Comparison of crystalline methamphetamine ("ice") users and other patients with toxicology-related problems presenting to a hospital emergency department

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ABSTRACT

Objective: To compare demographic and clinical characteristics of methamphetamine users and patients with other toxicology-related problems requiring medical intervention in a hospital emergency department (ED).

Design and setting: Prospective observational study of toxicology-related presentations to the ED of St Vincent's Hospital (SVH), Sydney, an inner-city tertiary hospital, between 1 October and 31 December 2006.

Main outcome measures: Differences between methamphetamine-related and other toxicology-related presentations to the ED in relation to behaviour, mode of arrival, accompaniment, need for scheduling, location of drug use, intravenous drug use history, psychiatric history and demographic characteristics.

Results: During the study period there were 10 305 patient presentations to SVH ED; 449 (4%) were toxicology-related presentations, of which 100 (1% of total) were methamphetamine-related. Methamphetamine users were significantly more agitated, violent and aggressive than patients with other toxicology-related presentations and significantly less alert, communicative and cooperative ($P < 0.001$); 24% of methamphetamine users (24/100) arrived with police accompaniment versus 9% of other toxicology patients (33/349) ($P < 0.001$). Methamphetamine users were more likely to have a history of intravenous drug use and mental health problems ($P < 0.001$); 39% of methamphetamine presentations (39/100) required scheduling under the *Mental Health Act 1990* (NSW) compared with 19% of other toxicology-related presentations (67/349) ($P < 0.001$); 43% of methamphetamine-related presentations (43/100) involved drug use on the street compared with 24% of other toxicology-related presentations (83/349) ($P < 0.001$). Two-thirds of all methamphetamine users were male, and the most common age group for both male and female users was 26–30 years. The mean age and sex distribution of patients with other toxicology-related presentations were not significantly different. Among methamphetamine users, 27% of women (9/33) were in the 21–25-year age group compared with 10% (7/67) of men ($P < 0.001$).

Conclusion: There were significant differences between methamphetamine-related and other toxicology-related presentations to SVH ED. Methamphetamine users were more aggressive, violent and dangerous, and thus more likely to pose a risk to health personnel and others. Methamphetamine appeared to be used consistently, rather than as an episodic "party drug".

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Crystalline methamphetamine ("ice") has emerged as a mainstream recreational illicit drug.[1,2] Its use is widespread in rural and metropolitan areas and across all socioeconomic levels.[3] Because methamphetamine use commonly results in agitation, aggression, insomnia, hallucinations, paranoia and psychosis,[4,5] psychostimulant intoxication is a serious issue for staff of Australian hospital emergency departments (EDs)[6] and other service providers, including ambulance officers and police.

Our study examined toxicology-related ED presentations requiring medical intervention. Our aim was to determine whether there are significant demographic or clinical differences between methamphetamine users and other patients presenting with toxicology-related problems.

METHODS

From 1 October to 31 December 2006, we conducted a prospective observational study of toxicology-related presentations to the ED of St Vincent's Hospital (SVH), Sydney, an inner-city teaching hospital. In 2006, there were 37 894 presentations to the SVH ED, with an admission rate of 46% (17 568).

For the purposes of our study, patients with toxicology-related problems were those who presented with any complaint directly related to the recent use of licit or illicit drugs. Patients were identified on the ED Information System (EDIS) by the triage nurse at initial presentation, alerting medical staff to the need to seek and record the information required for our study.

We designed a "Toxicology Admission" form based on the TOXBASE database, a Microsoft Access database originally developed by the Department of Clinical Toxicology and Pharmacology of the Mater Misericordiae Hospital, Newcastle.[7,8] Medical staff prospectively completed the form, which was then included as a permanent component of the patient's medical record. The data recorded included information on demographics, vital signs, behaviour in the ED, current substance use, psychiatric history, examination and management. Psychiatric history was self-reported and then confirmed by cross-checking. Various sources were checked to ensure that all eligible patients were included in the study, including the nursing and medical screens of EDIS, ambulance data forms, Section 24 schedules under the *Mental Health Act 1990* (NSW) and, finally, the medical records of all discharged patients with toxicology-related problems. A small number of forms were filled in retrospectively, based on information in the medical record, by a single unblinded investigator (P J B).

During September 2006, before commencement of the study, the Toxicology Admission form and study methods were trialled and modified, and staff were educated in the procedures to be followed.

