

IN THE NAME OF GOD

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General approach to the Poisoned Patients

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General Management

Resuscitation

Assessment

Decontamination

Antidotes



Resuscitation

Cardiac Arrest

Advanced cardiac Life Support

A B C

Airway

airway patency

Breathing

respiratory drive

Circulation

IV crystalloid bolus (10 to 20 mL/kg) is first-line treatment of hypotension



Altered mental status

Coma cocktail

Hypoxia

Supplemental oxygen

Hypoglycemia

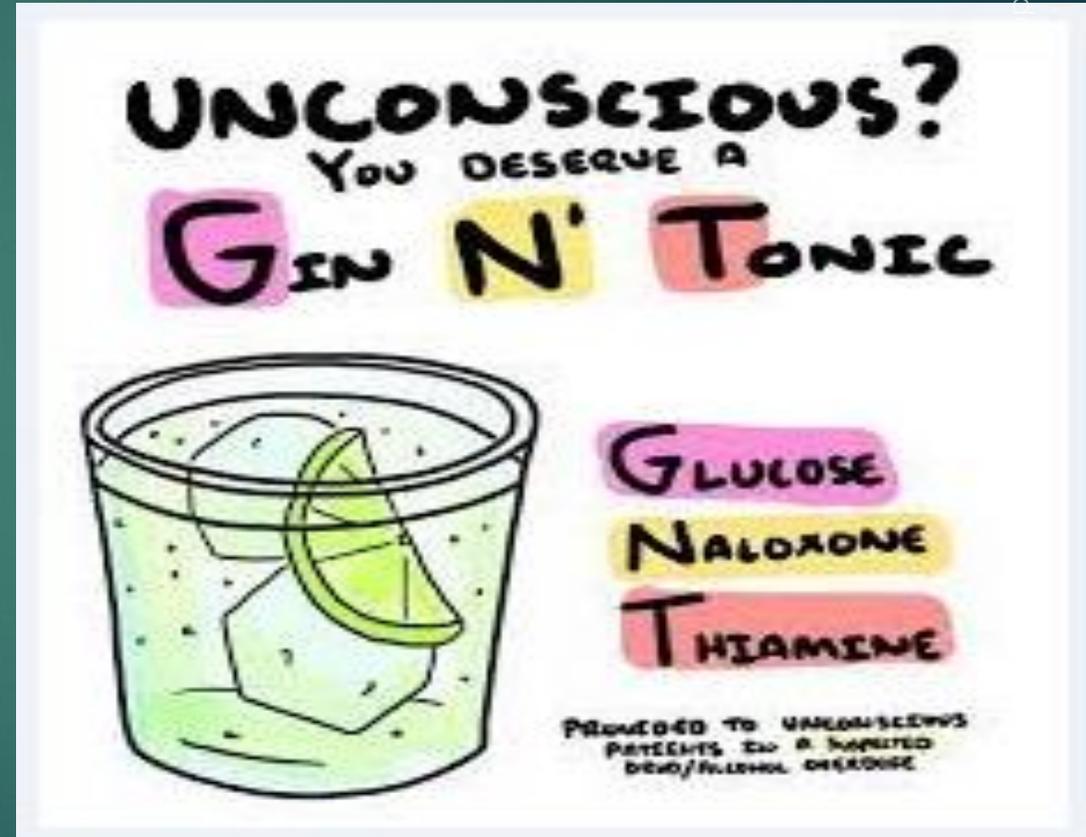
Hypertonic dextrose: 0.5 to 1.0 g/kg of D50W

Wernicke encephalopathy

Thiamine

Opioid-induced respiratory compromise

Naloxone



Assessment



- History ▶
- Physical examination ▶
- Diagnostic testing ▶

History

Identity of substances, doses, and route of exposure

Exposures

Inhalation ,Ingestion ,Cutaneous ,mucous membrane ,injection

Obtain collateral information

Empty medication containers or the scene environment

Past medical history

Hobbies, occupation, presence of a suicide note



Physical examination

General

,Signs of injury ,Odors Mental state
,Nutritional state

CNS

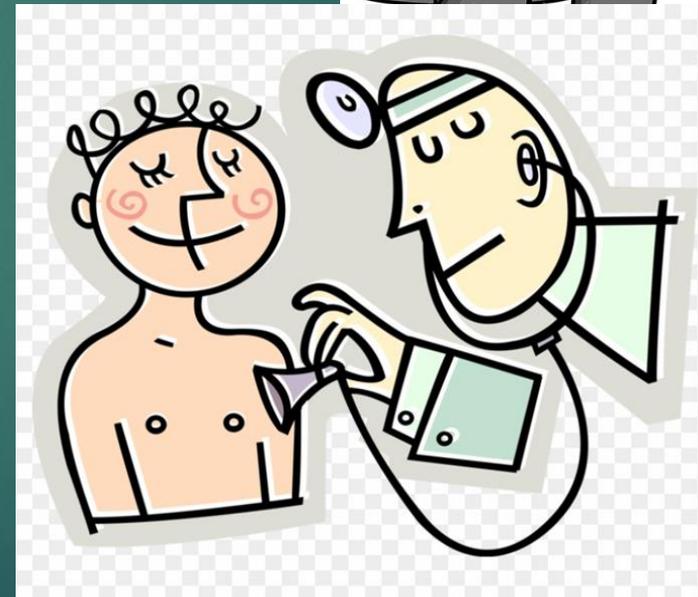
Conscious state ,Pupil size and reactivity ,Eye movements ,Cerebellar function/gait

