

## Case Report

# Synthetic Cannabinoid and Synthetic Cocaine Use during Pregnancy in a Soldier

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**Abstract**

Synthetic cannabinoid (spice) and synthetic cocaine (bath salts) are relatively new designer drugs of abuse. To date, there have been few reports in the medical literature documenting their use during pregnancy. A 22 year-old gravid woman at 32 weeks gestation presented with suicidal ideation and agitation that required restraints and admission to the psychiatric ward. The woman had a long history of illicit drug use as well as both spice and bath salt use during early pregnancy. She was briefly admitted to the psychiatric ward and subsequently had an uneventful delivery and postpartum course. Acute spice and bath salt intoxication is frequently encountered in Emergency Departments and providers need to be aware of the serious health threats of these designer drugs to mothers and their fetuses.

**INTRODUCTION**

Synthetic drugs of abuse are frequently encountered in Emergency Departments throughout the United States, but there is limited published data regarding their use in pregnancy. A computerized MEDLINE search for the period 1966 to November 2013, using the keywords “spice”, “bath salts”, “synthetic cannabinoids”, and “synthetic cocaine” revealed no reported cases of an isolated addition or discrete withdrawal syndrome of these agents in pregnancy. Additionally, a review of the REPROTOX ® database revealed no data on the fetal effects of these agents.

Since 2009, new drugs of abuse, known generically as spice and bath salts, have become readily available. They are collectively known as synthetic legal intoxicating drugs (SLIDS). These products are an herbal mixture interlaced with synthetic cannabinoid that are smoked as a marijuana alternative. They initially became prevalent in 2004 [1]. Laboratory analysis from Germany and Austria showed that spice contains added synthetic cannabinoids that act on the body in a similar way as delta-9 tetrahydrocannabinol (THC), the major psychoactive ingredient in marijuana. A large and complex variety of synthetic cannabinoids, most often cannabicyclohexanol, JWH-018, JWH-073, or HU-210, are used in an attempt to avoid the laws that make *cannabis* illegal, thus making spice a designer drug [2,3].

The synthetic cannabinoid is formulated to bind to the

endogenous cannabinoid receptors (i.e., CB1 and CB2), thereby deriving their effects. The “high” spice produces a significantly elevated state of euphoria as synthetic cannabinoids are full agonists to the cannabinoid receptors, while THC is only a partial agonist. Depending on the synthetic compounds in a specific brand of spice, this drug can be anywhere from 4 to over 100 times more potent than THC [1].

In regards to bath salts, they are distinguished by their packaging and are sold as bath or soaking preparations. Bath salts contain multiple substances that pose significant health risks, including heart attack, kidney failure, hallucinations and death [4]. The most common substances identified in these products are 3,4- methylenedioxypropylvalerone (MDPV), mephedrone and derivatives of cathinone, all of which produce stimulant-like effects.

Both spice and bath salts are sold over the internet and in various retail locations under multiple brand names. Packets of bath salts say “Not for human consumption” and inform consumers that the powder should not be used as snuff or smoked. Nonetheless, these products are often inhaled, ingested, smoked or (in the case of bath salts) injected.

Anecdotal reports from users indicate the euphoric high of bath salts and spice typically lasts 2 to 4 hours, with the let down effects lasting several hours more. Reported doses for

bath salts range from 5-10mg for the more lipophilic MDPV and 100mg-250mg for mephedrone. Bath salts are reported to cause euphoria, empathic mood, sexual stimulation, mental focus, and increased energy. Users may develop cardiac and circulatory disturbances, agitation, delirium, paranoia and psychosis. There have been anecdotal cases in which users have attempted to inflict injury on themselves or others. We currently do not know how long the agitation and delirium or how long these substances remain in the body

We report a case of a pregnant soldier that habitually used synthetic cannabinoid (spice) and synthetic cocaine (bath salts) as well as *cannabis* and tobacco throughout her pregnancy and her pregnancy outcome.

