Detection and minimizing risk in outbreaks by contaminated beverages. 
The methanol experience

Hossein Hassanian-Moghaddam  MD, FACMT  
Loghman-Hakim Hospital Poison Center  
Tehran-IRAN
Conflict of interest

None
Introduction

• Toxic Alcohol Outbreak (TAO) generally occurs as single sporadic events, epidemics are reported and continue to occur in different parts of the world due to the illicit manufacture and sale of alcoholic beverages.

• Size?

• Mortality and Morbidity?

• Prognostication Factors?
Prognostic factors in methanol poisoning

H Hassanian-Moghaddam*, A Pajoumand, SM Dadgar and Sh Shadnia

Poison Control Center, Loghman–Hakim Hospital, School of Medicine, Shaheed Beheshti Medical University, Tehran, Iran

The aim of this study was to assess the clinical and laboratory factors in methanol-poisoned patients to determine the prognosis of their toxicity. This survey was done as a prospective cross-sectional study in methanol-poisoned patients in Loghman-Hakim hospital poison center during 9 months from October 1999–June 2000. During this time 25 methanol-poisoned patients were admitted. The mortality rate was 12 (48%). Amongst survivors, three (23%) of the patients developed blindness due to their poisoning and the other 10 (77%) fully recovered without any complication. The mortality rate in comatose patients was nine (90%) while in non-comatose patients it was three (20%) \( (P < 0.001) \). There was a significant difference in mean pH in the first arterial blood gas of patients who subsequently died \( (6.82 \pm 0.03) \) and survivors \( (7.15 \pm 0.06) \) \( (P < 0.001, \text{M-W}) \). The mean time interval between poisoning and ED presentation in deceased patients were \( (46 \pm 15.7) \) hours, in survived with sequelae were \( (16.7 \pm 6.7) \) and in survived without sequelae were \( (10.3 \pm 7.2) \) hours \( (P < 0.002, \text{K-W}) \). We found no significant difference between the survivors versus the patients who died regarding methanol. Simultaneous presence of ethanol and opium affected the outcome of the treatment for methanol intoxication favourably and unfavourably, respectively. In our study, poor prognosis was associated with pH < 7, coma on admission and >24 hours delay from intake to admission. Human & Experimental Toxicology (2007) 26: 583–586.

Key words: fatal outcome; methanol; prognosis; toxicity
Question?

• Can early active case finding be helpful in disaster control by decreasing ingestion-presentation time period or it simply makes events more complicated by creating public fear, ED overcrowding, and wasting time and energy?

• Do we need a triage system and prepare a plan for assessment of multiple patients in mass poisoning, How?

Hassanian-MoghaddamH, Shadnia S. What Is The First Priority? Forgotten role of case finding in methanol outbreaks. 7th Annual Congress of Asia Pacific Association of Medical Toxicology; 2008; 7-10 December, Chandigarh, India
Sequence of events during outbreak from the beginning to the end

May 29th 19:45
- Presentation of the first case to Rafsanjan ED

May 30th 00:10
- Number of patients presented to EDs: 5
- EOC Activation

May 30th 13:15
- Number of patients presented to EDs: 15
- All hospitals in Rafsanjan were alarmed, ED resources were reorganized, all on-call physicians and staffs were recruited to the hospitals
- EMS system reorganized for possible transportation
- A hospital was assigned as the collection point: hospital resources were reorganized

May 30th 14:30
- Number of patients presented to EDs: 26
- Local resources were estimated insufficient for increasing number of patients

May 30th 15:00
- Transportation to Kerman (transported collection point) by EMS started
Active case finding by:

- Encouraging alert patients to find their compotators
- Sending warning messages via Short Message Service
- Repeated announcements by Rafsanjan radio broadcasting
- Announcement by speakers in some places
Sequence of events during outbreak from the beginning to the end

May 30th
16:00
• Active case finding protocol activated

May 30th
17:00
• First patients arrived at Bahonar hospital-Kerman (transported collection point)
• Evaluation of transported patients by serial blood gas analysis/repeated exams while ethanol therapy has started in Rafsanjan

