Concentrations of mephedrone in cases of fatal and non-fatal clinical intoxications

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Introduction

Mephedrone (4-methylmethcathinone, 4-MMC) has become established as a permanent illicit drug in the dynamic new psychoactive substances (NPS) scene.

Objectives and Aims

The aim of this work is to collect published data on the mephedrone concentrations in biological samples from cases of acute intoxications (fatal and non-fatal) and compare with results from human pharmacokinetics studies, wastewater and anonymous pooled urine analysis.

Methods

The PubMed® database complemented with Google Scholar® were systematically searched from database inception until February 15, 2017, to find published cases of mephedrone intoxications and concentrations in biological samples.

Results

Over the studied period, a total of 437 articles were identified for the general search “mephedrone OR 4-methylmethcathinone”, only publications including specific toxicokinetics criteria were included to review consideration. A total of 97 fatal cases and 57 non-fatal intoxication providing mephedrone concentrations in human biological matrices and attributed directly or indirectly to mephedrone were found. Mephedrone mean blood concentrations from fatal cases were 2,663 ng/mL (range 51-22,000 ng/mL), and from non-fatal cases mean were 166 ng/mL (range 13-412 ng/mL) (Table 1, Table 2). These were in a similar range from data found in controlled studies of mephedrone pharmacokinetics non reporting acute toxicity (135 ng/mL, range 52-218 ng/mL) (Table 3). Forensic epidemiology studies based on wastewater and anonymous pooled urine analysis point towards similar variations in use (nightclub scene) to those self-reported in surveys and questioners.

Conclusions

Mephedrone blood concentrations in cases of fatal intoxications were higher than in non-fatal cases. In both, great variability in mephedrone concentration were found that could be explained by interindividual differences in pharmacokinetics-pharmacodynamics, dose and routes of administration and concomitant poly-drug use.

Acknowledgements

Supported by grants from Instituto de Salud Carlos III (PI11/01961; Red de Trastornos Adictivos-RTA-FEDER RD16/0107/0003 and RD16/0107/0010; Juan Rodes fellowship JR16/00020) and The European Commission (HOME2014/JDRU/AQ/DRUG/7082, PREdict Project).

This paper has been accepted for publication (Curr Pharm Des. 2017 Jul 4.)