Drugs and Alcohol in the Trauma Patient

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Disclosures

• I have no financial disclosures
Objectives

• Discuss the epidemiology of alcohol and drug related trauma
• Discuss the challenges of alcohol and trauma specific to Montana
• Discuss alcohol physiology and metabolism
• Discuss the legal aspects of caring for the intoxicated trauma patient
Trauma

- Nationally, trauma is the leading cause of death between the ages of 1 and 40\textsuperscript{1,2}
  - 47% of all deaths in this age group
  - 80% of all teenage deaths
  - Over 60% of all childhood deaths
Wide Open Spaces

**Figure 2.** Motor vehicle crash (MVC) death rates per 100,000 population.
Wide Open Spaces

- Per miles traveled, Montana has the highest alcohol impaired fatality rate in the nation; more than double the national average\(^1\)\(^2\)
- Percentage of fatalities who are intoxicated in alcohol impaired crashes\(^3\)
  - 44%
- In fatal crashes, percentage of drivers with BACs of 0.08 or higher\(^3\)
  - 34%
Montana Culture

- Alcohol is a large part of Montana culture
  - 4th in the Nation for craft breweries per capita
  - 3rd in the Nation for beers consumed per capita per year
  - 40.5 gallons or 432 12oz beers

- Nationally 15% of the population have more than 5 drinks on one occasion
  - 20.8% of adult Montanans’ are binge drinkers
  - 25.2% of Montana’s youth are binge drinkers
Montana Culture

• Open containers
  – Montana was one of the last states with a motor vehicle law
    • 2005
  – Las Vegas, New Orleans, Kansas City, Memphis
    • Butte America
MVA → MVC

• “The term ‘accident’ implies a random event leading to injury. It is now recognized that many so-called ‘accidents’ are, in fact, predictable and, therefore, preventable. The most common contributory factor to injury occurrence is alcohol abuse.”

- American College of Surgeons
Alcohol and Physiology

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Alcohol and Physiology
Alcohol and Physiology

• Metabolism
Alcohol and Physiology
Alcohol and Physiology

• Once absorbed:
  – Liver metabolizes 80%
  – Kidney’s 10%
  – Skin and lungs the remaining 10%

• Zero order kinetics
  – Independent of plasma concentration
  – 15-30mg/dL/hr

• 80mg/dL (0.08%)
  – 200lb Man = 4 drinks
  – 150lb Woman = 2.5 drinks
Alcohol and Physiology

- **20-79 (mg/dL)**
  - Impaired coordination, euphoria, doubled collision risk at 50mg/dL\(^{14}\)

- **80-199**
  - Ataxia, labile mood, poor judgment

- **200-299**
  - Significant ataxia, slurred speech, N/V

- **300-400+**
  - Memory lapse, respiratory depression, coma
Alcohol and Physiology

• Acute elevation of BAC has been shown to prolong bleeding times\textsuperscript{22,23,27}
  – Inhibition of platelet activation and aggregation
  – Impaired clot formation

• Chronic alcohol use can enhance these abnormalities\textsuperscript{23}
  – Thrombocytopenia
  – Metabolic factors
Intoxication and Physiology

- LSU researchers performed trauma studies on intoxicated rats\(^6\)
  - Found significant impairment in the physiologic response to shock
  - Hypotensive earlier and responded slower to resuscitation
- A number of studies show an increase in resuscitation fluids and blood transfusions among intoxicated trauma patients\(^{20,21}\)
- However the clinical hematologic effects and associated outcomes are unclear\(^{25,26,27}\)
Intoxication and Injuries

- UCLA study\(^9\)
- Positive toxicology screen in penetrating trauma vs blunt trauma
  - 53% vs 31%
- The percentage of patients who presented to the ED DOA from penetrating trauma with a positive Tox screen
  - 69%
Intoxication and Injuries

- Pedestrians who are intoxicated\textsuperscript{11}:
  - Are less likely to use the crosswalk
    - 23\% vs 65\%
- After they are struck by a MV:
  - Present with a lower GCS
  - Higher rate of head, face, neck, chest, abdomen, extremity and pelvis injuries
  - Longer hospital stay
- 40\% of pedestrian fatalities had been drinking
Intoxication and Homicide

• Of 78,000 homicide victims in over 13 countries, 48% tested positive for alcohol.\textsuperscript{8}

• Of over 30,000 homicide victims in over 5 countries:\textsuperscript{10}
  – 5% positive for opioids
  – 6% positive for marijuana
  – 11% positive for cocaine.
Intoxication and Injuries

- Many studies reveal a greater incidence of craniofacial trauma in patients with alcohol intoxication.
- A 2004 study reviewed healthy adults from 16-60 who fell from a standing height:
  - Head injury among sober patients: 9%
  - Head injury among intoxicated patients: 48%
- The Country where the study was conducted:
  - Ireland
Intoxication and Injuries

• 2015 Norwegian study looked GCS and in moderate to severe head injured patients relative to standardized head CT severity scores\textsuperscript{19}

• The influence of alcohol significantly reduced the GCS score in a dose-dependent manner within similar head injured groups
Intoxication and Capacity

DANGER

REALLY BAD IDEA AHEAD
Capacity

• The ability to make a rational decision based on relevant facts and considerations.

