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Case Report: Magic Mushroom (*Psilocybe cubensis*) Intoxication

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ABSTRACT

Psilocybe mushroom, or widely known as the magic mushroom is a variety of mushroom commonly consumed because of hallucinogenic traits it causes toward its consumer. This hallucinogenic effect is caused by Psilocybin, a hallucinogenic substance often found within Psilocybe mushroom. This substance affects mental state of the consumer and has similar effect to those of LSD and Mescaline. Aside from its effect to cause mental disturbance, consumption of this mushroom may cause acute renal injury which leads to a fatal and life-threatening situation. A case of Psilocybe intoxication had been reported in a 22 years old male with a confirmed history of consuming Psilocybe mushroom. Patient first came with a symptom of disorientation and restlessness. Patient also often shook his head off, laughed out, screamed, and continuously making bizarre movements. Psychiatric examination confirmed a sign of auditory hallucination, unstable mood, and stereotypical behavior experienced by the patient. This case report was intended to elaborate the effects of Psilocybe mushroom consumption against physical and mental condition of the consumer, and its management in clinical settings.

1. Introduction

Psilocybe mushrooms or commonly known as magic mushrooms have been known to contain Psilocybin, a natural hallucinogenic substance that can affect the behavior of its users. The effect is similar to the effect of LSD and mescaline as other hallucinogenic substances. Although it is commonly consumed because of its cheap price, consumption of magic mushrooms can cause acute kidney failure which can be fatal and life-threatening. This case report aims to describe cases of intoxication due to magic mushroom *Psylobe cubensis* at Dr. Sardjito General Hospital Yogyakarta.

2. Case Presentation

A 22 year old male patient has been reported with a history of consuming *Psilocybe cubensis* obtained from the patient's friends. The patient was found by his family in the room in a state of strange behavior and difficult to communicate with. Patients also experience disorientation and perform movements such as people hitting a drum, raising their hands, shaking their heads, and laughing constantly at others. Sometimes the patient also screams, is restless, shows strange expressions, and continues to make strange movements.

From the alloanamnesis, it was found that the patient had previously undergone mental rehabilitation at the Grhasia Mental Hospital for 2 months. When reported, the patient had no symptoms of vomiting, diarrhea, or fever. The results of the examination of vital signs obtained blood pressure of 165/90 mmHg;

heart rate 70x/min; respiratory rate 20x/min and temperature of 36 degrees centigrade. No abnormalities were found on physical examination. Mental status examination revealed compos mentis consciousness, disturbed orientation, auditory hallucinations, strange and stereotypic behavior, unstable mood, and irrelevant and incoherent speech patterns. Routine blood laboratory examination showed a leukocyte count of 13.08; erythrocytes 6,11; Hb 17.9; hematocrit 50,%; and platelets 366. The patient received an injection of diazepam 5 mg/12 hours intramuscularly and Clozapine 50 mg/24 hours orally. After two days, the patient's symptoms improved and the patient was discharged.

3. Discussion

Magic mushroom or Psilocybe mushroom is a type of mushroom that is commonly consumed because it contains Psilocybin, a natural hallucinogenic substance that can cause changes in user behavior. This mushroom can be consumed dry, namely by eating the mushroom directly, or wet, namely as an ingredient in herbal tea concoctions or combined with other food ingredients. In rarer cases, the mushroom extract is taken by intravenous injection. Statistically, more than 100 species of hallucinogenic mushrooms have been found worldwide. The rate of use of hallucinogenic mushrooms at 15 to 24 years ranges from 1% to 8%. In the UK, nearly 340,000 people aged 16-59 years used magic mushrooms between 2004 and 2005.[1-5] Although the prevalence of mushroom use is quite common, the number of uses and cases of poisoning have not been studied extensively.

After consumption, these mushrooms are then digested in the stomach and intestines and undergo metabolic processes in the liver. The dephosphorylation process by the liver converts *Psilocybin* into the active form of this hallucinogenic substance, namely *Psilocin* which will circulate through the blood circulation until it is pumped through the brain circulation. [Psilocin] In the brain, *a* mechanism similar to LSD in affecting the central nervous system, namely by increasing the function of certain serotonin (5HT-2A) which is also a controlling neuromodulator. This neuromodulator functions to control other neurotransmitters so that they can affect mental functions such as mood, perception, memory, awareness, and appetite. [7-9]

In addition to being a partial agonist for the neurotransmitter serotonin, *Psilocin* also acts on muscarinic receptors on neurons that affect levels of the neurotransmitters acetylcholine, GABA, and glutamate. This results in involvement in body movement, memory, learning processes, and emotions. This shows that taking *Psilocybin* can trigger a psychotic state that resembles the symptoms of schizophrenia.[10]

The effects caused by Psilocybe mushroom *users* are highly dependent on the dose consumed, individual sensitivity to this hallucinogenic substance, and the user's reaction to changes in neurotransmitter activity. Doses commonly used for recreational use are reported to be between 1 to 5 grams of dried mushrooms, while fresh, wet mushrooms are about 10 times higher at 10-50 grams.

