# A REVIEW: MANAGEMENT OF POISONED PATIENT

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## ABSTRACT

According to the WHO (World Health Organization), over 3 million poisoning cases and 2,20,000 deaths occur each year. According to reports, 1–5% of suicide attempts involving drug overdose result in death. In underdeveloped countries like India, poisoning is one of the top causes of mortality. Insecticides, pesticides, rodenticides, fungicides, pyrethroids, and some medications, as well as OTC drugs in some other countries, are the most common causes of poisoning. Poisoning with pesticides poses a considerable risk of death. To improve quality of life, early and proper management is necessary. Management methods include supportive care, airway management, decontamination, whole bowl irrigation, and activated charcoal. Atropine is the most effective antidote for pesticide poisoning since it acts in both OP and carbamate poisoning.

**Keywords:** Poison, Types, Management , Antidote, Pesticide.

## INTRODUCTION

Any substance that is hazardous to your body when consumed, inhaled, or absorbed through the skin is considered a poison. Poisons have been employed for a variety of objectives throughout human history, the most popular of which being weapons, anti-venom, and medicine. Illness might emerge immediately following exposure to a poison, or it can take years to develop after long-term exposure. Around 3 million poisoning cases with 2,20,000 deaths occur annually, according to a WHO (World Health Organization) . Nearly all of these deaths take place in developed countries. Insecticides, rodenticides, mosquito repellents, kerosene, hair oil, and pharmaceuticals are also utilised for intentional poisoning due to their easy availability and lack of information. Academic, financial, social, and familial discord are all sources of stress. However, poisoning instances vary in terms of morbidity and fatality from country to country. According to our country's legal system, all documented cases of poisoning are either classified as unnatural death or are subjected to a medicolegal autopsy.[1]

In India, pesticide poisoning is a serious problem. In South India, organophosphorus (OP) chemicals are the most common cause of self-poisoning deaths. Poisoning is a common cause of unnatural morbidity and mortality in rural India. Furthermore, it has been noted that a substantial proportion of suicide attempts in young people are carried out by drug overdose, which is more common in women. It's also been stated that 1–5% of suicide attempts including drug overdose result in death. Poisoning is one of the leading causes of death

in developing countries like India, owing to the increased use of chemicals in commercial, occupational, and home settings, as well as the introduction of innovative types of pharmacological therapy and widespread use of insecticides in agriculture. Information regarding the pattern of poisoning in a highly specific area can aid in the early management of poisoning cases, lowering mortality and morbidity rates. There is a scarcity of data on acute poisoning among adults in our region.[2]

In many countries, the most common causes of poisoning are prescription and over-the-counter (OTC) drugs, as well as household chemicals, but in the Indian subcontinent, the most common causes are drugs and household chemicals. Pesticides and other agricultural fertilisers are the most well-known causative agents, followed by hypnotics and sedatives, caustic reagents, alcohol, and others. Household chemicals and plant toxins The most common occupation is agriculture. Organophosphorus poisoning, caused by occupational, accidental, or deliberate exposure of farmers or other workers to hazardous substances, accounts for the great majority of cases in poor nations. The World Health Organization estimates that over 3 million people each year as a result of pesticide self-administration. This can be reduced by limiting the availability of these compounds to the general public.Intentional poisoning victims were largely youngsters, but suicidal poisoning was the preferred means of self-destruction among adults.[3]

**TYPES OF POISON**

ORGANOPHOSPHATE POISONING

The most extensively utilised insecticide class nowadays is organophosphate insecticides. More than 40 have been approved for usage, and all of them offer a risk of acute toxicity. Chlorpyrifos, diazinon, malathion, and methyl parathion are some of the most regularly utilised organophosphates. Organophosphates are the most common cause of poisoning. class of all pesticides in symptomatic illnesses. Exposure to multiple organophosphates by multiple routes can lead to serious additive toxicity. It's vital to remember that these chemicals have a wide range of toxicity and absorption capabilities. Inhalation exposure causes the most rapid onset of hazardous effects, followed by gastrointestinal exposure and ultimately cutaneous exposure. nausea, dizziness, headache, secretions, sweating, salivation, and respiratory secretions,tears are the most typically reported symptoms. Muscle twitching, weakness, tremor, incoordination, vomiting, abdominal pains, and diarrhoea are all signs of the disease progressing. Some patient may experience vision problems like blurred ,dim vision. Persons attending the poisoned patient should avoid direct contact with patient contaminated clothes and wash the pesticide from the patient's skin and hair with chemical-resistant gloves. Organophosphate poisoning can be treated using antidotes, the most common of which being atropine . Antidotes should always be given by a medical practitioner.[4]

