PALLIATIVE CARE
CASE OF THE MONTH

"I Swear I Didn't Use Any Drugs!"
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Case: Mr. J is a 40-year-old male with metastatic lung cancer that is following up in the outpatient supportive and palliative medicine clinic. He has been on Oxycodone for the past six months and states that his pain is constant and located in his chest around the area of the documented malignancy. A pain agreement was previously signed and reviewed, and the prescription drug monitoring program database reviewed with no concerning activity. He has a distant history of cocaine use and PCP abuse; he has used neither per his report in over 20 years. Other medications include a PPI, Effexor for depression, and Senokot.

He feels well overall and has no new complaints or concerns today. He is currently being treated with Opdivo, and his recent imaging shows no further progression of his cancer. A urine drug screen was completed on his last visit; the results show POS for urine oxycodone and POS for urine phencyclidine. All other results are negative.

When asked about the positive urine screen for phencyclidine, he looks shocked and states:

"That's impossible; I haven't touched that stuff in over 20 years! I swear I didn't use any drugs!"

Discussion: Substance abuse carries significant health related consequences, and often gives a prescribing clinician keen insight into the psychosocial environment in which the patient resides. In the outpatient clinic, the frontline for the evaluation and monitoring of substance use disorder (SUD) involves the implementation of screening tools such as the SOAPP and ORT[1], pain agreements with explicit expectation-setting, and urine drug screening.

Urine Drug Screening 101

Testing of urine for specific substances or metabolites typically begins with a urine drug enzyme immunoassay screen (EIA). The immunoassay will report substances either above or below a cutoff: if a substance is present, but below the lab cutoff, it will generate a negative result. If the presence of a substance is strongly suspected, but the EIA is negative, then the next step is confirmatory testing. Confirmatory testing is most commonly available through Gas Chromatography/Mass Spectrometry (GC/MS) or high-performance liquid chromatography (HPLC).[2] Drugs are typically detectable in the urine drug immunoassay screen for 1-3 days after ingestion depending on its metabolism and excretion.

False-Positive Results

A number of substances are known to generate false-positive results on EIA, though results often vary depending on which specific immunoassay is used. Below is a table with several of the more commonly prescribed agents.[3]

	False-Positive Results on EIA					
	Amphetamine or Methamphetamine	Phencyclidine	Methadone	Opiates	BZD	MJ
Diphenhydramine			x			
Sertraline					x	
Trazodone	x					
Venlafaxine		x				
Quinolones				x		
Chlorpromazine	x		x			
Quetiapine			x			
Dextromethorphan		x				
Ranitidine	x					
Verapamil			x			

*modified from Palmer et al. commonly prescribed medications and potential false-positive urine drug screens

False-Negative Results

Interestingly, there are also a number of substances that can generate false-negative results on various screening and confirmatory tests (though again many of these are assay-specific, i.e. GC/MS vs EMIT and may depend on laboratory specific methods). Additionally, synthetic opiates and benzodiazepines are often negative on EIA and only detectable via GC/MS. Below is a table with some of these substances.[2]

	False-Negative Results					
	Amphetamine or Methamphetamine	Cocaine	Methadone	Opiates	BZD	MJ
Tolmetin	x			x		x
Ibuprofen						x
Salicylates		x				
Fluconazole		x				
Chlorpromazine metabolites	x					

*modified from Bertholf et al. 'False-positive' and 'false-negative' test results in clinical urine drug testing

Resolution of Case: Mr. J insisted that his positive PCP urine EIA must be wrong. A repeat urine drug EIA again demonstrated the presence of phencyclidine. Confirmatory testing was performed with GC/MS which did not demonstrate the presence of PCP. On review of his medication list, it was presumed that his Effexor had generated a false-positive result for phencyclidine on his EIA urine drug screen.

Resolution of Case continued:
This false positive effect is believed to be related to the cross-reactivity between venlafaxine and the active metabolite O-desmethylvenlafaxine within the PCP assay reagent. False-positive results may persist for several days after the discontinuation of venlafaxine.[4]

References:

1. Moore TM, et al. A Comparison of common screening methods for predicting aberrant behavior among patients receiving opioids for chronic pain management. Pain Med. 2009;10:1426-1433.
2. Reisfield GM, Goldberger BA, Bertholf RI. "False-positive" and "false-negative" test results in clinical urine drug testing. Bioanalysis 2009;1(5):937-952.
3. Palmer TA et al. Commonly prescribed medications and potential false-positive urine drug screens. Am J Health-Syst Pharm 2010;67:1344-1350.
4. Landy GL, Kripalani M. False positive phencyclidine result on urine drug testing: a little known cause. BJPsych Bulletin. 2015;39(1):50.