Interference with amphetamine/methamphetamine tests

Some prescription medications contain amphetamine or methamphetamine, while the active ingredient of some prescription medication may be metabolized to amphetamine or methamphetamine, causing positive amphetamine/methamphetamine test results (see Table 1). For example, Adderall contains a mixed amphetamine salt widely prescribed as a psychostimulant medication for attention deficit hyperactive disorder, or ADHD, and use of such medication would cause a positive amphetamine test. In January 2002, the U.S. Food and Drug Administration approved Paremyd eye drops which contain hydroxyamphetamine. Although amphetamine is metabolized to hydroxyamphetamine, hydroxyamphetamine is not metabolized to amphetamine. Therefore, use of such products should not cause a positive amphetamine test result.

Opiate test results

Several prescription medications for pain management contain morphine, codeine, hydrocodone, oxycodone, or related opioid. Oxycodone has variable cross-reactivity with different opiate-screening assays, and there is also a specific immunoassay which recognizes the presence of oxycodone in urine — but taking codeine or morphine containing analgesic medication produces positive opiate test results in drugs-of-abuse testing. Ingestion of fentanyl-containing drugs (which are also opioid) or use of the Duragesic fentanyl patch should not cause a positive opiate test because fentanyl has very poor cross-reactivity against antibodies used in opiate-screening assays, which recognize morphine and related substances only.

Marinol converts to marijuana metabolite

Although marijuana is a Schedule I drug, a synthetic tetrahydrocannabinol (Marinol) is used for treating nausea and vomiting in cancer patients undergoing chemotherapy and also as an appetite stimulant to patients with AIDS. Because Marinol is also converted into marijuana metabolite (THC-COOH), it causes positive marijuana test; however, Δ⁹-tetrahydrocannabinivarin (THCV), which is a natural constituent of cannabis product, is absent in Marinol. THCV is metabolized by human liver into THCV-COOH, and the presence of this metabolite, in addition to THC-COOH in urine, indicates abuse of marijuana rather than prescription use of Marinol.

Benzodiazepines-containing drugs

Although benzodiazepine is not part of the five federally mandated drugs for workplace testing, many private companies test for benzodiazepines as a part of their employment drug-testing program. Benzodiazepines is one class of the most frequently prescribed drugs in the United States, and these are used as tranquilizers, muscle relaxants, and anticonvulsants as well as to treat symptoms of anxiety. More than 50 different drugs that contain amphetamine or methamphetamine, or metabolize to amphetamine or methamphetamine.

<table>
<thead>
<tr>
<th>Active ingredient</th>
<th>Brand names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td>Adderall, Biphetamine, Dexedrine, Dextrostat, Desoxyn</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>Aproneuran, Aselin, Asenlix, Dinintel, Finedal, Rexigen</td>
</tr>
<tr>
<td>Amphetaminil</td>
<td>Apetinil</td>
</tr>
<tr>
<td>Clobenzorex</td>
<td>Falagan, Lipolin</td>
</tr>
<tr>
<td>Ethyl amphetamine</td>
<td>Rondimen, Pondinil, Anexate</td>
</tr>
<tr>
<td>Fenoproporex</td>
<td>Segotin, Segentine</td>
</tr>
<tr>
<td>Mefenorex</td>
<td>Didrex</td>
</tr>
<tr>
<td>Prenylamine</td>
<td>Carbex, Deprenyl, Eldepryl</td>
</tr>
</tbody>
</table>

Table 1. Drugs that contain amphetamine or methamphetamine, or metabolize to amphetamine or methamphetamine.
CLINICAL ISSUES

Propoxyphene medications

Propoxyphene, a milder narcotic analgesic than benzodiazepines, is used in treating mild to moderate pain, and is sold under trade names of Darvocet, Darvon, Propacet, and Wygesic. Because this drug is also abused, it, too, is sometimes tested in private employers’ workplace drug-testing programs. Prescription use of propoxyphene may cause a positive test result because the cut-off concentration for propoxyphene in urine (300 ng/mL) can be reached after medical use of this drug.

Medical exposure to cocaine

Cocaine is used infrequently as a local anesthetic in ear, nose, and throat surgery, and also is administered topically during ophthalmic procedures. Positive drug-testing results for cocaine (as benzoylecgonine, the major metabolite) may be encountered in subjects who have undergone such procedures. A patient may be positive up to 72 hours after an otolaryngologic procedure where cocaine is used as an anesthetic. Cocaine metabolite can also be detected in the urine specimen of the physician who is performing the procedure.4

Jacobson, et al, studied the effect of use of ophthalmic solution containing cocaine on urine excretion of benzoylecgonine in patients. Out of 50 subjects studied, 47 subjects (94%) demonstrated a positive screening result for cocaine (as benzoylecgonine) four to six hours after receiving eye drops. In addition, 35 subjects (70%) showed positive results 24 hours after receiving eye drops containing cocaine. The authors conclude that ophthalmic administration of cocaine may cause positive test results up to two days after procedure.5

Novocain, although synthetically derived from cocaine, has a distinct structural difference from cocaine and the metabolite of cocaine (benzoylecgonine). Therefore, use of Novocain during dental procedures or use of other anesthetic agents, including benzocaine, tetracaine, and lidocaine, should not cause false-positive cocaine test results in urine DOA testing.

Conclusion

Because these drugs are often abused, medical review officers and healthcare providers must be aware of true positive results due to use of such drugs as legal medications. Verification of medical use of such drugs is important in order to determine whether an individual tests positive for DOA due to the medical use of such a drug with a valid prescription.

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References