Medical Conditions in Methamphetamine Users

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Overview

- Introduction of medical conditions observed in methamphetamine (MA) users
- Methamphetamine Treatment Project (MTP) follow-up study design
- Prevalence rates of medical conditions in MA users post-treatment
- Relationship of medical conditions to frequency of MA use and route of administration
- Conclusions and future directions
Methamphetamine

- Synthetic stimulant drug
- Mechanism of action: increases dopamine/NE
- $T^{1/2}$: 12 hours
- Routes of administration: IV, smoking, intranasal, and oral
Epidemiology

- More than 12 million Americans have used meth; 1.4 million within past year (NSDUH, 2004)
- 2nd most commonly abused drug worldwide
  - High rates in Asia, Australia, Scandinavia, US
Short-Term Effects

- Euphoria
- Increased energy/productivity
- Increased concentration
- Decreased appetite
- Increased libido
- Decreased sleep
Medical Consequences

- Acute and chronic conditions affecting multiple organ systems
- Limited literature
- Toxicity possible after single dose, but serious effects more common after prolonged use \(^1\)
- Increasing ED and hospital visits\(^2\)
- Complications may be life-threatening

\(^1\) Karch, 2002; Kaye et al., 2007; \(^2\)SAMHSA, 2004
Medical Effects - Mechanisms

- MA-induced sympathetic nervous system stimulation
- Organ pathology from excess circulating catecholamines
- Direct toxicity to tissues
- Chemical and street drug contaminants
- General health consequences of drug-using lifestyles (needle sharing, malnutrition)
- Concomitant use of other substances
Cardiovascular effects

- Heart rate and blood pressure elevation
- Autopsy studies: cardiomegaly, microvascular disease, accelerated CAD
  - Peripheral catecholamine excess: cardiotoxic
  - Rapid progression of multivessel CAD in young MA abusers relative to controls
- Arrhythmias
  - QTc prolongation
  - Sudden death
- Acute coronary syndrome

1Newton et al., 1999; 2Karch, 2002; 3Haning and Goebert, 2007; 4Turnipseed et al., 2003
Cardiovascular effects- cont’d

- Aortic dissection\(^1\)
  - Mechanisms: HTN, reactive oxygen species
- Acute MI\(^2\)
  - Mechanisms: vasospasm, platelet aggregation
- Cardiomyopathy\(^3\)
  - Usually after prolonged use
  - Mechanisms: catecholamine-mediated vasospasm, cell death, possible direct toxicity\(^4\)

\(^1\) Davis and Swallwell, 1994; \(^2\) Packe et al., 1990; \(^3\) Hong et al., 1991; \(^4\) Maeno et al., 2000
Dental effects

- Rampant caries and tooth fracture most common
- Periodontal disease
- Mechanisms:
  - Poor oral hygiene
  - Xerostomia (dry mouth)
    - Alpha 2 receptor stimulation, dehydration
  - Soft drink consumption
  - Bruxism
  - Acidic content of MA
  - Corrosive contaminants of MA (smoking)

1 Shaner et al., 2006
Dermatological Effects
Dermatological Effects

- Pruritis
- Cutaneous ulcers and excoriations from skin picking (formication, “meth bugs”)
- Abscesses
- Cellulitis
- Burn injuries
CNS effects

- **Psychiatric symptoms**
  - Depression, anxiety, and psychosis common

- **Altered consciousness**\(^1\)

- **Tonic-clonic seizures**\(^2\)
  - Secondary to hyperthermia, ARF, shock

- **CVA**\(^3\)
  - Mechanisms: vasospasm, HTN, cerebral vasculitis

- **Choreoathetoid movement disorders**\(^4\)

- **Hyperkinetic and repetitive movements**\(^5\)

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CNS effects – cont’d

- **Neurocognitive deficits**
  - 40% MA-dependent individuals display evidence of neuropsychological impairment\(^1\)
  - Frontostriatal and limbic deficits including memory, executive functions, attention and psychomotor tasks\(^2\)
  - Severity of deficits may worsen during initial abstinence and may persist for 9 months or longer
  - At least partial recovery in dopamine terminal and cognitive functioning in MA dependent populations\(^3\)

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\(^1\)Rippet et al., 2004; \(^2\)Scott et al., 2007; \(^3\)Wang et al., 2004
Aims

- To characterize the prevalence of medical problems in methamphetamine using populations.
- To describe the nature and extent of the association between medical conditions and post-treatment MA use frequency.
- To determine the relationship between route of administration and medical outcomes.

