

K51 Bladder Wash: A (Not-So) Alternative Specimen for Postmortem Forensic Toxicology

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Learning Overview: The goal of this presentation is to determine the potential of bladder washes (BW) as an alternative specimen in postmortem toxicology in cases where there is no urine available to analyze.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating the efficiency of BW drug analyses compared to traditional blood and urine drug analyses. The findings in this study may influence postmortem toxicology laboratories to implement BW as a possible alternative specimen.

Urine is an excellent sample in postmortem forensic toxicology to provide evidence of previous drug use. However, there are many cases in which the bladder is voided prior to their autopsy or dehydration occurs postmortem. In these cases, it is possible to wash the bladder with distilled water or saline and thus collect the BW and any available residual urine for drug screening and confirmation. The San Francisco Office of the Chief Medical Examiner (OCME) has made the collection of BWs at autopsy an option when urine is not available. While BWs are not conventional, this study aims to determine its use in postmortem forensic toxicology.

Data from analysis of BW samples collected at the OCME were analyzed to assess the efficiency of this alternative sample in comparison to blood from the same individual by determining the identities of individual analytes and their metabolites ($n=100$). The BW samples, which were obtained by rinsing the bladder wall with 10mL of 0.9 sodium chloride solution and then collecting the resulting solution via a syringe, and the blood samples (peripheral and/or cardiac) were analyzed by Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). Authentic case results following routine testing showed that for individual analytes, there is an 80%–90% correlation between blood and BW results. In addition, when examining both parent drug and metabolite data, this estimate correlation increases. The results have also shed light on noteworthy findings regarding specific analytes. For example, in the preliminary study, it was found that in two out of the seven fentanyl/norfentanyl cases, both drugs were detected in the BW, but not in the blood. Three other fentanyl cases had both drugs detected in the blood, with either one or neither of the drugs detected in the BW. Also, the preliminary study showed that the primary metabolite of heroin, 6-Acetylmorphine (6-AM) was BW analyses, BW and urine drug analyses from corresponding postmortem cases were obtained to create a control cohort ($n=40$). To assess the current knowledge and opinions regarding BWs in postmortem toxicology, a survey was sent out to various coroner and medical examiner offices across the country. As of now, the results of the survey are pending.

This preliminary study appears to indicate that standardizing the collection and analysis of BWs in postmortem toxicology will provide forensic pathologists with a comprehensive toxicological profile in cases where urine and/or other biological specimens are not available for collection and subsequent analysis. In addition, since two different specimens from the same case can be used for a drug confirmation, analyzing a BW in addition to a blood sample can allow a forensic toxicologist to confirm drug results without requiring traditional screen and confirmation regimes.

Bladder Wash, Alternative Specimen, Postmortem Toxicology