

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

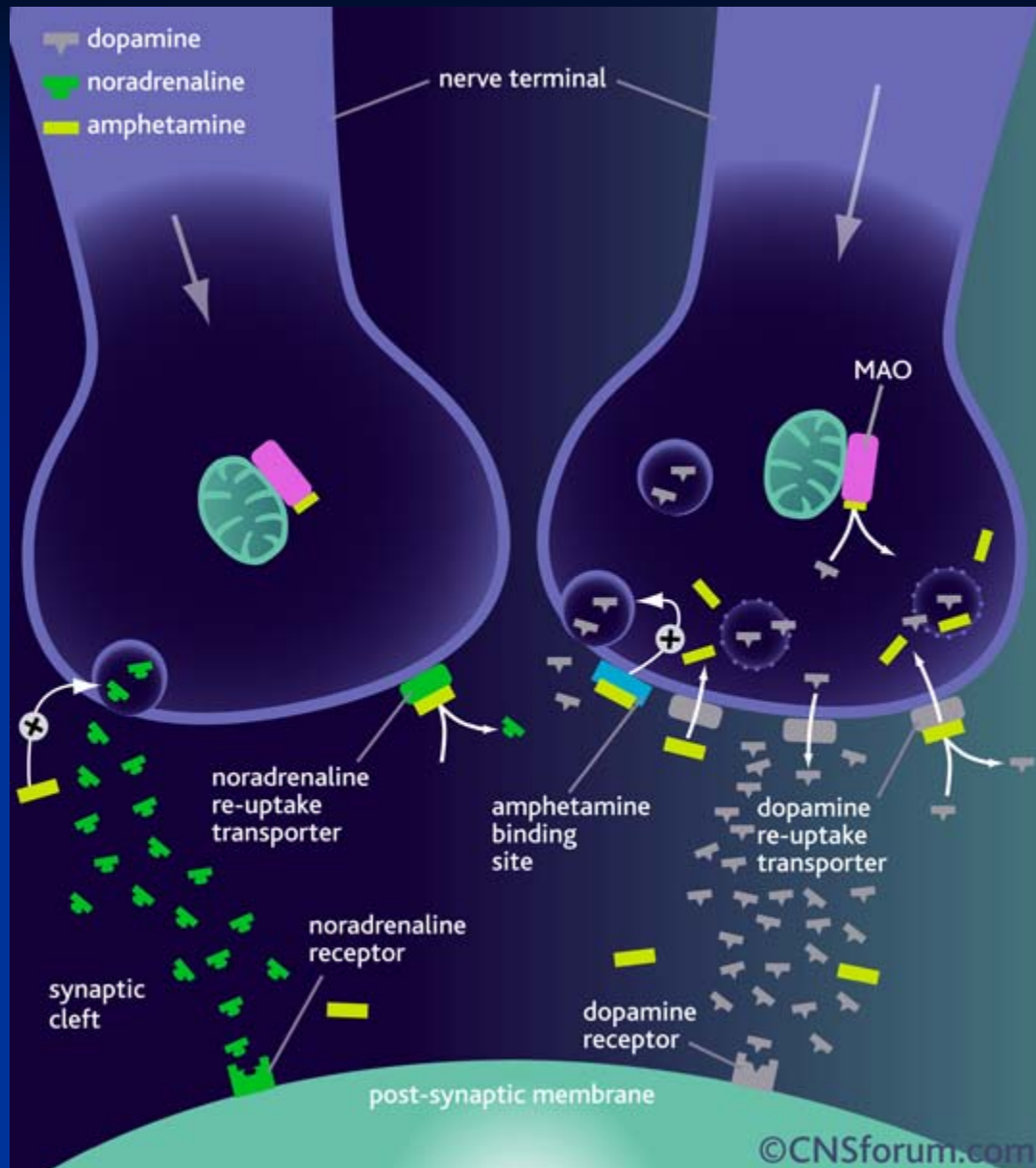


- Synthetic stimulant drug
- Mechanism of action: increases dopamine/NE
- $T_{1/2}$: 12 hours
- Routes of administration: IV, smoking, intranasal, and oral

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 visits²
- Complications may be life-threatening

¹ Karch, 2002; Kaye et al., 2007; ²SAMHSA, 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 elevation¹
- Autopsy studies: cardiomegaly, microvascular disease, accelerated CAD²
 - Peripheral catecholamine excess: cardiotoxic
 - Rapid progression of multivessel CAD in young MA abusers relative to controls
- Arrhythmias
 - QTc prolongation³
 - Sudden death
- Acute coronary syndrome⁴

¹Newton et al., 1999; ²Karch, 2002; ³Haning and Goebert, 2007; ⁴Turnipseed et al., 2003

Cardiovascular effects- cont'd

- Aortic dissection¹
 - Mechanisms: HTN, reactive oxygen species
- Acute MI²
 - Mechanisms: vasospasm, platelet aggregation
- Cardiomyopathy³
 - Usually after prolonged use
 - Mechanisms: catecholamine-mediated vasospasm, cell death, possible direct toxicity⁴

¹Davis and Swallowell, 1994; ²Packe et al., 1990; ³Hong et al., 1991; ⁴Maeno et al., 2000

“Meth Mouth”



Shaner JW, Kimmes N, Saini T, and Edwards P, 2006. “Meth mouth”: rampant caries in methamphetamine abusers. *AIDS Patient Care and STDs* 20(3): 146-150.

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)

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 consciousness¹
- Tonic-clonic seizures²
 - Secondary to hyperthermia, ARF, shock
- CVA³
 - Mechanisms: vasospasm, HTN, cerebral vasculitis
- Choreoathetoid movement disorders⁴
- Hyperkinetic and repetitive movements⁵

¹Richards, 1999; ²Albertson et al., 1999; ³Yen et al., 1994; ⁴Rhee et al., 1998; ⁵Wallace et al., 1999

CNS effects – cont'd

- Neurocognitive deficits
 - 40% MA-dependent individuals display evidence of neuropsychological impairment¹
 - Frontostriatal and limbic deficits including memory, executive functions, attention and psychomotor tasks²
 - 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 populations³

¹Rippet et al., 2004; ²Scott et al., 2007; ³Wang et al., 2004

Health Conditions In Methamphetamine Dependent Patients 3-years Post-Treatment

■ 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 \geq 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

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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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