## CASE PRESENTATION

A 22-year-old gravida 3 para 0 estimated to be at 31 weeks gestation by unsure last menstrual period presented to the Labor and Delivery ward with anxiety, agitation and suicidal ideation following a verbal and physical altercation with her fiancé. At the time of presentation, she was a US soldier who had recently returned from a deployment to Afghanistan. She had a history of depression, anxiety and post traumatic stress disorder all associated with a sexual assault that occurred shortly after returning from deployment. She reported recurring thematic nightmares of a sexual encounter with the man who had raped her, hypervigilance to touch, and frequent flashbacks. During the two months prior to admission, she was extremely depressed, suffered hypersomnia, loss of appetite, anhedonia, fatigue and suicidal ideation and never left her home except to go to work.

The patient began using marijuana at age 13 and alcohol at age 9. She reported her *cannabis* use as averaging 0.5gm per day until age 19, at which time she joined the US Army. From the ages of 13 to 16 she also regularly used opioids. Following her rape the patient began using MDMA (3,4-Methylenedioxymethamphetamine), marijuana, spice and bath salts. Upon finding out that she was pregnant at approximately 10 weeks gestation; the patient said that she had curtailed her use of spice and bath salts. About 2 years prior to that time, she regularly used spice (approximately 5 gm/day) and bath salts (150 gm/day). During this period neither substance was prohibited by law, thus it was viewed as a legal "high". Concurrently, neither was there a test available for bath salts and spice at the time of this case report; all usage is self-reported.

Upon ceasing the use of spice and bath salts, she experienced severe withdrawal symptoms that lasted approximately 3 weeks. These symptoms included anxiety, depression, agitation, nausea, vomiting, sweating, chills, and sleep disturbance.

In November 2010 Fort Bragg banned the use of spice and bath salts [5]. Yet, the patient continued using these illegal substances and was twice disciplined under the Uniform Code of Military Justice for misconduct and subsequently released from the military. At the time of presentation the patient was in the process of a divorce from another service member that she said was a "contract marriage" of convenience for increased monetary benefits. At the time of admission she was living with her fiancé also a former service member who is the father of the unborn child. She reported that her fiancé was in rehabilitation for spice and bath salt abuse.

At the time of admission, the patient was non-compliant, combative and appeared to pose a threat to herself, her unborn child and the staff. She expressed suicidal ideation and threatened harm to both herself and her unborn child by attempting to induce an abortion with a coat hanger. Hospital security was called and physical restraints were applied.

The patient was hospitalized for 3 days under the care of the inpatient psychiatric team with obstetrical consultation. The patient remained physically restrained and was treated with lorazepam. Once she became calm and cooperative, the restraints were removed.

After 3 days of hospitalization, the patient denied any further suicidal ideation or desire to harm her fetus. The patient was released to her command with follow up scheduled. She was also referred to the military substance abuse program.

Over the following weeks, the patient missed routine obstetrics and psychiatric appointments. Attempts to contact the patient and the father of the baby were unsuccessful. The patient's commander was contacted and informed us that she had been discharged from the Army. Follow-up contact with the patient was made after her baby was born. She and the father of the baby (also discharged from the Army) were at her parents' home. The patient reported that she had an uncomplicated vaginal delivery. She gave birth to a 3260g male infant with an Apgar of 8/9. The infant has had no health issues and is meeting his developmental milestones. No teratogenic effects of the bath salts and spice were seen. Subsequently, no recorded visits or telephone consults have been documented in her medical records and no new medications or therapy has been noted, possibly due to relocation.

## DISCUSSION

This patient presents an interesting noteworthy case for three main reasons: firstly, she abused designer drugs during her pregnancy and little is known of their specific effects to the unborn child. Secondly, she was a military service member and with rising use in the military, research is ongoing in an effort to combat abuse. Lastly, substance abuse among patients whether pregnant or not, may be a sign of other mental illnesses and it is imperative that screening is conducted so that mental illness can be diagnosed and treated.

The prevalence of recreational substance abuse among women of child bearing age has increased over the last 2 decades [6,7]. Approximately 5% of pregnant women use illicit substances such as marijuana or cocaine and a much larger proportion smoke tobacco or consume alcohol [8,9]. Consequently, numerous reports of cases of illicit substance abuse in pregnancy have been documented [7,10-12]. Substances most commonly used in pregnancy include alcohol, tobacco, caffeine, marijuana, cocaine, amphetamines and opioids. Poly-substance abuse is very common.

