Emergency department alcohol and drug screening for Illinois pediatric trauma patients, 1999 to 2009

Norman G. Nicolson, B.A.*, Patrick M. Lank, M.D., M.S., Marie L. Crandall, M.D., M.P.H., F.A.C.S.

Division of Trauma and Critical Care, Department of Surgery, Northwestern University Feinberg School of Medicine, 676 N Saint Clair, Suite 650, Chicago, IL 60611, USA

KEYWORDS: Pediatrics; Trauma; Alcohol; Screening

Abstract

BACKGROUND: Recent guidelines recommend universal substance abuse screening for all trauma patients aged 12 years and older because brief interventions can help prevent future trauma. However, little is known about actual rates of screening in this setting.

METHODS: The Illinois State Trauma Registry was queried for severely injured patients from 1999 to 2009. Multivariate logistic regression was used to characterize, according to demographic and physiologic parameters, which patients were screened with blood alcohol and urine toxicology and which screened positive.

RESULTS: Of the 12,264 pediatric patients, 40% were tested for alcohol and 37% for drugs. Nine percent of patients screened positive for alcohol and 8% for drugs. Age strongly predicted positive tests, as did male sex. Black and Hispanic patients were screened for alcohol most frequently, but only Hispanics were more likely to test positive.

CONCLUSION: Although current guidelines recommend screening all trauma patients 12 years and older, current practice falls far short of this goal.

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Although adults admitted to the hospital because of trauma are routinely screened for alcohol and other drugs, pediatric patients are screened less consistently, in spite of the fact that many of those who are screened do test positive. Recent guidelines from the Pediatric Trauma Society recommend universal screening for all pediatric trauma patients over the age of 12. However, these guidelines probably do not reflect current practice in many trauma centers, and actual rates of drug and alcohol testing have not been readily available.

Previous studies have focused on the potential advantages of using trauma as an opportunity for intervention in the life of a young person involved with alcohol or drugs, but few have attempted to show whether or to what extent this type of screening is actually taking place in trauma centers.
centers. Some have investigated the rate of drug and alcohol use in pediatric trauma, but have not characterized how many patients are being tested and what factors determine who is tested and who is not.\textsuperscript{3–5} Few studies looking at screening rates have used large multi-center datasets, with some based on fewer than 100 admissions to a pediatric trauma center.\textsuperscript{6,7} One recent Canadian study used province-wide data, but is of uncertain relevance in practice in the United States.\textsuperscript{8} The largest domestic study on this topic was able to draw on a large and extensive trauma registry, but did not include hospitals from outside densely populated Los Angeles County.\textsuperscript{9} In light of the lack of available data about current drug and alcohol testing rates in pediatric trauma, we designed this study to investigate how often these patients are tested, and which groups of patients are tested more often.

Methods

The Illinois State Trauma Registry is a deidentified database of all trauma admissions statewide to the 64 adult and pediatric trauma hospitals that are approved as Level I or II centers by the American College of Surgeons. Criteria for Level I or II designation include 24-hour in-house coverage by general surgeons, immediate availability of specialty care, participation in trauma system planning, and ability to offer screening and brief intervention for substance abuse.\textsuperscript{10} The trauma registry dataset is extensive, containing information as varied as patient demographics, diagnosis at the time of admission, and medical information such as vital signs, test results, procedures performed, and condition upon discharge from the hospital. The registry was queried from 1999 to 2009 for all patients under age 19 present ing to emergency departments with injury severity scores greater than 10. Annual results were combined to create a unified multi-year dataset with respect to the variables of interest. An exemption from the Northwestern University institutional review board was granted because of the retrospective nature of the study and the use of deidentified patient information.

Any blood alcohol level above zero was considered positive in this patient population, while a urine drug screen was considered positive if urine toxicology showed marijuana or cocaine. Opioid and benzodiazepine testing data were available but were not used in light of the frequent appropriate medical use of those drugs in the setting of trauma, while phencyclidine and amphetamine data were excluded on the basis of frequent false positives associated with dextromethorphan, ephedrine decongestants, and some psychiatric medications.\textsuperscript{11,12} No data were available for possible questionnaire-based screening methods, such as AUDIT or other tools.

