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Maternal and Fetal Death due to Fentanyl, Methamphetamine and Cocaine Use – A Case Report

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Abstract

We report a case of a 21-year-old pregnant lady with past psychiatric episodes, suicidal ideation, and polysubstance use who was found dead in her apartment. On scene inspection, the deceased body was found in the bathtub. She was pronounced dead at the scene. The fetus was delivered by emergency cesarean section in the adjacent hospital and found to be a stillbirth. Pre-autopsy CT, macroscopic examination, histological examination, and toxicological analysis were performed. There was no evidence of injuries or features of drowning, and an anatomical cause of death was not detected. Toxicology testing revealed several substances at significant concentrations, including fentanyl, methamphetamine, amphetamine, cocaine, benzoylecgonine, olanzapine and cannabis products. The cause of death was given as fentanyl, methamphetamine and cocaine toxicity. The manner of death was accidental. Although it is not uncommon to see deaths due to substance use individuals, the peculiarity of this case lies in the same level of drugs found in both mother and fetus that has never been reported in the forensic literature. This case highlights the importance of a thorough analysis of history, circumstances, histologic examination, and qualitative and quantitative toxicological analysis, which can provide relevant medicolegal data for death investigation agencies and healthcare professionals in treating patients and preventing such deaths.

Keywords: *Pregnancy, Cocaine, fentanyl, methamphetamine, maternal and fetal mortality*

1. Introduction

The physical and mental health of the mother during pregnancy can have a pronounced impact on the well-being of her fetus. The opioid crisis has significantly affected many populations, including pregnant women and infants. The influence of drugs on the central nervous system can reduce a pregnant mother's intellectual abilities, impair her decision making and undermine her care for herself and her infant. The dangers of substance use are concerning, as 13% of pregnant Canadian women surveyed reported cigarette smoking, 11% alcohol consumption, and 5% reported using other drugs while pregnant.1 Women might be hesitant to seek treatment because an intense stigma exists against substance abuse, especially while pregnant. 2,3,4,5,6

Many drugs are administered to pregnant women, and only insufficient data exist to determine a therapeutically optimal and safe drug treatment. The general advice on using medicines in pregnancy is that you can only prescribe drugs to pregnant women if the benefits for the mother outweigh the risks for the fetus. The problem is that most medicine safety data are lacking. Most drug effects are dose-dependent. So, the first step to examine potential fetotoxicity is to test the transplacental transfer of drugs. Placental transfer from the maternal to the fetal side occurs primarily via passive diffusion, and some drugs are pumped across the placenta by various active transporters. The use of drugs during pregnancy can lead to medical complications such as early pregnancy loss, a detached placenta, fetal growth restrictions, blood clots, heightened blood pressure, intrauterine death, preterm labour, neonatal abstinence syndrome (NAS), stillbirth and hemorrhage following delivery.7,8 Maternal placenta-associated syndromes (PAS) comprise abnormal conditions during pregnancy associated with placental dysfunction.9

Fentanyl is a very potent opioid pain reliever. Fentanyl is usually used in a hospital setting. In non-medical situations, you will experience a quick rush of well-being (euphoria) when fentanyl is injected, smoked, snorted or ingested in high doses. Fentanyl is cheap for drug dealers to make into a street drug, compared to other opioids, but it is more powerful. Drug dealers who make fake pills may not know or control how much fentanyl goes into each pill. Drugs may also become contaminated with fentanyl accidentally when drug dealers re-use surfaces and equipment used for fentanyl. Fentanyl is causing high rates of overdose and overdose deaths in Canada.

The wide use of illicit drugs is a massive burden to any country's health sector and further challenges the legal system. Strategic preventive and rehabilitation programmes must be implemented to save future generations of the state. This case was unique as maternal and fetal deaths have not been reported in the English literature due to fentanyl, methamphetamine and cocaine toxicity.

2. Case Report

A 21-year-old pregnant woman in her third trimester was found unresponsive in her bathtub. Emergency Medical Services were called to the residence, but due to obvious signs of death, she was pronounced dead at the scene. The fetus was delivered by emergency cesarean section in the adjacent hospital and found to be a stillbirth. She was reported to have a past history of substance use and drinking alcohol during the pregnancy. She may have used substances that evening. She had an extensive psychiatric history, including suicide attempts and threats, borderline personality disorder, and substance-induced psychosis. She was prescribed olanzapine, quetiapine, and sertraline and took her medicines erratically. Her partner revealed that her behaviour in the past few weeks suggested that she was using methamphetamines again. A post-mortem examination, imaging and toxicology testing were performed. External examination revealed a well-developed, well-nourished adult female whose appearance was consistent with the stated age of 21 years with advanced pregnancy changes.

