



Acetyl Fentanyl: Acute Toxicity Case Report

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Abstract

Acetyl fentanyl is a recent synthetic drug of recreation that little is known in values to ascribe cause of death. A young female while at work took a break and was subsequently found in the locked bathroom with a syringe in her arm. She was taken to the hospital and died shortly after arrival. Toxicology blood screening was performed and was negative for drugs of abuse and chromatography was negative. Drug testing of residual fluid in the syringe revealed the substance to be acetyl fentanyl. Blood quantitation for acetyl fentanyl was positive at 180 ng/ml. The cause of death was certified as acute acetyl fentanyl toxicity and the manner of death was certified as accident. To our knowledge this is the lowest fatal level that has been reported in the literature where acetyl fentanyl is the only drug identified.

Introduction

Acetyl fentanyl [N-(1phenethylpiperidin-4-yl)-N-phenylacetamide] is a relatively new synthetic recreational drug that became recognized in 2013 [1,2]. Acetyl fentanyl is a derivative of fentanyl, both of which are synthetic opioids; however, unlike fentanyl, there is no licit usage. Thus, manufacturing of acetyl fentanyl occurs in clandestine laboratories [3-5]. The CDC issued its first health advisory in June of 2013 urging preparation of emergency departments, state laboratories and medical examiners/coroners [2]. Acetyl fentanyl has been reported to be about 15 times more potent than morphine, but 3 times less potent than fentanyl [3]. Acetyl fentanyl like other opioids binds to μ -opioid receptors (agonist) in the brain and has analgesic effects and produces an alteration in mood, euphoria, drowsiness, respiratory depression, suppression of the cough reflex, constriction of pupils and impairs GI motility as demonstrated in rats and or mice [3]. Common physical forms of acetyl fentanyl is in tablet and powder forms [3]. The CDC published one of the first reports of fourteen fatalities in Rhode Island describing characteristics of users of acetyl fentanyl: age range of 19-57, male (72%), white and history of drug use (79%) with 50% of those having a history of opioid use [4]. The route of administration has been intravenous, but also surmised to include snorting and smoking [4]. McIntyre et al. [5] initially published postmortem acetyl fentanyl levels in various bodily fluids and tissues in a death: peripheral blood (260 ng/ml), central blood (250 ng/ml), liver (1,000 ng/kg), vitreous fluid (240 ng/ml) and urine (2,600 ng/ml). Another study included 4 cases of fatal acetyl fentanyl overdose with the peripheral blood concentrations ranging from 310 to 600 ng/mL [6]. A report of two fatal cases indicated a femoral blood concentration of 192 ng/mL and 255 ng/mL [7].

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Case Presentation

A 32 year old female had been performing normal duties at work. She explained to her co-workers that she was going on a break to meet a "friend" around 1610 hrs. When she had not returned from her break, co-workers began looking for her. The decedent was found inside a locked bathroom at work at 1700 hrs when a co-worker heard the bathroom water running and received no response. A syringe with a needle was reported to be sticking in the decedent's arm. Medics were summoned and she was transported to the hospital where she was pronounced dead approximately 10 min after reaching the hospital. Significant medical history included heroin abuse. The syringe had been transported to the hospital and was collected as evidence when the body was picked up for transportation to the Medical Examiner's Office. Upon undressing the decedent, a small clear plastic baggy containing a white powder was found in the decedent's pants pocket (Figure 1). The syringe that was collected contained residual transparent slightly pink tinted fluid (Figure 2).

An autopsy was performed and revealed therapeutic devices in place and intravenous lines were noted in both antecubital fossa. A separate puncture wound was noted adjacent to the IV line in the left antecubital fossa. There were no other significant external findings. Internally, the lungs were edematous with a combined weight of 1115 grams and there was cerebral edema with a brain



Figure 1: Clear plastic bag containing acetyl fentanyl.



Figure 2: Pink fluid in 1 cc syringe.

weight of 1390 grams. Toxicology results revealed a negative blood ethanol and a negative blood drug screen. No urine was available for analysis. The fluid in the syringe and the powder in the plastic baggy were tested and found to be acetyl fentanyl. The blood quantitation of acetyl fentanyl was 180 ng/ml (peripheral blood). The cause of death was ruled acute acetyl fentanyl toxicity and the manner of death was ruled accident.

Discussion

Unlike other publications, this case did not initially test positive for fentanyl in the blood screen. In line with one other report, there were no other drugs or medications identified [5].

In accordance with other publications, our case demonstrated that the acetyl fentanyl specimen was not mixed with heroin or other drugs [4].

The physical findings in this case support an opioid overdose [8]. This is consistent with the current thought that acetyl fentanyl acts like other opioids with respiratory depression causing pulmonary

edema. As such, naloxone, an opioid antagonist, is utilized in an attempt to reverse toxic side effects like respiratory depression; due to the increased potency of acetyl fentanyl, a higher dosage of naloxone may be necessary [1].

For those of us performing autopsies, a high index of suspicion is necessary as screening tests (ELISA) for fentanyl can be positive [1], but as our case confirms it isn't necessarily positive. Further testing is necessary to confirm a fentanyl analog when one is determining cause of death. Otherwise, a cause of death may not be determined.

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