CASE REPORT

Kratom-induced psychosis: Case report and literature investigation

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Substance use disorder is a major concern for public health. Legal substances are often misused to get high. Beside the risk of developing subsequent mental health and physical conditions, one of major risk is related to behavioural changes leading to criminal behaviour. Some of these substances need regulation to ensure public as well as individual safety. This article is a case report describing Mitragyna speciosa (Kratom) induced psychosis in a patient suffering from schizophrenia. We hope this article can bring attention to regulating bodies about the risks associated with readily available "legal" drugs like Kratom.

Key words: Psychosis, schizophrenia, Kratom, Mitragyna speciosa, drug-induced, legal highs

Introduction

For the last decade we have seen an increase in the amount and variety of substances that have infiltrated the drug market. They are being abused for their neuroactive properties. Most of these substances are legal, and readily available. They pose a significant risk to consumers due to the lack of scientific studies and quality control of the products [1]. These substances can be natural products with psychoactive effects, chemically altered products, or misuse of an existing drug (i.e., gravol) [2]. They are qualified as "legal high" or "herbal high" when these substances are not prohibited by the country where they are used. The most commonly used and widely published are caffeine pills, synthetic cannabinoid, and cathinones found in bath salts [3].

Mitragyna speciosa is one of these new substances. It is found on the market under the name Kratom and can be found associated with other substances under the names Ketum, Krypton, K2, depending on the other substance(s) present. This product comes from the leaves of a tree primarily from Malaysia and Thailand and is known for its opioid-like symptoms [4].

Mitragyna speciosa, among the other legal high substances, is of a major concern in mental health and notably in forensic psychiatry world. Its use is not prohibited in many countries, yet it can pose a major impact on a patient's mental stability and risk of violence. Our paper presents a case of a patient enrolled in a forensic psychiatry program who developed psychosis after abusing Mitragyna speciosa.

Case report

We present the case of a 28-year-old man who was diagnosed with schizophrenia. He was free from any psychotic symptoms for several years and treated with long-acting risperidone and oral olanzapine. One week after his discharge from the inpatient program, the police were contacted due to his bizarre behaviour and suspicious activities. He was brought back to the hospital. He was dismissive and irritable with paranoid thinking. His presentation was similar to his previous admissions where he presented with unstable psychotic symptoms. As a result, we increased his olanzapine to 15 mg daily.

He was kept in the hospital due to his unstable mental status and risk of violence. His symptoms evolved in three phases over a three-week period. As described above, he initially presented with a thought disorder phase, being dismissive, and non-compliant. The second phase consisted of a clear paranoid phase where he was more talkative, but oppositional, paranoid, and more extraverted. The third phase consisted of a hypomanic phase where he was being jovial, giving away his money to copatients. He had no racing thoughts or pressured speech. During his previous admissions he never had any kind of mood-related symptoms. After three weeks he returned back to baseline as a symptom free, high functioning individual.

This individual acknowledged the use of Kratom, which helped us identify it on the urine sample taken at the time of admission. His urine drug screen was also positive for Lorazepam, olanzapine and Risperidone (his current medications) and Mitragyna speciosa. He explained that he purchased Kratom off the internet because it was advertised as an anxiety relieving substance, and he had been denied an increased dosage of Lorazepam. He further articulated that he believed that Kratom would be a desirable product as it has some energizing effects.

The patient also appeared to be quite knowledgeable about Kratom, as he provided explanation as to the different types of the Kratom teas, identified by their colour (red, green, white and black) and their respective effects. He said he purchased all four types to feel more energized in the morning and get some help with sleep at night. The amount of product he used remained unknown to us.

After this incident, substance use disorder became one of the main targets of the patient's rehabilitation program. He became mindful that his brain is sensitive to any psychoactive substances, and he should remain away from it. In the past, he presented some minor but obvious changes of his mental status, which resulted from using caffeine pills.

Discussion

This case report is the first to report the impact of Kraton on an individual suffering from a severe mental illness. As detailed below, the relationship between this substance and psychiatric symptoms is not clear in literature. This case highlights that Mitragyna speciosa is a misused substance with significant neurocognitive effects and is a readily available source for a "legal" high.

Characteristics of Mitragyna speciosa

Mitragyna speciosa originates from Malaysia, Thailand and Indonesia. Due to its opioid-like effect it is used either to become intoxicated, to treat opiate addiction due to its ability to manage withdrawal symptoms, or both. The literature also describes its use by local people in South Asia for increasing energy and performance (such as driving bike taxis) [5].

The effects of Mitragyna speciosa are varied by the type and age of the plant and its veins. According to websites advocating for the use of this tea, each of the four veins have a distinct effect:

1. red vein is known for its calming influence that can help users unwind and release tension;
2. white vein is more energizing and contributes to a positive mood;
3. green vein is used as a mild energy booster that can perk the user up without putting them on edge; and
4. yellow vein is made from young leaves and has slightly higher energizing effects [6,7].

