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An Adolescent's Use of Veterinary Medicines: A Case Report Exploring Addiction

Mark Mohan Kaggwa ^a, Sympson Nuwamanya^a, Scholastic Ashaba^a, Godfrey Zari Rukundo^a, and Sheila Harms^b

^aDepartment of Psychiatry, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda; ^bDepartment of Psychiatry & Behavioural Neurosciences, McMaster University, Hamilton, Canada

ABSTRACT

This case report describes a 17-year-old high school student serious suicide attempt using an injectable composite of veterinary medications (vitamins, vaccines, antibiotics, and antihelminthics) typically used to treat chickens. The use of this particular substance and the route of administration was novel as a method for suicide lethality and there have been no previous cases of this kind. However, this youth also developed chronic self-harming behaviors where she would repeatedly self-inject the veterinarian medication composite which included substances that were largely inert but did have a potential neuropsychiatric side effect profile that complicated her psychiatric presentation. In this context of chronically injecting a substance with unclear psychoactive properties, an interesting set of symptoms and behaviors emerged that required diagnostic clarification and interpretation. Diagnostic considerations for this youth included major depressive disorder with psychotic features, a possible emerging borderline personality disorder, post-traumatic stress disorder (PTSD), as well as a possibility of an unknown substance use disorder using the veterinary medication composite. The purpose of this case study is to highlight the clinical course and explore sociocultural factors, including family and interpersonal relationships as contextually important variables.

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Addiction; depression; suicide; veterinary medications; borderline personality disorder; deliberate self-harm; Uganda

Introduction

Uganda is a low-income country with a population of 42 million, where 60% of the people are engaged in farming activities such as harvesting crops and animal rearing (Gottschalk 2020; WorldBank 2019). Plant and veterinary medicines are readily available to treat common diseases in local animal populations such as chickens, goats, cows, and dogs. These veterinary medications frequently include antibiotics, antihelminthics, multivitamins, vaccines, and pesticides. The medicines are misused by humans in various ways such as in the treatment of human diseases, aid to commit/attempt suicide, abortion of unwanted pregnancies, and drugs of addiction (AVMA 2020; Erramouspe, Adamcik, and Carlson 2002; Lust et al. 2011). Some veterinary medicines such as ketamine, steroids, and opioids (i.e., carfentanil) have addictive properties in humans (Lust et al. 2011) although there is no data indicating how often these veterinary medications are being used as drugs of abuse. With mass production, availability, and access to veterinary products, coupled with their misuse, many may use them as substances of addiction (Lust et al. 2011; Perrin, 2015). The following encounter was the first of its kind in the psychiatry department at

Mbarara Regional Referral Hospital, creating a challenging and novel clinical situation for review and consideration, where the patient presented with self-injection with a mixture of veterinary medicines (vitamins, vaccines, antibiotics, and anthelmintics).

Case presentation

A 17-year old adolescent girl was admitted to the psychiatry ward with a six-month history of functional decline, positive psychotic symptoms, chronic self-harming behaviors and suicidal ideation, as well as neurovegetative symptoms. She had no previous mental health concerns nor admissions to a psychiatric facility. She also denied having any acute or chronic medical problems and did not take any regularly prescribed medications. During the initial admission interview, she acknowledged having repeatedly made suicide attempts by injecting her thigh with a mixture of veterinary medications accessed at her parents' chicken farm with the intent to die. She showed the interviewing clinician a tea bottle where she concealed the veterinary medication composite which consisted of vitamins, vaccines, antibiotics, and anthelmintics. In exploring her first suicide attempt with the injectable

veterinary medication, she reported profound sadness about not completing suicide, believing that she was a failure in her family and that they would be much better off if she was dead. She also reported symptoms including lack of sleep, refusal to eat, anhedonia, fatigue, and had been isolated from the rest of the family. She also described having extreme sadness, fear, and paranoia, believing that her family members were traitors.

