Findings that shed new light on the possible pathogenesis of a disease or an adverse effect

Dependence and psychosis with 4-methylmethcathinone (mephedrone) use

N Bajaj,¹ D Mullen,² S Wylie²

¹ Department of General Adult Psychiatry, Falkirk Royal Infirmary, Falkirk, UK

² Eriskay House, Stobhill Hospital, Glasgow, UK

Correspondence to N Bajaj, nbajaj@doctors.org.uk

Summary

'Legal highs' are recreational drugs sold over the internet and the so-called 'head shops' all over the UK. They are freely available to buy and use as they are not covered by the Misuse of Drugs Act 1971. Mephedrone (4-methylmethcathinone) was sold as a 'legal high' until 17 April 2010 when it was made a class B drug under the Misuse of Drugs Act 1971. Numerous deaths and self-harm has been associated with mephedrone use. Effects of mephedrone are reported to be empathogenic similar to 3,4-methylenedioxymethamphetamine (MDMA, ecstasy) and stimulant properties similar to cocaine. Not much is known of the effects of mephedrone on mental health. We present a case of dependence and psychosis in a patient using mephedrone (4-methylmethcathinone). The patient needed inpatient hospital care, was treated with antipsychotic olanzapine and recovered well.

BACKGROUND

4-Methylmethcathinone (mephedrone, 4-MMC) is a stimulant drug related to cathinone and methcathinone and was freely available to buy on the internet and in the so called 'head shops' across the UK before 17 April 2010.¹ It was often sold as plant food or bath salt marked 'not for human consumption'. It is known by other street names like Miaow-Miaow, Bubble drone and M-Cat. The effects of mephedrone are reported to be empathogenic, similar to 3,4-methylenedioxymethamphetamine (MDMA), and have stimulant properties similar to cocaine. Mephedrone is sold as a white powder costing around £10–£30 per gram and can be consumed orally or snorted (insufflation). The use of mephedrone as a recreational drug rapidly gained popularity in the UK over the past 18 months often as an alternative to ecstasy among teenagers, party-goers and clubbers. Numerous deaths and self-harm associated with mephedrone use has been reported in media.^{2–6 10} Deaths have also been associated with other drugs like gamma-butyrolactone (GBL) and benzylpiperazine (BZP) sold as 'legal highs' initially and then made illegal class C drugs. The term 'legal highs' causes misconceptions where legal is perceived as safe by users. Searching the word 'legal highs' on the internet brings up hundreds of websites selling 'legal highs' based both in the UK and abroad. It is a poorly regulated industry with consumers having little knowledge of ingredients or their effects. Though it is difficult to estimate the usage of mephedrone in the UK, the annual Mixmag (a dance magazine) Drugs Survey 2010 suggested that mephedrone was a popular drug among clubbers. Despite mephedrone being made a class B drug not much is known about its effect on mental and physical health problems and potential to cause addiction. We attempt to raise awareness among clinicians about 'legal highs' in general and mephedrone in particular with this case report. This case report

describes a patient using mephedrone in a dependent manner presenting with psychosis and dependence on mephedrone.

CASE PRESENTATION

We report the case of a young, employed, man needing inpatient psychiatric treatment following prolonged mephedrone use. He had experimented with recreational drugs like cocaine, ecstasy and heroine as a teenager but denied using any of these drugs on a regular basis and last used them over 10 years ago. He started by trying various legal highs available over the internet and ended up using mephedrone on a regular basis. He used mephedrone for over a year before he presented to us. He initially found mephedrone to be uplifting and made him feel happy. He describes using mephedrone recreationally to begin with but the quantity and frequency rapidly escalated. He was also drinking up to four cans of lager every night. He started using it daily obtaining it from different sources over the internet. He reported his tolerance to the drug increased and he needed more mephedrone to achieve similar effects. He reported using more than he had planned because of the 'bad come downs' and short duration of effects. Five months after regularly using mephedrone he had difficulty sleeping at night, had poor appetite and had lost weight. He began to develop auditory and visual hallucinations and presented to his general practitioner (GP). He reported auditory hallucinations starting as a low noise later becoming distinct voices. He experienced auditory hallucinations in the form of his close relative's voices plotting to kill him. He also described visual patterns and disturbances at the times and was treated with low dose chlorpromazine and diazepam by his GP. He was later started on fluoxetine 20 mg by his GP after he reported having low mood and other symptoms of depression. After this episode he tried quitting

