężenie etanolu we krwi wynosiło 1,71‰. Zaobserwowano, że 10,9% badań toksykologicznych wykazało obecność narkotyków – kannabinoidów (i jeden przypadek benzodiazepiny). Nie

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tive for additional drugs, of which all but one were cannabinoids. We found no difference in sex, age, ethanol levels, day of intoxication and hospital length of stay between drug users and non-drug users.

Discussion: Approximately 9.2% of Dutch adolescents have used cannabinoids at least once in their life time, which is comparable with data from a national survey on drug use in America. Based on these observations, we may conclude that the use of cannabis during an episode of AAI is similar to other Dutch teenager use and they are not at higher risk of drug use.

Conclusions: This study shows additional drug abuse in more than 10% of adolescents with an AAI. More research is needed to gain insight into the long term consequences of alcohol and drug abuse in these patients.

Keywords: Acute Alcohol Intoxication, Psychoactive substances, Cannabis, Adolescence.

stwierdzono różnic między użytkownikami narkotyków i osobami ich nieużywającymi pod względem płci, wieku, stężenia etanolu, dnia, w którym nastąpiło zatrucie, i długości pobytu w szpitalu.

Omówienie: Około 9,2% holenderskich nastolatków przynajmniej raz w życiu używało kannabinoidów, co jest porównywalne z danymi z ogólnokrajowego badania na temat używania narkotyków w Ameryce. Można zatem wywnioskować, że używanie konopi przez badanych podczas epizodu AAI jest podobne do używania przez innych holenderskich nastolatków, i że nie są oni pod tym względem w grupie większego ryzyka.

Wnioski: Badanie to pokazuje, że ponad 10% nastolatków z AAI nadużywa dodatkowo narkotyków. Potrzebne są dalsze badania, aby uzyskać wgląd w długotrwałe konsekwencje nadużywania alkoholu i narkotyków przez tę grupę pacjentów.

Słowa kluczowe: ostre zatrucie alkoholowe, substancje psychoaktywne, cannabis, okres dorastania.

Introduction

It is increasingly common for adolescents to be in emergency care with acute alcohol intoxication (AAI) and this is often associated with other problems [1]. In particular, simultaneous use of alcohol and drugs, due to its additive and interactive effects, is considered to be an additional risk for the health and well-being of adolescents [2-4]. In the Netherlands, a number of studies have been performed to describe the risk factors and epidemiology of AAI amongst adolescents [5]. However, to date, there is no information regarding the incidence and risk factors of simultaneous AAI and illicit substance use in general populations of adolescents.

The aim of this study was to assess if adolescents hospitalised with AAI are at risk of additional drug use.

Material and methods

Study design and patients

This was a prospective, single-centre study conducted between January 2016 and September 2019. All patients between 12 and 18 years of age who were admitted to the pediatric ward of a large district general and teaching hospital in the Netherlands with an AAI were included. Patients were hospitalised in case of reduced level of consciousness and/or in combination with signs of hypoglycemia, hypothermia or a social condition. The decision was made by the attending physician. Patients whose urine examination was not performed were not included. Furthermore, patients with a previous episode of AAI were also excluded from the study.

Clinical protocol AAI

All patients admitted to the emergency department for an AAI were examined, blood samples were taken to measure blood alcohol concentration and an urine sample was taken for a standard panel of toxicology screening, namely amphetamine, metamphetamine, benzodiazepines, opiates, cannabis, cocaine, methadone and tricyclic antidepressants. Toxicology screening was performed by the Department of Clinical Pharmacology according to standard procedures. Patients who were admitted for clinical observation received intravenous fluid administration and vital functions were monitored continuously. Patients were discharged the following morning.

Data collection

Data were collected from medical records at admission and at the outpatient clinic mostly 4-6 weeks after admission. Admission data included age, sex, blood alcohol concentration and presence of other drugs in urine toxicology testing. Extra information was collected about alcohol consumption, drug use, use of other medication and presence of injuries.