Cardiovascular

Heart rate/blood pressure ,Cardiac auscultation

Respiratory

Oxygen saturation ,Respiratory rate
,Chest auscultation



Physical examination

GI

Oropharynx ,Abdomen ,Bladder

Peripheral nervous

Reflexes ,Tone ,Fasciculations ,Tremor
,Clonus

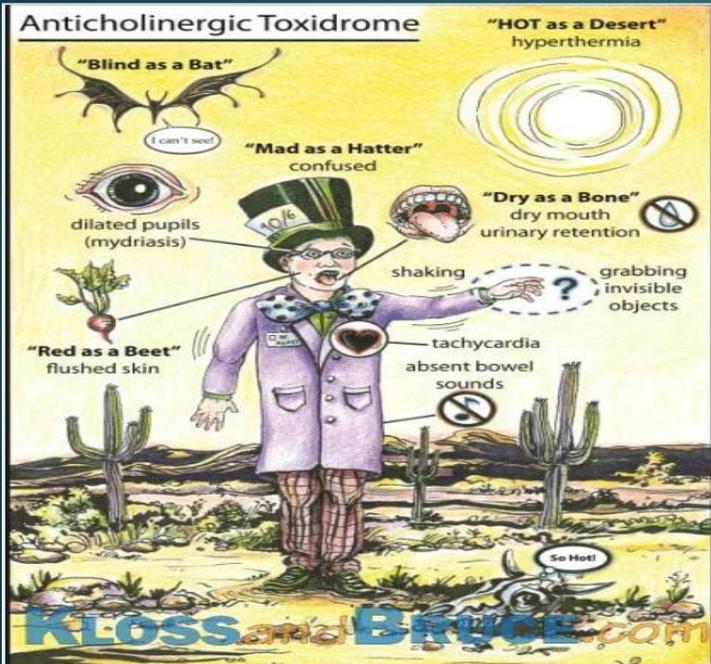
Dermal/peripheral

Bruising ,Cyanosis ,Flushing ,Dry/moist
skin ,Injection sites ,Bullae



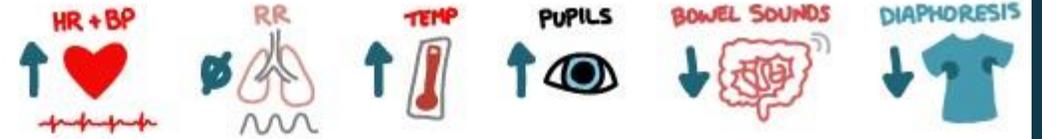
Toxidromes

The groups of signs and symptoms that consistently result from particular toxins



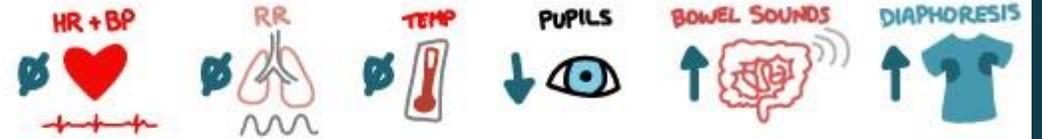
Anticholinergic

Low potency antipsychotics
Oxybutinin, Ipratropium
ACh receptor antagonists



Cholinergic

ACh receptor agonists
AChEIs ie. Donepezil



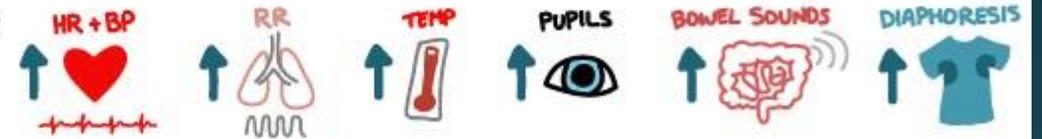
Opioid

Morphine
Heroin
Hydromorphone



Sympathomimetic

Epinephrine
Cocaine
Amphetamine & methylphenidate



Sedative-Hypnotic

Benzos & bars
"Z-drugs" (ie. zopiclone)
Antihistamines

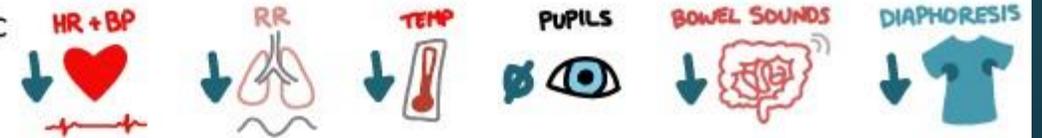


TABLE 176-4 Common Toxidromes

Toxidrome	Examples of Agents	Examination Findings (most common in bold)
Anticholinergic	Atropine, <i>Datura</i> spp., antihistamines, antipsychotics	Altered mental status, mydriasis, dry flushed skin, urinary retention, decreased bowel sounds, hyperthermia, dry mucous membranes Seizures, arrhythmias, rhabdomyolysis
Cholinergic	Organophosphate and carbamate insecticides Chemical warfare agents (sarin, VX)	Salivation, lacrimation, diaphoresis, vomiting, urination, defecation, bronchorrhea, muscle fasciculations, weakness Miosis/mydriasis, bradycardia, seizures
Ethanolic	Ethanol	CNS depression, ataxia, dysarthria, odor of ethanol
Extrapyramidal	Risperidone, haloperidol, phenothiazines	Dystonia, torticollis, muscle rigidity Choreoathetosis, hyperreflexia, seizures
Hallucinogenic	Phencyclidine Psilocybin, mescaline Lysergic acid diethylamide	Hallucinations, dysphoria, anxiety Nausea, sympathomimetic signs
Hypoglycemic	Sulfonylureas, insulin	Altered mental status, diaphoresis, tachycardia, hypertension Dysarthria, behavioral change, seizures
Neuromuscular malignant	Antipsychotics	Lead-pipe muscle rigidity, bradyreflexia, hyperpyrexia, altered mental status Autonomic instability, diaphoresis, mutism, incontinence
Opioid	Codeine, heroin, morphine	Miosis, respiratory depression, CNS depression Hypothermia, bradycardia
Salicylate	Aspirin Oil of wintergreen (methyl salicylate)	Altered mental status, respiratory alkalosis, metabolic acidosis, tinnitus, tachypnea, tachycardia, diaphoresis, nausea, vomiting Hyperpyrexia (low grade)
Sedative/hypnotic	Benzodiazepines Barbiturates	CNS depression, ataxia, dysarthria Bradycardia, respiratory depression
Serotonin	SSRIs MAOIs Tricyclic antidepressants Amphetamines Fentanyl St. John's wort	Altered mental status, hyperreflexia and hypertonia (>lower limbs), clonus, tachycardia, diaphoresis Hypertension, flushing, tremor
Sympathomimetic	Amphetamines Cocaine Cathinones	Agitation, tachycardia, hypertension, hyperpyrexia, diaphoresis Seizures, acute coronary syndrome

