

## Fatal Case of Diazepam and Paraquat Poisoning – A Case Report

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### ABSTRACT

**Background:** A very dangerous activity among youth and young adults is the indiscriminate mixing and sharing of prescription drugs, often in combination with alcohol or other drugs. The effects of these combinations of substances can be fatal.

**Case Report:** A 28 years old adult male with alleged history of diazepam and paraquat poisoning was admitted with complaints of chest discomfort, epigastric pain, vomiting and drowsiness. The patient developed acute respiratory distress syndrome (ARDS), multiple organ dysfunction syndrome (MODS) and expired on the next day. To conclude, diazepam even though considered to be a safer drug, has risk of drug abuse and is fatal when taken in overdose along with other central nervous system depressants. Paraquat is a highly toxic compound widely used as herbicide and ingestion of the drug causes death due to respiratory failure.

**Conclusion:** The present study emphasizes on the proper surveillance of diazepam intake in known psychiatric patients and strict rules must be enforced by the Government on marketing of herbicides and pesticides.

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► *Implication for health policy/practice/research/medical education:* Fatal Case of Diazepam and Paraquat Poisoning

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### 1. Introduction:

Diazepam and other benzodiazepines (chlordiazepoxide, alprazolam, and lorazepam) are frequently used as sedatives and anti-anxiety drugs (1). The effects of over dosage are drowsiness, stupor, coma, respiratory depression and hypotension. Benzodiazepines misuse is associated with

increased risk of tolerance, abuse and dependence (2). Drug abuses remain a major problem in developing countries and are associated with several social and economic consequences (3).

Acute paraquat poisoning continues to be a major public health concern in many developing countries (4). Paraquat poisoning is by far one of the most clinically significant herbicides in terms of morbidity and mortality. The main target organ for paraquat toxicity is the lung and death occurs due to respiratory failure (5). In India, most of the concentrates of paraquat are

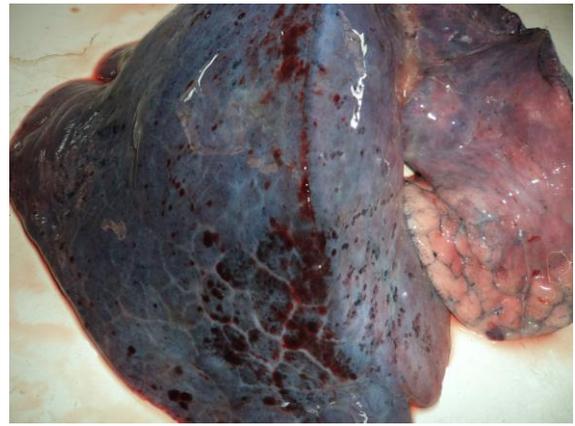
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available as 10-20% solutions. Following ingestion of large amounts of concentrated formulation, the rapid development of multi-organ failure and cardiogenic shock is almost universally fatal. When smaller amounts are ingested, paraquat is actively taken up into pulmonary epithelial cells where redox cycling and free radical generation trigger a fibrotic process that may lead to death (6).

## 2. Case Report:

Herein, we report the case of a 28-year-old male admitted to the casualty ward-JIPMER, with alleged history of consumption of 25 tablets of 5mg diazepam followed by ingestion of 150ml of paraquat solution. About 6hrs later the patient was brought to the hospital with symptoms of vomiting, epigastric pain, chest discomfort and drowsiness. The patient was given bowel wash and was put on immunosuppressive therapy namely cyclophosphamide, and methylprednisolone. The pulmonary gas exchange parameters revealed respiratory acidosis and decreased  $paO_2$ . Despite standard supportive measures given, the patient's clinical condition worsened and he developed acute respiratory distress syndrome, multiple organ dysfunction syndrome followed by shock and expired. The deceased was brought to the department of Forensic Medicine and Toxicology at JIPMER. The body was that of an adult male, with rigor mortis present all over the body. Post-mortem lividity was present on the dependent parts of the body in the supine position. The autopsy found that he was a well-built male with no external injuries. The internal findings revealed multiple petechial haemorrhages over the base and postero-lateral surface of the left lung (Figure 1). Both the lungs were found to be oedematous and congested. Heart was intact with multiple petechial haemorrhages over the posterior surface of the left ventricle (Figure 2) and the right chambers contained clotted blood. The liver, spleen, kidney, adrenal glands, brain and intestine were also found to be congested. Toxicological analysis of viscera and blood revealed the presence of paraquat and a benzodiazepine,



**Fig. 1.** Multiple petechial haemorrhages over the base and postero-lateral surface of the left lung.



**Fig. 2.** Multiple petechial haemorrhages over the posterior surface of the left ventricle.

although the exact nature and concentration of the latter could not be established.

## 3. Discussion:

In India, more than one hundred thousand persons (134599) lost their lives by committing suicide during one year (2010). Suicides due to 'Drug Abuse/ Addiction' have shown an increasing trend during last 3 years (7). The Benzodiazepines are widely prescribed for anti-anxiety disorders, insomnia, epilepsy, and other psychiatric conditions (8). Although benzodiazepines are generally safe and well-tolerated, the potential for misuse and abuse is considerable (9). Benzodiazepines depress alveolar ventilation and cause respiratory acidosis. As a result of their sedative, anxiolytic, and amnesic properties and their ability to control acute agitation, these compounds are considered to be the drugs of

choice for premedication. Benzodiazepines mediate its actions by acting upon the GABA-A receptors, an inhibitory neurotransmitter (10).

Acute paraquat intoxications are mostly due to ingestion of the concentrated liquid herbicide formulations. Death in paraquat poisoning is due to its capacity to generate huge amounts of free oxygen radicals. Death occurs mostly as a consequence of damage to the alveolar epithelial cells (type I and II pneumocytes) and bronchiolar Clara cells resulting in pulmonary edema, infiltration of inflammatory cells into the interstitial and alveolar spaces, proliferation of fibroblasts and excessive collagen deposition leading on to pulmonary fibrosis, as a result respiratory failure ensues (5). The ingestion of a large dose of paraquat (over 40 mg paraquat ion/kg body weight) invariably proves fatal. Less severe poisoning (20-40 mg paraquat ion/kg body weight) is fatal in most cases, but death may be delayed by weeks, the ultimate cause usually being lung damage characterised by pulmonary fibrosis (11).

Benzodiazepine overdose is rarely fatal when taken alone without other drugs. At the same time when multiple medications are in benzodiazepine overdose, severe symptoms include difficulty in breathing, slowed heart rate, low blood pressure, loss of coordination, and loss of consciousness leading to coma and, potentially, death. Any suspected overdose should be treated as an emergency. The person should be taken to the emergency department for observation and treatment.

#### 4. Conclusion:

Diazepam even though considered to be a safer drug, has high chance of drug abuse and act as a potent central nervous system depressant when taken along with other drugs resulting in stupor, coma and death. Paraquat poisoning has high mortality even in small quantity due to multi organ dysfunction syndrome. Surveillance of misuse should be undertaken in the current use. Effective mental health treatment, which often includes pharmacologic therapy, is important to prevent suicide, however to adequately promote the safety and well-

being of individuals at risk of suicide, consumers, family members, and others should be aware of the associated risk these substances pose. There are actions that state and local communities, policy-makers, and family members can take to reduce the number of suicides due to substance overdose. The medical professional should counsel the patient on the harm of misuse and limit the amount of medicine, with necessary dispensing. Strict legislation measures must be imposed by the government regarding the sales of herbicides and pesticides (12).

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