**Al-Mustaqbal University College**
**Department of Pharmacy**
**5th stage**
**Clinical Toxicology**
**Lecture: 1**

# Initial Evaluation & Management of poisoned patient

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# Clinical Toxicology

**Clinical toxicology is processes involved with the different forms of toxic chemicals and they associated with the different forms of diseases.**

**It typically coincides with other sciences like as biochemistry, pharmacology and pathology.**

**Clinical toxicology deals with the adverse effects of agents such as chemical, drugs etc.**

# Initial Evaluation & Management

**All poisoned patients should be managed as if they have a potentially life-threatening intoxication, although they appear normal.**

**The initial approach to the poisoned patient should be essentially similar in every case, irrespective of the toxin ingested.**

**This approach can be termed as (routine poison management)**

# Initial Evaluation & Management

**Poisoning can result from exposure to a variety of substances, ranging from household cleaning products to pesticides.**

**However, prescription and over the counter medications account for nearly one half of poisoning exposures.**

# Initial Evaluation & Management

**Evaluation** : involves **recognition** that poisoning has occurred, **identification** of agents involved, **assessment** of severity and **prediction** of toxicity.

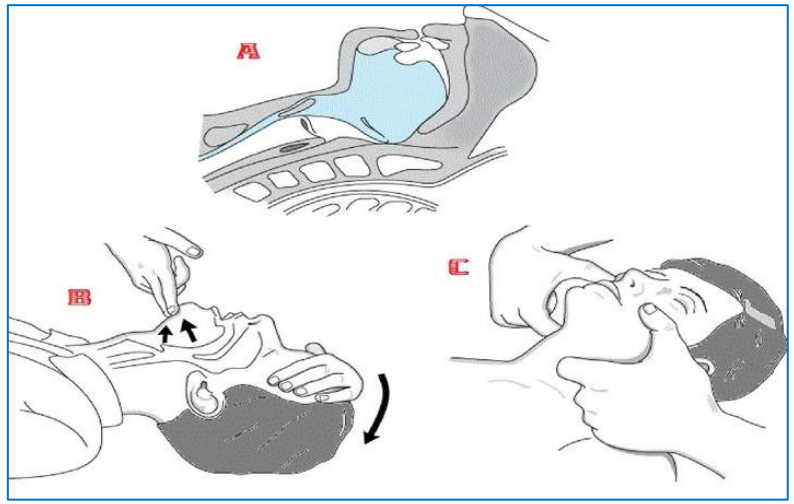
**Management** : is directed to the **supportive** care, **prevention** of poison absorption or **enhancement** of elimination , and when appropriate the administration of **antidote**.

# Initial Evaluation (ABCDEs)

## Airway:

Airways should be kept **patent** and any suspicion for **obstructing material** must be removed.

The most common factor contributing to **death** from poisoning is **loss of airway-protective reflexes** with subsequent airway obstruction caused by: **Flaccid tongue** or Pulmonary **aspiration** of gastric contents.



# Initial Evaluation (ABCDEs)

**Breathing:**

Evaluate **respiratory rate** and if available, **oxygen saturation**.

If there is **no oxygen monitor** available but the patient has an **elevated respiratory rate**, consider supplemental **oxygen**.

# Initial Evaluation (ABCDEs)

**Circulation:**

A prompt **assessment** of vital signs and hydration status is essential.

1. Check **blood pressure** and **pulse rate** and **rhythm**.

2. Begin continuous **ECG** monitoring

3. Secure **venous access**

4. Draw blood for **routine studies**

5. Begin **intravenous infusion** If the patient is **hypotensive**, normal saline or another isotonic solution is preferred

# Initial Evaluation (ABCDEs)

**Disability (Neurological):**

A decreased level of **consciousness** is the most common serious **complication** of drug overdose or poisoning .

In patients that are presented with **seizures**, it is important to check the **blood sugar** level.

If the blood sugar level **is < 72 md/dL**, then administer **50ml of 50% dextrose IV**

**Toxic seizures** should be treated with **IV benzodiazepines** , Seizures **refractory** to benzodiazepines can be treated with **barbiturates**.

# Initial Evaluation (ABCDEs)

**Exposure (evaluation of temperature):**

**Consider the possibility of toxic syndromes associated with hyperthermia.**

**Toxic levels of certain drugs can lead to significantly elevated body temperature.**

# Definitive care with poisoning

1. Try to **identify** the poison.
2. Accurate and complete **history** from sources other than patient (family, friends, pharmacist, & pill bottles at the scene).
3. Attempt to establish the **time** and **amount** of the ingestion.

