

Illicit Drug and Alcohol Users Admitted to the Pediatric Emergency Department

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Key words: substance abuse, adolescents, emergency department, drug screen, ethanol

Abstract

Background: Clinicians' impression of adolescents' alcohol or drug involvement may underestimate substance-related pathology.

Objectives: To describe the characteristics of adolescents presenting to the pediatric emergency department due to substance abuse and to determine whether physicians can reliably identify these patients.

Methods: We conducted a prospective cohort study of all patients aged 12–18 years presenting to a pediatric emergency department between 1 January 2005 and 31 December 2006 for whom a urine drug screen or ethanol blood levels was ordered. According to departmental protocol, urine drug screen and ethanol levels are taken for specific indications. Based on the history and clinical findings the pediatrician in the ED assessed on a 5-point likelihood scale the possibility that the patients' symptoms were related to substance abuse.

Results: Of the 139 patients in the study group 40 (30%) tested positive for ethanol or drugs of abuse. The median age was 16. Compared with patients who tested negative, there were more patients with decreased level of consciousness among patients who tested positive for ethanol or drugs (5% vs. 33% respectively, $P < 0.001$). The median physician estimate for the likelihood of substance abuse was 5 in patients who tested positive and 2 in patients who tested negative ($P < 0.001$). The likelihood of a positive drug/ethanol test was not affected by age or gender.

Conclusions: The likelihood of substance abuse is higher in patients presenting with a low level of consciousness. Physicians may accurately assess the likelihood of substance abuse in these patients.

IMAJ 2008;10:779–782

Substance abuse among adolescents is a major public health concern. Studies around the world have shown that a large percentage of adolescents are using alcohol and drugs [1-6]. In the emergency department, conditions such as trauma, self-inflicted injuries, seizures, decreased level of consciousness, and psychiatric emergencies may be related to substance abuse [7-13]. Clinicians' impression of adolescents' alcohol or drug involvement may underestimate substance-related pathology [14]. Structured interviews can serve as a clinical tool to identify problem drinking or drug use in the ED [15-20]. However, self-reporting of substance use may not be reliable even when a structured inter-

view is conducted [21]. Moreover, there are no published Israeli studies on structured interviews as a tool to identify adolescent drinking problems.

We hypothesized that among patients aged 12–18 years presenting to the ED who meet a predetermined set of criteria (and do not report on drug use) at least 20% suffer from drug-related pathology. We also hypothesized that a large proportion of these patients will not be identified by the pediatrician in the ED without laboratory tests. The objective of the current study was to determine the percentage of patients presenting to the pediatric ED due to substance abuse and to determine whether physicians can reliably identify these patients.

Subjects and Methods

We conducted a prospective cohort study in the pediatric ED of Assaf Harofeh Medical Center, a university-affiliated general hospital in Israel, between 1 January 2005 and 31 December 2006. The study protocol was approved by the hospital ethics committee. The study group comprised all patients aged 12–18 years presenting to the ED if a urine drug screen or ethanol blood levels was ordered. According to departmental protocol, urine drug screen and ethanol levels were taken if the patient presented with any of the following signs: decreased level of consciousness, acute confusional state, new onset of psychiatric symptoms (psychosis, depression), panic attack, attempted suicide, or a history of substance abuse. Patients were excluded if there was a known psychiatric disorder or if they suffered from moderate or severe mental retardation.

Before the study commenced, pediatricians working in the ED were instructed regarding the study hypothesis. Instructions on how to complete the study forms were given and recurrent reminders in writing and by phone to the ED were conducted throughout the study period. Based on the history and clinical findings, the pediatricians in the ED (senior resident, fellow or attending physician) assessed on a 5-point likelihood scale the possibility that the patients' symptoms were related to substance abuse (the scale ranged from 1 to 5, with 1 indicating symptoms unlikely to be related to substance abuse and 5 indicating symptoms most likely related to substance abuse).

