



Case Report

Deliberate Use of Ketamine by A Healthcare Professional

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Abstract

Suicidal tendencies among healthcare professionals are one of the significant problems. Data on suicide among healthcare professionals are alarmingly increasing globally. India is home to approximately 1 million doctors, the largest globally. Medical Students and trainees often commit suicide. Suicide among healthcare professionals occurs due to improper balancing of personal and professional lives. The methods used for suicide vary from violent methods (hanging, falls) to drug overdose. Due to easy access to controlled drugs, non-medical use leads to addiction, disease, and mental disorders in the impaired healthcare professional. For both recreational and self-harm, commonly used are anaesthetic drugs. Ketamine is one of the easily accessible drugs available for healthcare professionals working in the ICU and CCU. It is increasingly gaining popularity as a recreational drug due to its hallucinatory effects and feelings of disconnect. We

present a case of a healthcare worker working in an ICU who deliberately used ketamine for self-harm.

Keywords: suicidal ideation; drug overdose; health personnel; illicit drugs; intensive care units; ketamine.

Introduction

Suicidal tendencies among healthcare professionals are one of the significant problems. WHO Member States have committed themselves to work towards the global target of reducing the suicide rate in countries by one-third by 2030, according to the WHO Mental Health Action Plan 2013–2030.[1] Data on suicide among healthcare professionals are alarmingly increasing globally. India is home to approximately 1 million doctors, the largest globally. The risk of suicide among doctors is considered 2.5 times higher than that in the general population.[2] Medical Students and trainees often commit suicide due to academic and work-related stress, mental illness, and harassment. Healthcare professionals have reported various suicide methods. Violent methods like hanging, falling from a height and jumping in front of the train. Others resort to drug overdose due to easy accessibility, and death occurs with less struggle.[3]

Anaesthetic drugs are commonly used for both recreational and self-harm. Ketamine is a phencyclidine derivative. It is increasingly gaining popularity as a recreational drug due to its dissociative and hallucinatory effects.[4] Medically used for anaesthesia, procedural sedation, and treatment of depression and suicidal

tendencies. Ketamine is one of the easily accessible drugs available for healthcare professionals working in the ICU and CCU.[5,6] We present a case of a healthcare worker working in an ICU who deliberately used ketamine for self-harm.

Case Report

A twenty-six-year-old healthcare professional was on rotational duty in an intensive care unit. He completed his duty and was off duty the following day. He was not present during his next rotational duty, and his colleagues had called over the phone, to which he did not respond. One of his colleagues came to his room in the hostel. His room was locked from the inside; no response came when he was asked to open the door. The door lock was broken, with the help of the security personnel at 7.30 am. He was found unresponsive with an intravenous catheter in his right cubital fossa. He was taken to casualty and was declared brought dead.

Crime Scene Findings

The security guard immediately cordons off the room after shifting the unresponsive healthcare worker. An empty syringe with a few broken ampoule parts was found around and inside the dustbin. The dose calculation for the ketamine drug was available in a nearby notebook.

Autopsy Findings

He was moderately built. An injection mark was present on the dorsum of the left hand (fig.1). The dark red colour fluid oozed from the mouth and nostrils. Purplish pink hypostasis presents over the upper back. The skin marbling was present over the upper part of the left chest, left arm, and forearm. Marbling was absent on the right upper limb (fig.2). Cyanosis was present in the nails of both hands (fig.2) and feet. On gross examination brain was congested and edematous (fig.3). Decomposition changes were present over the scalp, liver, kidneys, and heart. The visceral organs were preserved for histopathology and chemical analysis. During histopathology

examination, the lungs showed severe pulmonary edema. The brain showed congestion. The liver, kidneys, heart, stomach, and intestine sections showed autolytic changes. Skin bit from the injection site was unremarkable. Qualitative analysis of viscera and blood was ketamine positive. Negative for alcohol, Propofol, Fentanyl, Morphine, Vecuronium, and other volatile poisons. We opine the cause of death as cerebral and severe pulmonary edema due to ketamine, and the manner of death was suicidal. The time since death was 18 to 24 hours.

Discussion

Suicide among healthcare professionals increasing alarmingly in recent years. The methods used for suicide vary from violent methods (hanging, falls, etc.) to a drug overdose.[3] Due to easy access to different psychoactive and potentially harmful substances. Using those therapeutic drugs for recreational purposes leads to addiction, disease, and mental disorders in the impaired healthcare professional. [7,8] Suicide among postgraduate students was common due to workplace stress. Other causes are personal life or problems with improper balancing between personal and professional lives.[9] The commonly used drugs are alcohol, psychotropic, illicit and non-illicit, and sedative/hypnotic drugs.[10] Healthcare workers have been identified as a critical occupational group of ketamine users. The use of ketamine was first noted on the West Coast in 1971. During the 1980s, there were reports of its non-medical use internationally and among physicians.[11] On the street and the Internet, ketamine is known as "vitamin K," "Special K," "Super K," "Ket," or simply "K." It is available in a liquid form that is dried into a pure-white crystalline powder and is typically self-administered by ingestion or insufflation in a fashion similar to PCP. It is rarely injected intravenously or intramuscularly in liquid form

In 2021, around 0.9% of 12th graders used ketamine in the United States.[12] A study by Singh et al. reported a four-fold increase in ketamine use in Malaysia.[13] In 2005, the Chinese government called for the 'People's War

on Drugs' in response to the drug abuse epidemic. The use of narcotic drugs had come down, but synthetic drugs, including ketamine use, increased in 2010.[14] The World Drug Report by the United Nations discussed emerging trends of non-medical use of ketamine along with the expansion of the illegal market.[15]

In 1980, unauthorized experimentation with ketamine was first reported in Australia. The mean age of intentional use of ketamine is 25.8 years (range 16 - 41years). The age of the deceased, in this case, is 26 years. The Usual method of ketamine use is snorting (82%), intravenous (11%), intramuscular (4%), and swallowing (3%).[16] Intravenous infusion method used by the individual in this case.