# Supportive Care and Monitoring

**Remember that acute poisoning is a dynamic illness and the patient's condition may fluctuate over time.**

**Therefore repeated examinations and ongoing clinical assessment and management are required.**

# Physical examination

**This may provide clues as to what the drugs ingested were.**

**Important aspects of the examination include:**

- **Vital signs (PR, RR, BP, temp, O2 saturation if available)**
- **Neurological exam (pupil size, Glasgow Coma Scale (GCS), mental state, tone, reflexes, clonus, focal signs)**
- **Skin (colour, sweating absent/present)**
- **Dry mouth/salivation, bowel sounds, urinary retention**
- **Evidence of trauma**

# Risk Assessment

An **early, accurate** risk assessment is the **key to managing** acutely poisoned patients.

It enables us to **predict** the likely clinical **course**, potential **complications**, and to **plan** the management of the patient.

# Risk Assessment

**5 steps of a risk assessment:**

**1. Agent(s)**

**Assess whether the ingested agents are likely to cause significant toxicity.**

**2. Dose(s)**

**Calculate the dose taken in mg/kg body weight, use this information to predict likelihood of significant toxicity.**

# Risk Assessment

**3. Time since ingestion**

**This is important for determining the likely clinical progress of the patient, and to guide management.**

**4. Clinical features and progress**

**Correlate the patient's clinical features and progress with the dose taken and time since ingestion.**

**5. Patient factors (weight and co-morbidities)**

**Consider individual patient factors that may put the patient at particular risk.**

# Investigations

**1. Blood sugar level**

**2. ECG – look for:**

**- Rate (Bradycardia or Tachycardia)**

**- Rhythm**

# Management

**The management of poisoning is directed towards**

**1- The prevention of further poison absorption**

**2- The increase of poison elimination**

**3- Use of an antidote (if appropriate)**

# Prevention of further poison absorption

## 1- Dermal Exposure

*Remove all clothing.

*Washing skin gently with soap and water for at least 30 minutes.

## 2- Eye Exposure

*Washing conjunctiva with running water or normal saline for 20 minutes.

*Solid corrosives should be removed by forceps.

# Prevention of further poison absorption

## 3- GIT Exposure

*Induction of emesis

*Gastric lavage

*Activated Charcoal

*Cathartics

*Whole bowel irrigation

# Induction of Emesis

**Ipecac syrup:**

**The safe method for induction of vomiting, should be given within 30 minutes of poison ingestion.**

**Syrup of ipecac should no longer be used routinely as a poison treatment intervention at home.**

# Induction of Emesis

## Emesis Contraindications

1.Convulsions.

2.Corrosives.

3.Hydrocarbons

4.Coma

5.Less than 6 months of age (not well developed gag reflex)

# Gastric Lavage

Used in **hospitals** when **emesis was failed** or there was **contraindication** for it.

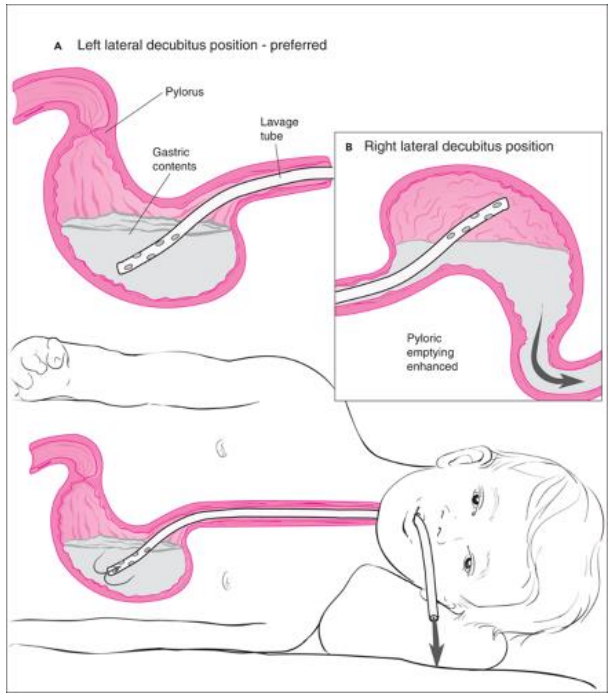
Gastric lavage is **effective** in the first **4-6 hrs** after ingestion.

