Methamphetamine: The problem is crystal …. but is the solution clear? How can general practitioners help patients and families now?

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1. Why is methamphetamine a problem?

The chemical

Methamphetamine is a synthetic substance deriving from phenethylamines. Phenethylamines are endogenous trace amines with structural similarity to the monoamines (dopamine, nor-epinephrine, serotonin). Addition of a methyl group to phenethylamine gives α-methylphenethylamine AKA amphetamine. Addition of a second methyl group gives α-dimethylphenethylamine AKA methylamphetamine. Methamphetamine exists in three forms of varying purity:

- Powder has the street name 'speed' and is approximately 10% pure
- Base has the street name 'base' and is approximately 20% pure
- Crystalline has the street name 'crystal' or 'ice' and is approximately 80% pure

Crystal methamphetamine is the most **potent** form of methamphetamine and can be **smoked**. The outcome here is more **intense** effects (e.g. euphoria) that occur more **rapidly** (cf. base or powder). In turn, dependence is more likely. In 2013, crystal users were 10 times more likely to use often (≥ weekly) compared with those using powder. The final effect is increased individual and societal harms.

The physiological and psychological effects

Methamphetamine increases dopamine, norepinephrine and serotonin levels in the synaptic cleft. Vesicular monoamine transporter-2 (VMAT-2) function is reversed by methamphetamine thereby increasing cytosolic concentrations of the monoamines. Function of the membrane transporters for dopamine (DAT), nor-epinephrine (NET) and serotonin (SERT) is reversed by methamphetamine which increases transport of these monoamines from cytosol to synaptic cleft. Methamphetamine prolongs exposure of postsynaptic receptors to monoamines by inhibiting the monoamine oxidase. The outcomes here include tachycardia, hypertension, hyperthermia, hyperreflexia, mydriasis, euphoria, improved attention, disinhibition, psychosis (paranoia, formication), choreoathetosis.

The clinical problems

Acute problems include: Coronary syndromes, aortic dissection, arrhythmia, tremor, anorexia, rhabdomyolysis, acute pulmonary oedema, cerebrovascular accident, seizure, organ failure, psychosis, aggression and violence, anxiety, agitation. Chronic problems include cardiomyopathy, immunosuppression, dental caries, bacterial skin infections, neurotoxicity, cognitive impairment, depression, suicidality.

2. How can the general practice community assist patients with crystal methamphetamine use disorder?

It must be emphasised that the evidence base for methamphetamine treatment is limited.

Withdrawal management

Limited data exist to define the course of withdrawal. Symptoms include hypersomnia, hyperphagia, anhedonia, dysphoria, fatigue, anxiety, agitation. No medications are approved for this purpose. Few trials (n=9) of few medications (n=4) exist. No evidence is available for any psychosocial intervention here. In practice containment, observation (especially for suicidal ideation in vulnerable patients) and symptomatic relief may be needed.

Relapse prevention

No medications are approved for longer-term treatment. A recent review involved 39 studies of 18 medications. Dexamphetamine, modafinil, bupropion, naltrexone and methylphenidate were identified as medications with some potential. Bupropion is promising for those with low baseline consumption (e.g. ≤ 18 days/month) and is PBS authorised for tobacco smokers. Naltrexone may be effective and is PBS authorised in comorbid alcohol dependence. Dexamphetamine and methylphenidate are Schedule 8 medications. Modafinil is expensive and only PBS authorised for narcolepsy. In terms of psychosocial interventions, an Australian study found two CBT sessions (45-60 min) effective in attaining abstinence.

Engagement and retention

It is clear that methamphetamine use declines when users engage in treatment (i.e. both placebo and treatment groups improve in multiple studies of various treatment modalities). Other factors also improve (psychological distress, polysubstance use, sexual risk taking behaviour). Multiple treatment modalities can be effective. Almost any form of constructive engagement with a substance use treatment service, such as initial assessment, may be enough to foster positive change. But, poor treatment uptake (10%) and retention (<50%) in methamphetamine users is well documented. However, *53% of methamphetamine users had been to see a general practitioner in the past month*.

3. So what to do as a general practitioner?

Acute medical and psychiatric assessment and treatment (chest pain? arrhythmia? CCCF? agitated psychosis?) to exclude the 'not to be missed' sequelae. A comment on methamphetamine-induced psychosis:

- Usually transient
- Paranoia may be associated with aggression and violence
- Assessment and investigations as for any undifferentiated case of altered mental status
- Ongoing use of antipsychotics usually not required

4. Withdrawal management 'detox'

- Commonly requested and thought of as 'the cure'
- Used in isolation highly ineffective
- Limited and brief (Day 3-5) role of benzodiazepines (irritability, agitation)
- Be aware of low mood, anhedonia with associated suicidal ideation in at risk patients

5. Longer-term medical assessment and treatment

- History, examination, investigation as for any substance use disorder
- Treat medical problems (e.g. skin and soft-tissue infections, cardiac care, BBV, dental)
- Treat psychiatric problems (e.g. depression)
- Develop a therapeutic alliance
- Invest in intensive follow-up
- Provide education on harms and treatment options
- Provide brief intervention and brief motivational interviewing
- Encourage renormalisation (e.g. relationships, community involvement, employment)
- Consider clinical psychology referral on GP MHCP (CBT)

- Consider naltrexone in comorbid alcohol use disorder
- Consider bupropion in comorbid tobacco use disorder

6. Where specialist services may be needed consider

- Referral to the local community alcohol and drug service
- Referral to the Next Step Inpatient Withdrawal Unit (East Perth)
- Referral to long-term residential rehabilitation (NGO)

7. Tools and resources for general practitioners

Parent and Family Drug Support Line

Available to call 24/7 on 94425050 (metro) and 1800653203 (country). This is a confidential, non-judgmental telephone counselling, information and referral service for anyone concerned about a loved one's alcohol or drug use. Callers have the option to speak to an experienced parent volunteer.

Meth Helpline

Proving 24/7 support for users, family and friends impacted by meth use. The number is 1800 874 878. The Mental Health Commission (MHC) Methamphetamine (Meth) Initiative, which forms part of the Western Australian Meth Strategy 2016 (WA Meth Strategy 2016). Previous Liberal State Government).

Clinical Advisory Service

A 24-hour phone service for GPs and other health care professionals seeking clinical information and advice on alcohol and drug treatment. Staffed by experienced medical officers from Next Step Drug and Alcohol Services.

Cracks In the Ice: Crystal Methamphetamine.

An evidence-based information source produced in partnership by Australian Government Department of Health, National Drug and Alcohol research Centre, National Drug Research Institute, NHMRC Centre of Research Excellence in Mental Health and Substance Use. https://cracksintheice.org.au

Ice: Training for Frontline Workers.

Produced by the National Centre for Education and Training on Addiction. https://nceta.androgogic.com.au