The numerous suicide attempts by self-injecting the medications were described as being done with the intent to die. However, they were also associated with brief periods of relief from depressive symptoms, a self-reported sense of euphoria, and a temporary sense of relaxation that occurred during the injection. Following this unexpected experience of achieving temporary relief from her emotional suffering from the feeling of physical pain associated with injecting, she reported an increasing urge to self-administer injections as a way of relieving all negative emotions. The injections were typically followed by periods of intense, prolonged sadness, guilt, and self-loathing. The patient described experiences of boredom, anger, or loneliness as triggering an urge to self-inject which would be temporarily relieved through self-administering of the veterinary medications. Over time, she developed patterns of self-injection that occurred up to multiple times daily, however, reported no discomfort associated with the injections. She described not being able to cope without having access to the mixture to the extent that she smuggled it into her boarding school, disguised in tea bottles, which she understood would be a serious offense if discovered and could compromise her ability to remain at a prestigious boarding school. Eventually, while at school, fellow students observed her injecting herself with unfamiliar medicine and informed the school authorities. The authorities then contacted her parents who were made aware of these behaviors and subsequently removed her access to the medications and the syringe.

Prior to hospitalization, the patient reported hearing strange commanding voices not heard by others around her that would provide a running, derogatory, and abusive commentary about her. These voices were identified as belonging to her mother and reportedly prevented her from experiencing any happiness that she had historically felt. The voices kept reminding her of how ugly she was, what a failure she had been, and discouraged her in any positive efforts. The patient was clear that the onset of the voices occurred following the use of injectable veterinary medications. It was also determined that the patient had insight, judgment, and cognitive abilities such that she was capable of providing a reliable history.

Despite having no previous history of substance use, she described wanting to experiment with more serious drugs of abuse such as cocaine or marijuana to mitigate the experience of critical voices and sad feelings. She was aware that these kinds of substance seeking inclinations were a serious cultural taboo for a person of her age and gender in the Ugandan setting. However, she was insistent that she wanted to experiment with these substances in the future as a way of self-medicating despite the social and physical risks involved. She denied using or adding other substances in addition to the veterinary mixture.

During her hospitalization, she participated in sessions with a hospital psychologist (NS) and a number of stressors originating within context of the patient's family were uncovered. The patient was the middle child in a family with 5 children. There were many descriptions of hard feelings in the family, and all of the children were described as having conflicted relationships with their parents. Whenever the patient reflected on these relational challenges, she reported worsening of sadness relieved through self-injections. The patient's parents both worked as teachers who were described as hardworking and wanted their children to achieve the best in life. The parents had a poultry farm as a side business to boost their income, which also assisted them in being able to enroll their children in good private schools within the country. The parents described trying to instill good habits and morals in their children using disciplinary approach they believed would achieve success. They endorsed using parenting strategies such as heavy punishment, making their children work on the poultry farm, as well as reading books. The patient's mother was described as having very high expectations and was reportedly unhappy with the patient's performance in her senior high exams (i.e., O – level) despite her above-average grades. The patient reported feeling as though her mother was critical of her looks, her body appearance, and her dress code, such that she could never please her mother. The mother reportedly accused the patient of becoming pregnant as a reason for her poor performance and was described as intrusive to the extent that she would wake her daughter in the night to palpate her abdomen in order to confirm her suspicion of pregnancy, which was later determined to be untrue. The patient's parents indicated that they wondered if the patient was fabricating symptoms.

Overall, the patient experienced her mother as harsh and demanding, with few experiences of feeling loved and accepted. In light of this, she has preferred to live with relatives, away from her nuclear family. This was the preferred option since it reduced her access to veterinary medicine, injections, and put her in a less stressful

environment. While she reported that she wanted to continue self-injecting, she also recognized the need to engage in these types of harm reduction techniques to assist with her recovery. When asking the patient about potential Borderline Personality Disorder (BPD) symptoms, she reported ongoing efforts to avoid her parents' rejection and perceived abandonment. She also endorsed recurrent self-harming/suicidal behaviors, affective instability, and a chronic feeling of emptiness. The patient's brother reported that she had stable relationships with her friends, and historically was able to control her emotions in front of the mother despite her conflicted feelings. Despite the non-life-threatening verbal trauma she experienced from the mother, the patient experienced other symptoms of PTSD including intrusive and upsetting memories, nightmares about her experiences with her mother, physical reactions in response to traumatic reminders of her mother's abuse.

On physical examination, the patient had normal vital signs. At no point were there any concerns about her cardiac, respiratory, hepatic, or renal functioning. There were multiple injection sites visible on her thighs with no marked swelling or redness. The patient was in good physical health with no other complaints except psychological distress. All basic baseline afforded investigations were normal, including liver functional tests, renal functional tests, complete hemogram, and urinalysis.