Using the R statistical software package, we examined the relationship of testing to patient demographics, injury mechanism, and systolic blood pressure on admission. A multivariate logistic regression was performed to determine who was most likely to be tested for alcohol or drugs, using patient age, sex, race, injury mechanism, and systolic blood pressure less than or equal to 60 mm Hg as the independent variables.\textsuperscript{13} A similar regression was performed to determine which screened patients were most likely to test positive.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Frequencies of alcohol and drug testing for pediatric trauma patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAL test frequency (%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>0–11 (n = 4,607)</td>
<td>10</td>
</tr>
<tr>
<td>12–18 (n = 7,657)</td>
<td>58</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Asian (n = 145)</td>
<td>27</td>
</tr>
<tr>
<td>Black (n = 2,964)</td>
<td>44</td>
</tr>
<tr>
<td>Hispanic (n = 1,923)</td>
<td>42</td>
</tr>
<tr>
<td>Native American (n = 9)</td>
<td>22</td>
</tr>
<tr>
<td>Other (n = 175)</td>
<td>35</td>
</tr>
<tr>
<td>White (n = 6,530)</td>
<td>40</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male (n = 8,477)</td>
<td>42</td>
</tr>
<tr>
<td>Female (n = 3,787)</td>
<td>36</td>
</tr>
<tr>
<td>Mechanism</td>
<td></td>
</tr>
<tr>
<td>Blunt (n = 10,321)</td>
<td>38</td>
</tr>
<tr>
<td>Penetrating (n = 1,607)</td>
<td>60</td>
</tr>
<tr>
<td>Systolic BP (mm Hg)</td>
<td></td>
</tr>
<tr>
<td>0–60 (n = 679)</td>
<td>25</td>
</tr>
<tr>
<td>60+ (n = 10,460)</td>
<td>44</td>
</tr>
<tr>
<td>Total (n = 12,264)</td>
<td>40</td>
</tr>
</tbody>
</table>

\textsuperscript{BAL = blood alcohol level; BP = blood pressure; UDS = urine drug screen.}
\textsuperscript{*Within tested population.}
positive. Raw frequencies for both testing and results were also calculated for blood alcohol and urine toxicology for each year included in the study.

Results

For the time period of interest, 12,264 patients met the inclusion criteria for the study (injury severity score >10, age 0 to 18). Of these, 40% were tested for alcohol and 37% for drugs, while 9% of all included patients screened positive for alcohol and 8% for drugs (Table 1). The patient population was mostly male with mostly blunt injuries.

Older age was the strongest predictor of alcohol and drug testing (Figs. 1, 2). Patients aged 12 and above were tested for alcohol 58% of the time, and for drugs 49%. The adjusted odds ratio (OR) of being tested for alcohol was 1.28 (95% confidence interval [CI]: 1.26 to 1.29) for each year of age, and for drug testing was 1.17 (95% CI: 1.16 to 1.18) per year. A systolic blood pressure of greater than 60 mm Hg also predicted alcohol (OR 3.45, 95% CI: 2.79 to 4.27) and drug (OR 2.42, 95% CI: 1.94 to 3.04) testing. Alcohol testing was more common in black (2.21, 95% CI: 1.38 to 3.55) and Hispanic (2.01, 95% CI: 1.25 to 3.25) patients, but there were no significant differences in drug testing depending on race. Testing did not vary significantly with patient sex. Mechanism of injury was not a significant predictor of alcohol or drug testing in this patient population, and the rate of testing for alcohol and other drugs did not increase or decrease significantly across the time period studied.

Among tested patients, age was the most powerful predictor of a positive test for alcohol (1.17, 95% CI: 1.12 to 1.22) or drugs (1.16, 95% CI: 1.12 to 1.20). Girls were less likely than boys to test positive for alcohol (.63, 95% CI: .52 to .76) or drugs (.65, 95% CI: .53 to .80). Hispanic patients were more likely than others in this patient group to test positive for alcohol (4.47, 95% CI: 1.53 to 19.1). No racial group was significantly more likely than any other to test positive for drugs.

