Interpreting Pregnancy and Post-Pregnancy Fentanyl Fat Sequestration in Urine Drug Test Results

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Background

- Pregnant or post-pregnant persons (PoPPP) with opioid use disorder (OUD) who are engaged with recovery treatment programs may be required to participate in urine drug testing
- Pregnancy-related alterations in fat deposition and lipid metabolism have the potential to alter the absorption and clearance of lipophilic substances, such as fentanyl and norfentanyl
- Physiologic changes in PoPPP complicate accurate interpretations of urine drug tests.

Objective

- To present 4 cases of PoPPP with OUD whose GC/MS results for fentanyl and norfentanyl do not follow expected clearance patterns and explore phenomenon of fentanyl fat sequestration.

Case Presentation

Case 1: 33-year-old gravida 1 para 0 with OUD, intermittent fentanyl use during pregnancy with last use in the third trimester.

- Patient completed 22 urine drug tests throughout care:
  - 6 of 16 urine immunoassay drug tests were presumptive positive for fentanyl with confirmatory for norfentanyl only and 3 of 16 tests were presumptive positive with negative GC/MS confirmation

Case 2: 39-year-old gravida 2 para 1001 with history of OUD, stable on methadone throughout pregnancy.

- Patient provided 12 urine specimens for analysis:
  - After an initial urine immunoassay negative for fentanyl, and no return to use, patient experienced two subsequent presumptive positive urine immunoassays for fentanyl with confirmatory levels of norfentanyl only.
  - The remainder of the 9 urine immunoassays resulted negative for fentanyl.

Disclosure

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Case Presentation

Case 3: 35-year-old gravida 5 para 3002 with OUD, initiated on methadone in the second trimester of pregnancy.

- Patient provided 13 urine samples for drug testing:
  - First four urine drug tests following fentanyl use displayed expected linear clearance of fentanyl and norfentanyl. However, the fifth urine result showed low level detection of fentanyl (0.80 ng/dl) with continued linear decline in norfentanyl.

Case 4: 36-year-old gravida 3 para 1011 with history of OUD, stable on suboxone one year prior to pregnancy.

- Patient provided 11 urine specimens for analysis:
  - 5 of the 11 urine drug tests during pregnancy were presumptive positive for fentanyl. GC/MS testing confirmed all samples negative for fentanyl. 2 of the 5, separated by 60 days and 3 negative GC/MS tests, resulted positive for minute levels of norfentanyl only (1.0 ng/ml and 0.9ng/ml, respectively).

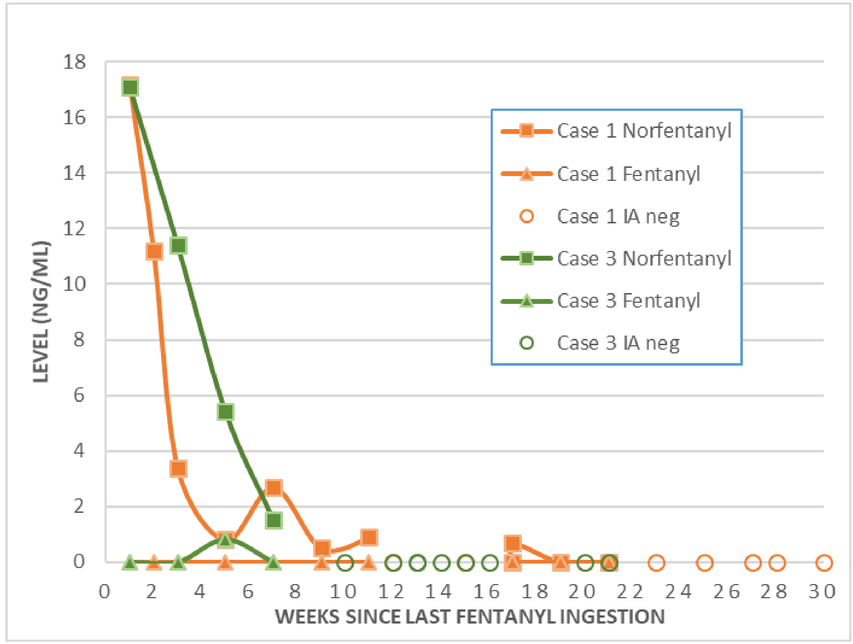

Figure 1. Case 1 urine drug test results with four outliers removed (>500ng/ml, 40.7 ng/ml, >500ng/ml, 42.9 ng/ml norfentanyl respectively) and Case 3 urine drug test results with two outliers removed (both >500ng/ml norfentanyl). to better depict the trends of fentanyl and norfentanyl.

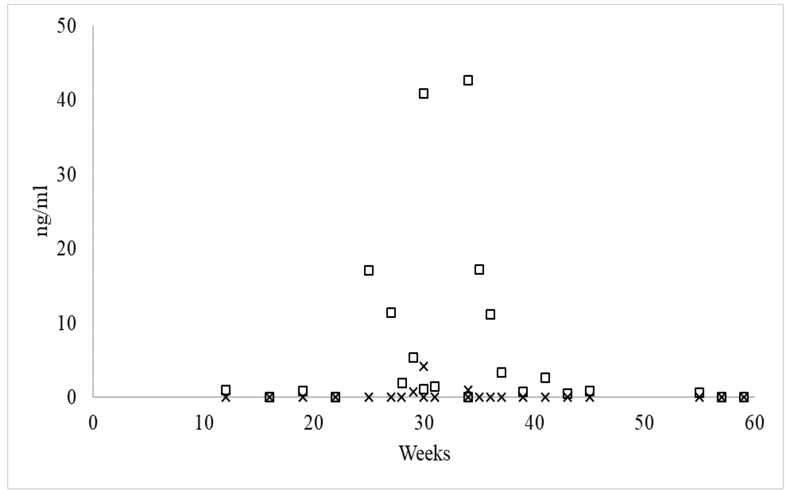

Figure 2. Square = norfentanyl, X = fentanyl. Represents data across the four cases showing greater variation in norfentanyl clearance compared to fentanyl.

Discussion

- **Interpretation of urine IA and GC/MS results for fentanyl and norfentanyl for PoPPP with OUD is complex.**
- GC/MS levels for fentanyl and norfentanyl spike following fentanyl ingestion (often >500ng/mL) and downtrend in a slow, linear fashion due to the lipophilic nature of fentanyl.
- The irregular detection patterns in the cases presented here may represent pregnancy-associated fluctuations in lipid metabolism altering fentanyl and norfentanyl clearance, resulting in non-linear and delayed excretion.
- **Aberrant results require careful interpretation by the ordering clinicians, in tandem with psychosocial evaluation, to ensure stability in recovery. The responsibility lies with physicians to advocate on behalf of the clients within the child welfare system.**

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