More research is needed to determine the effects of synthetic cannabinoids and synthetic cocaine on unborn and newborn babies. We do know that, for example, THC freely crosses the placental barrier and directly affects the fetus. Since many patients that use spice and bath salts also use marijuana as well as other substances, such as tobacco, cocaine and alcohol, it is

difficult to identify the specific effects of spice or bath salts on the fetus.

Research also demonstrates that the chronic use of marijuana results in decreased uteroplacental perfusion and intrauterine fetal growth restriction. It may alter the pituitary-adrenal axis and hormone production, adversely affecting fertility and pregnancy. Suppression of ovulation has been reported in chronic cannabis smoking. The production of both estrogen and progesterone by the human placenta may also be altered [7,13].

Studies of bath salts compounds that include mephedrone and MDPV, show that they possess intrinsic stimulant properties that affect the plasma membrane dopamine, norepinephrine and serotonin transporters, thereby resulting in both re-uptake inhibition and direct agonist activity. Effects vary among tested compounds despite structural similarities, making the exact action of mephedrone and MDPV somewhat theoretical. The net result of these properties is a sympathomimetic toxidrome similar to that of other illicit drugs most providers are more familiar with, such as cocaine, methamphetamine and ecstasy [14].

The American College of Obstetricians and Gynecologists (ACOG) has issued multiple recommendations regarding management of patients with substance abuse during pregnancy. Women who acknowledge use of an illicit substance during pregnancy should be counseled and offered the necessary treatment. ACOG also acknowledged that some states consider intrauterine fetal drug exposures as a form of child neglect or abuse [15].

The majority of patients with a history of substance abuse or addiction often deny it when interviewed preoperatively. Therefore, a high index of suspicion for drug abuse in pregnancy, combined with non-judgmental questioning of every patient is necessary. Risk factors that suggest substance abuse in pregnancy include lack of prenatal care, history of premature labor and cigarette smoking.

Based on experience with other stimulants and case series, management of patients with exposures to spice and bath salts should be similar to management of other drugs that induce a sympathomimetic state. Agitation should be controlled with benzodiazepines as first line therapy. Other supportive measures including fluid management and temperature control may play significant roles as well. Seizures may occur, and should be responsive to medications acting through GABA promotion, such as benzodiazepines, barbiturates, and propofol. Airway compromise, extreme sedation needs, seizures evolving to status epilepticus, and uncontrolled agitation all suggest the need for advanced airway management. Both the risks of acute coronary syndrome and rhabdomyolysis and subsequent need for monitoring parameters are unclear at this point [16-19].

No specific antidotes exist. Despite the widespread use of designer drugs of abuse such as spice and bath salts, there are few reports in the medical literature about their use in pregnancy. Providers need to be aware of the serious health threat of these designer drugs to mothers and their fetuses.

Confounding this patient's clinical presentation was a history of underlying mental illness. This patient has a history of depression, anxiety and PTSD. Substance abuse with concurrent mental illness is not a new phenomenon. Patients with both concurrent mental illness and substance abuse are said to have dual diagnoses (DD). Currently, it remains to be known for certain if treating both conditions concurrently or individually provides the best outcomes with the exception of seeking safety. Defined as cognitive behavior therapy (CBT) simultaneously addresses trauma and substance abuse, seeking safety has shown to improve long term prognosis for DD patients.

A recently released Veterans Administration analysis of service utilization among formerly deployed veterans between October 2001 - December 2011 found that mental health disorders were diagnosed and treated more than any other illnesses second only to connective tissue and musculoskeletal disease. During this period, the VA also saw an increase in drug dependence among these veterans. Research is ongoing in identifying service members with dual mental health and substance use disorders in an effort to identify and treat [1].

At the time the patient was hospitalized tests for bath salts and spice was almost nonexistent. Also, in our experience patients who use these products commonly report to the emergency department (ED) for treatment of chest pain [20].

Overall, little is known about the effects of spice and bath salts on a growing fetus. Abusing any substance while pregnant has the potential to lead to complications during and after pregnancy. Tests are now available to detect certain types of synthetic cannabinoids and synthetic cocaine; however easy availability of these drugs may not decrease their use. Further research is needed to determine if these products will cause lasting harm to a newborn.

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