

Chapter-10

Poisoning

Poisoning: Types of poisoning: Clinical manifestations and Antidotes Drugs and Poison Information Centre and their services – Definition, Requirements, Information resources with examples, and their advantages and disadvantages

Poisoning:

A poison is any substance that is harmful to your body. You might swallow it, inhale it, inject it, or absorb it through your skin. Any substance can be poisonous if too much is taken. Poisons can include:

- Prescription or over-the-counter medicines taken in doses that are too high
- Overdoses of illegal drugs
- Carbon monoxide from gas appliances
- Household products, such as laundry powder or furniture polish
- Pesticides
- Indoor or outdoor plants
- Metals such as lead and mercury

Types of poisoning:

There are several types of poisoning that can occur, depending on the substance involved and the way in which it enters the body. Here are some of the most common types of poisoning:

1. **Ingestion Poisoning:** This occurs when someone swallows a toxic substance, either accidentally or intentionally. Examples of ingested poisons include household cleaners, medications, and poisonous plants.
2. **Inhalation Poisoning:** This occurs when someone breathes in toxic fumes or gases, such as carbon monoxide or chlorine gas. This type of poisoning is often associated with industrial accidents, fires, and other environmental hazards.



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3. **Injection Poisoning:** This occurs when a toxic substance is injected into the body, such as through the use of contaminated needles or syringes. Injection poisoning is commonly associated with drug abuse.
4. **Absorption Poisoning:** This occurs when a toxic substance is absorbed through the skin, either by direct contact or through prolonged exposure to a contaminated environment. Examples of substances that can cause absorption poisoning include pesticides, lead, and mercury.
5. **Radiation Poisoning:** This occurs when the body is exposed to high levels of ionizing radiation, such as in the aftermath of a nuclear accident or a nuclear weapon detonation. Radiation poisoning can cause a range of serious health effects, including radiation sickness, cancer, and organ damage.

Clinical manifestations:

- Clinical manifestations refer to the physical or observable signs and symptoms of a disease or medical condition.
- Poisoning occurs when a person is exposed to a substance that is harmful to the body, either through ingestion, inhalation, injection, or absorption through the skin.
- Clinical manifestations of poisoning can vary depending on the type and amount of the substance ingested or absorbed, as well as the age, health status, and individual sensitivity of the person affected.

In general, clinical manifestations of poisoning can be divided into four categories: local effects, systemic effects, central nervous system effects, and cardiovascular effects.

1. **Local Effects:** Local effects are limited to the area where the poison has come into contact with the body. Examples of local effects of poisoning include:
 - Skin irritation or burns from contact with corrosive substances, such as acids or alkalis.
 - Eye irritation or damage from exposure to certain chemicals or gases.
 - Mucous membrane irritation or burns from ingesting corrosive substances, such as bleach or drain cleaner.
 - Respiratory irritation or burns from inhaling noxious gases, such as carbon monoxide or chlorine.
2. **Systemic Effects:** Systemic effects refer to symptoms that affect the whole body, such as fever, headache, or fatigue. Examples of systemic effects of poisoning include:
 - Gastrointestinal symptoms, such as nausea, vomiting, diarrhea, or abdominal pain.
 - Cardiovascular symptoms, such as high or low blood pressure, rapid or irregular heartbeat, or chest pain.
 - Respiratory symptoms, such as coughing, shortness of breath, or wheezing.
 - Renal symptoms, such as decreased urine output or blood in the urine.
 - Liver symptoms, such as jaundice, abdominal pain, or liver failure.



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- Hematologic symptoms, such as anemia, bleeding, or clotting disorders.
 - Metabolic symptoms, such as acidosis or alkalosis.
3. **Central Nervous System Effects:** Central nervous system effects are symptoms that affect the brain and spinal cord. Examples of central nervous system effects of poisoning include:
- Confusion, disorientation, or hallucinations.
 - Seizures or convulsions.
 - Coma or loss of consciousness.
 - Agitation, restlessness, or anxiety.
 - Depression, drowsiness, or lethargy.
 - Memory loss or cognitive impairment.
4. **Cardiovascular Effects:** Cardiovascular effects refer to symptoms that affect the heart and blood vessels. Examples of cardiovascular effects of poisoning include:
- Chest pain or discomfort.
 - Irregular or rapid heartbeat.
 - Low blood pressure or shock.
 - Pulmonary edema or fluid buildup in the lungs.
 - Cardiac arrest or sudden death.