Diagnoastic Testing

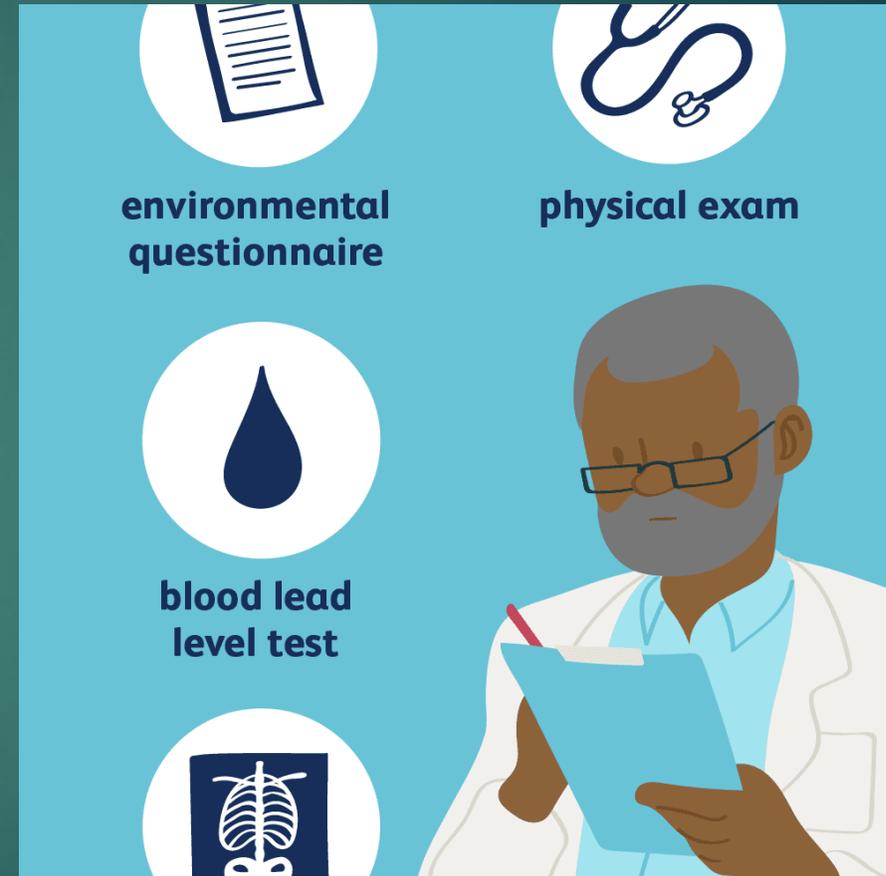
Serum drug concentrations

Urine drug screen

ABG

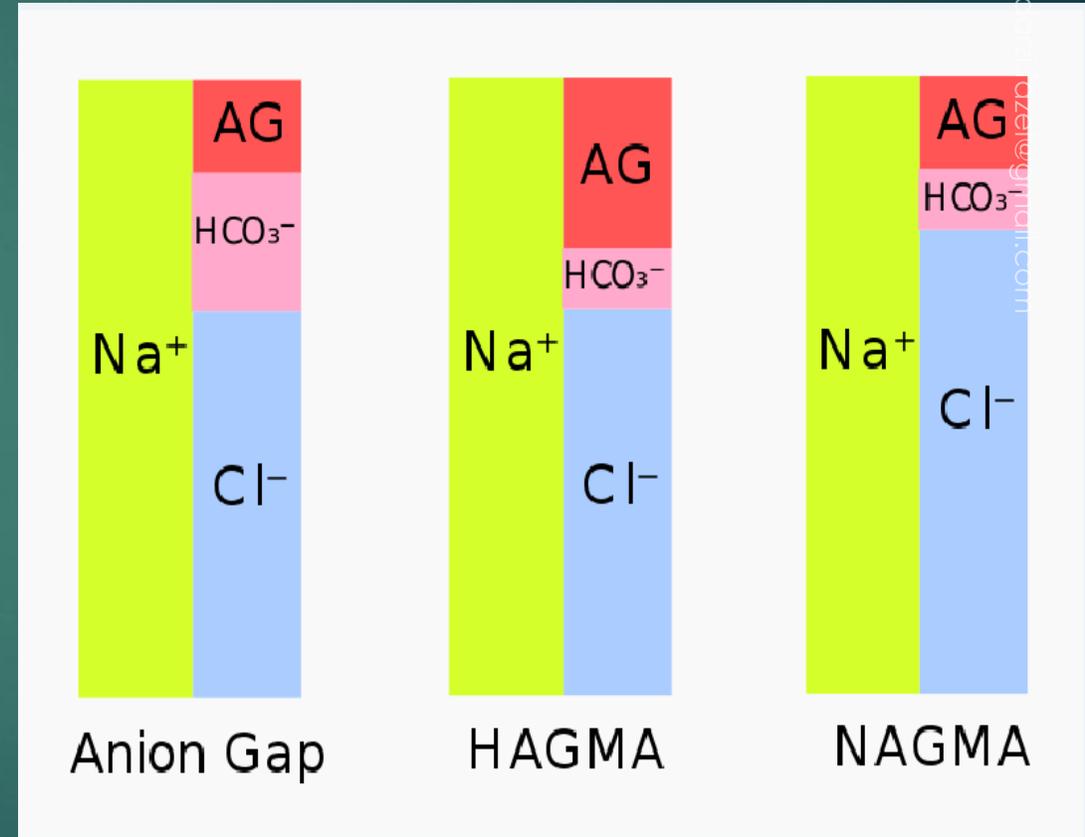
ECG

Radiography



High-Anion GAP Acidosis

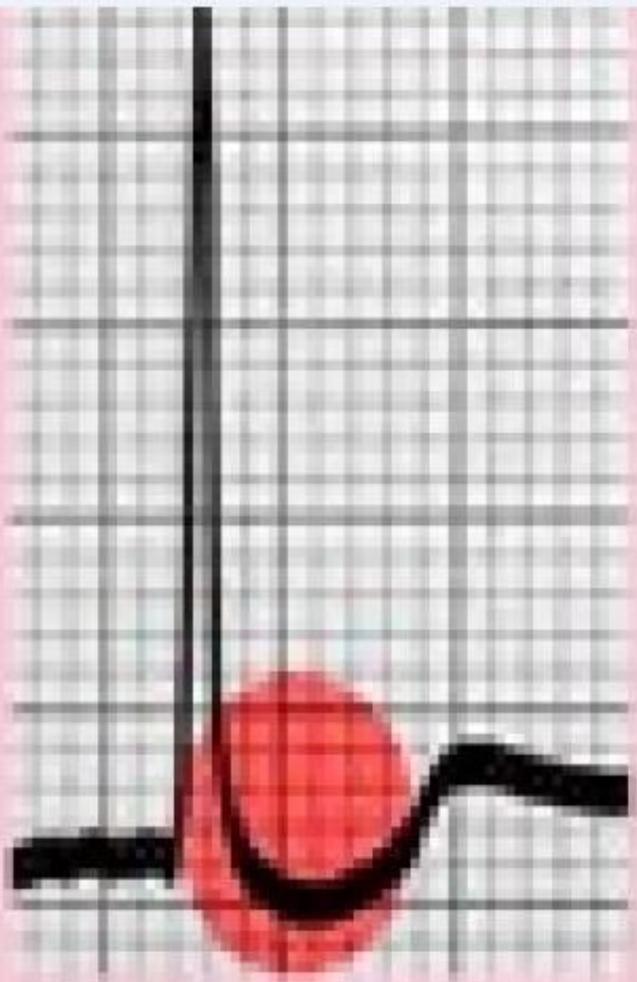
Alcoholic ketoacidosis
Cyanide
Diabetic ketoacidosis
Ethylene glycol
Iron
Isoniazid
Lactic acidosis
Metformin
Methanol
Salicylates
Uremia



