K52 6-Monoacetylmorphine Confirmation by Liquid Chromatographic Tandem Mass Spectrometric Determination of 6-Monoacetylmorhine and Noscapine in Vitreous Humor

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After attending this presentation, attendees will learn of the great care required in the interpretation of low level determinations by liquid chromatographic tandem mass spectrometric (LC/MS/MS) methodologies.

This presentation will impact the forensic community by demonstrating how LC/MS/MS is an extremely sensitive technique and extraordinarily low levels of drugs are routinely detected. Interpretation at these extremely low levels is not straight-forward.

The objective of this work is to present a potential pitfall in modern tandem mass spectrometric methodologies. Tandem mass spectrometry is an extremely sensitive technique and extraordinarily low levels of drugs are routinely detected. Interpretation of these extremely small amounts of drugs or metabolites is not straightforward. For example, substances with similar retention times and the same ion transitions can potentially result in false positives, as has been observed in the liquid chromatographic tandem mass spectrometric (LC-MS/MS) analysis of succinylcholine and venlafaxine. These instances illustrate a potential limitation of typical multiple reaction monitoring (MRM) techniques in qualitative confirmations of these non-routine analytes.

It has been observed that a similar deficiency may occur in the LC- MS/MS identification of 6-monoacetylmorphine (6-MAM), a commonly accepted marker of heroin abuse. On occasion, it has been observed LC- MS/MS peaks with retention times and ion transitions very similar to 6- MAM have appeared in specimens containing morphine but not anticipated to involve heroin.

The veracity of MRM identification of this "6-MAM" was examined by simultaneously determining the presence of 6-MAM and noscapine in vitreous humor. Noscapine is an alkaloidal substance, found in the opium poppy. It persists throughout the manufacture of heroin and it, and other similar alkaloids, have been proposed as urinary markers of heroin usage.

Morphine, 6-MAM, and noscapine was examined in vitreous humor from a series of twelve morphine-positive cases. Two of the cases were thought to not involve heroin, although 6-MAM had been putatively identified in stomach contents by LC-MS/MS. Morphine was confirmed in all of the vitreous specimens, 6-MAM in ten, and noscapine in eight. All of the noscapine-positive specimens also contained 6-MAM. Neither 6-MAM nor noscapine were detected in vitreous from the two cases not expected to involve heroin, although 6-MAM had previously been "detected" by LC-MS/MS in stomach contents.

Noscapine was employed as an alternate indicator of heroin use and suggest that 6-MAM might be falsely identified by typical MRM techniques. This suggests that LC-MS/MS identifications based on a small number of ion transitions are fallible, and that great care must be taken during the interpretation of detecting 6-MAM at low levels.

6-Monoacetylmorphine, Noscapine, LC/MS/MS

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