Statistical analysis

SPSS 22 software was used for data analysis. Frequency (percentage) and mean (SD) were used to describe the variables. In addition, independent sample *t*-test and χ^2 test were applied to analyse the data; $p < 0.05$ was considered as significant.

Ethical considerations

Medical ethical approval for the study was obtained from the Scientific Review Committee of Tergooi hospital in November 2019 (reference number KV19.062, registration number 19.60). Informed consent by pediatric patients' caregivers was not required. The study was not subject to the Medical Research Involving Human Rights Act (WMO), since no interventions were performed, and data were collected retrospectively.

■ Results

Over a period of 3.5 years, a total number of 163 adolescents between 12 and 18 years of age was presented to the emergency department with an AAI and confirmed blood ethanol levels. Of these patients, we excluded 33 because they were not admitted and 29 because urine toxicology was not performed, thus 101 adolescents were included for analysis.

Urine toxicology results

Urine toxicology screening was positive in 11 of 101 screened adolescents (10.9%), in 10 patients for cannabinoids (90.9%) and in one for diazepam (9.1%) (Table I). We found no difference in sex, age, ethanol levels and time and day of alcohol consumption between the drug users group and drug non-users group. In the drug non-users group, 4 out of 90 adolescents claimed to have used substances other than alcohol. No negative effects of the additional drug use were found during admission. In both groups, adolescents were discharged home the next morning.

■ Discussion

This study shows additional drug use in more than ten percent of adolescents with an AAI. We found that cannabis was the consumed drug in almost all cases. Remarkably, more than half of the adolescents recalled no history of drug use at admission.

Four adolescents who screened negative for drugs in urine reported drug use on admission. Three reported the use of cannabis and one reported the use of extasy (XTC). All of these four cases of alcohol intoxication took place out of the home. An explanation for the admitted drug use could be that on presentation, the history is taken under the influence of alcohol and most cases is difficult to verify.

In the Netherlands between 2007-2016, almost five thousand adolescents were admitted to hospital due to alcohol intoxication and of these patients more than half started drinking before 14 years of age. Females, adolescents with lower educational background and adolescents raised in nontraditional family structures are at higher risk of being admitted with AAI at a younger age [5]. However, recent developments, like raising the minimum age for obtaining low-alcohol drinks, more awareness of the consequences of alcohol use and the opening of outpatient alcohol clinics, seems to decrease the number of hospital admissions. In contrast to alcohol, less is known about hospital admission due to the combination of alcohol and drug use. It is assumed that these numbers are much lower though there is a lack of reliable data. More data is available about the use of drugs in general. According to the European School Survey Project on Alcohol and Other Drugs (ESPAD) in 2015, about 12% of Dutch teenagers aged 15 admitted consumption of cannabis in the last thirty days [6]. A more recent study from 2017 showed that 9.2% of Dutch adolescents used cannabinoids at least once in their life time. These numbers were higher in boys than girls [7]. This is comparable with data from a national survey on drug use in America, which shows that 12.5% of the adolescents used marijuana in the past year [8]. Based on these observations, we may conclude that the use of cannabis during an episode of acute alcohol