CARBAMATES

Insecticides containing carbamates are commonly used in homes, gardens, and agriculture. Aldicarb, carbaryl, and carbofuran are examples of carbamates. Because carbamates inhibit cholinesterase enzymes, they have comparable exposure symptoms to organophosphates, however carbamate poisonings are usually less severe. Blood tests can be used to see if carbamate pesticides are influencing cholinesterase levels, just like they can with organophosphates.[4]

PYRETHROIDS

Pyrethroid insecticides are synthetic insecticides that are utilised in a range of applications. Cyfluthrin, cypermethrin, and permethrin are common examples. Pyrethroids have a low systemic toxicity due to inhalation and cutaneous absorption, and they are quickly eliminated by the kidney. When skin is exposed, an inflammatory reaction starts within 1-2 hours. It is not a cholinesterase inhibitors but its symptoms are similar to organophosphate poisoning. [4]

FUNGICIDES

Some of the most catastrophic and widespread cases of pesticide poisoning in the past have been caused by the inadequate use of grain which is treated with organic mercury or hexachlorobenzene. Nowadays number of fungicides causes various types of systemic poisonings. For starters, absobtion is low and have less intrinsic toxicity in mammals. Secondly , number of fungicides are available in various dosage form such as suspension of powders and granules, which is responsible for quick and efficacious absorption . Third, the application approaches are such that just a few people are exposed extensively. Fungicides as a class, aside from systemic poisonings, are most likely to blame.[4]

PHOSPHINE

Phosphine, like methyl bromide, is extremely irritating to the respiratory tract. Ingestion of solid aluminium phosphide has caused the majority of severe acute exposures, with fatality rates between from 50 - 90 . nausea,fatigue, headache, , thirst, cough,dizziness, shortness of breath ,jaundice and chest tightness are common poisoning symptoms.[4]

RODENTICIDES

For a variety of reasons, rodenticides represent a particularly high danger of unintentional poisoning. they are designed to kill mammals, some other class of rodents, their toxicity comparable to the humans. Warfarin and other type of anticoagulant rodenticides were created to solve this problem by developing chemicals that were highly harmful to rodents but not to humans. Rodenticides provide an inherent danger of exposure to humans, particularly children, because rodents frequently share human habitats. Finally, because rodents have evolved resistance to existing rodenticides, new and potentially more harmful rodenticides are always being developed.[4]

**WHERE TO TREAT**

Because of the significant danger of mortality from pesticide poisoning, all patients should be taken to the nearest health care centre as soon as feasible. At that point, the health care worker's expertise and resources will determine whether the patient should be transported promptly to a hospital with more resources or kept under surveillance in the initial facility.

Many patients will present to outlying health-care facilities, such as small rural hospitals, where staffing and resources are insufficient to manage the patient. All patients who present themselves to such hospitals should be safely transferred. Patients should only be kept in these outlying health care facilities.

A minimum set of skills and resources must be provided in order for a pesticide poisoned patient to be safe at a health care facility:

• skills and knowledge of how to resuscitate patients and screen for clinical signs of pesticide poisoning;

• skills and knowledge of how to resuscitate patients and intubate patient ,check airway until ventilator can be attached.

