Drugs and trauma center patients: What do we know about involvement of prescription drugs?

Gordon Smith M.D., M.P.H.

Patricia Dischinger, Ph.D.

National Study Center for Trauma & EMS

Shock Trauma Center, University of Maryland, Baltimore

Exploring the Science and Experience of Testing for Prescription Drugs in the Non-Regulated Workplace

This presentation was modified from its original format for 508 compliancy.

Drugs and injured patients
What do we know?

- Alcohol
  - Much known
    - Shock Trauma a leader in this area
      - Long history research on trauma patients
    - Screening tests leading to brief interventions
    - Case-control studies
      - Dose response relationship with injury risk
- Illicit and prescription drugs
  - Much less known
    - Some prevalence information but less complete

Psychoactive substance use disorders among seriously injured trauma center patients

- Carl A. Soderstrom, MD, Gordon S. Smith, MD, Patricia C. Dischinger, PhD, David R. McDuff, MD, J. Richard Hebel, PhD, David A. Gorelick, MD, Timothy J. Kerns, MS, Shiu M. Ho, MA, Kathleen M. Read, MSW
- JAMA 1997:277
- Objective: To assess the prevalence of psychoactive substance use disorders (PSUDs) among a large, unselected group of seriously injured trauma center patients, using a standardized diagnostic interview and criteria.
- Design: Prevalence study.
- Setting: A level I regional trauma center.

- Drug dependence
  - Drugs include amphetamines, cocaine, marijuana, opiates, and phencyclidine

Age, years	Lifetime	Current
18-20	24%	19%
21-39	39%	25%
40-59	20%	10%
≥60	2%	1%

Epidemic increases in cocaine and opiate use by trauma center patients: documentation with a large clinical toxicology database

- Carl A. Soderstrom, MD, Patricia C. Dischinger, PhD, Timothy J. Kerns, MS, Jospeh A Kufera, MA, Kimberly A. Mitchell, MS, and Thomas M. Scalea, MD
- J Trauma 2001;51:557-564

- July 1984 – June 2000
- N = 53338 trauma patients
- Shock Trauma, Baltimore, MD
- Alcohol testing on blood: 98%
- Drug screens on urine: 60%

Percentage of Trauma Patients with Unintentional Injuries and Positive Tests for Alcohol & Other Drug Use

Year	Alcohol,%	Cocaine,%	Opiates,%
1985	31.1	2.2	2.2
1986	32.5	4.4	2.7
1987	31.3	5.8	3.3
1988	32.0	7.1	3.8
1989	30.1	8.1	5.8
1990	32.5	4.7	5.2
1991	29.2	6.6	5.7
1992	26.6	8.9	8.4
1993	25.6	9.6	11.1
1994	23.6	10.4	13.0
1995	23.3	11.4	14.2
1996	21.3	11.0	17.5
1997	20.8	11.3	20.9
1998	19.3	10.5	20.6
1999	18.6	9.9	19.7
2000	17.7	8.5	16.9

Drug and Alcohol Use in Motor Vehicle Crash Admissions to a Major Trauma Facility

- The Walsh Group and National Study Center for Trauma and Emergency Medical Systems
  - **Primary Goal:** Evaluate feasibility of using rapid drug-test (POCT) in trauma setting
  - Phase I (6-month study, 2002, N = 322)
    - Traffic Injury Prevention 2004
  - Phase II (3-month study, 2003, N = 168)
    - Accid. Anal. Prev. 2005
    - TRU Staff performs, interprets, and records toxicology results

Methods

- Admissions to Shock/Trauma UM – Baltimore
- Admissions from all over state of MD
- Only trauma patients
  - Aliquot taken from clinical specimens
  - Point of Collection Test [POCT]
    - THC, Coc, Mamp /MDMA, Opi, BDP
    - Analyzed urine for drugs
    - Blood for Etoh
- Funding Office of National Drug Control Policy (ONDCP)

Drug and Alcohol Use in Injured Drivers

- Phase II AAP 2005

Alcohol/Drug combination	**Percentage**
No drugs or alcohol	34%
Drugs only, one drug	26%
Alcohol only	15%
Alcohol and one drug	12%
Drugs only, multiple drugs	9%
Alcohol and multiple drugs	4%

- Walsh et al. 2005

Marijuana Use by Age Group

- % Drivers positive within each age group

Age bracket, years	Percentage
16-20	50%
21-25	26.1%
26-34	28.6%
35-44	28.6%
45-54	18.2%
55+	6.7%

