What's new in...

Toxicity of drugs of abuse

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Toxicity caused by drugs of abuse is a frequent reason for presentation to hospital. Cannabis is the most widely used recreational agent. Although not often associated with acute toxicity requiring hospital admission, there is increasing recognition of its cardiovascular, respiratory and central effects. Strong opioids like heroin and methadone are still the most common causes of fatal recreational drug poisoning, but morbidity and mortality caused by cocaine has been increasing. Numerous hospital presentations continue to occur following ecstasy use. Although less common, episodes of toxicity relating to other drugs of abuse, such as newer stimulants (e.g. piperazines), gamma hydroxybutyrate and its precursors, and ketamine, are increasingly encountered by medical staff. This article is an update on the toxicity of recreational drugs, concentrating on recent research findings and emerging issues.

Keywords cannabis; cocaine; drugs of abuse; gamma hydroxybutyrate; ketamine; methylenedioxymethamphetamine; methylamphetamine; opioids; piperazines; toxicity

What's new?

- There is increasing understanding of the health effects of the use of cannabis, including psychosis and myocardial ischaemia after acute use, and chronic psychosis and respiratory disease after long-term use
- Some of the effects of cannabis may be enhanced by the increasing concentration of Δ-9 tetrahydrocannabinol in available cannabis preparations
- Cocaine use and mortality is increasing in the UK
- Acute myocardial ischaemia is a complication of exposure to cocaine and the recently published American Heart Association guidelines for management stress the early use of benzodiazepines, glyceryl trinitrate infusion and coronary angiography and avoidance, where possible, of beta blockade
- Although still relatively uncommon, toxicity associated with some newer synthetic sympathomimetic stimulants is increasing: piperazines usually have mild effects but can cause seizures and serotonin syndrome, while phenethylamine derivatives can cause severe toxicity including peripheral vasoconstriction and gangrene
- Ketamine appears to be used increasingly for its psychedelic and dissociative properties — its toxic effects may include agitation, paranoia, hypertension, hyperpyrexia, impaired consciousness and seizures

Introduction

Illicit drug use remains a common global problem, as illustrated by data on lifetime and recent prevalence of use of illicit drugs (Table 1).[1–4] The public health impact of acute toxicity relating to these agents is substantial and advising on recreational drug toxicity forms an important component of the work of acute medicine physicians and poisons centres. This article aims to update clinicians on some recent developments.

Opioids

Heroin use remains a substantial public health problem and deaths from respiratory depression and cardiovascular collapse following overdose are common (Figure 1), especially after intravenous use. Naloxone is still the mainstay of therapy for severe opiate toxicity and is distributed amongst users in many communities in an attempt to reduce heroin-related deaths.

Substitution therapy with methadone or buprenorphine has become routine, and toxicity from these long-acting opiate receptor agonists may result from acute overdose or accumulation after chronic use. Methadone in high concentration can delay ventricular repolarization, prolong the QT interval and provoke *torsade de pointes* ventricular tachycardia.[5,6] Buprenorphine does not affect the QT interval

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Recent data on prevalence of drug use

Drug	Lifetime prevalence (%)				Last year prevalence (%)			
	UK[a]	Europe[b]	USA[c]	Australia[d]	UK[a]	Europe[b]	USA[c]	Australia[d]
Age range	16–59 y	15–64 y	>12 y	>14 y	16–59 y	15–64 y	>12 y	>14 y
Any	30.2	–	46.1	38.1	10.2	–	14.4	13.4
Cannabis	30.2	21.8	40.6	33.5	8.4	7.1	10.1	9.1
Heroin	0.8	–	1.5	2.8*	0.1	0.1–0.6	0.1	0.5*
Cocaine	7.7	3.6	14.5	5.9	2.7	1.2	2.3	1.6
Ecstasy	7.2	2.8	5.0	8.9	1.9	0.8	0.9	3.5
Amphetamines	11.9	3.3	–	6.3	2.2	0.6	–	2.3