- atropine intravenous (IV) administration if signs of cholinergic poisoning develop;
- diazepam IV administration if the patient develops seizures.[4]

## MANAGEMENT

## SUPPORTIVE CARE:

## AIRWAY MANAGEMENT

The necessity to secure the airway is dictated by the loss of airway-protective reflexes and worry about aspiration or the presence of respiratory failure. Rapid sequence intubation (RSI) with preoxygenation and neuromuscular inhibition is the best strategy to secure the airway unless the patient is dead.[5]

## DECONTAMINATION

Health care staff who are treating poisoned patients are obligated to wear respiratory and skin protection. Latex gloves are ineffective against many chemicals, and only rubber gloves should be used in a poisoning situation. It is recommended that you wear a complete face mask with an organic vapor/high efficiency particulate air filter until the cleaning of the skin and gastrointestinal tract is accomplished.Showering with soap, a lot of water, and shampoo is the best way to decontaminate your skin. Skin folds, regions beneath fingernails, ear canals, and other parts of the body that could collect chemicals should be thoroughly examined and cleaned. If exposure is suspected, contact lenses should be removed so that the eyes can be properly inspected and rinsed. Contaminated clothing should be properly removed, packed, and washed. Leather objects can't typically be decontaminated, so they should be packaged and disposed of as hazardous trash.[5]

## WHOLE BOWEL IRRIGATION

Another method of decontamination is whole bowel irrigation (WBI), which works by increasing the passage of poison through the gut. It's done by inserting a nasogastric or orogastric tube and delivering substantial amounts of osmotically balanced polyethylene glycol solution (PEG) at a rate of 1–2 L/hour until the patient has at least two clear, liquid stools. In contrast to other types of GI decontamination. In the ICU, WBI can be initiated or continued. WBI has long been used to treat body packers. Individuals who eat massive amounts of illicit drug packages for illegal transit are known as body packers. If a packet leaks accidentally, fatal levels of the medication can be absorbed into the body packers' system, posing a serious health risk. Given the life-threatening risk associated with even a single packet leaking, WBI should be initiated as soon as possible to remove the packets. Patients with an ileus or blockage, as well as those who have had a GI tract damage, are contraindicated.[6]

## ACTIVATED CHARCOAL

A typical decontaminant is activated charcoal. It's made in a two-step process that begins with the pyrolysis of various carbonaceous materials and ends with high-temperature treatment with oxidising agents like steam or carbon dioxide to "activate" it and boost its adsorptive ability. Toxins in GI lumen are adsorbed onto activated charcoal and transported along the GI tract, limiting their absorption. It does not adsorb metals, corrosives, or alcohols well. The choice to administer activated charcoal is based on a risk assessment of each individual patient and is not considered routine therapy. There have been reports of charcoal aspiration, so it's important to assess the patient's capacity to secure the airway before administering it. Before administering charcoal through a nasogastric tube, chest radiography should be used to confirm tube position. Following multidose charcoal treatment, additional problems such as intestinal rupture or obstruction have been described. Overall, if risks are minimised, activated charcoal delivery is a viable decontamination strategy for patients presenting with early, possibly severe xenobiotic poisoning.[7]

## Syrup of ipecae

Ipecac syrup causes emesis by cting as a direct irritant on the stomach and by acting centrally at the chemoreceptor trigger zone. Due to a lack of evidence for improved results and concerns such as delayed administration of oral antidotes and other decontamination agents, aspiration, and difficulties from prolonged emesis, current recommendations prohibit frequent use of ipecac.[7]

**ANTIDOTE**

Atropine is the most significant antidote for pesticide poisoning, as it works in both OP and carbamate poisoning. However, dose recommendations vary greatly between sources, and there is a lot of diversity in how it is given in reality. The effectiveness of the second antidote for OP poisoning, an oxime like pralidoxime, varies significantly depending on the OP and the dosage taken. Currently, it is recommended that all OP poisoned patients who require atropine be given oximes; nevertheless, many patients do not appear to benefit. More information is necessary. When intubating OP pesticide poisoned individuals, suxamethonium should be avoided. There is a critical need for consistent evidence-based recommendations, as well as a greater emphasis on ensuring long-term access to antidotes in rural hospitals that see the majority of patients. The goal of current research is to find novel antidotes that are both inexpensive and effective.[8]