Data processing involved Verity TeleForm scan station, verification and reader software and technology (Verity Inc, Sunnyvale, Calif, USA). This technology allows Toxicology Admission forms to be scanned via a Kodak i40 scanner, read and verified by the Verity TeleForm software and then directly transferred into the TOXBASE database. As well

1 Behaviour of patients during toxicology-related presentations to SVH ED, October–December 2006

Behaviour	Alert, communicative, cooperative*	Anxious, restless, cooperative†	Agitated, showing bizarre behaviour‡	Extremely agitated, aggressive§	Violent, self-destructive¶	Not recorded	Total
Methamphetamine-related presentations	21% (21/100)	13% (13/100)	20% (20/100)	18% (18/100)	3% (3/100)	25% (25/100)	100
Other toxicology-related presentations	29% (102/349)	16% (57/349)	6% (20/349)	2% (7/349)	0% (1/349)	47% (162/349)	349

SVH ED = St Vincent's Hospital Emergency Department (Sydney). * No acute distress. † Moderate distress. ‡ Possible danger to self or others. § Probable danger to self or others. ¶ Definite danger to self or others. ◆

as being automatically checked by the software, data were manually verified by review against the hard-copy Toxicology Admission form for each presentation.

Data were analysed using GraphPad InStat 3 software (GraphPad Software Inc, San Diego, Calif, USA) and Microsoft Excel 2002 (Microsoft Corporation, Redmond, Wash, USA). Two-tailed χ^2 tests were used to compare categorical contingency data tables. Two-tailed unpaired *t* tests were used to compare means.

RESULTS

During the study period, there were 10 305 presentations to SVH ED, of which 449 (4%) were clinically determined to be the result of the use of licit or illicit drugs (toxicology-related). Of these, 100 (22%) were methamphetamine-related (representing 1% of total presentations). Sixteen of the 449 presentations (4%) were the result of accidental overdose with licit drugs.

Methamphetamine users were significantly more agitated, violent and aggressive than other drug users ($P < 0.001$) (Box 1). There was, however, no significant difference between the two groups in the proportion who were anxious (13% of methamphetamine users v 16% of others). While 29% (102/349) of patients with other toxicology-related problems were alert, communicative and cooperative, only 21% (21/100) of methamphetamine-related patients were in this category, but the difference was not statistically significant ($P = 0.078$).

Other differences between methamphetamine-related and other toxicology-related presentations are summarised in Box 2.

The most common age group for methamphetamine-related presentations was 26–30 years for both men and women. However, it was noteworthy that 27% of women (9/33) were in the 21–25-year age group, compared with only 10% of men (7/67) ($P < 0.001$). Similarly, with other toxicology-related presentations, 26% of women (34/129) were aged 21–25 years, compared with 15% of men (33/220) ($P = 0.002$).

Although the proportion of methamphetamine-related presentations remained constant at 1% of all ED presentations throughout the study period, it was interesting to note that, as a proportion of toxicology-related presentations, methamphetamine-related presentations fell from 24% (38/158) in October to 20% (34/166) in December.

Patients included in our study came from a wide range of areas, with only 40% (178/449) residing in the SVH ED catchment area.

DISCUSSION

Our study demonstrated that there are significantly higher levels of behavioural disturbance among patients presenting to an ED with methamphetamine-related problems than among patients with other toxicology-related problems. Methamphetamine users are more agitated, violent and aggressive.

This has implications for ED staff and others, including police and ambulance personnel who are involved in the care of these patients. It is also an important consideration for administrators who resource those services and are responsible for providing a safe environment for staff and other

2 Demographic and clinical differences between methamphetamine users and other patients presenting to SVH ED with toxicology-related problems, October–December 2006

	Methamphetamine-related presentations (*n* = 100)	Other toxicology-related presentations (*n* = 349)	*P*
Mode of arrival at ED			
Accompanied by police	24 (24%)	33 (9%)	< 0.001
Accompanied by family or friends	23 (23%)	144 (41%)	< 0.001
Site of drug use prior to presentation			
On the street	43 (43%)	83 (24%)	< 0.001
In a bar, hotel or club	3 (3%)	55 (16%)	< 0.001
At an event or concert	0	7 (2%)	0.153
History and psychological assessment			
History of previous intravenous drug use	56 (56%)	106 (30%)	< 0.001
History of personality disorder	22 (22%)	48 (14%)	0.021
History of psychosis, or psychosis on presentation	27 (27%)	12 (3%)	< 0.001
Scheduled under Schedule 2 or Section 24 of the *Mental Health Act 1990* (NSW)*	39 (39%)	67 (19%)	< 0.001
Sex			
Male	67 (67%)	220 (63%)	0.407

