Two cases of confirmed ingestion of the novel designer compounds: 4-methylmethcathinone (Mephedrone) and 3-fluoromethcathinone

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Introduction

Cathinone (Cath) is a pharmacologically active alkaloid (stimulant) extracted from the leaves of the Khat plant (Catha edulis)1. Cath and methcathinone (MC) are controlled under the UK Misuse of Drugs Act (Class C and B respectively). However, derivatives such as ethcathinone (EC), 4-methylmethcathinone (4-MMC or mephedrone) and 3-fluoromethcathinone (3-FMC), which are not controlled under current law, have been produced and marketed to satisfy the drug dance culture scene. The dose, effects and safety of these products have not been evaluated, and are only known from user’s discussion forums on drug chat room websites1,2,3.

Cases

Two cases were admitted to an inner-city hospital Emergency Department (ED) on separate days within a 2 week period. Case 1, a 30 year old male, presented with drowsiness (GCS 6/15), respiratory rate 20 per minute, heart rate 47 per minute and BP 140/80mmHg. He was alert and orientated within 2 hours of presentation. He subsequently gave a history of ingestion of 1g of mephedrone, GBL, “neodoves” and “neo-blues”.

Case 2, a 22 year old male, presented after oral ingestion of 200mg of mephedrone and subcutaneous injection of 3.8g of mephedrone. On arrival in the ED he was agitated with 7mm dilated pupils, heart rate 105 per minute and BP 177/111mmHg; these features settled within 6 hours of presentation. Serum and urine from both cases were sent for analysis at St George’s - University of London.

Methods

A screening method was developed for ten methcathinone related compounds (Cath, MC, EC, 4-MMC, 2-FMC, 3-FMC, 4-FMC, dimethylcathinone (DMC), 4-methoxymethaminobutyronitrile (4-MAB) and 4-methoxymethcathinone (4-oxoMC)). Derivatives of Cath and MC were synthesised in-house as secondary standards by Kingston University. 500µL of urine or serum were extracted by liquid-liquid extraction and screened using gas chromatography with mass-spectrometric detection. Chromatographic separation of all derivatives was achieved over a 12min run. The principle fragment ion for 4-MMC and 3-FMC was m/z 58.

Results

Routine toxicological screening showed case 1 to be positive in urine for GBL, cyclizine (administered in ED) and 3-FMC. No drugs were found in the serum. Case 2 was positive for 4-MMC in urine and serum (0.15mg/L), with no other drugs found. No therapeutic or toxic reference ranges are available for CATH and MC.

Conclusions

The clinical features seen in case 1 were consistent with GBL toxicity, and the 3-FMC was consistent with the history. Case 2 is the first known case of toxicity from lone use of mephedrone. Clinicians and analytical toxicologists should be aware of the potential for use of these compounds in patients presenting with signs of sympathomimetic toxicity.

References