| TYPE OF POISON | SYMPTOMS | ANTIDOTE/TREATMENT |
|---|---|---|
| Organophosphates<br><br>Acephate,Chlorphoxim Chlorpyrifos , Dimethoate, Malathion | Anxiety, skeletal-nerve muscle junctions,seizure,twitching<br><br>sweating,salivation,<br><br>Diarrhea,tearing,miosis | ATROPINE: Adults and children over the age of 12 years: 2 to 5 mg IV every 15 minutes until pulmonary symptoms are controlled; children under the age of 12 years: 0.05 to 0.1 mg/kg every 15 minutes; dosages repeated as needed for symptom control (up to 24 hours, taper dose)<br><br>PRALIDOXIME: (2-PAM, Protopam) IV, 1 to 2 g (adults) over 10 minutes, 20 to 50 mg/kg (children) over 30 minutes; repeat in 1 to 2 hours and at 10- to 12-hour intervals as needed for symptom control; alternatively, continuous IV infusion 10 to 20 mg/kg/hr (up to 500 mg/hr) after initial bolus and continued for 24 hours.<br><br>BENZODIAZEPINES:Seizures with benzodiazepines (diazepam ) 0.2 to 0.5 mg/kg IV every 5 minutes to a maximum of 10 mg in children >5 years, 5 mg in children 5 years; lorazepam may also be used; 5 to 10 mg slow IV, repeated every 5 to 10 minutes to control or maximum 30 mg in adults; 0.2 to 0.5 mg/kg IV every 5 minutes to a maximum of 10 mg in children >5 years, 5 mg in children 5 years; |

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| | | lorazepam may also be used<br>Maintain and Protect airway<br>Supplemental oxygen<br>FUROSEMIDE (Lasix), 40 to 160 mg IV is used for pulmonary congestion remaining after full atropinization |
| Carbamates<br>Carbamyl,Pirimicarb,trimethacarb<br>Pirimicarb | Coma,Seizures,Hypnotonicity in serious toxic exposure | ATROPINE: IV atropine (preferably or IM) Adults and children over the age of 12 should take 2.0 to 4.0 mg every 15 minutes until secretions are under control; children under the age of 12 should take 0.05 to 0.10 mg/kg every 15 minutes until secretions are under control; continue for 2 to 12 hours; continued signs of poisoning indicate the need for more atropine.<br>PRALIDOXIME: is not recommended for pure carbamate poisoning; nevertheless, it may be required in combined organophosphate/carbamate poisoning or unexplained poisoning accompanied with cholinergic syndrome.<br>Keep the airway open and protected.<br>Oxygenation using supplementary oxygen.<br>furosemide (Lasix) 40 to 160 mg after atropinization. |
| Pyrethroids<br>Allethrin, Dimethrin,Fenothrin<br>Deltamethrin, Cypermethrin<br>permethrin | Indigestion,tremor,incoordination,<br>salivation,vomiting,seizures,<br>paresthesias,nasal stiffness | It is recommended that you clean your skin thoroughly with soap and water; vitamin E oil preparations are beneficial in avoiding and curing paresthesias; corn oil and petrolatum are less effective. |

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| | | For hypersensitivity reactions, standard antiallergy therapy is used.<br>Benzodiazepines are used to treat seizures. |
| Repellants<br>Diethyltoluamide—DEET | CNS-Depression,Seizures,Mild skin<br>Nausea,Irritation,Vomiting,Indigestion,<br>Tachycardia,Dermal Exposure | Decontamination<br>Seizure control with benzodiazepines<br>Assistive care |

## CONCLUSION:

Pesticides poison is the most common cause of suicidal poisoning in addition to these other home compounds such as insecticide, rodenticide, mosquito repellent, hair dye, and kerosene are all caustic poisons. Because of their widespread availability, lack of awareness, despair, academic stress, and budgetary constraints, they are primarily utilised for poisoning. We often treat poisoned patients like critical care physicians. As with any severely ill patient, the initial priority is to stabilise the airway, breathing, and circulation. Identifying the toxin by history, toxidrome, or laboratory tests may point doctors in the proper direction. In cases where the particular poison agent is known, antidotes can be administered.

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