During her 4-day stay on the psychiatry ward, she was given antipsychotics (trifluoperazine 10 mg a day), which greatly reduced the voices, and an antidepressant (amitriptyline 75 mg), which helped with improvements in sleep, increased appetite, and reduction in depressive symptoms. She also reportedly engaged in self-injection of the veterinary medication while she was on the psychiatric ward. During her stay in the ward, she was offered psychotherapy to explore and understand her problems using short-term psychoanalysis. However, at discharge, she was given fluoxetine 20 mg to reduce the chances of a lethal overdose with tricyclic antidepressants.

Discussion

In this case we encountered several diagnostic dilemmas. Our patient met the criteria for major depressive disorder with psychotic features and suicidality as per DSM V with various symptoms including a depressed mood, poor sleep, refusal to eat, anhedonia, and isolation from the family members (Arlington, 2013). This diagnosis is common in the Ugandan setting and was not necessarily surprising. However, the patient presented with very uncommon behaviors, specifically repeated self-

injection over 1.5 months that were intended as a method for completed suicide. Despite the intended lethality, the repeated pattern was striking, leading to the hypothesis that she may have an addiction. Her persistent use of the veterinary medications meets DSM V criteria for unknown substance use disorder (USUD) of the DSM-5 (Arlington, 2013) with 9 symptoms out of 12, thus severe USUD. However, none of the animal medicines used by the patient (Table 1) were identified to have any addictive properties or elements based on an extensive literature search in google scholar and PubMed. One of the questions that was raised had to do with deciphering addiction from addictive-like behavior, including an understanding of potential exacerbating factors that contributed to her clinical picture. If we considered her behaviors to reflect an addiction, the potential cause of the addictive behaviors includes a number of hypotheses such as: 1) the mixture of veterinary medicines creating a new addictive compound, 2) the preservatives acting as the addictive components, 3) an unknown component with addictive properties present in these medicines. Given the dearth of information about the use of these substances in humans, more research is necessary to explore the addictive properties of these substances and their effect on humans, particularly as it relates to the development of psychiatric symptoms. Alternatively, the veterinary medications may have caused side effects that were part of her psychiatric presentation. For example, levamisole hydrochloride can cause neurovegetative symptoms and may explain the psychiatric presentation or worsening of the depressive symptoms that were ego-syntonic for the patient (WebMD 2020). It was also noted that most of the drugs in the veterinary medication disrupt the Thyroid Stimulating Hormone (TSH) and may also induce depressive and psychotic symptoms experienced by the patient (Pancieria and Post 1992; Poirier et al. 1999).

The impact of deliberate self-harm could explain the maintenance of her self-harming addictive symptoms. Specifically, repeated injection would necessarily lead to a pain response associated with an increase in endorphins, leading to a dopaminergic response (Taiminen et al. 1998). It is this neurochemical cascade that could have sustained the self-harm behaviors, focusing on pain and an associated endorphin release (Taiminen et al. 1998). This could also explain the euphoria and relief after injection. The injection could also have been a way to express the psychological trauma she went through (Saçarçelik et al. 2013). It is interesting to note that in Uganda, only the sickest patients require injectable medications, demonstrating a form of illness severity. Dynamically, the patient may

Table 1. List of drugs used in veterinary medications mixture (taken from a list of ingredients found on the medications used by the patient).

Components	Common use in chicken	Adverse effects in humans
Multivitamin containing Vitamin A, B1, B2, B6, C, D, E, K3, D-Calcium pantothenate, Niacinamide, Folic acid, DL-Methionine, Choline bitartrate, L-Lysine hydrochloride, and Glucose,	Helps in chicken growth, good egg production, and treatment of vitamin and amino acid deficiencies	<ul style="list-style-type: none"> • No known adverse effects.
Erythromycin thiocyanate (Sinha 2020)	Treatment of chronic respiratory disease.	<ul style="list-style-type: none"> • Hepatitis • Prolonged QT interval • Cardiac arrhythmias • Hematological disorder • Depression • Anxiety • Insomnia • Paranoia • confusion, • Found in eggs and consumed by humans. • No adverse effects identified • Causes mild changes to thyroid functional tests
Levamisole hydrochloride (WebMD 2020)	A broad-spectrum anthelmintic	
Oxytetracycline (Cunha 2016)	Broad-spectrum antibiotic	
Sulfadiazine Trimethoprim (Panciera and Post 1992)	Broad-spectrum antibiotic	
Flyumekvin Sulfadimidine (Panciera and Post 1992)	Broad-spectrum antibiotics Broad-spectrum antibiotics	<ul style="list-style-type: none"> • Prohibited for human use • Blocks TSH leading to thyroid cancer in non-primate animals but mild changes to thyroid functional tests in humans • Lack of appetite • depression • anxiety • No side effects found with Newcastle vaccine • The vaccines have not been found to be lethal in humans despite previous effects in animals of the live vaccines • No evidence of the effect to immunosuppressed humans
Enrofloxacin (fluoroquinolone) (Rania 2020)	Antibiotics	
New castle, Paw pox, Poul typhoid (Strausbaugh and Berkelman 2003)	Vaccines	

