

Determination of ergotamine in hair, plasma and urine samples by liquid chromatography – tandem mass spectrometry.

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AIMS: Ergotamine has been therapeutically used since the 1950s, most frequently for the treatment of vascular headaches. The drug is highly toxic and in large, repeated doses can produce all the symptoms of ergot poisoning. The objective of this study was to develop a sensitive and selective analytical method based on a rapid sample preparation and on specific mass spectrometry detection for the determination of ergotamine in different biological fluids.

METHODS: Sample preparation involved a liquid/liquid extraction of ergotamine and the internal standard, trideuterated lysergic acid diethylamide, from plasma, urine or aqueous supernatants obtained from hair samples incubated with methanol. Chromatographic separation was accomplished by gradient elution on a cyanopropyl column. Positive ion electrospray ionisation and tandem mass spectrometric experiments were carried out on an ion trap mass spectrometer.

RESULTS: A liquid chromatography – tandem mass spectrometry method (LC-MS/MS) was developed and validated in three matrices (urine, plasma and hair). The assay was linear in the ranges 50-1000 pg/mL (plasma and urine) and 10-200 pg/mg (hair). The limits of detection were estimated to be 10 pg/mL in urine and plasma, 5 pg/mg in hair, while limits of quantification were respectively 25 pg/ml and 10 pg/mg. The precision of the analysis was always better than 16%. The validated method was successfully applied to the analysis of plasma, urine and hair specimens obtained in a case of ergotism, resulting from intake of ergotamine tartrate for treating migraines. Ergotamine concentrations were 320 pg/ml in plasma, 100 pg/ml in urine, 23.9 pg/mg in proximal and 12.45 pg/mg in distal hair samples.

CONCLUSIONS: The developed liquid chromatography – tandem mass spectrometry method was found to be selective and sensitive for the measurement of ergotamine in plasma, urine and hair. The extraction procedure is simple and rapid and the analysis time is short. It can be successfully applied for both clinical and forensic toxicology purposes.

KEYWORDS: *Ergotamine, Hair, Plasma, Urine, LC-MS/MS*

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