ETIOLOGICAL CHARACTERIZATION OF EMERGENCY DEPARTMENT ACUTE POISONING

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Abstract

An investigation of emergency department (ED) poisonings was conducted to characterize poisoning demographics and evaluate risk factors for suicide. Risk factors for suicide included depression, alcohol abuse, family history of addiction, and a history of attempted suicide. The association between alcohol, marijuana, and cocaine exposure and acute respiratory disease (ARD) was also evaluated.

Methods

Data collection was performed according to HIPAA regulations after approval by the hospital's Institutional Review Board (IRB) committee. The setting was the emergency department of an inner city level one trauma center with approximately 45,000 visits per year. The study population consisted of 649 poisoning cases admitted between 2004 and 2007 at a level 1 emergency department. Painful sensory symptoms associated with alcoholic liver disease were variable and dependent on the stage of alcohol abuse.

Results: Study Population

Between December 2004 and May 2007 a total of 649 ED poisonings were identified. Most of the poisoning cases were between 36 and 45 years old. Pediatric cases younger than 15 years old represented only 4.4% of cases and the most frequently affected age group was 46. Of the total of 649 poisoning cases there were more male, than female, with 42.7% (n=277) female and 55.3% (n=363) male. Poisonings cases were predominantly African American (13%), followed by Hispanic (11.9%), and White (6.6%). Over 69.3% of the total cases were single in comparison to 12.3% who were married. Most patients were uninsured (45.6%), while 35.1% were covered by the Illinois Department of Public Aid (IDPA). Medicare and Medicaid covered 8.2%, and only 9.9% of patients had private coverage.

Results: Reported Toxic Substances

The exposure situations identified most commonly encountered in ED included: heroin 35.4% (n=230), cocaine 31.7% (n=206), heroin and cocaine concomitantly taken 4.3% (n=28), alcohol 2.2% (n=14), multiple pharmaceuticals 3.5% (n=35), antidepressant/antipsychotic poisoning at 6% (n=32). Significant correlations were found between heroin poisoning and asthma (p=0.029, DF=1, p=0.001). Cocaine poisoning and heroin poisoning were significantly correlated (p=0.001, DF=1, p=0.001). A change in the pattern of illicit drug use from injection to inhalation was detected and raises treatment costs by significantly increasing both the rate of hospitalization and hospital length of stay (LOS).

Introduction

Poisonings from substance abuse and accidental toxic exposure remain a significant concern for hospital emergency departments (EDs) with more than four million incidents of poisoning occurring in the United States each year. The Institute of Medicine has recently identified poisoning as the second leading cause of injury-related mortality, with an estimated health care cost of over $12.6 billion annually.1

Trends in the United States for illicit drug use indicate that cocaine abuse decreased between 1992 and 2002, though patterns of abuse were not consistent throughout the country as cocaine use actually increased 100% or more in four states during this same time period.2 Although heroin and cocaine remain the most frequently abused drugs leading to ED visits, ED visits involving prescription narcotic analgesics increased 153% from 1995 to 2002. Concomitant use of drugs were involved in 75% of the drug abuse-related ED visits, and dependence was an underlying factor in these cases. Substance abusers are more likely to be hospitalized for acute intoxication, and 2-3 times more likely to use an emergency room than non-abusers.3 The relationship of drug abuse and co-morbidities, particularly between heroin and asthma, has been reported sporadically in the scientific literature. In an investigation conducted in Bronx, NY, a correlation between cocaine use and new onset asthma was reported amongst substance abusers.4 Steensen et al. 1993 reported a relationship between heroin abuse and pulmonary edema, which was supported by Marly et al. who found a pattern of heroin overdose-induced pulmonary edema.5 Levine et al. 2005 found that the pathogenesis of heroin abuse included inhalation of intravenous heroin and hospitalization and utilization patients with acute asthma exacerbation.6 Knowledge of condition-specific morbidity and mortality for patients with asthma as well as other aggravating factors is essential for making critical decisions in emergency care. There is a need, especially for emergency providers in underserved minority communities with high frequencies of poisonings and substance abuse, to understand the demographic factors involved in poisoning and related co-morbidities.

Methods

Data collection was performed according to HIPAA regulations after approval by the hospital's Institutional Review Board (IRB) committee. The setting was the emergency department of an inner city level one trauma center with approximately 45,000 visits per year. The study population consisted of 649 poisoning cases admitted between 2004 and 2007 at a level 1 emergency department. Demographic data abstracted from patients’ medical records included age, gender, race, marital status, employment, insurance coverage, time of visit. Data on personal medical history including diabetes mellitus, hypertension, cardiovascular diseases, asthma, HIV status, hepatitis, and anemia were collected. The poisoning data collected referred to the type of poison, the poisoning exposure route, and the circumstances of ingestion (intentional or unintentional). Smoking: asked whether the patient was a current smoker, illicit drug use, and any history of mental illness such as depression, psychosis, and anxiety disorder was collected from all subjects. Poisoning was grouped into fifteen substance categories: drugs in four separate categories: pharmaceutical or medicinal drug use, recreational drug use, chemical exposure, and industrial exposure. Circumstances of the exposure were also categorized into seven groups that included: suicide, abuse, medicolegal, therapeutic use, and adverse drug events (ADE). The route of exposure was recorded as: inhalation, ingestion, injection, dermal, and inhalation.

Conclusions

Poisoning and drug addiction remain a significant burden on the healthcare systems. The mean LOS for asthma without drug abuse was 1.21 days. For asthmatic patients with a history of illicit drug poisoning the mean LOS was 7.07 days. The hospital charges ranged between $99.00 and $13,000.00 with a mean of $2,941 for asthmatics without abuse and between $12,000 and $659,874.00 with a mean of $28,028.00 for the group of asthmatics with illicit drug poisoning. The difference between the LOS for patients with asthma who abused drugs and the LOS of asthmatics without abuse was statistically significant (p=0.001), as was hospital cost (p=0.001).

The relationship between asthma and drug abuse may be complex, whereas the observed correlation between cocaine use and cardiovascular impairment might be more readily explained due to the effect of cocaine on the heart and blood vessels. However, the observed correlation in this study between heroin use and asthma provides evidence that asthma may be a predisposing factor for heroin addiction or that asthma may be exacerbated by heroin abuse. Several cases have been reported in recent years that suggest sudden and sometimes life-threatening asthma responses can be temporally correlated to the abuse of cocaine and heroin, such as mortality reports in the state of Maryland that demonstrated a large percentage of patients who died from asthma had positive post-mortem urine drug tests.

The results of this study provides evidence supporting that deliberate poisoning with illicit drugs remains a serious healthcare issue that significantly aggravates co-morbidities and raises treatment costs by increasing both the rate of hospitalization and hospital length of stay. Heroin abuse is a burden on asthma patients in terms of both their health and hospital costs, particularly when patients are covered by insurance policies. Asthma education and self-management techniques that acknowledge the impact of the use of recreational drugs, specifically heroin and cocaine, may need to be provided and patients must be educated on how to avoid asthma exacerbation by avoiding common triggers, drug use, and other adverse stressors.