- Walsh et al. 2005

Crash Culpability Among Injured Drivers Using Alcohol, Marijuana or Cocaine

- Estimate injury risk from drug use
- To determine culpability (fault), police officers consider all possible evidence and information
  - Driver information
  - Witness information
  - Vehicle condition
  - Environmental conditions, etc.
- Testing results for alcohol, cocaine and marijuana from confidential Clinical Toxicology Database of trauma patients
  - Determined alcohol use by blood alcohol concentration (BAC, 20 mg/dL or higher)
  - Determined cocaine (COC) or marijuana (MAR) use from urine specimen (+ or -)
    - Did not assess opiate use due to clinical practice of giving opiates for pain management
- Soderstrom, Dischinger, Kufera, et al; 49th AAAM Annual Scientific Conference 2005

Linkage of multiple data sources

- Police crash reports
- Ambulance and EMX logs
- Hospital records including toxicology reports

Analysis of Culpability
COC+ Relative to COC-

- COC+ drivers were significantly more likely to be culpable than COC- drivers
  - Odds Ratio = 2.3
    - 95% CI=[1.4 - 4.0]

- Cocaine positive

Analysis	Percentage
Culpable	81%
Not culpable	19%

- Cocaine negative

Analysis	Percentage
Culpable	64%
Not culpable	36%

- Soderstrom, Dischinger, Kufera, et al; 49th AAAM Annual Scientific Conference 2005

Odds of Culpability by Gender and Substance Use

- Odds of being culpable for Blood alcohol concentration positive were significantly high among both genders
  - And 40% higher for women than men

- Men

Drug	Percentage
Blood alcohol +	6.5
Cocaine +	2.2
Marijuana +	1.1

- Women

Drug	Percentage
Blood alcohol +	9.1
Cocaine +	2.3
Marijuana +	1.1

- Soderstrom, Dischinger, Kufera, et al; 49th AAAM Annual Scientific Conference 2005

Limitations of Current Research

- Even among the hospitalized population, drug use rates are low, requiring large numbers of cases for analysis
  - For some subgroups (i.e. elderly, etc), the number of positive cases is very small
- Toxicology samples drawn for the treatment of the patient, not for legal reasons
  - Over 90% of patients are tested for BAC
  - Rate of testing for other drugs is close to 50%
  - Urine used for most drug testing
    - Does not accurately reflect serum levels at time of injury
    - Presence does not mean increased risk

Limitations of Current Studies

- Most based on presence of drugs only
  - Need to quantify serum levels that impair performance
  - No agreement on concentrations considered impairment
- High rate prescription drug use population 18+ years
  - 50% take at least 1 drug during previous week
  - 7% took 5 or more prescription drugs

  Source: Kaufman, JAMA 2002
- Opiate
  - Opiate used regularly (5 days/week for 6 weeks): 2%
  - 3% less frequently

  Source: Kelly, Pain 2008

Use of Prescription Drugs During the Preceding Week by Sex and Age

- Men
  - Any use

Age, years	Percentage
18-44	29%
45-64	47%
≥65	71%

  - ≥5 drugs

Age, years	Percentage
18-44	<1%
45-64	6%
≥65	19%

- Women
  - Any use

Age, years	Percentage
18-44	46%
45-64	66%
≥65	81%

  - ≥5 drugs

Age, years	Percentage
18-44	3%
45-64	12%
≥65	23%

- Total by all ages and both sexes:
  - 50% any use
  - 7% ≥5 drugs

Kaufman, D. W. et al. JAMA 2002;287:337-344

Drugs and injured patients
What do we know?

- Alcohol
  - Much known
    - Dose response relationship with injury risk
    - Screening tests leading to brief interventions
- Illicit drugs
  - Much Less known
    - Some prevalence information but less complete
      - Most studies use urine rather than blood
    - Causal role in injuries less clear
- Prescription drugs
  - Even less information known
    - Elderly at risk from sedating medications

Recommendations for Trauma Studies - Illicit and prescription drugs

- Need for comprehensive data on serum levels at time of injury
- Look for “at risk” serum levels
- Interaction other drugs, including alcohol
  - Elderly especially susceptible
- Need for analytical studies to estimate risk
  - Case-control studies
  - Culpability studies
  - Differences between on and off the job injuries

Available Injury Data Sources in Maryland

- Police crash reports
- Ambulance and EMS logs
- ED data
- Hospital records
- Statewide Trauma Registry
- Toxicology
- Autopsy records
- Vital statistics
- MVA licensing
- Driver citations

Opportunities for Trauma Studies

- Develop comprehensive testing
  - Serum levels on all admissions
    - Admission blood stored till discharge at STC
  - Medical Examiner bloods collected for all fatalities
    - OCME tests for the following substances:
      - All abusive drugs (marijuana, cocaine, heroin, opiates, hallucinogens, etc.)
      - Most prescription drugs
  - Document drugs given in field by EMS
- Interviews with patients or proxies
  - Identify work injuries
  - Prescription drug use history
    - Legal and illegal
- Feasibility of such studies proven
  - Maryland could be a model for country

Questions???

Dr. Gordon Smith

gssmith@som.umaryland.edu
410-328-3847