mephedrone but could only manage abstinence for a few weeks and returned to bingeing on mephedrone. He was referred to specialist mental health services and was treated for a short while with the antipsychotic drug chlorpromazine. He was given a diagnosis of drug-induced psychosis. He continued to have difficulty maintaining abstinence and relapsed to heavy use of mephedrone. Prior to admission he was bingeing twice-weekly on 4–5 g of mephedrone orally, by insufflation (snorting) and per rectally. He presented to us as agitated, tearful, distractible, with poor eye contact, had motor restlessness and diaphoresis. His speech was rapid but coherent and relevant. He had depressive cognitions about his future. As an inpatient he reported visual and auditory hallucinations and had features of hypomania, agitation, excitability and labile mood. He had good insight into his condition and recognised that his mental state was due to excessive mephedrone use. General physical examination and blood results were unremarkable. After admission his fluoxetine 20 mg was stopped and he was started on olanzapine 5 mg. There was no family history of alcohol or drug problems. There was no significant past medical history. He fulfilled the International Classification of Diseases (ICD) 10 criteria for dependence syndrome as he experienced a strong desire to take the substance, difficulties in controlling substance-taking behaviour, tolerance and progressive neglect of alternative pleasures and persistence of use despite clear evidence of overtly harmful consequences. Over the course of his mephedrone use he had described auditory and visual hallucination, persecutory ideation, agitation, irritability, pressured speech, poor concentration, insomnia, reduced appetite, weight loss and difficulty managing his personal and working life. He was discharged after 4 weeks as an inpatient with a diagnosis of dependence on stimulants—that is, 4-methylmethcathinone—with psychosis.

INVESTIGATIONS

Full blood counts, urea and electrolytes, liver function tests, cholesterol, triglycerides and high-density lipoprotein cholesterol were all within normal ranges. ECG showed sinus bradycardia with sinus arrhythmia. CT scan was normal. Urine drug screens done during his inpatient admission were negative.

OUTCOME AND FOLLOW-UP

The patient was followed up in an outpatient clinic 4 weeks after discharge. His mood was euthymic and he did not have any hypomanic or psychotic symptoms. He reported feeling better. He was compliant with olanzapine 5 mg. On being offered further follow-up he declined stating he was well and 'back to normal'.

DISCUSSION

'Legal highs' have been used in the last few years as a way of promoting designer drugs. On 17 April 2010 mephedrone and the other cathinone derivatives were made illegal Class B drugs by the Home Office after recommendation by the Advisory Council on the Misuse of Drugs. The rapid rise in popularity of mephedrone as a 'legal high' and the urgency with which it had to be made an illegal class B drug has been part of a worrying trend. GBL, BZP and synthetic cannabinoids like 'spice', which were available as 'legal highs',

were also made illegal drugs in December 2009 just a few months before mephedrone was made illegal. The Home Office classified GBL and BZP as illegal Class C drugs whereas synthetic cannabinoids such as 'spice' are now controlled Class B drugs alongside cannabis.⁷ Mephedrone had already been popular in other European countries before it became popular in UK. Sweden classified 4-MMC as a 'health hazard' or 'hazardous substance' pending further legislation and a ban on 4-methylmethcathinone came into effect on 15 December 2008 making its sale illegal.⁸ Denmark's Minister for Health and Prevention banned mephedrone, flephedrone and ethylcathinone on 18 December 2008.⁹ Finland, through the Medicines Act, classified 4-methylmethcathinone as a 'medicinal product', making it illegal to manufacture, import, possess, sell or transfer it without a prescription. 4-Methylmethcathinone was added to Israel's list of controlled substances, making it illegal to buy, sell or possess in December 2007. The case in our report is in keeping with the symptoms reported in the Advisory Council on the Misuse of Drugs report on mephedrone.¹⁰ Commonly reported clinical effects associated with mephedrone use include tachycardia, palpitations, agitation, anxiety, mydriasis, chest pain, breathlessness, nausea, vomiting, headache, hypertension, confusion, hallucinations, peripheral vasoconstriction and, rarely, convulsions. Despite a number of 'legal highs' being made illegal this trend is likely to continue. NRG-1, chemically 'naphthyl analogue of pyrovalerone', and 5,6-methylenedioxy-2-aminoindane (MDAI) are already on sale as 'legal highs' on various internet sites and are being advertised as replacements for mephedrone. More research and appropriate legislation into ways of effectively controlling the rapid rise of 'legal highs' as recreational drugs is required. Education and awareness, especially among teenagers, of the harm 'legal highs' in general and mephedrone in particular can cause is urgently needed.

Learning points

- ▶ Mephedrone use can be associated with auditory and visual hallucination, persecutory ideation, agitation, irritability, pressured speech, poor concentration, insomnia, reduced appetite and weight loss.
- ▶ There is risk of dependence on mephedrone.
- ▶ 'Legal highs' should not be perceived as safe for recreational use as long-term effects of their use on mental and physical health and the potential to cause addiction remains unknown.
- ▶ Physicians should be aware of asking not only about prescribed and illicit drugs but also drugs that the patient may consider to be 'legal highs'.

Competing interests None.

Patient consent Obtained.

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