May 30th
18:00
• Catheter placement for hemodialysis in a number of patients according to national guideline started
• Sending patients to hemodialysis

May 31st
02:00
• Number of patients presented to Rafsanjan EDs exceeded 500 cases
• Patients underwent hemodialysis were distributed among 5 hospitals in Kerman for further evaluation

May 31st
18:00
• The outbreak estimated to be controlled
• Sporadic cases are still presenting to Rafsanjan EDs
• Discharge of asymptomatic patients started

June 3rd
• End of outbreak was issued by EOC

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<tr>
<th>Number of transported patients to other cities of the province</th>
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<tr>
<td>Kerman</td>
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<td>177</td>
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Outbreak in brief

• Hemodialysis
  – 75 in Rafsanjan
  – 100 in Kerman

Most common indications reported as metabolic acidosis (pH<7.25 and/or Base Deficit>15mmol/L) refractory to metabolic blockade and visual disturbances.

• Transported Patients:
  – Except that in 138 patients in which reliable reports of physical exams were reported to EOC, 65 (47%) had visual disturbances.

• End of the outbreak: 8 (1.1%) deaths were reported 7 in Rafsanjan and 1 in Zarand.

• No visual disturbance
Challenges

• This active approach of case finding in epidemics can impose challenges due to the potential for over-burdening of the health system

• Triaging of investigations and treatments to those patients who are most likely to benefit

• Specifically in the case of methanol, symptoms may be minimal at the time of assessment despite a high risk of toxicity
Facts

• Patients may present with severe toxicity at which point outcomes are anticipated to be very poor regardless of the treatment received

• Given the episodic nature of epidemics, the complexity is compounded when the responsible clinicians are inexperienced in the assessment and management of methanol poisoning
How to assess the patients, including plans to prevent hospital overcrowding

1. All conscious patients to be referred to a local clinic or hospital (public announcements)
2. *Pre-emptively administer ethanol (for who?)
3. Confirmation of exposure
4. Transportation in specific cases

CRITICAL CARE

Risk factors related to poor outcome after methanol poisoning and the relation between outcome and antidotes – a multicenter study

RAIDO PAASMA,1 KNUT ERIK HOVDA,2 HOSSEIN HASSANIAN-MOGHADDAM,3 NOZHA BRAHMI,4 REZA AFSHARI,5 LEIV SANDVIK,6,7 and DAG JACOBSEN8

1Department of Anesthesiology and ICU, University of Tartu, Pärnu County Hospital, Estonia
2The National NBC Center; Department of Acute Medicine, Oslo University Hospital, Ulleval, Oslo, Norway
3Department of Clinical Toxicology, Loghman-Hakim Poison Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
4Department of Intensive Care Medicine and Clinical Toxicology, (CAMU), Tunis, Tunisia
5Medical Toxicology Center, Imam Reza (p) Hospital, Mashhad University of Medical Sciences, Mashhad, Iran
6Faculty of Medicine, University of Oslo, Oslo, Norway
7Section of Epidemiology and Statistics, Oslo University Hospital, Ulleval, Oslo, Norway
8Department of Acute Medicine, Oslo University Hospital, Ulleval, Oslo, Norway

Introduction. Thorough prognostic and metabolic studies of methanol poisonings are scarce. Our aims were to evaluate the factors associated with sequelae and death from methanol poisoning, to develop a simple risk-assessment chart to evaluate factors associated with sequelae and death from methanol poisoning, and to compare the antidotes ethanol and fomepizole. Patients and methods. We present a retrospective observational case series of methanol-poisoned patients from Norway (1979 and 2002–2005), Estonia (2001) and Tunisia (2003/2004), and patients from two different centers in Iran (Teheran 2004–2009 and Mashhad 2009–2010) who were identified by a positive serum methanol and had a blood acid-base status drawn on admission. The patients were divided into different groups according to their outcome: Survived, survived with sequelae, and died. Results. A total of 320 patients were identified and 117 were excluded. Of the remaining 203 patients, 48 died, and 34 were discharged with neurological sequelae. A pH < 7.00 was found to be the strongest risk factor for poor outcome, along with coma (Glasgow Coma Scale (GCS) < 8) and a pCO2 ≥ 3.1 kPa in spite of a pH < 7.00. More patients died despite hyperventilation (low pCO2) in the ethanol group. Conclusions. Low pH (pH < 7.00), coma (GCS < 8), and inadequate hyperventilation (pCO2 ≥ 3.1 kPa in spite of a pH < 7.00) on admission were the strongest predictors of poor outcome after methanol poisoning. A simple flow-chart may help identify the patients associated with a poor outcome.