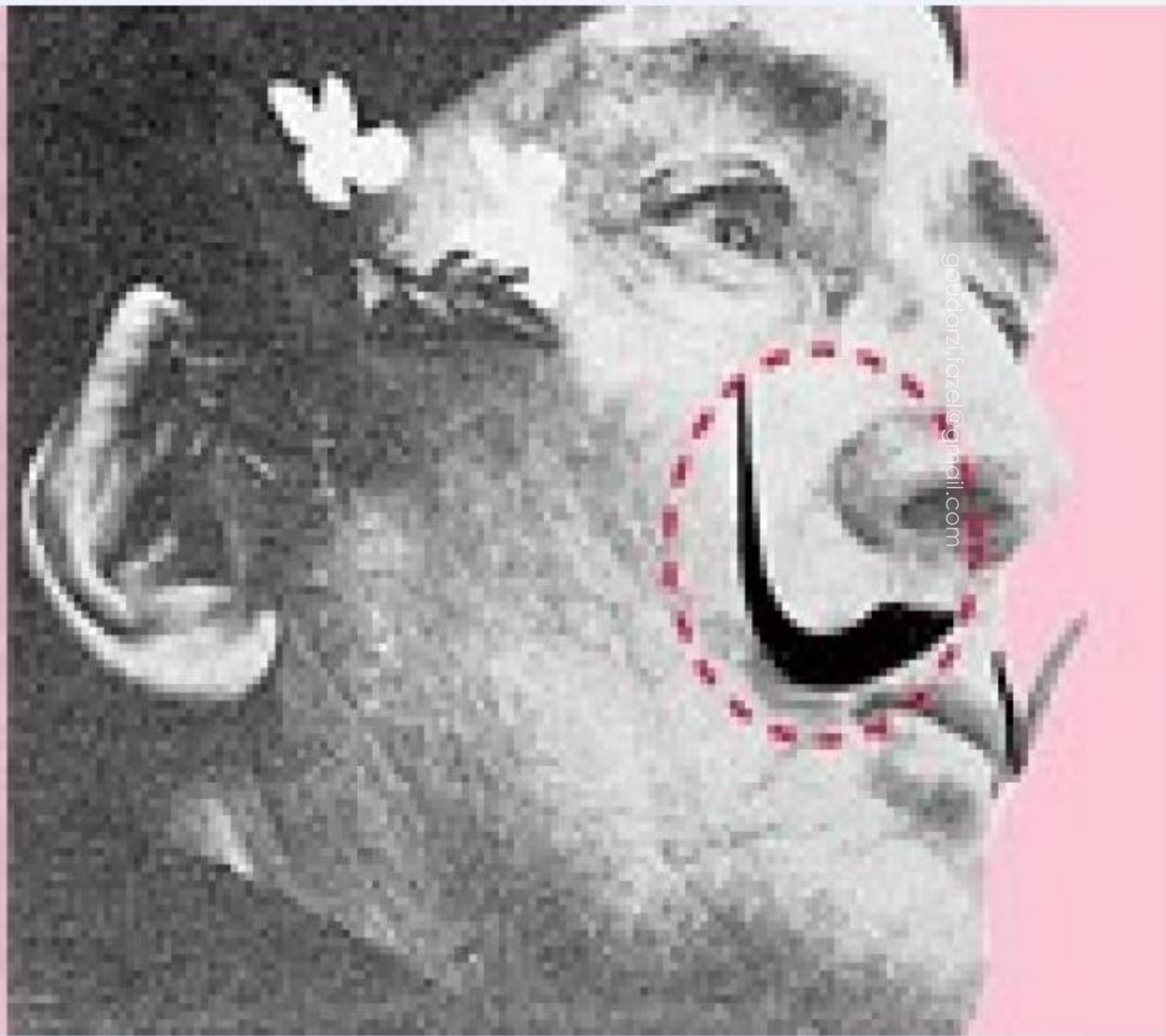
ECG

Toxicologic Electrocardiogram Manifestations

SEGMENT/INTERVAL	APPEARANCE	AGENT(S)	SEGMENT/INTERVAL	APPEARANCE	AGENT(S)
P wave	Absent	Digoxin Cholinergics Hyperkalemia	QT/QTc	Prolonged	Antipsychotics (typical and atypical), citalopram, hydrofluoric acid, methadone, ethylene glycol (oxalate byproduct)
	Notched	Quinidine			
PR interval	Prolonged	Beta-antagonists, calcium-channel antagonists, magnesium	T wave	Peaked	Hydrofluoric acid (hyperkalemia)
				Flattened	Lithium
QRS interval	Prolonged	Type 1 antidysrhythmics, cocaine, diphenhydramine, tricyclic antidepressants	U wave		Barium, beta-agonists, lithium, methylxanthines (caffeine, theophylline), toluene
ST segment	Scooped	Digoxin ("Salvador Dali's moustache")			