SVH ED = St Vincent's Hospital Emergency Department (Sydney). * Patients scheduled under the *Mental Health Act* are those deemed to be a danger to themselves or others. They may be scheduled by accompanying police under Section 24 or by the attending medical practitioner under Schedule 2 upon presentation to the ED. ◆

patients. It is essential not only to provide resources to ensure adequate numbers of staff, but also to train all staff members in how to manage aggressive and violent patients. Personal safety must also be taken into account in the design of EDs and the provision of equipment such as personal alarms. Skilled security staff must be readily available to help if necessary and, ideally, prevent problems.

While our findings concurred with data from a Perth study[6] that demonstrated a high proportion of patients with a psychiatric history among amphetamine users, the proportion of our patients arriving at the ED with police accompaniment (24%) was higher than in the Perth sample (16%). Our results also differ from those of an American study in which the majority of methamphetamine-related patients presented via ambulance and only 10% were accompanied by police.[5]

Our study suggests that methamphetamine use tends to be ongoing, rather than a "one off" experiment by recreational drug users. Methamphetamine users were also significantly more likely to have a history of previous intravenous drug use than other drug users, again suggesting regular rather than occasional drug use. We are presently undertaking a longer-term study to examine this issue, which may have serious ramifications for the health system and for health and related personnel. If a substantial proportion of these aggressive and violent patients are habitual drug takers, especially previous intravenous drug users, then the chances of them harming health workers (eg, by transmission of bloodborne viruses) are magnified, and there is even greater need to plan and implement preventive measures.

Another issue that warrants further investigation is the age and sex of people presenting with methamphetamine-related problems. Data available from the 2004 National Drug Strategy Household Survey indicate that the age group most likely to use methamphetamine is people aged 20–29 years.[9] In our study, while this was true of women, men seemed to use the drug at a later age (26–35 years). Further study would elucidate whether these users are presenting as a result of acute or chronic methamphetamine-related problems. Our observation that a higher proportion of women than men in the 21–25-year age group were presenting with toxicology-related problems suggests that the anti-drug message is perhaps less effective in young women.

To our knowledge, this is the first comparative study of methamphetamine users with other drug users in an Australian ED. (The Perth study[6] examined amphetamines in general.) A strength of our study was that we had a complete dataset for each patient. Forms were filled in prospectively as part of the medical record, and any missing information was obtained from elsewhere in the record. Coordination of the study by one investigator ensured consistency in collection and analysis of data.

The major limitation of our study was that it depended on subjective identification of subjects for inclusion. Ideally, all ED patients during the study period would have undergone urine drug screening in order to capture every person to be included and to accurately ascertain what drugs had been taken. As this was not practical in the context of normal ED activity, it is possible that some patients concealed their drug use or were unaware of the exact substance taken.

It should also be noted that our hospital is situated near Kings Cross, Sydney's "red-light" district, where there are more drug users and homeless people with mental health problems than in many other geographical locations. The resulting spectrum bias may have led to overestimation of extreme categories such as behaviour and concurrent substance use. This may limit the applicability of our findings to other hospital practices, although it most likely provided more subjects for our study than would have been the case in a different geographical location.

In summary, our study demonstrated significant differences between the characteristics of patients presenting to SVH ED with methamphetamine-related problems and those presenting with other toxicology-related problems. Methamphetamine users were more likely to present alone or arrive with police accompaniment, to require scheduling under the *Mental Health Act*, and to be of possible danger to themselves or others. They were more likely to have used the drug on the street rather than at bars, clubs, events or concerts, and were more likely to have a history of intravenous drug use and of violent or aggressive behaviour. About a fifth of methamphetamine users had some form of personality disorder, and a quarter had displayed psychosis. Perhaps most notably, methamphetamine users were more aggressive, violent and dangerous than other patients with toxicology-related problems in the ED.

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COMPETING INTERESTS

None identified.

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