Which Drug Tests in Medical Emergencies?

Three patients present to an emergency department. One has claimed to have overdosed on acetaminophen, one is maintained on theophylline but recently started taking erythromycin, and one is dehydrated but receives lithium. Which patient would benefit from quantitative determination of serum drug concentrations?

Each of them would; in every case, measurement of drug concentrations in serum or plasma would affect the decision-making process for providing patient care. Clinical findings of tachycardia and vomiting would suggest theophylline toxicity, whereas tremor, ataxia, and clonus may indicate lithium poisoning. Because several disease states may produce signs and symptoms similar to those seen in overdose, the management of patients with these findings cannot be properly directed until the concentration of drug is known. Despite the refinement of didactic education during residency training, graduates frequently do not appreciate the range of pharmaceuticals whose concentrations can directly affect patient care. Clinicians relying on evidence-based medicine to select laboratory tests to support the management of poisoned patients have been disappointed. Which quantitative drug concentrations have clinical utility in emergency medicine practice remains in question.

This question has now been largely answered in new guidelines from the National Academy of Clinical Biochemistry. In this issue, Wu et al. (1) offer recommendations not only for which drugs require measurement, but also the timeframe in which their concentrations should be determined and reported. The list of authors includes members of the American College of Medical Toxicology, a group of board-certified medical toxicologists who are uniquely experienced in both emergency medicine and clinical toxicology. The recommendations contained in this report should promote effective emergency management of poisonings; moreover, it will assist emergency physicians in better communicating their needs to directors of clinical chemistry laboratories. The recommendations made by this group therefore have considerable utility for emergency and urgent care physicians whose practice demands that any studies they perform have an effect on patient management and be done rapidly—often within 1 h. With this work, Wu et al. (1) have provided a major service to emergency physicians.

Three more patients present to an emergency department. The first is a young psychiatric patient who requires hospitalization, has no history of ingestion, and has a normal physical examination with normal vital signs; the second is a known heroin addict with apnea after heroin use; and the third was found in a crack house with severe agitation, hypertension, and tachycardia. Would these patients benefit from qualitative determination of the presence of drugs by use of the urine “toxic screen”?

The answer to this question remains, sadly, unanswered. In each of the latter group, qualitative drug screening results would not change clinical outcome. A psychotic patient who has normal vital signs and examination would likely not require any therapy other than psychiatric hospitalization. Hopefully, no clinician would withhold naloxone from an apneic patient because toxic screen results have not returned. Similarly, a patient who has used a sympathomimetic agent—be it cocaine, phencyclidine, amphetamine, or methylenedioxymethamphetamine (MDMA)—requires immediate sedation irrespective of toxic screen results. In fact, the constituents of the typical urine toxic screen (cocaine metabolite, morphine and congeners, amphetamine, barbiturates, benzodiazepines, phencyclidine, and occasionally tetrahydrocannabinol) can be differentiated by reviewing a patient’s vital signs, a focused physical examination, and if necessary, a trial of naloxone. This entire process takes ~60 s. Experienced clinicians rarely base their medical therapy on toxic screen results; these tests are largely irrelevant to patient care.

Nonetheless, toxic screens do have utility in an emergency department setting, particularly in questions of child neglect or abuse. In adults, however, qualitative methods are commonly used to determine whether exposure to a substance has occurred. Most situations in which this knowledge is necessary are in outpatient settings, such as in hiring practices or in determining compliance with methadone therapy. The limitations of qualitative urine assays in changing acute medical care calls into question whether they should be used at all in adult patients requiring emergency therapy. Wu et al. (1) are the ideal group to narrow the applications in which qualitative drug screens have some utility.

Surprisingly, they do not, and Wu et al. miss an opportunity to propose limitations for the application of such qualitative methods, thereby applying some selectivity to their profligate use. The authors do recognize that toxic screens offer little clinical advantage in managing poisoned patients, but they also believe it is “inevitable” that clinicians, particularly in “small or rural hospitals”, will continue to order these test despite any recommendations to the contrary. For this view to apparently drive expert panel recommendations is disheartening. Rather than propose limitations on the use of qualitative screens, Wu et al. suggest that manufacturers alter their products’ detection profiles. The authors could have alternatively proposed that insurance companies refuse to pay for these relatively valueless tests. This course of action would offer the potential for rapid change in clinical practice patterns, the opportunity to practice evidence-based medicine, and the ability to improve clinical emergency medicine skills.
In summary, emergency physicians, laboratory directors, and even other clinicians will better understand each other’s practices after reading Wu et al. For this reason, Wu et al. represents an important addition to reading lists; perhaps more importantly, it is a significant contribution that should be saved for future reference and education.

Reference


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