**Digitalis
effect**

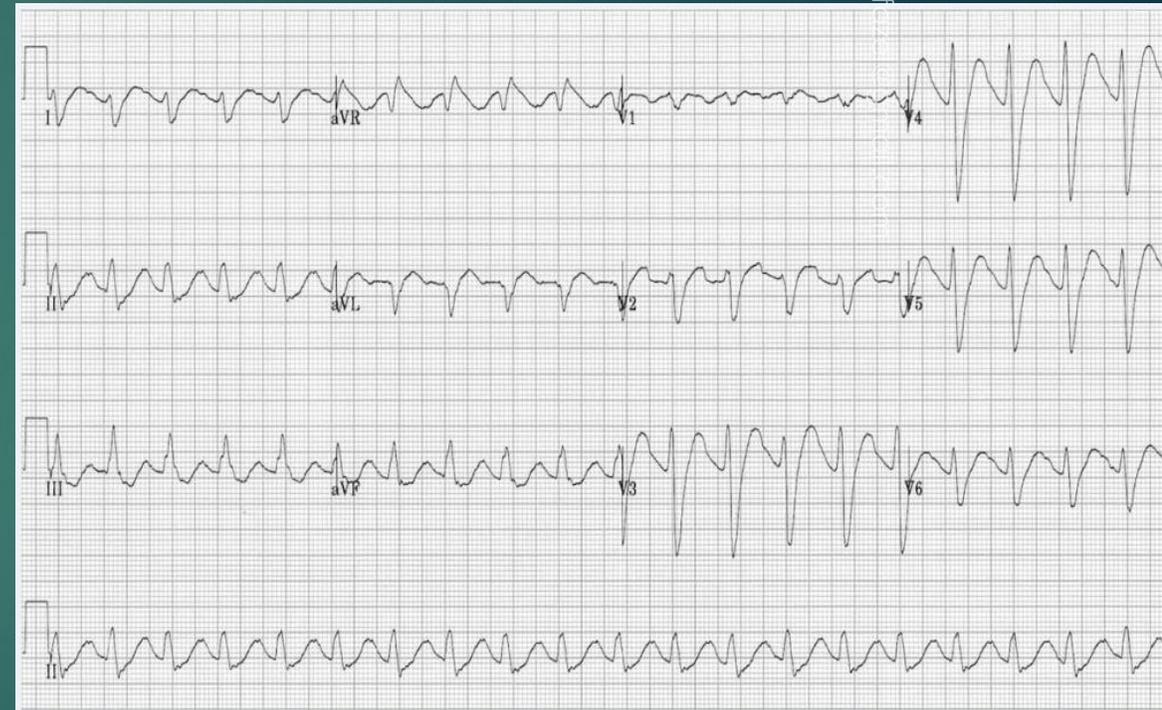


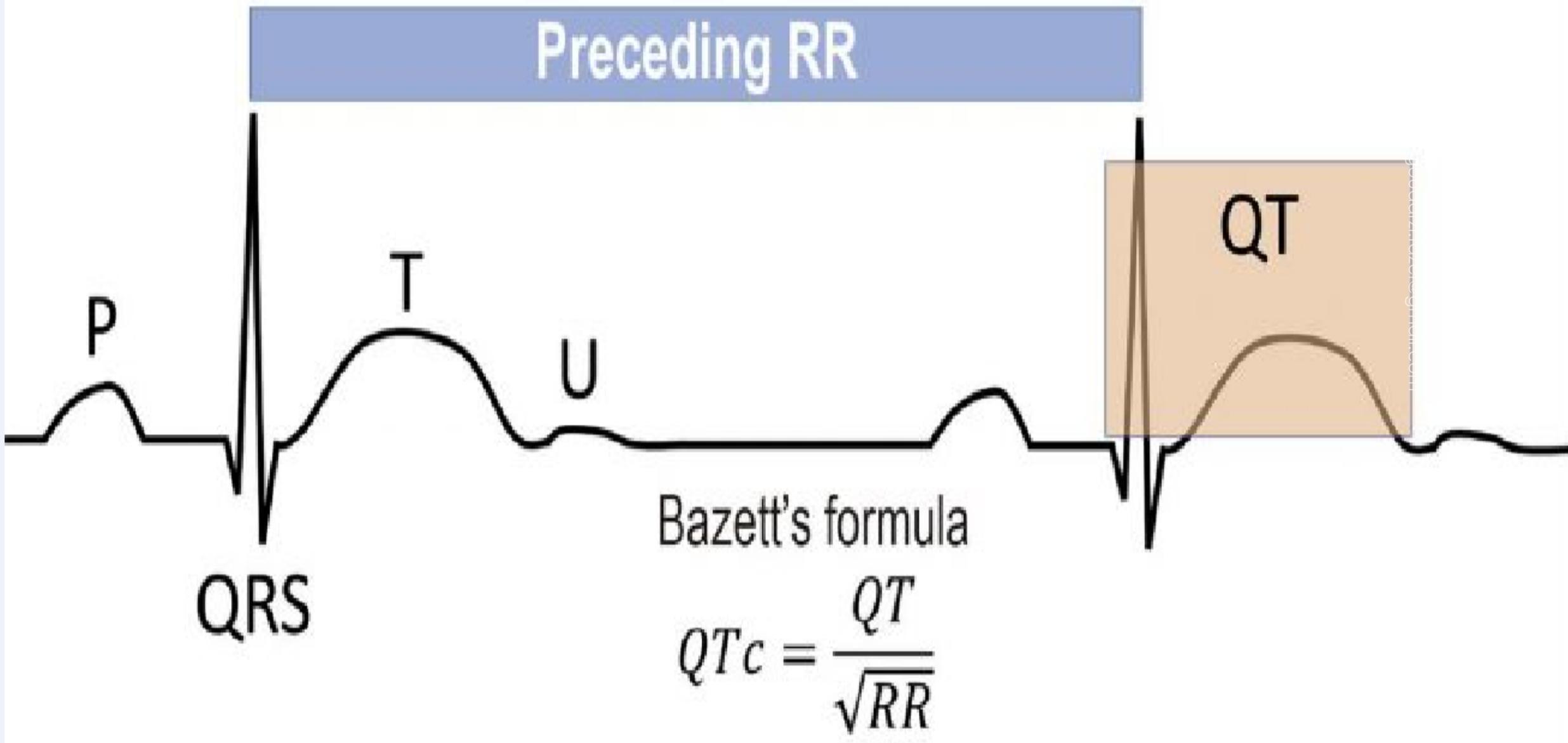
Electrocardiographic Features of Digoxin Toxicity

- Virtually any arrhythmia is possible. None specific for digoxin toxicity
- Classic arrhythmias thought to be associated combine some SVT (↑ ectopy and automaticity) with slow ventricular rate (↓ AV conduction)

“Digitalis effect”

- Shortening of QT interval
- “Scooped” or “sagging” ST depressions
- J point depression
- Flattened/inverted/Biphasic T waves





Radiopaque Agents

Drugs

- Chloral hydrate
- Enteric-coated preparations
- Phenothiazines
- Sustained-release products

Metals and Minerals

- Arsenic
 - Calcium
 - Iron
 - Lithium
 - Lead
 - Potassium
- ## Foreign Bodies



Decontamination

Ocular or dermal exposure



Activ

Decontamination

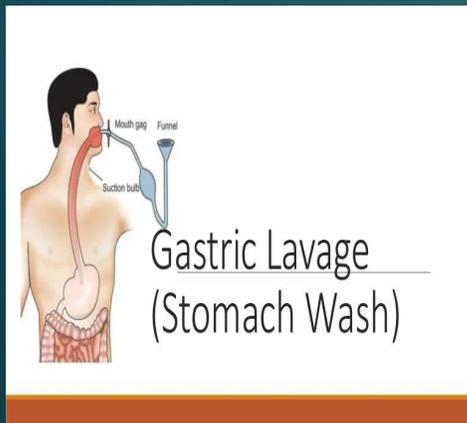
Gastrointestinal Tract

syrup of ipecac

Gastric lavage

Single dose activated charcoal

Whole bowel irrigation



Gastric lavage

Indications

Rarely indicated

Consider for recent (<1 h) ingestion of life-threatening amount of a toxin for which there is no effective treatment once absorbed