Antidotes:

- A medical substance that is used to prevent a poison or a disease from having an effect
- Antidotes are agents that negate the effect of a poison or toxin.
- Antidotes mediate its effect either by preventing the absorption of the toxin, by binding and neutralizing the poison, antagonizing its end-organ effect, or by inhibition of conversion of the toxin to more toxic metabolites.
- Antidote administration may not only result in the reduction of free or active toxin level, but also in the mitigation of end-organ effects of the toxin by mechanisms that include competitive inhibition, receptor blockade or direct antagonism of the toxin.

Types of Antidotes:

Antidotes are substances that can counteract the effects of toxins or poisons. There are several types of antidotes, including:

1. **Chemical antidotes:** These are substances that can chemically neutralize the effects of a poison. For example, sodium bicarbonate can be used as an antidote for acidic poisons.



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2. **Physiological antidotes:** These are substances that can counteract the effects of a poison by affecting the body's physiological processes. For example, naloxone can be used as an antidote for opioid overdose by blocking the effects of opioids on the body's nervous system.
3. **Functional antidotes:** These are substances that can reverse the toxic effects of a poison by restoring normal bodily functions. For example, glucose can be used as an antidote for insulin overdose by restoring normal blood sugar levels.
4. **Mechanical antidotes:** These are physical measures that can be taken to remove a poison from the body. For example, activated charcoal can be used to absorb toxins in the digestive system before they can be absorbed into the bloodstream.
5. **Immunological antidotes:** These are substances that can stimulate the body's immune system to produce antibodies that can neutralize the effects of a poison. For example, antivenom can be used as an antidote for snake venom by providing the body with specific antibodies that can neutralize the venom.

Drugs and Poison Information Centre and their services:

- Drug Information and Poison Control Center is a source of authentic accurate unbiased and reliable source of information about drugs and poisons to health care professionals and common masses.
- A Drugs and Poison Information Centre (DPIC) is a specialized facility that provides information about drugs and poisons to healthcare professionals, patients, and the general public. These centers serve as a valuable resource for education, prevention, and treatment of drug-related problems.

Objectives

- To provide independent, unbiased, authentic, accurate and objective drug information to assist health professionals in rational prescribing to optimize patient care.
- To advise general public regarding safe, effective and economic use of medicines.

Requirements:

- Requirements for a Drugs and Poison Information Centre may vary depending on the country, but generally, it should have a team of experts, including pharmacists, toxicologists, and healthcare professionals with expertise in drug-related issues.
- The center should also have access to a comprehensive database of information on drugs and poisons, as well as the ability to perform research on drug-related issues.

Information resources:

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- Databases: DPICs often maintain their own databases of information on drugs and poisons. These databases may include information on the pharmacology of drugs, their toxicology, interactions, side effects, and dosing guidelines.
- Online resources: DPICs may also offer online resources, such as websites, apps, or chatbots, where people can access information about drugs and poisons.
- Phone helplines: Many DPICs offer phone helplines that people can call to speak with a healthcare professional or pharmacist about drug-related issues.

Advantages:

- Increased patient safety: DPICs can provide healthcare professionals with up-to-date information about drug-related issues, including drug interactions and adverse effects, which can help to prevent adverse drug reactions and improve patient safety.
- Improved education: DPICs can provide education and training to healthcare professionals and patients, helping to improve their understanding of drug-related issues.
- Timely information: DPICs can provide information quickly in the event of a drug or poison-related emergency.

Disadvantages:

- Cost: Setting up and maintaining a DPIC can be expensive.
- Limited availability: DPICs may not be available in all areas, which can limit access to information about drugs and poisons for some people.
- Limited scope: DPICs may not have the resources to cover all drugs and poisons, which can limit the scope of their services.

Services

- Services offered by the DIPCC at Department of Pharmacy, University of Peshawar
- Choice of Therapy.
- Medicine Dose.
- Duration of Therapy.
- Drug Identification.
- Therapeutic Alternatives.
- Drug Interactions & Their Management.
- Drug Contraindicated in Pregnancy, During Lactation.



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- Dose Adjustment in Hepatic and Renal Impairment.
- Drug Updates, Withdrawals, ADRs, Antibiotic Resistance, Novel Dosage Forms and Delivery Systems.
- Information on Reconstitution, Dilution, Stabilities and Rate Calculations of Parenterals.
- Mode of Drug Administration.
- Special Drug Related Precautions/Warnings.
- Poisoning Prevention Strategies.
- Poison Management Information (Identification, Diagnostic Tests, Absorption Minimizing Techniques, Elimination Enhancement Techniques, Antidotes Availability and Administration).

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