Table I. Demographic data and urine toxicology screening results on admission

Characteristics	All screened *N* = 101	Positive urine toxicology screening *n* = 11	Negative urine toxicology screening *n* = 90	*p*-value
Gender				0.393**
Boys	52/101 (51.5%)	7/11 (63.6%)	45/90 (50%)	
Girls	49/101 (48.5%)	4/11 (36.4%)	45/90 (50%)	
Age (mean, SD)	15.82 (1.3)	15.55 (1.29)	15.9 (1.3)	0.458*
Blood ethanol conc. in ‰ (mean, SD)	1.71 (0.38)	1.60 (0.67)	1.73 (0.33)	0.301*
Day of intoxication				0.950**
Weekend	59/101 (58.4%)	6/11 (54.5%)	53/90 (58.9%)	
Working days	3/101 (3.0%)	0/11 (0%)	3/90 (3.3%)	
Holiday	29/101 (28.7%)	3/11 (27.3%)	26/90 (28.9%)	
Unknown	10/101 (9.9%)	2/11 (18.2%)	8/90 (8.9%)	
Location				0.168**
Home	31/101 (30.7%)	5/11 (45.5%)	26/90 (28.9%)	
Outside home	68/101 (67.3%)	5/11 (45.5%)	63/90 (70%)	
Unknown	2/101 (2.0%)	1/11 (9.0%)	1/90 (1.1%)	
Anamnestic drug use	8/101 (7.9%)	4/11 (36.4%)	4/90 (4.4%)	
Injuries reported	9/101 (8.9%)	3/11 (27.3%)	6/90 (6.7%)	
Type of drugs in urine screen	*N* = 101	*n* = 11		
Amphetamines	0/101 (0%)	0/11 (0%)	–	
Benzodiazepine	1/101 (1.0%)	1/11 (9.1%)	–	
Cannabinoids	10/101 (9.9%)	10/11 (90.9%)	–	
Cocaine	0/101 (0%)	0/11 (0%)	–	
Methadone	0/101 (0%)	0/11 (0%)	–	
Opiates	0/101 (0%)	0/11 (0%)	–	
Tricyclic-antidepressants	0/101 (0%)	0/11 (0%)	–	

**Independent sample t-test. **χ^2 test*

intoxication is similar to other Dutch teenagers and they are not at higher risk of drug use.

We observed that more than ten percent of adolescents used drugs in combination with alcohol. We did not observe any negative effect of additional drug use in the acute phase of hospitalisation. Besides, duration of hospital admission were comparable with or without additional drug use. However, we like to emphasise that these findings might be different in case of other, potentially more harmful illicit drugs like cocaine, LSD or GHB. These were not part of the standard toxicology panel screening in our population. Simultaneous use of alcohol and cannabis in non-hospitalised adolescents has been reported by various studies. A study in Croatia showed that out of 272 adolescents with AAI 17 urine samples were positive to addictive substances with 10 positive for cannabis. There was no difference in drug use among boys and girls but other risk factors for simultaneous drug use were not identified [9]. Simultaneous use of alcohol and cannabis overall, not in case of an AAI, has been reported in various studies with incidence varying from 21.6% to 31.1% [10-12].

A few studies found that simultaneous alcohol and marijuana use among adolescents is associated with public health problems including violence, driving under the influence of alcohol or drunk passenger and is positively associated with alcohol use frequency and intensity [13, 14]. It therefore remains important to persuade these patients to visit the outpatient clinic to obtain additional data to assess risk profile and to educate about the long term consequences.

We acknowledge that our study has some limitations. First, we only included adolescents with

an AAI who were admitted to the hospital. This may create a selection bias and the true AAI numbers with simultaneous use of other drugs may therefore be underestimated. Second, it is a single-centre study with a relatively small population of 101 patients. Furthermore, a standard panel was used for urine of toxicology screening so it would also be interesting to test for drugs that are becoming increasingly popular among the youth nowadays like new psychoactive substances. Nevertheless, we believe our study is representative since our hospital covers a large residential area which is both rural and urban, and because previous studies found relatively small differences in acute alcohol incidence between the different provinces of the Netherlands.

In conclusion, this study shows additional drug abuse in more than ten percent of adolescents with an AAI. More research is needed to gain insight in the long term consequences of simultaneous alcohol and drug abuse in these patients.

Conflict of interest/Konflikt interesów

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Ethics/Etyka

The work described in this article has been carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) on medical research involving human subjects, Uniform Requirements for manuscripts submitted to biomedical journals and the ethical principles defined in the Farmington Consensus of 1997.

Treści przedstawione w pracy są zgodne z zasadami Deklaracji Helsińskiej odnoszącymi się do badań z udziałem ludzi, ujednoliconymi wymaganiami dla czasopism biomedycznych oraz z zasadami etycznymi określonymi w Porozumieniu z Farmington w 1997 roku.

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