Hypotheses

- MA use frequency will be associated with higher rates of medical comorbidity
- Injection use will be associated with higher rates of medical comorbidity
Study Design

- Post-treatment follow-up of 301 MTP participants
- Medical conditions assessed at 3-year follow-up by trained interviewers and physicians
- Multivariate logistic regression used to determine relationship of medical conditions with MA use frequency during follow-up:
  - Self-reported health conditions
  - Physical exam findings
  - Laboratory abnormalities
  - ECG abnormalities
- Covariates: sociodemographic factors, lifetime MA use, and route of administration
Participants

- Inclusion criteria: 18+ yrs old, MA dependence dx at entry, use within 30 days prior to tx
- Exclusion criteria: Severe medical or psychiatric conditions, need for detox, recent drug treatment
- Characteristics: average age of 37, majority male (62%), Caucasian (68%), employed (71%), and unmarried (77%)
- Average MA use at follow-up: 11 years total, 4.5 days out of past 30
- Preferred route of administration smoking (65%), followed by IV (26%) and intranasal (9%) use
Assessment Instruments

- Addiction Severity Index (ASI)
- Life Experiences Timeline (LET)
- Health Status Survey (HSS)
- Medical History Survey
- Physical examination
- Vital signs
- ECG
- Clinical laboratory testing
Results

- **Frequencies of lifetime medical problems (n=301)**
  - Hypertension: 19%
  - Wounds and Burns: 41%
  - Back injury: 35%
  - Hepatitis: 15%
  - Sexually transmitted diseases: 31%
  - Severe dental problems: 33%

- **Frequencies of physical exam abnormalities (n=301)**
  - BMI>=25: 66%
  - HTN: 22%
  - Missing teeth: 64%
  - Oral pathology: 41%

- **ECG abnormalities (n=245)**
  - QTc prolongation: 20%
  - Bradycardia: 10%
Results (Cont’d)

- Relationship of medical problems to MA use during follow-up
  - No significant associations between medical conditions and frequency of MA use during follow-up period or past 30 days

- Association of injection use with medical problems
  - Hepatitis (OR: 15.3; 95% C.I., 6.4-36.8)
  - Dental problems (OR: 2.2, 95% C.I., 1.2-4.0)
  - STDs (OR: 2.1, 95% C.I., 1.2-3.9)
  - Missing teeth (OR: 2.4, 95% CI 1.2-4.7)
  - Hep C core Ab (OR: 13.1; 95% CI 5.6-30.1)
Study Limitations

- Health conditions assessed in a relatively young sample at a single time point post-treatment.
- Alcohol and other drug use not controlled for in multivariate analyses.
- Users may alternate routes of administration over time.
Conclusions and Future Directions

- Certain health conditions consistent with known consequences of stimulant use were observed at elevated rates.
- Post-treatment MA use frequency was not associated with a majority of medical outcomes.
- For a subset of conditions, disease risk was exacerbated by intravenous MA use.
- Future research questions:
  - Physical health trajectories of MA users
  - Mechanisms underlying disease pathogenesis
  - Effects of treatment on health conditions
  - Health effects of MA relative to other drugs of abuse
Acknowledgements

Collaborators:

- Suzette Glasner-Edwards, Ph.D.
- Patricia Marinelli-Casey, Ph.D.
- Maureen Hillhouse, Ph.D.
- Alfonso Ang, Ph.D.
- Jeremy Hunter, M.A.
- William Haning, M.D.
- Paula Colescott, M.D.
- Richard Rawson, Ph.D.

Thanks to the treatment and research staff at the participating community-based center sites and the study investigators in each region.

The research presented in this talk was supported by grants provided by the Center for Substance Abuse Treatment (CSAT), Substance Abuse and Mental Health Services Administration (SAMHSA), US Department of Health and Human Services.
Proposed Study: Health Conditions in Prescription Drug Abusers and their Relationship to Treatment Outcomes

Aims

To describe the demographic characteristics and etiology of drug use in a population of adult prescription drug abusers.
- Patterns of use
- Sequence of multidrug use
- Pre-treatment health conditions
- Patterns of service utilization

To characterize the prevalence of medical and psychiatric comorbidities in this population.

To describe the nature and extent of the association between medical conditions and treatment outcomes.
- Treatment retention
- Substance use outcomes
- Medical and psychiatric outcomes
Hypotheses and Goals

- **Hypothesis:** Higher rates of medical and psychiatric comorbidities will be associated with poorer treatment outcomes
  - Treatment retention
  - Substance use

- **Findings will have clinical implications for:**
  - Early identification of Rx drug abusers
  - Identification of unique treatment needs
  - Development of targeted screening and treatment interventions
Assessment Instruments

- Addiction Severity Index (ASI)
- SF-36
- HIV Risk-Taking Behavior Scale
- PRISM
- Beck Depression Inventory
- Beck Anxiety Inventory
- Brief Pain Inventory
- Brief Substance Craving Scale
- CGI
- Quality of Wellbeing Scale
Thank you

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