



K29 Preliminary Drug Screening on Postmortem Urine: An Impractical Practice

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After attending this presentation attendees will: (1) become aware of the practice of “urine-first” screening of decedents for toxicological study; (2) learn the drugs commonly detected by urine and blood drug screening; (3) be familiar with the overall sensitivity and specificity of urine drug screening on postmortem specimens; and, (4) observe a cost analysis of different protocols for postmortem drug screening; and 5. be able to form an opinion about “urine-first” drug screening based on cost and effectiveness.

This presentation will impact the forensic science community by showing how initial drug screening of urine specimens followed by reflex screening of positive urine specimens as a protocol for assessing toxicological factors in the autopsy is financially beneficial, but is too inaccurate to be of adequate quality for forensic use.

Background: In serving rural communities with limited budgets, the request often comes from the county medical examiners that screening for drugs on decedents be performed initially on urine, and if positive, reflex testing be performed on blood for confirmation. The rationale for the request is the rapid turnaround of the urine drug screen and the significant difference in cost. These requests are generally honored, since in rural counties where these data were obtained, medical examiners are very conscious of cost containment for county services. Therefore, most drug screens were performed on urine, and negative results were not further evaluated. Trying to find literature to support this “urine-first” screening practice was not successful. Therefore, we elected to perform a study of known urine and blood drug screens with discrepant results. By so doing, we hope to bring reliable data to the discussion of whether the “urine first” policy is scientifically or financially prudent.

Materials and Methods: Results of 501 autopsies were reviewed from the years 1997-2009. All cases with discrepant urine and drug blood screens were collected and analyzed. The urine drug screens were a seven-item panel that screens for cannabinoids and their metabolites, benzodiazepines, amphetamines, opiates, cocaine and its metabolite, tricyclics, and barbiturates. Blood specimens from decedents with positive urine drug screens were sent to a reference laboratory for confirmation.

Results: In all, 11 decedents had both urine and blood drug screens performed, approximately 2% of the group studied. The decedents’ demographics showed 7 men and 4 women, mean age for both 39 years. Men had more positive drugs detected on urine screen than did women (20 versus 6), although this difference was not significant. There were 9 true positive tests, 17 false positives, 45 true negatives, and 5 false negatives. Thus, the sensitivity was 64% and the specificity was 73%.

Discussion: Screening urine for drugs on postmortem specimens does not appear to be an accurate way to determine which drugs were present at the time of death. It is inexpensive, however, given an example of 100 autopsies in a given period, the costs incurred for the “urine-first” protocol would be: (\$36 initial urine work-up cost + \$180 follow-up blood work-up cost)(36 false positives) = \$7,776 spent on further working-up specimens that were positive in the absence of drugs; (\$180 blood work-up cost)(27 false negatives) = \$4,860 “saved” on false negatives, i.e. specimens not worked-up because they were negative in the presence of drugs; and (27 false negatives + 51 all other specimens)(\$36 urine work-up cost) = \$2,808; total cost, \$7,776 – 4,860 + 2,808 = \$5,724. Compared to the price of initial screening by blood work-up for all cases (\$180 blood work-up cost)(100 specimens) = \$18,000, the savings are substantial, \$12,276. However, the reliability of the results must be considered as well. In a screening protocol for which nearly half of the results are not accurate because of poor sensitivity and low specificity, one must make a judgment as to whether the money saved is worth the information lost, or scrambled by misleading results. Considering how many critical decisions about manner and cause of death are based on the presence or absence of drugs in a decedent, it would seem inappropriate to choose such a protocol as a routine practice.

Urine, Postmortem, Drug Screen