Keywords Methanol poisoning; Prognosis; Antidote; Metabolic disturbances
Basic clinical characteristics in prioritizing patients to receive HD

- pH < 6.7 & coma – likely to die (low priority)
- pH > 7.2 and alert – likely to survive without sequelae with adequate ADH blockade (low priority)
- pH 6.7 to 7.2 – high risk of sequelae (this is the prioritized group for HD – with coma, vision deficits, and compensated acidosis all favoring a high priority)
Concerns

1. A triage system for antidote, HD, discharge plan
2. Estimation of incident
3. Applicable local guidelines
4. Possible exposure with no measurement (role of guidelines)
5. Lack of antidote/HD machine
6. The period of follow-up for asymptomatic patients
7. Decision for transferring some patients
Limitations and Strengths

- Diagnosis and treatment
- National guideline
- Active case finding
  - Not sufficiently stated in previous publication
  - ED overcrowding?
  - Lower ingestion-presentation time
  - Simpler treatments
- Distribution and activating the resources
Conclusion

• Risk-benefit decisions

• The combined effect of case finding using various techniques and the triaging of patient management appeared to be extremely useful, given an overall mortality of 1.2%, compared to a mean mortality of 26% from previous outbreaks

• To develop a protocol for health professionals in any part of the world to triage and manage toxic alcohol outbreaks (TAOs) (In final steps)
Methanol mass poisoning in Iran: role of case finding in outbreak management

Hossein Hassanian-Moghaddam1,2, Ali Nikfarjam3, Amirhossein Mirafzal4, Amin Saberinia4, Abbas Ali Nasehi5, Hossein Masoumi Asl6, Nadereh Memaryan3

1Toxicological Research Center, Loghman-Hakim Hospital, Kamali Ave, South kargar Street, Tehran 13336, Iran
2Department of Clinical Toxicology, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3Ministry of Health, Mental and Social Health and Substance Abuse office, Tehran, Iran
4Department of Emergency Medicine, Kerman University of Medical Sciences, Kerman, Iran
5Iran-HeLa Institute of Applied Sciences and Technology, Tehran, Iran
6Department of Pediatric Infectious Disease, Iran University of Medical Sciences, Tehran, Iran
Address correspondence to Hossein Hassanian-Moghaddam, E-mail: hassanian@sbma.ac.ir, hasanian2000@yahoo.com

ABSTRACT

Background There are no guidelines addressing the public health aspects of methanol poisoning during larger outbreaks. The current study was done to discuss the role of active case finding and a national guideline that organizes all available resources according to a triage strategy in the successful management of a methanol mass poisoning in Rafsanjan, Iran, in May 2013.

Methods A retrospective cross-sectional study was performed reviewing the outbreak Emergency Operation Center files. The objectives were to describe the characteristics, management and outcome of a methanol outbreak using Active Case Finding to trace the victims.

Results A total of 694 patients presented to emergency departments in Rafsanjan after public announcement of the outbreak between 29th May and 3rd June 2013. The announcement was mainly performed via short message service (SMS) and local radio broadcasting. A total of 361 cases were observed and managed in Rafsanjan and 333 were transferred to other cities. Seventy-five and 100 patients underwent hemodialysis (HD), retrospectively. The main indication for HD was refractory metabolic acidosis. Eight patients expired due to the intoxication. Except for the deceased cases, no serum methanol level was available.

Conclusion In developing countries, where diagnostic resources are limited, use of active case finding and developing national guidelines can help in the management of large outbreaks of methanol poisonings.

Keywords methanol, poisoning, outbreak, epidemics, mortality, intoxication
Thank You

Any question?