There was evidence of scarring from multiple, linear, parallel old cuts on forearms and a longitudinal linear surgical scar in the lower abdomen. There was no evidence of external injuries or features of drowning. After a thorough autopsy, an anatomical cause of death was not detected. Toxicology testing revealed several substances at significant concentrations, including fentanyl, methamphetamine, amphetamine, cocaine, benzoylecgonine, olanzapine and cannabis products.

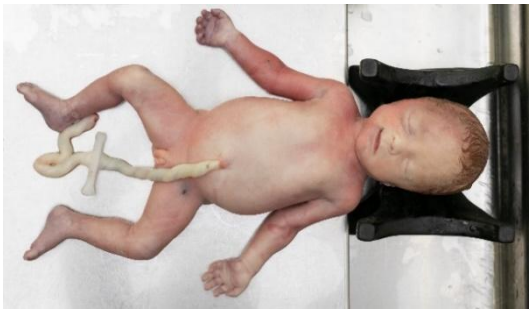

Figure 1. *The anterior view of a healthy fetus with no trauma or significant dysmorphic features.*

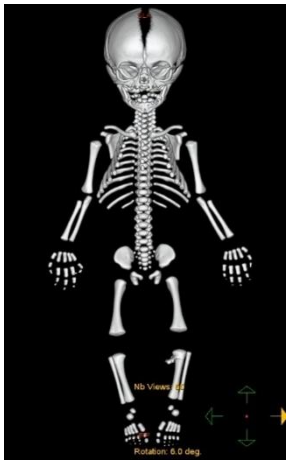

Figure 2. *The normal skeletal survey reconstructed from a whole-body CT scan.*

A post-mortem examination of the infant was conducted. The gestational age was estimated to be around 29-30 weeks. Preautopsy radiology is devoid of any structural skeletal anomalies (Figure 02). There was no evidence of trauma or dysmorphic features (Figure 01). The internal examination findings were consistent with healthy organs for a female fetus of 30 weeks gestation. An anatomical cause of death was not detected. The placenta and umbilical cord were macroscopically and microscopically unremarkable. There was also no evidence of abruption of the placenta. Qualitative and quantitative toxicological analysis of heart blood revealed the same results as that of mothers.

3. Toxicology Results

Substances detected	
Fentanyl:	15 ng/mL ± 1 ng/mL
Methamphetamine	> 0.40 mg/L
Amphetamine	0.070 mg/L ± 0.007 mg/L
Cocaine	< 0.0063 mg/L s
Benzoylecgonine	< 0.013 mg/L
Olanzapine	0.10 mg/L ± 0.01 mg/L s
Tetrahydrocannabinol (THC)	7.1 ng/mL ± 0.9 ng/Ml
Hydroxy-THC	Detected
Carboxy-THC	Detected
Cannabinol	Detected

4. Discussion

Substance use in pregnancy is commonly linked with multiple obstetric and neonatal adverse outcomes. The well-documented pathologies are Maternal placenta-associated syndromes (PAS), which comprise abnormal conditions during pregnancy associated with placental dysfunction, including pre-eclampsia, eclampsia, gestational hypertension, placental infarction, and placental abruption, oligohydramnios. The adverse effects of these pregnancy complications on fetal and infant outcomes are well-established. These conditions originate from placental spiral arteries, placental ischemia, and endothelial dysfunction, although the cause is multi-factorial. During pregnancy, substance abuse is on the rise, especially opioids, both prescribed and illicit, resulting in a hidden epidemic of neonatal abstinence syndrome (NAS). It is a multisystemic disorder resulting from chronic in-utero exposure and its abrupt cessation at birth. The predominant symptoms include the central nervous system, gastrointestinal, and autonomic manifestations. The pathophysiology of this condition remains unknown. Multiple neonatal and maternal factors affect the expression of symptoms, including gestational age, sex, genetics, and maternal polysubstance abuse or smoking. The diagnosis is based on an accurate maternal history and neonatal clinical features, with or without biological testing.Caring for women with substance use during pregnancy can be rewarding, challenging, complex, and time-consuming. Ideally, all pregnant women should be pre-nataly screened. Those with positive screens should be promptly diagnosed and treated to avoid the morbidity and mortality associated with continued substance use during pregnancy. This activity has so many challenges due to social stigmata. A holistic, multi-disciplinary, interprofessional team comprising Nurses, physicians, midwives, social workers, and mental health and addiction medicine specialists who work together as an interprofessional team can improve outcomes for mothers and their children.

Conclusion

Substance use in pregnancy remains a significant public health problem, which can lead to several harmful maternal and neonatal outcomes. Which drug is being used, the degree of use and the point of exposure influence the effects of drug use in pregnancy. In addition to the direct effects of drug exposure in utero, several other variables are associated with deleterious maternal and infant consequences, including psychiatric comorbidity, polysubstance use, limited prenatal care, environmental stressors and disrupted parental care.

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