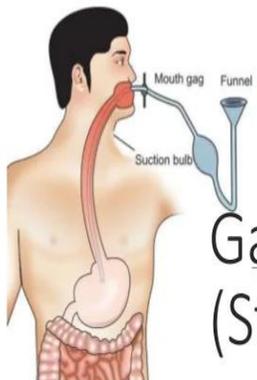
Contraindications

Corrosive/hydrocarbon ingestion

Supportive care/antidote likely to lead to recovery

Unprotected airway

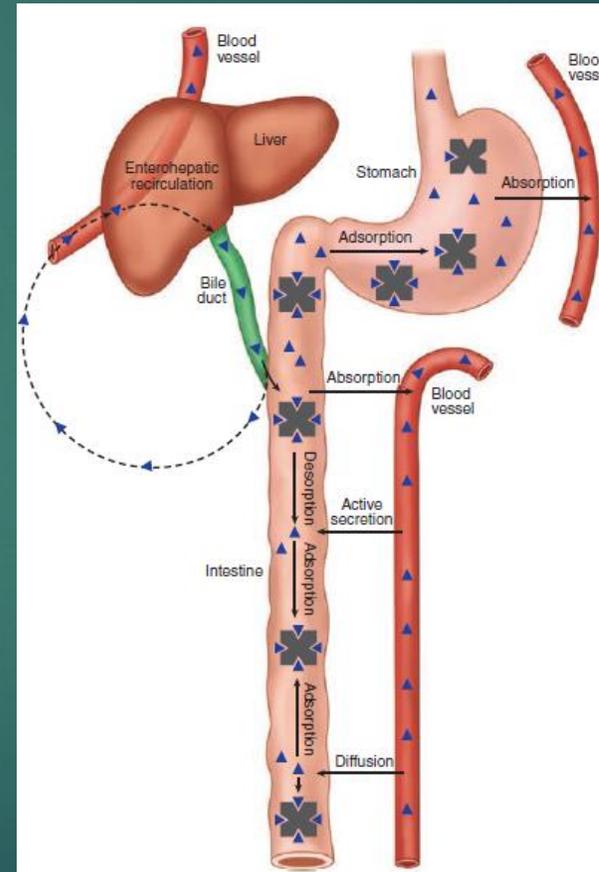
Unstable, requiring further resuscitation (hypotension, seizures)



Gastric Lavage
(Stomach Wash)

Single dose activated charcoal

- Activated charcoal (AC) is an excellent nonspecific adsorbent
- preventing absorption of a potentially toxic xenobiotic
- enhance elimination by blocking enterohepatic or enteroenteric recirculation of a potentially toxic xenobiotic



Single dose activated charcoal

Contraindications

- Nontoxic ingestion
- Toxin not adsorbed by activated charcoal
- Recovery will occur without administration of activated charcoal
- Unprotected airway
- Corrosive ingestion
- Possibility of upper GI perforation

Complications

- Vomiting
- Aspiration of the activated charcoal

Activated charcoal

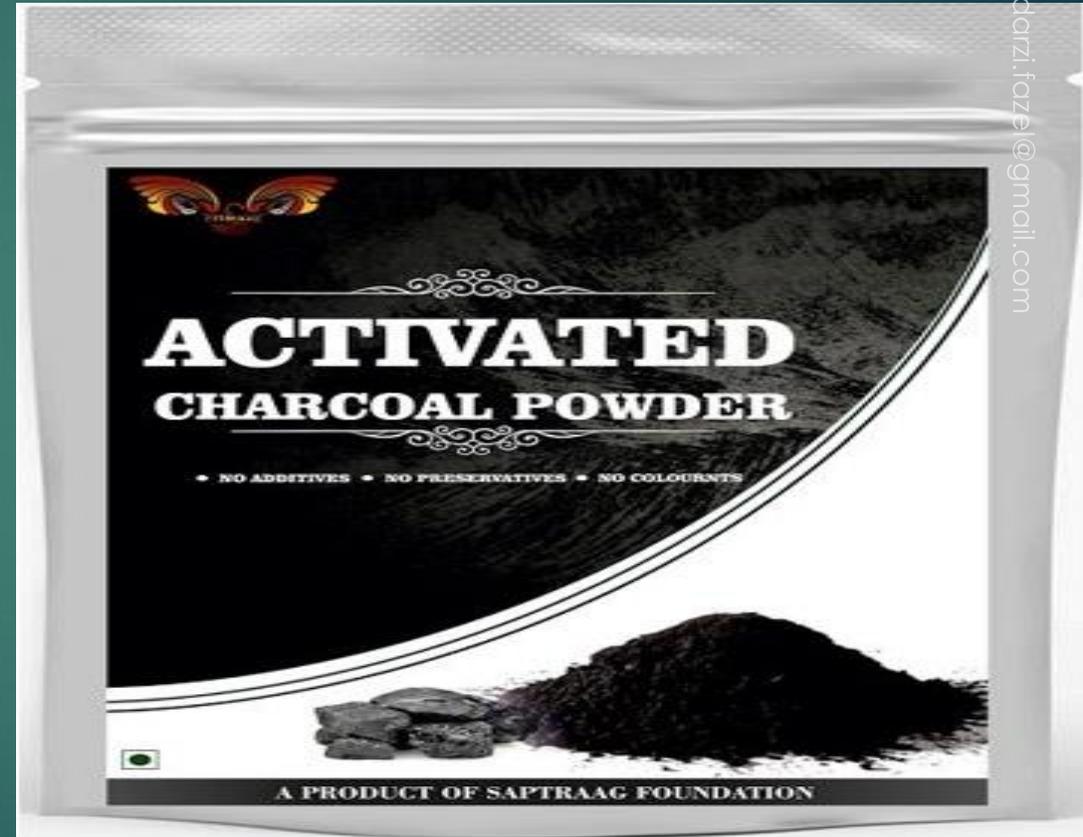
Dosing

activated charcoal 50 to 100 g in adults (1 g/kg of body weight) and 0.5 to 1.0 g/kg of body weight in children