The main effect of *Psilocybe* is closely related to the performance of the central nervous system and has some resulting sympathomimetic effects. In some cases, the individual will appear very anxious, restless, confused, and have impaired concentration and judgment. In serious cases, it can cause acute psychotic episodes in the form of symptoms of visual hallucinations, severe paranoia, to total loss of reality. This can lead to other follow-up events such as accidents, attempts at self-injury, or suicide. Although it can cause some *sequelae* above, *Psilocybe* does not cause psychological and physical dependence or withdrawal symptoms. Other physiological side effects include dizziness, nausea, weakness, muscle aches, chills, abdominal pain, and pupil dilation.[5.8]

Hallucinations are the most frequently encountered symptoms as a result of the use of *magic mushrooms*. These main symptoms are generally not dangerous or life-threatening directly. However, fatal consequences can occur if accompanied by the involvement of kidney

tissue damage as a result of other intoxications. In some fatal cases, the consumption of *magic mushrooms* is thought to be closely related to the simultaneous use of other hallucinogenic substances such as alcohol use. Several other cases reported the simultaneous use of *magic mushrooms* with other poisonous mushrooms, such as the *Cortinarius* and *Amanita mushrooms*, which have been reported to cause kidney failure. mushrooms *Cortinarius* have orellanine toxin which inhibits DNA and RNA synthesis and causes oxidative stress, as well as direct toxicity to the renal tubular epithelium. mushroom *Amanita* contains *amatoxin* which is not only hepatotoxic but can also cause gastrointestinal symptoms such as nausea and vomiting, and is highly nephrotoxic. Kidney damage due to these two fungi requires supportive and intensive care, and sometimes hemodialysis to maintain kidney function.

Initial handling of magic mushroom intoxication cases is carried out as in general emergency management, namely ensuring airway patency, maintaining ventilation and respiratory functions, and maintaining blood and oxygen circulation to tissues (Airway, Breathing, Circulation). In this primary survey, it is necessary to assess the need for respiratory aids, maintain adequate blood pressure, and install an infusion for adequate fluids. If the patient has seizures, aggressive seizure management should be given. Administration of drugs should be done with extreme caution because of the possibility of unexpected drug interactions.[3,4]

If the primary survey has been carried out and the patient's vital signs are stable, then a secondary survey is carried out in the form of a complete physical examination and alloanamnesis to obtain a clear history of the disease and other sources of supporting data. Until now, no specific laboratory tests have been found to detect the hallucinogenic substance psilocybin-psilocin in clinical settings, so an approach is needed in the form of laboratory tests that are relevant to the pharmacokinetic mechanism of this substance, such as blood or urine screening for morphine, diazepam, phenobarbital, kidney function tests, liver function tests, HBsAg, chest X-ray, and ECG.[10]

Laboratory tests are also needed to confirm whether kidney damage has occurred. Laboratory tests in the form of measuring serum creatinine levels and the enzyme creatine kinase (CK) are reported to be quite specific in assessing the impact of nephrotoxicity due to the consumption of magic mushrooms. An increase in the value of both indicators above normal levels confirms that there has been damage to kidney tissue. Routine urine examination can also be done to look for signs of hematuria, proteinuria, and myoglobinuria as other signs of kidney damage.[1-5]

The administration of drugs in cases of magic mushroom intoxication must not only consider symptoms or symptomatic treatment but must also consider the course of the disease and other possible causes. For example, in the case of drug-related disorders, the vital signs are generally stable and there are no symptoms of confusion, delirium, or hallucinations; in substance-induced psychotic disorders, hallucinations are generally found without insight. If there are indications of abnormalities in kidney function such as pain in the lower back, increased levels of urea-creatinine, or abnormal blood pressure, it is necessary to consult an internal medicine specialist for further management. [6,7]

It is also necessary to monitor the patient regularly to see the progress of the patient after the initial treatment. Regular physical and laboratory examinations need to be carried out to observe the progress or worsening of the patient's condition due to intoxication, as well as to prevent lethal complications that may arise sometime after the initial intoxication. With adequate treatment, it is hoped that it can accelerate the patient's recovery and can reduce the death rate due to magic mushroom intoxication.[8-10]

4. Conclusion

Magic mushroom intoxication causes symptoms of confusion, disorientation, hallucinations, and

psychotic symptoms with rapid onset. The presence of organ involvement can cause fatal complications. An approach is needed in the form of physical examination and support that supports a rapid and precise diagnosis, as well as comprehensive management that focuses on treating life-threatening symptoms directly and symptomatic treatment, taking into account the signs and symptoms of nephrotoxicity that can be life-threatening.

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