Mitragyna speciosa became popular on the internet and its "beneficial" effects spread quickly. The reason for its rapid and efficient market increase is likely due to its unregulated retail. Furthermore, it is presented as an herbal and natural product [8]. Mitragyna speciosa was banned in many countries, including Malaysia and Thailand. There continues to be no regulation in the European Union, and it is highly dependent on each individual country. It is under surveillance in the United States, after being banned for a short time. An organized protest on September 13, 2016, seemed to have played a role in the reintegration of Mitragyna speciosa as a legal substance [5,9].

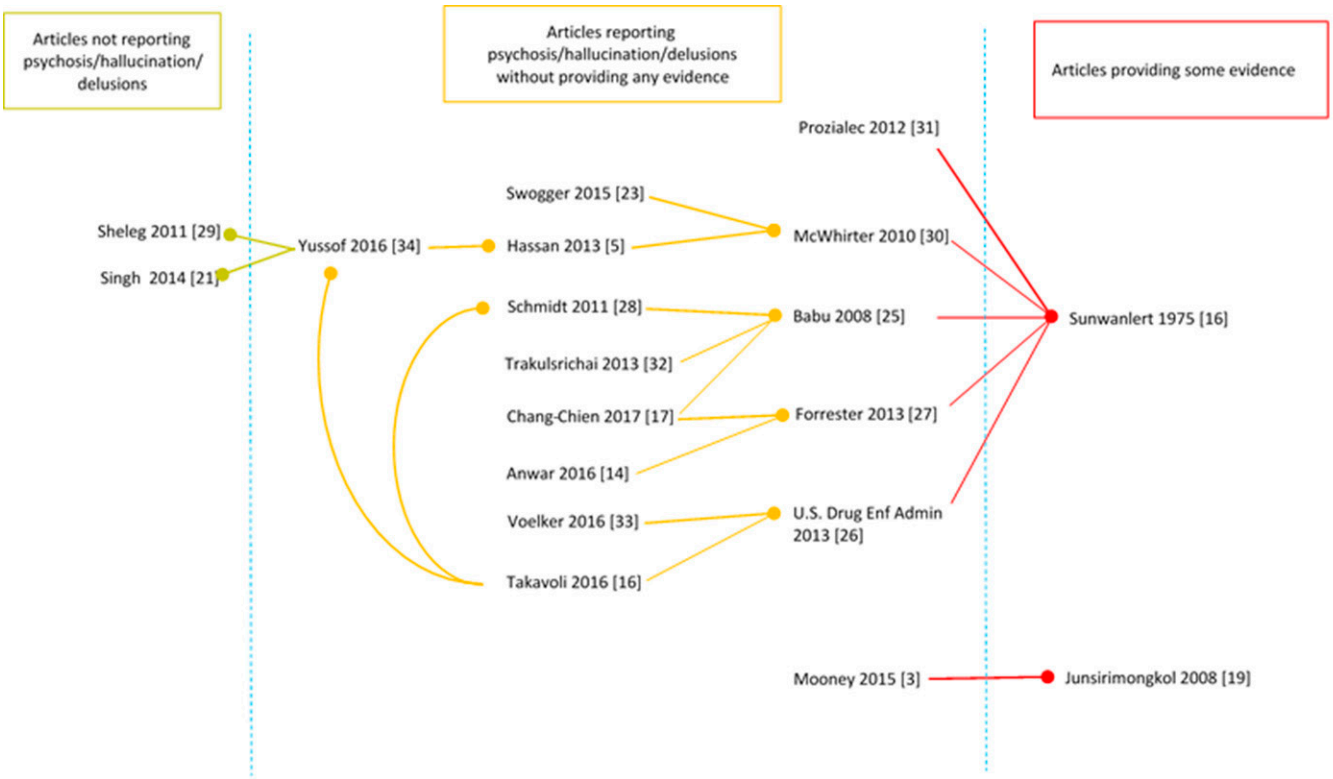

Figure 1: Articles claiming about Kratom-induced Psychosis and their sources – x ⟵ y means "x cited by y"

Clinical manifestations under Mitragyna speciosa

Although many argue the potential medical uses of Mitragyna speciosa, there is a lack of data illustrating its potential pharmacological effects or its side effects [8,10]. Some articles have attributed fatalities to its use. However, in some of these cases, Mitragyna speciosa did not appear to be the only substance consumed [11,12]. One recent paper argued that it is not an opioid-like product [13]. Rather it may have antipsychotic effects due to its binding affinity to dopamine D2 receptors [11]. The data published is a result of clinical trials on animals and observational studies on humans. If Kratom was simply an opioid-like substance, it would not have energizing effects. There is definite need for more research on this substance.