**Technique**:

1. An assistant with **suction machine** should be available.

2. Dentures, mucous, vomitus should be **removed** from patient's mouth.

3. Proper **tube size** to be selected according to the patient **age**



# Activated charcoal

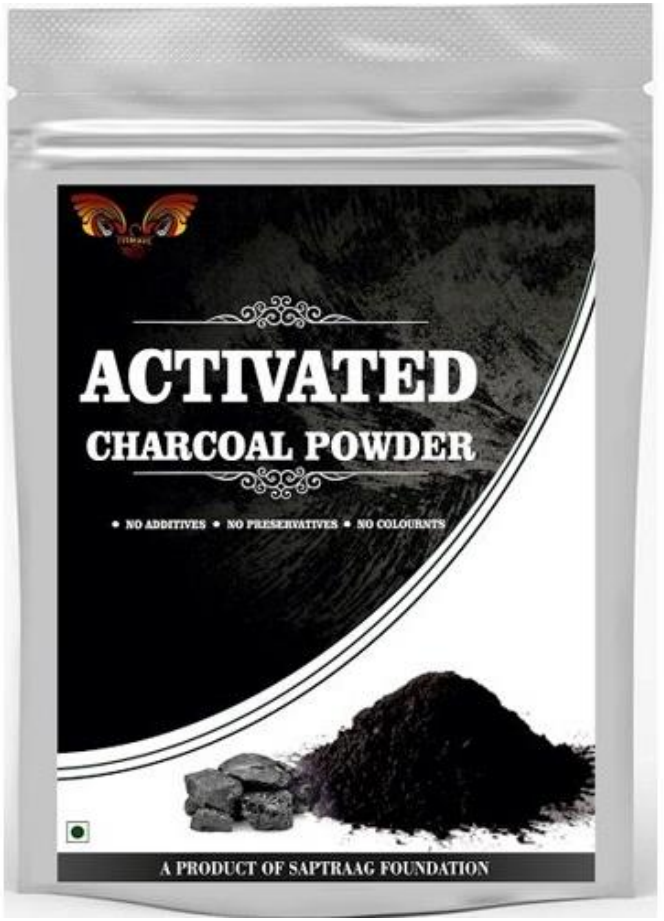
**Adsorption** of a wide variety of drugs and chemicals.

It is **not digested**; it stays **inside** the GI tract and **eliminates** the toxin when the person has a **bowel movement**.

**Adult dose is 1 gm/kg**.

**Indications:** (all of these must be met)

- Within **one hour** of time of ingestion
- Patient at **risk of significant toxic** effects
- Patient **NOT** at risk of **airway compromise**

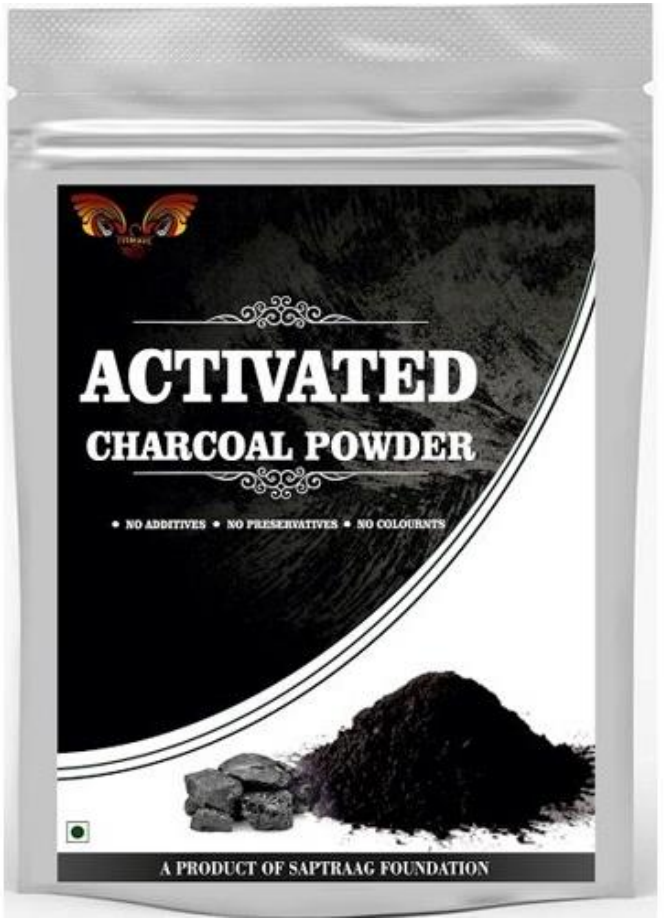


# Activated charcoal

**Contraindications:**

- If an oral antidote is given
- Seizures, coma
- Corrosive ingestion
- Agent not bound to activated charcoal:

Hydrocarbons, alcohols and corrosives (acids, alkalis)



# Cathartics (Laxatives)

These are substances that **enhance** the **passage of material through GIT** and **decrease** the **time of contact** between the poison and the absorptive surfaces of the stomach and intestine.