Urine samples were tested by an immunoassay (SureStep®, Applied Biotech, Inc, San Diego, CA, USA). The urine was

ED = emergency department

tested for the following substances: THC (tetrahydrocannabinoid), morphine, methadone, cocaine, tricyclic antidepressants, PCP, barbiturates, benzodiazepines, amphetamines, and MDMA (methylenedioxymethamphetamine). In addition, 5 ml of blood was taken from each patient. Ethanol was measured in whole blood by an enzymatic assay on an automated Hitachi 917 analyzer.

Statistical analysis

Descriptive statistics were used to describe the study population. Patients with a positive drug screen in the urine or high ethanol level in the blood were compared with those with negative results using the Student *t*-test or Mann-Whitney as appropriate for continuous variables and chi-square or Fisher's exact for categorical variables. A logistic regression model was used to study the effect of demographic and clinical variables on the presence of a positive drug/ethanol test.

Results

Of the 139 patients in the study one was excluded from the analysis because he was too young. The characteristics of the study population are presented in Table 1. Blood ethanol level was measured in 85 patients and urine drug screen was ordered in 134.

Forty patients (30%) tested positive for ethanol or drugs of abuse [Table 2]. The median age of patients testing positive for ethanol or drugs and those with negative tests was 16 years in both groups ($P = 0.37$). Median Glasgow Coma Scale was 15 for patients testing positive and patients with negative results. However, there were more patients with decreased level of consciousness among patients who tested positive for ethanol or drugs compared with patients testing negative for drugs or ethanol (5% versus 33% respectively, $P < 0.001$).

History regarding substance abuse was available in 136 patients (98%). Two patients reported using illicit drugs while 37 (26.6%) reported consuming alcohol. Of the 97 patients who did not report alcohol or drug usage 13 (13.4%) tested positive (5 with high ethanol level and 8 with positive urine toxicology screen). In

Table 1. Characteristics of the study population

Variable	n
Age (yrs, median and range)	16 (12–18)
Gender male (%)	65 (47%)
Presenting symptom*	
Behavioral changes	45 (32%)
Decreased level of consciousness	45 (32%)
Acute confusional state	34 (23%)
New onset of psychiatric symptoms (psychosis, depression)	4 (3%)
Panic attack	18 (13%)
Attempted suicide	13 (9%)
New onset of seizures	12 (9%)
Other	48 (35%)
History of ethano/drug usage	39 (28%)

* Patients may have had more than one symptom

Table 2. Results of ethanol and urine drug screen

	No. of patients (%)
Ethanol level > 10 mg/dl	29 (21%)
Positive urine drug screen	
THC	5
Opioids	4
MDMA	4
Benzodiazepines	2
Ethanol and positive urine drug screen	2

Table 3. Association between demographic variables and physician assessment and the likelihood for positive drug/ethanol tests

	Odds ratio	95% CI
Age (yrs)		
12–15	1	Reference
16–18	0.942	0.3–3.2
Gender		
Female	1	Reference
Male	1.26	0.36–4.34
Glasgow Coma Scale		
15	1	Reference
< 15	6.16	1.34–28.5
Physician assessment		
1–3	1	Reference
4–5	16.6	4.83–57.1

most cases of positive drug screen a positive history could be obtained after confronting the child with the results. There was no difference in the proportion of patients with a positive urine toxicology screen among patients with ethanol level higher than 10 mg/dl and those with no ethanol intoxication ($P = 0.415$).

The median physician estimate for the likelihood of substance abuse was 5 in patients testing positive and 2 in patients testing negative ($P = <0.001$). When the same analysis was repeated to include only patients in whom there was no history of substance abuse, physician assessment for those who tested positive was significantly higher than for those who tested negative (median score 4 and 2 respectively, $P < 0.001$). In four patients who tested positive for drugs, physician assessment for the possibility of substance abuse was 3 or less.

In a multiple logistic regression [Table 3] a lower Glasgow Coma Scale and a higher physician assessment were associated with increased likelihood for a positive drug/ethanol test. The likelihood of a positive drug/ethanol test was not affected by age or gender.