*All opiates

[a] Data from UK Focal Point on Drugs: http://www.ukfocalpoint.org.uk/web/Publications201.asp
[b] Data from European Monitoring Centre for Drugs and Drug Addiction: http://www.emcdda.europa.eu/drug-situation?CFID=5559743&CFTOKEN=d9e8bc4acad4908e-FC60CDF7-F215-D6C4-1676B0353795E8C8&jsessionid=3830e337d40a19d73fbe41551a6175603c13
[c] Data from Substance Abuse and Mental Health Services Administration: http://www.oas.samhsa.gov/nsduh/2k7nsduh/AppG.htm#TabG-2
[d] Data from Australian Institute of Health and Welfare: http://www.aihw.gov.au/publications/phe/ndshs07-df/ndshs07-df.pdf

Table 1

and, as a μ opiate receptor partial agonist, causes less respiratory depression than morphine, but its effects are often not fully reversible with naloxone. Buprenorphine toxicity has been particularly severe following intravenous use (e.g. crushed sublingual preparations), or when combined with other sedatives. Long-acting opiates, e.g. oxycodone, are increasingly available on the illicit market.

Recently a toxic leucoencephalopathy has been described following inhalation of heated heroin vapours. Clinical features include an altered level of consciousness, motor restlessness, ataxia and spastic paraparesis. These are associated with characteristic magnetic resonance imaging changes, including symmetrical increases in signal in the cerebellar and cerebral white matter with sparing of the subcortical white matter.[7]

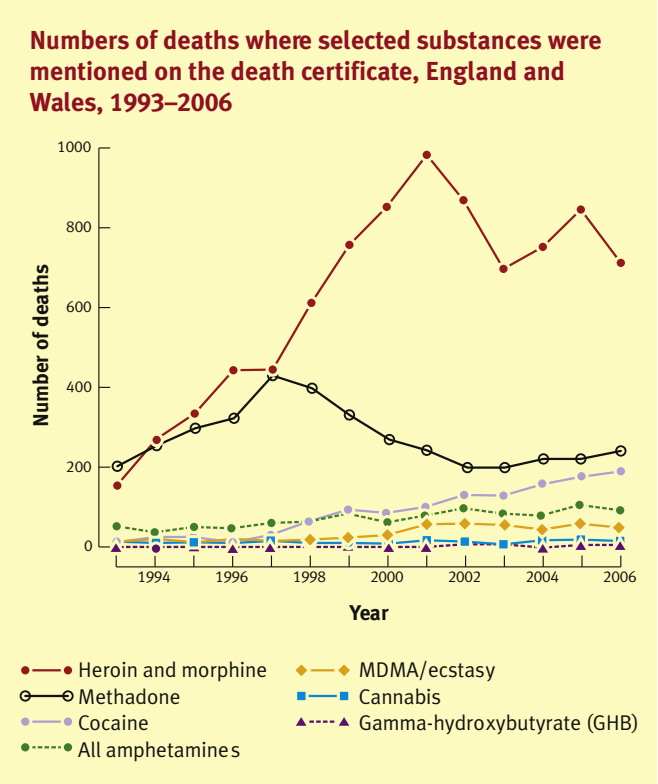

Figure 1

Cannabis

Acute toxicity relating to cannabis is not a common reason for hospital admission but this drug is important because of its very high prevalence of use (Table 1). Although epidemiological data suggest prevalence is stable or declining, the concentration of the major psychoactive component in cannabis preparations, Δ-9 tetrahydrocannabinol (THC), appears to be increasing as a result of the increased supply of indoor, intensively grown, unpollinated female cannabis termed 'skunk' or 'sinsemilla'.

As well as the expected respiratory effects of cannabis smoking, there is accumulating evidence of acute cardiovascular toxicity. Tachycardia and hypotension or hypertension are common, while excess carboxyhaemoglobin reduces the oxygen-carrying capacity of the blood. These effects cause or exacerbate myocardial ischaemia. A reduction in time to develop angina symptoms in patients with chronic stable angina has been recognized for many years, but more recently an almost 5-fold increase in the relative risk of myocardial infarction has been reported within 1 h of smoking cannabis.[8] Following myocardial infarction, an increased risk of