• In criminal law, it refers to the ability of the defendant to understand the wrongfulness of his/her actions.

• Vague and somewhat subjective…
“Capacity” is the ability of a person to understand the significant benefits and risks of and alternatives to proposed health care and to make and communicate a health care decision.
– MCA 53-21-1302(2)
Capacity

• In medicine it refers to the ability of the patient to “appreciate”:
  – Diagnosis and prognosis
  – Nature of recommended care
  – Alternative courses of care
  – Risks, benefits and consequences of alternatives

• And a decision **must be made**,  
• And that decision **must be**
  – consistent with their values
  – not a result of delusion
  – made using logical reasoning
• Questions to determine the ability of the patient to understand the treatment and the proposed options for care

  - What is your understanding of your condition?
  - What are the options for your situation?
  - What is your understanding of the benefits of treatment and what are the odds that the treatment will work for you?
  - What are the risks of treatment and what are the odds that you may have a side effect or bad outcome?
  - What is your understanding of what will happen if nothing is done?
• Questions to determine the ability of the patient to *appreciate* how that *information applies to their own situation*\(^{15-18}\)
  
  • Why do you think your doctor has recommended *(name of specific treatment or test)* for you?
  
  • *Tell me what you really believe about your medical condition.*
  
  • Do you think it *(specific treatment/test)* is the best treatment/test for you? Why or why not?
  
  • What do you think will actually happen to you if you accept this treatment? If you don't accept it?
• Questions to determine their ability to reason with that information in a manner that is supported by the facts and the patient's own values\textsuperscript{15-18}

• What factors/issues are most important to you in deciding about your treatment? What are you thinking about as you consider your decision?

• Do you trust your doctor? Why or why not?

• How are you balancing the pluses and minuses of the treatments?

• What do you think will happen to you now?
• Questions to determine the ability of the patient to communicate and express a choice clearly\textsuperscript{15-18}

  • You have been given a lot of information about your condition. Have you decided what medical option is best for you right now?

  • We have discussed several choices; what do you want to do?
Montana Code Annotated

• “Incapacitated” means that a person is determined by the supervising health care provider or a court to lack the ability to give or withhold consent for medical care.
  – MCA 53-21-1302(5)
Incapacity and Illness

• Acute medical illnesses
  – Intoxication, unstable vital signs, hypoglycemia, head trauma

• Chronic medical illnesses
  – Alzheimer’s, dementia, psychiatric illnesses
Anecdotal Medicine
Intoxication and Occult Injury

• Missed injuries in the intoxicated trauma patient are common
• The risk of unsuspected injuries has been independently associated with a positive blood alcohol concentration\(^{24}\)
  – 5 times as likely to miss injuries at initial presentation
Intoxication and the C-Spine
The Canadian C-Spine Rule
GCS 15, normal vital signs

Please check off all choices within applicable boxes:

1. Any One High-Risk Factor Which Mandates Immobilization?
   - No
   - Yes
   - O
   - O
   - Age ≥ 65 years
   - OR
   - Dangerous mechanism *
   - OR
   - Numbness or tingling in extremities

2. Any One Low-Risk Factor Which Allows Safe Assessment of Range of Motion?
   - No
   - Yes
   - O
   - O
   - Simple rear-end MVC **
   - OR
   - Ambulatory at any time at scene
   - OR
   - No neck pain at scene when asked
   - OR
   - (answer “yes” if no pain)
   - O
   - O
   - No pain during midline c-spine palpation
   - (answer “yes” if no pain)

3. Patient Voluntarily Able to Actively Rotate Neck 45° Left and Right When Requested, Regardless of Pain?
   - No
   - Yes
   - O
   - O

* Dangerous Mechanism
- fall from elevation ≥3feet/5 stairs
- axial load to head, e.g. diving
- MVC high speed (≥100km/hr), rollover, ejection
- motorized recreational vehicles e.g. ATV
- bicycle collision with object e.g. post, car

** Simple Rearend MVC Excludes:
- pushed into oncoming traffic
- hit by bus/large truck
- rollover
- hit by high speed vehicle (≥100 km/hr)
Figure 11. National Emergency X-Radiography Utilization Study (NEXUS) Criteria

Meets all low-risk criteria?
1. No posterior midline cervical-spine tenderness
2. No evidence of intoxication
3. A normal level of alertness
4. No focal neurologic deficit
5. No painful distracting injuries

- YES: No Radiography
- NO: Radiography
WARNING:

DRINKING MAY CAUSE MEMORY LOSS.
OR WORSE, MEMORY LOSS.
References

2. CDC. Behavioral Risk Factor Surveillance System (BRFSS)[database]
3. CDC. Prevention Status Reports (PSR)[database]
4. USDOT NHTSA State Alcohol-Impaired-Driving Estimates 2012 Data
References

12. NHTSA Fatalities and Fatality Rates in Alcohol-Impaired-Driving Crashes by State, 2007-2008
References