One of our goals in this case report was to understand the relation between Kratom and psychosis. Many articles list the potential of developing psychosis as a possible side effect of Kratom. However, when we performed a systematic literature review using key words Kratom and psychosis or hallucination in PubMed, PsychNET, and Web of Science databases, only six articles were found [11,14–18]. This is in contrast to the several articles found when using Google Scholar. Due to this discrepancy we looked more closely at several articles from Google Scholar that claimed a relation between psychosis and Mitragyna speciosa. Many of these articles simply repeated what was stated in another article (see Figure 1). It is concerning that authors continue to repeat the same information without any clear validity. Moreover, to report Kratom-induced psychosis, some authors cited articles that never reported this possible side effect.

This thorough literature investigation leads us to believe that only one article was published exposing the risk of Mitragyna speciosa and psychotic episode [16]. Through this literature review we found that there is only a single article published in 1975 that highlights the potential risk of psychosis when using Mitragyna speciosa. This article described five instances of psychosis in 30 Kratom users. The case descriptors were quite succinct. No information about past psychiatric history of the patients (except for two out of five

who had previous diagnosis of a psychotic disorder) was provided. Furthermore, no information was provided on how the patients were diagnosed; therefore, it is possible the diagnosis was solely based on clinical opinion. An abstract from 2008 is accessible online commenting on hallucination and delusions among individuals who used Kratom [19]. Despite multiple attempts to contact the author of this abstract, we have not been able to access the full content of the article. Therefore, it seems that since 1975, there is no clear and reliable evidence about Mitragyna speciosa induced psychotic disorder. This may suggest that Kratom, on its own, does not induce any psychotic event; however, it may enhance a psychotic episode when the individual presents with some mental vulnerabilities.

Despite the low level of evidence to link Mitragyna speciosa and psychosis, the clinical observation of our case is highly suggestive that his worsening symptoms are due to the consumption of this substance. Based on the information gathered during our literature review, we felt the need to hypothesize why our patient developed these symptoms to understand why this substance has induced relapsing of his symptoms. Although opiates are not particularly known to induce a psychotic episode, some articles suggest that psychosis can result from opiate withdrawal [20]. Therefore, the opioid-like effect of Mitragyna speciosa may be the reason why our patient became psychotic. However, a recent study suggested that the substance can have antipsychotic properties [13]. Therefore, by binding D2 receptors [11] Mitragyna speciosa may inhibit the therapeutic potential of antipsychotic medication. Nonetheless, it seems that being predisposed to psychosis due to underlying schizophrenia is the reason our patient developed psychotic symptoms while using Kratom. However, there is a lack of evidence that conveys that Mitragyna speciosa causes psychosis.

The risk of legal high

Moreover, this case also raises our concerns about the potentiality of a legal high, particularly by individuals who are predisposed to behavioural changes. The risk of legal high exists at several levels. The concerns are primarily because these legal substances are considered as natural substance and are difficult to ban. Therefore, studies need to be conducted to prove the effects of the substance. This is even more difficult when the substance is identified as beneficial by a group of users such as for Kratom [1,5,21]. In addition to this, these substances come into the market as unknown substances, which cannot fall under any local regulation [1]. As a result, the European Union has not been able to make any clear recommendation on how to deal with this issue, and each country has developed its own legislation regarding Kratom [22].

The other difficulty encountered with legal high is related to the internet. The internet has been pivotal in helping spread the knowledge on the substance and where to get supplied. Some websites specialize in these substances [1,23]. They often provide information about the benefits and potential side effects. However, to our knowledge, they do not provide any information regarding the composition of the product and the potential interaction with other active substance (such as medication). Indeed, often no formal study, such as analytical chemistry, is performed. Some authors identified that the propaganda offered by the internet has two effects on the individuals:

1. it helps the young users to get introduced to legal high and
2. it offers a platform for older users to try new substances [1].

Another issue identified with legal high is related to the composition and the use of the product. A study performed in the United Kingdom analyzed the components in legal high bought on several occasions during a 6-month period [24]. It showed that although the components remained the same, the concentration variated over time. As it is often identified in addiction program, users experience side effects, sometimes leading to death, when they go to a new supplier for the same drug, as the concentration may be different, and therefore their tolerance lower. There is then a real issue related to the lack of knowledge. In addition, it was also identified for

Kratom, that the concentration used in Western countries was much higher than those available in Malaysia or Thailand, which may explain why negative outcome occur more frequently in Western countries [21].

Conclusion

Legal high in general and Kratom in particular present several issues that affects the health of people who use it. In our opinion, there is low evidence at this stage to say that Kratom has a potential to enhance psychotic episode on its own. However, it can affect those individuals who have a predisposition to psychosis. We are unsure as to how it will be regulated in Canada and the United States. What is clear however is that if these countries plan to keep this substance legal, there is a definite need for further research to highlight that the benefits outweigh the potential harm.

Conflict of Interest: none

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