Comments

Although the rates of positive blood alcohol test results in severely injured pediatric patients are lower than the rates in adults, a significant number of pediatric patients did test positive (9% for alcohol and 8% for drugs), especially those patients aged 12 years and older (14% and 11%, respectively). Suspicion of intoxication undoubtedly increases the proportion of screened patients testing positive for alcohol or drugs, but it is also likely that at least some unscreened patients would test positive if given a test. For these reasons, it is impossible to accurately characterize the
rate of substance use or abuse among pediatric trauma patients without universal testing.

Unsurprisingly, the data show that older adolescents more commonly use alcohol and drugs, and that they are tested more frequently. This information may be used to guide decision making about an appropriate age range for universal testing, but trauma patients of all ages have some chance of testing positive for alcohol or drugs. Blood alcohol and urine toxicology testing is far from universal, even in the higher risk group of patients 12 years and older, who were tested only 58% and 49% of the time for alcohol and drugs, respectively. Our findings demonstrate racial disparities in testing, possibly revealing racial or socioeconomic biases at work, although some hospitals in the state may screen aggressively and see a racially skewed patient population, confounding this result. Test result data provide little reason to differentially target particular racial groups for alcohol or drug screening.

Given the significant benefit of brief intervention for substance abuse in trauma patients, an effort should be made to minimize the number of patients who are missed by ED drug and alcohol screening. Although knowledge of patients’ drug and alcohol status may play a role in their immediate medical care, there is a more important reason for concern: unscreened patients will not be referred to appropriate counseling for substance abuse. Previous research in adults has shown that counseling in this context is effective in reducing subsequent hospitalization for further substance abuse-related injury.15,16 Furthermore, there is increasing evidence that similar interventions may be effective in injured adolescents.17–20 These interventions may be performed directly by emergency medicine personnel, and even computer-based substance abuse counseling may be effective in persistently changing patient attitudes about drinking or drugs.21,22

The most important limitation of this study is its retrospective nature. Although testing outcomes seem to vary on the basis of patient age and race, along with other factors, causality cannot be established. Inter-hospital variability likely plays an important role and was not addressed by the study. Additionally, although the multivariate regression accounts for several possible variables of interest, additional potential confounding factors such as patient insurance status, time of day at presentation, and Glasgow Coma Scale score were not accounted for in the analysis. Finally, although the scope of the statewide trauma registry is an improvement over previous more limited studies, Illinois practice patterns may not be fully consistent with nationwide trends.

Previous research has highlighted some possible reasons for reluctance on the part of trauma surgeons to screen their patients for alcohol or other drugs: lack of time, lack of training in how to screen or how to counsel patients with positive screens, or perceived lack of effective resources to perform interventions for substance abuse.23 Trauma providers may worry that they will put their patients at legal risk by testing for substance abuse, but in most states they are generally not required to report testing results to authorities except in cases of suspected child abuse.16 Although the cost of screening programs may be a concern, the costs of undiagnosed and untreated substance use and abuse can be significant, strongly impacting the future health and potential of young people. Previous research in adults has shown that screening and brief intervention in trauma centers may actually be cost saving in the long term, with each dollar spent on screening and brief interventions saving 3 to 4 dollars in future healthcare costs.24

In fact, most state and society guidelines do mandate drug and alcohol testing for severely injured adolescent patients in the Emergency Department, but, as this study shows, actual screening rates in practice were nowhere near 100% from 1999 to 2009, and did not significantly improve across the time period studied. However, as data for more recent years become available, screening rates may climb, reflecting growing awareness of the importance of this problem. A recent pilot study has established a methodology for spreading universal screening practices to pediatric trauma centers nationwide.25 Continued monitoring of trauma registry data is needed to assess the adoption of screening guidelines at a national level.

References