Effects of Ketamine on Organ Systems

According to Cami and Farre, the mesocorticolimbic dopamine system is the most recognized anatomical structure for reinforcing drug effects.[16] Effects of ketamine are altered senses (78%), Out of body experience (52%), Euphoric rush (50%), Escaping reality (38%), Feeling of well-being (26%), Dancing all night (23%), Creativity (20%), Stress release (4%).[17]K-hole phenomena features include marked confusion, speaking difficulties, unexplainable experiences, floating sensations, and mind/body dissociation. The least frequently endorsed items included near-death experiences, astral travel, and alien phenomena.[18]

Ketamine stimulates the Cardiovascular System through sympathetic activation. Chronic use of ketamine promotes myocardial remodelling causing changes in the cardiac electrophysiological properties. Thus, causing ventricular myocardial apoptosis and fibrosis that increases the potential of malignant arrhythmias finally leads to sudden cardiac death.[19]Wong et al. reported that ketamine use leads to dilatation of the common bile duct, microscopic bile duct injury, and significant liver fibrosis.[20] Chu PS et al. reported that the syndrome of Cystitis with contracted bladder with secondary renal failure was noted in street ketamine users.[21]

In acute intoxication, the standard presentations are neurological manifestations of

confusion and impaired consciousness. For chronic users, the majority had features of ketamine cystitis and upper gastrointestinal problems with deranged liver function tests.[22] Tao et al. reported a case of chronic ketamine poisoning with gross findings of the edematous and congested brain and lungs and hemorrhagic spots over the surface of the heart. The microscopic examination of confirmed pulmonary congestion and edema and histopathology of the heart showed cardiac muscle fibrosis around small arteries. Histopathology of the brain showed chronic hypoxic changes with rupture of small arteries in the internal capsule region. The small arteries in the heart and brain showed shedding of endothelium and hyaline degeneration. Similar changes were not present in the small arteries in the kidneys.[23] Pulmonary edema was documented in the present case, and other findings were not appreciated since the patient was brought dead. The gross findings were less evident due to decomposition and autolytic changes in the histopathology examination. However, the crime scene findings and the chemical analysis confirmed the ketamine use for self-harm. Hence the death was concluded as suicidal and due to ketamine poisoning.

Ketamine has been included as a psychotropic substance under controlled drugs in The Narcotic Drugs and Psychotropic Substances Act, 1985, in the February 10, 2011 amendment. The Punishment for contravention of psychotropic drugs varies from six months to twenty years, and a fine of ten thousand rupees to two lakh rupees based on the quantity of the drug.[24]

To prevent such non-medical use of ketamine and other controlled drugs. Various Standard Operating Procedures (SOPs) were implemented and followed in the healthcare systems. Usage of newer technologies for handling controlled substances with inclusive training about the digitalization of the operating procedure to the health care workers. They have a nationally recognized, consistent approach to automation and digitalization in the handling-controlled drugs with appropriate SOPs.[25] Awareness among the health care workers

regarding the hazards and the legal concerns of controlled substances and serious action needs to be taken for non-adherence.

Conclusion

In the reported case, cerebral and pulmonary edema due to ketamine is the cause of the death. In such cases of the brought dead with non-specific autopsy features, the autopsy surgeon needs to consider the person's access to controlled drugs and suspect use of the same. Substance use and non-medical use of controlled drugs by the health care professional increased substantially. Such a person with mental breakdowns needs to be counselled and encouraged to abstain from those controlled drugs.

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FIGURE LEGENDS



Figure 1. An injection mark was present on the dorsum of the left hand (black circle).



Figure 2. The skin marbling was present over the upper part of the left chest, left arm, and forearm (red arrow). Cyanosis was present in the nails of both hands (black arrow).

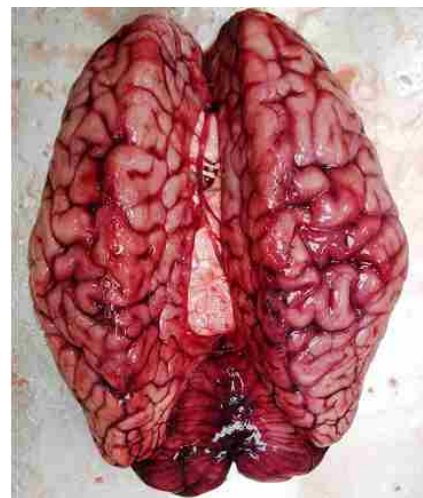


Figure 3. The brain was congested and edematous.

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