**a)Osmotic cathartics:** increase osmotic pressure in the lumen, as Magnesium sulfate.

**b) Irritant cathartics:** act by increasing motility, such as caster oil.


**Contraindications:**

GIT hemorrhage, Recent bowel surgery, Intestinal obstruction.

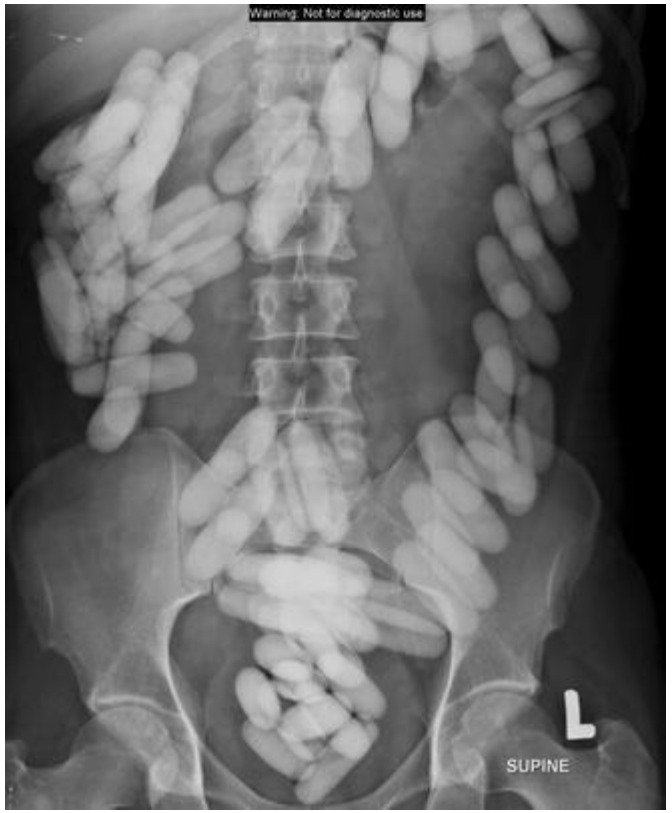
# Whole Bowel Irrigation

**The goal of WBI is to clean GIT from non-absorbed ingested toxins.**

**Polyethylene glycol electrolyte solutions are used.**

**Indications**

- ✓ **Ingestion of a toxin that is known to be poorly adsorbed by a charcoal.**
- ✓ **Ingestion of massive amounts of drugs**
- ✓ **Ingestion of sustained-release or enteric-coated preparations**
- ✓ **Removal of ingested packets of illegal drugs (body packers).**



# Antidote

A **therapeutic** substance used to **counteract** the toxic action(s) of a specific **xenobiotic**

Antidotes are **classified** according to mechanism of action into:

1- **Interacts** with the poison to form a nontoxic complex that can be excreted e.g. **chelators**

2- **Accelerate** the detoxification of the poison: **N-acetylcysteine, thiosulfate.**

# Antidote

3- **Decrease** the rate of conversion of the poison into its toxic metabolites: **Fomepizole.**

4- **Compete** with the poison for certain receptors: **Naloxone.**

5- **Block the receptors** through which the toxic effects of the poison are mediated: **atropine.**

6- **Bypass the effect** of the poison: **O2** treatment in CO and cyanide toxicity.

7- **Antibodies** to the poison: **digiband, antivenoms**

# Antidote

**Antidotes also can be classified into:**

**1- Physical**

**2- Chemical**

**3- Physiological**

# Antidote

## 1- Physical Antidotes

**Agents used to interfere with poisons through physical properties, not change their nature**

**a) Adsorbing: the main example is activated charcoal.**

**b) Coating: a mixture of egg & milk makes a coat over the mucosa.**

**c) Dissolving: 10% alcohol or glycerine for carbolic acid.**

# Antidote

## 2- Chemical Antidotes

a) **Oxidizing**: Amyl Nitrite is used in cyanide toxicity.

b) **Reducing**: Vitamin C used for drugs causing Met-Hb.

c) **Precipitating**: Starch, it makes blue precipitate with iodine.