The antibiotics are prohibited due to the spread of bacterial resistance and untested side effects. All the drugs are recognized by and under control of the Uganda National Drug Authority.
TSH – thyroid stimulating hormone

have been acting out a need to be seen as severely unwell. Furthermore, the dynamic interpretation may also offer ideas about her own self-identity as being as worthless as a farm animal, thus treating herself as such. The preference to inject would also have been due to culture not preferring to cut on the exposed body parts, which are associated with witchcraft and bad omen. Despite having multiple injections sites on her thigh, none were septic possibly because of the broad-spectrum antibiotics in the mixture (Table 1) did not allow the development of sepsis in the region, the patient did not become medically ill from sepsis because of the same reason.

These symptoms could also be explained by an emerging BPD or borderline personality trait expressions of distress, which have been observed in adolescents which makes our thinking of the addictive behavior, being to injecting (deliberate self-harm) rather than a potential substance of addiction. Various factors contribute to the emerging BPD, the parenting style (authoritarian style), childhood maltreatment and trauma, adolescence. The most striking experience is the trauma described in the context of a parenting style that was experienced as

authoritarian, with unrealistic expectations and limited expressions of affection or praise. The family environment was described as limited in its ability to foster trust or understanding between parents and children. For example, mother's action toward the daughter including, palpating the abdomen at night thinking she is pregnant showed the extent of mistrust between them. The parenting style dominated by physical punishments could have led to psychological trauma and in an attempt to get the help, the patient preferred to live with relatives and family friends rather than with parents. With no room to escape her challenges, she became depressed, deliberately harmed herself, as suicide was her only option.

Suicide is an illegal and culturally unacceptable practice in most Ugandan cultures such that the bodies of the suicide victims are frequently beaten in a public forum after death as a stringent lesson for the living to avoid suicide (Knizek, Kinyanda, Owens, and Hjelmeland 2011). Additionally, those individuals who have died by suicide are not given a proper burial, which is culturally very significant (Joomlasupport 2012). Those who don't die within an attempted suicide are punishable by law for their attempt (Lubaale 2017). Despite suicide by

ingestion of pesticides being common in the country (Kinyanda et al. 2011), there is no available literature about suicide attempts via injections of veterinary medicines. Suicide attempts are strongly deterred in Uganda and it was surprising that the method used as an attempt ended up in a recurrent use (deliberate self-harm) particularly when the possibility for recourse or punishment was high. Deliberate self-harm when patients try to have superficial cutting is also not culturally accepted and may have resulted in the patient injecting herself on the thighs where it is not visible to the public.

Conclusion

Adolescents have different ways of communicating distress, and one of them is deliberate self-harm. This case raised the question of addiction and addictive behaviors as a marker of distress which led to the need to probe for a deeper understanding of the cultural and developmental context. The specific use of veterinary medicine posed diagnostic challenges/dilemmas where pharmacology, symptomatology, and culture were difficult to untangle. However, this addiction was an addiction to injecting/pain (deliberate self-harm) rather than the content in veterinary medicine, thus, an emerging BPD. This act was a signal communicating her suffering and treatment was delivered.

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Author contributions

MMK clerked the patient and was involved in the management of the patient with guidance from GZR. MMK conceived the idea and wrote the first draft of the case report. NS contributed to the organization of the information included in the report. GZR, SA, SH, and MMK revised and edited the subsequent versions of the case report. All authors read and approved the final version of the case report.

Disclosure statement

The authors declare that they have no conflict of interest.

ORCID

Mark Mohan Kaggwa  <http://orcid.org/0000-0002-4733-154X>

Informed consent

The patient was below the consenting age (17years) in Uganda. Therefore, we obtained a verbal informed assent and permission from both parents to publish this information.

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