

CASE REPORT

False-positive phencyclidine (PCP) on urine drug screen attributed to desvenlafaxine (Pristiq) use

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Accepted 10 November 2017

SUMMARY

We report a likely false-positive phencyclidine (PCP) result detected with a urine drug screen (UDS) (Medtox, St Paul, Minnesota, USA) in the setting of therapeutic desvenlafaxine (Pristiq) use. Desvenlafaxine (O-desmethylvenlafaxine) is the active metabolite of venlafaxine (Effexor). Prior reports have confirmed venlafaxine use resulting in a false-positive for PCP on a UDS. However, there has been a paucity of reporting of commercially available desvenlafaxine formulations (Pristiq, Khedezla) resulting in false-positives for PCP on a UDS.

BACKGROUND

Phencyclidine (PCP) is a dissociative sedative hallucinogen originally used as a veterinary tranquilliser. PCP was a very popular drug in the 1970s, known by the street names 'angel dust' or 'peace pills'. Its use has since declined, as reflected by decreased hospital visits and poison centre calls being reported over the last 40 years.¹ In recent years, PCP use has trended up once again, increasing from 0.16% of law enforcement drug seizures in 2007 to 1.0% in 2015 in one metropolitan area.² PCP is one of five mandated drugs of abuse in the Department of Health and Human Services guidelines for urine drug testing. Abusers of PCP often dip or spray marijuana cigarettes with liquid PCP, referred to as smoking 'wet', 'illy' or 'fry'. Although symptoms of PCP intoxication usually last 4–6 hours, detection time of PCP in the urine is approximately 8 days.³ However, it is still rare to obtain a urine drug screen (UDS) positive for PCP, especially in the elderly population. A number of drugs have been found to cause false-positive PCP results, including dextromethorphan, ibuprofen, imipramine, meperidine, diphenhydramine, doxylamine, ketamine, lamotrigine, tramadol and venlafaxine.^{3–5} We are unaware of other reports of false-positive immunoassay screen for PCP in the setting of commercially available desvenlafaxine formulation (Pristiq, Khedezla) use.

CASE PRESENTATION

A 60-year-old Caucasian woman with depression, asthma and history of gastric bypass surgery presented with a chief complaint of confusion. She was difficult to arouse, tachycardic (heart rate: 121) and febrile (39.1°C) with normal blood pressure (110/79 mmHg) on presentation. A chest X-ray showed a left lower lobe consolidation. All

other systems were unremarkable. The patient was admitted for pneumonia with sepsis.

The patient was a non-smoker and rarely used alcohol. According to her husband, the patient was exposed to marijuana the previous night. Encephalopathy and delirium were presumed to be secondary to the patient's sepsis. An immunoassay UDS (Medtox, St Paul, Minnesota, USA) was ordered, which resulted in a positive PCP result. The patient and family were questioned and denied ever using PCP.

The patient's home medications included montelukast, hydromorphone, dexilant, lorazepam, sucralfate, nortriptyline, mirtazapine, solifenacin and desvenlafaxine (Pristiq).

OUTCOME

The patient's pneumonia with sepsis was treated with intravenous fluids and antibiotics. The patient improved overnight and was much more responsive the following morning. The patient's immunoassay UDS results were positive for benzodiazepines, cyclic antidepressants, cannabis metabolites and PCP. Her prescription history explained the first two results. She admitted to smoking cannabis on the night prior to admission, but she and her family denied any use of PCP. We attributed the positive immunoassay UDS result for PCP to her therapeutic use of desvenlafaxine, due to prior evidence with venlafaxine.

DISCUSSION

We are unaware of other reports of false-positive immunoassay screen for PCP in the setting of commercially available desvenlafaxine formulation (Pristiq, Khedezla) use. False-positive results for PCP have been observed with venlafaxine.^{6,7} Venlafaxine and its metabolite O-desmethylvenlafaxine (ODV, desvenlafaxine) resulted in false-positive immunoassay screens for PCP in a case series of three separate patients.⁴ The authors reported that venlafaxine undergoes both O-demethylation and N-demethylation, the major metabolite ODV also exhibits antidepressant activity, and an average of 87% of a labelled dose of venlafaxine is excreted in a 48-hour urine, with 5% excreted as parent drug, 29%–48% ODV. The authors obtained pure samples of venlafaxine and the ODV metabolite from the manufacturer, prepared solutions of venlafaxine and ODV in drug-free urine at final concentrations ranging from 1 000 000 to 100 µg/L venlafaxine or ODV, and tested those solutions with the Syva immunoassay; PCP cross-reactivity became



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To cite: Farley TM, Anderson EN, Feller JN. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-222106

clinically significant if combined concentrations of venlafaxine and ODV of 100000µg/L are present in a urine sample. The authors concluded that the false-positive immunoassay results they had observed in their three patients were caused by cross-reactivity of venlafaxine and ODV with the Syva rapid test PCP assay. Bond *et al.* reported a venlafaxine-treated patient who had a false-positive urine immunoassay screening result for PCP (Abbott, AxSYM fluorescent polarised immunoassay) confirmed by the absence of PCP on gas chromatography (GC)/mass spectrometry (MS) analytical testing. A serum sample obtained 3 hours after ingestion revealed the presence of both venlafaxine and ODV. A rechallenge of the Abbott AxSYM immunoassay using urine spiked with venlafaxine found false-positive PCP at venlafaxine concentrations of 4.2mg/mL and ODV concentrations of 0.7mg/mL.⁸ In 2007, Santos *et al.* reported a venlafaxine-treated patient who had false-positive immunoassay results for PCP on two urine samples (Instant-View Multi-Drug Screen Urine Test, Alpha Laboratories). Subsequent GC/MS analysis of urine and blood documented the absence of PCP, and confirmed the presence of venlafaxine in blood and venlafaxine and norvenlafaxine in urine.⁶ In the present case additional analytical testing was not completed. However, there is an established link between venlafaxine-derived ODV metabolite and false-positive immunoassay results.^{4,8} ODV is the same entity that was found in commercially available formulations of desvenlafaxine and as such

would be expected to result in a false-positive immunoassay result. As such, the Food and Drug Administration included a warning about this possibility in the prescribing information for the initial commercial preparation of desvenlafaxine.⁹ Our case strengthens this link. We believe the positive PCP result obtained is most likely due to desvenlafaxine (Pristiq). However, we cannot rule out the possibility of PCP-laced marijuana or PCP use by the patient. As use of desvenlafaxine increases, false-positive urine immunoassay screens for PCP are likely to become more common.

Contributors Conception or design: TMF. Analysis or interpretation of data: TMF, JNF, ENA. Drafting the work and revisions: TMF, JNF, ENA. Final approval of the version published: TMF, JNF, ENA. All authors made substantial contributions to this work. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Learning points

- ▶ Commercially available desvenlafaxine formulations (Pristiq, Khedezla) may cause a false-positive phencyclidine (PCP) result on a urine drug screen.
- ▶ PCP is a dissociative sedative hallucinogen, the use of which has declined since the 1970s, with a slight increase in recent years.
- ▶ A number of drugs may cause false-positive PCP results, including dextromethorphan, ibuprofen, imipramine, meperidine, diphenhydramine, doxylamine, ketamine, lamotrigine, tramadol, venlafaxine and desvenlafaxine.

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