# Antidote

**3- Physiological (Pharmacological) Antidotes**

**a) Antagonism**

**1- Competitive Antagonists.**

**2- Non-Competitive Antagonism**

**b) Chelating Agents**

**Unite metallic poisons to form soluble, nonionizable, less toxic, and easily excreted chelates. e.g Dimercaprol (BAL)**

**c) Antibodies (Immunology-based Antidotes) e.g. Digoxin Specific Antibody Fragment (FAB fragments, Digiband)**

# Enhancement of Poison Excretion

## 1- Forced Diuresis

**It is a simple method for some poisons.**

**It is effect is increased with manipulation of urine pH. e.g. Fluid Diuresis, Osmotic Diuresis as mannitol 10%.**

# Enhancement of Poison Excretion

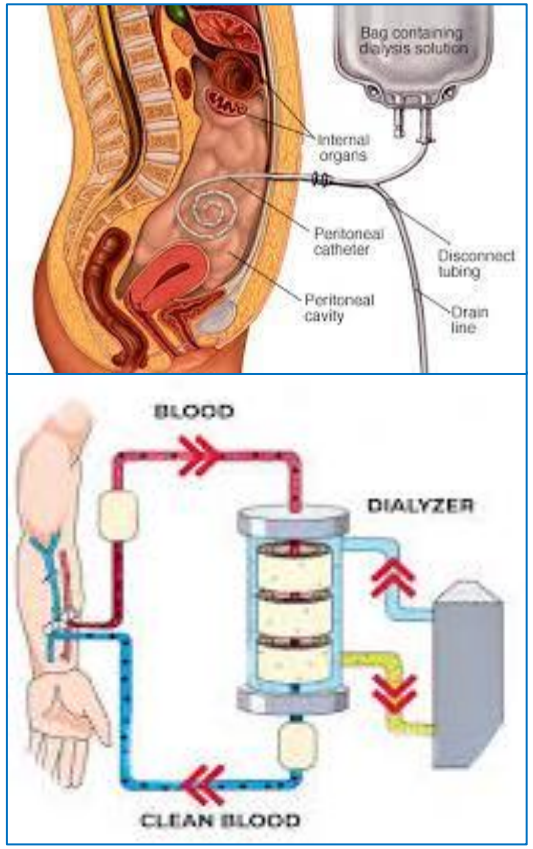
## 2- Dialysis

By allowing toxic substances to **pass** through **semi-permeable** membrane depending on the **concentration gradient**.

It is **beneficial** when renal function is **impaired**.

a) **Peritoneal** dialysis

b) **Hemodialysis**

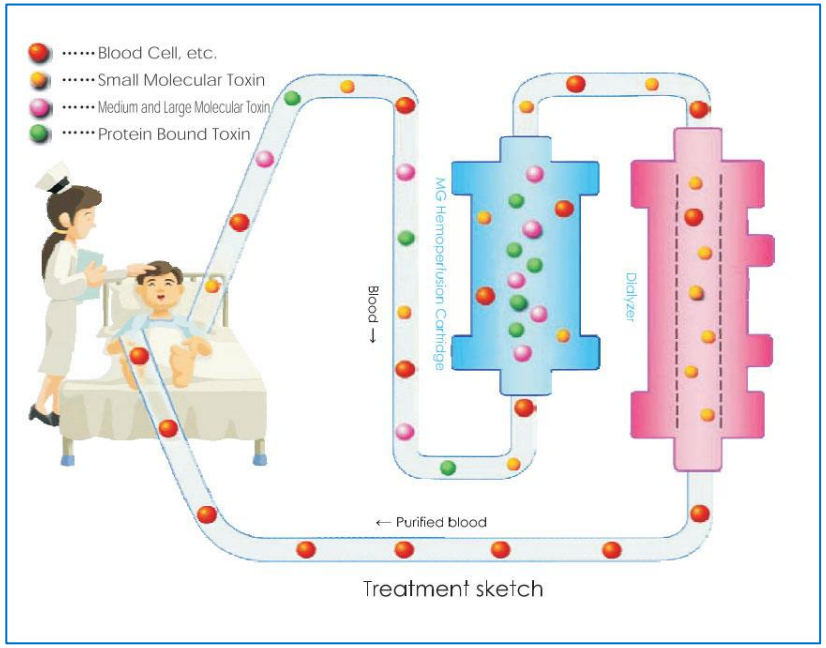


# Enhancement of Poison Excretion

## 3- Hemoperfusion

Using **equipment** and **vascular** access similar to that for hemodialysis.

The blood is pumped directly through a **column** containing an **adsorbent** material (either charcoal or resin).



Treatment sketch

# THANK YOU
# FOR YOUR ATTENTION