Discussion

In this prospective cohort of Israeli adolescents presenting to the pediatric ED with different signs we found a high level of ethanol and drug abuse. Patients presenting to the ED with substance abuse were more likely to have a decreased level of

consciousness. We also showed that physicians correctly suspected substance abuse in many of these cases.

We found no association between ethanol intoxication and positive urine drug screen. Contrary to these findings, a study of 289 adults with positive ethanol test found that more than half had a positive drug screen [22]. These conflicting results may be attributed to the different population (adults versus adolescents) or different laboratory techniques.

Thirteen percent of the patients in this cohort who tested positive for drugs or ethanol did not give a history of substance abuse. These results are in line with previous studies showing that self-report of substance use has limited validity [21,23,24]. Even when a structured interview was used to detect substance abuse and compared with a urine drug screen, only 57% of cases could be identified by history alone [21].

The role of drug screening in the ED is controversial. Hepler et al. [25] found that the ability of clinicians to accurately predict which, if any, of a large number of intoxicants were present in a given patient, is minimal. In the current study physicians were not asked to detect which substance the patient consumed but were able to assess the likelihood of substance abuse. Other studies in pediatric emergency departments [26,27] showed that comprehensive drug screening has little impact on patient management. Among more than 300 pediatric patients seen in an urban pediatric ED only a minority had unexpected toxicology screening results [26]. Moreover, toxicological screening results rarely necessitate a change in medical management. Adding a broad-spectrum high performance liquid chromatography drug screening to the history, physical examination and limited drug screen (examining serum for ethanol, aspirin, and acetaminophen urine for benzodiazepines, barbiturates, amphetamines, cocaine, phencyclidine, and opiates) had unexpected results in only 3% of cases [27]. The main outcome measure in these studies was treatment while in the ED. In the current study we did not explore whether or not the findings of the toxicology screening changed the medical treatment.

Even when – based on the history and physical examination – the results of the toxicology screening are expected to be positive, establishing the diagnosis of substance abuse may have an effect on the treatment (e.g., avoiding brain computed tomography in a patient with acute confessional state). Another possible beneficial effect of early identification of substance abuse in the pediatric ED is the opportunity to intervene in order to engage these patients into prevention plans. Previous studies have shown that screening for alcohol in the ED and brief interventions are an effective secondary prevention strategy [28,29]. However, more studies are needed to determine whether or not early identification and enrolment into long-term prevention plans actually reduces future substance abuse among adolescents visiting the ED.

In our study physicians suspected substance abuse in most cases. In only four cases of substance abuse did physicians score the likelihood of substance abuse as average or low. One can therefore conclude that in our population there is no place for universal drug screening based on a predetermined set of symp-

toms. Such tests should be ordered when the clinician suspects substance abuse.

The current study has several limitations. In some cases ethanol levels were measured several hours after the patients developed symptoms. In such cases low ethanol levels cannot rule out the possibility of substance abuse. The immunoassay that we used to screen for drugs is applicable to only ten drugs. Moreover, the sensitivity of the assay varies between different drugs (for example, among benzodiazepines, diazepam is detected at a concentration of 195 ng/ml while midazolam is detected only at a concentration of 12,500 ng/ml). Many other drugs (e.g., glue sniffing) that are popular among adolescents may be undetectable by this assay. If that is the case the true incidence of substance abuse may be even higher than what we found. Another disadvantage of the immunoassay is the possibility of false positive results [11]. Since most cases of positive drug screen in our study were confirmed by the child we believe the results are reliable.

In conclusion, substance abuse is not uncommon among adolescents presenting to the pediatric ED. The likelihood of substance abuse is higher if the patient presents with a low level of consciousness. In most cases physicians may accurately assess the likelihood of substance abuse in these patients. Future studies are needed to determine whether identification of substance abuse in the ED can serve as an opportunity to enroll these patients in a prevention plan.

Acknowledgment: Supported by a grant from the Israel Anti-Drug Authority and the Israel Ministry of Health

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