Sorbitol: If used with the first dose of AC:

adult: 4.3 mL/kg body weight of 70% sorbitol

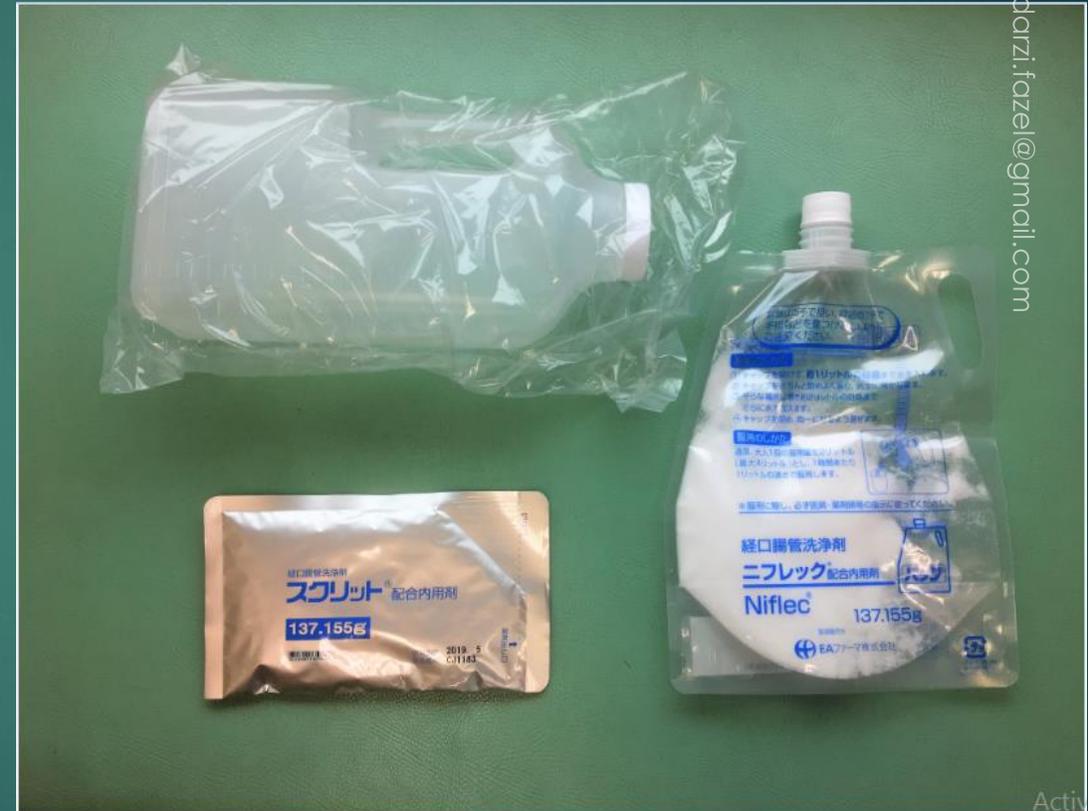
child: 4.3 mL/kg body weight of 35% sorbitol



Whole bowel irrigation

Polyethylene glycol is an osmotically balanced electrolyte solution

Administration in large quantities mechanically forces substances through the GI tract, limiting toxin absorption



Whole bowel irrigation

Indications (potential)

Iron

Lead

arsenic

Lithium

diltiazem or verapamil

Contraindications

Unprotected airway

GI perforation, obstruction
or ileus, hemorrhage

Intractable vomiting

Cardiovascular instability

Whole bowel irrigation

Complications

Nausea, vomiting

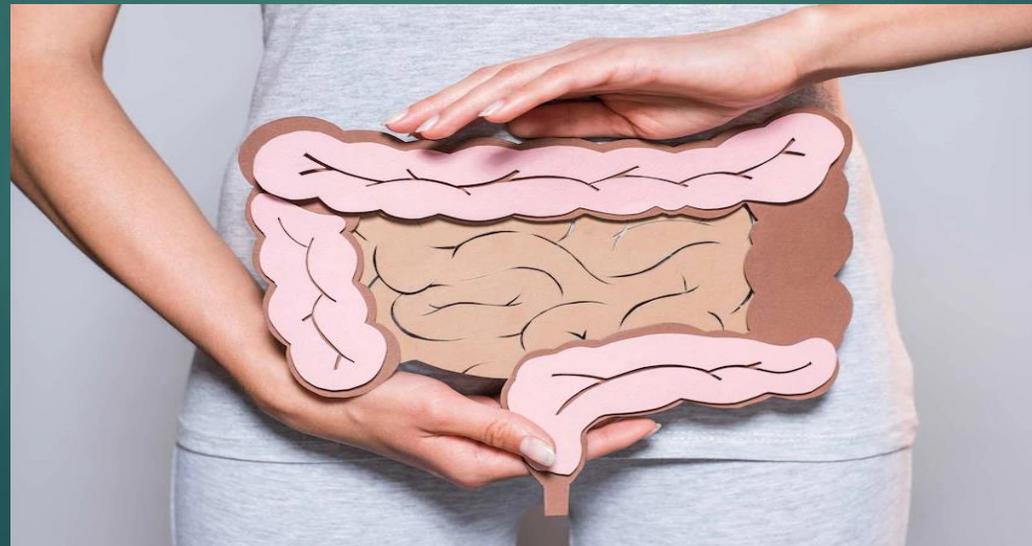
Aspiration

Time consuming; possible delay instituting other definitive care

Dose

25 to 40 mL/kg/hr

Until the rectal effluent is clear or until the desired effect is otherwise demonstrated



Enhanced Elimination

- Multidose activated charcoal
- Hemodialysis
- Hemoperfusion
- Urinary alkalization



Multiple doses of activated charcoal

Sustained-release preparations

Bezoar formation

The substance delays gastrointestinal motility

Poorly absorbed substance (e.g., phenytoin)

Phenobarbital

Theophylline

Carbamazepine

Salicylates

Digitoxin

Dapsone

Quinine

Urinary alkalization

Indications

salicylate

Phenobarbital

Chlorophenoxy herbicides

Chlorpropamide

Contraindications

Preexisting fluid overload

Renal impairment

Hypokalemia

COMPLICATIONS

Hemodialysis

Indications

Lithium

Phenobarbital

Salicylates

Valproic acid

Methanol/ethylene glycol

Metformin-induced lactic acidosis

Potassium salts

Theophylline

Contraindications

Hemodynamic instability

Infants (generally)

Poor vascular access

Significant coagulopathy

Hemoperfusion

Indications

Theophylline

Carbamazepine

Paraquat

Contraindications

Hemodynamic instability

Infants (generally)

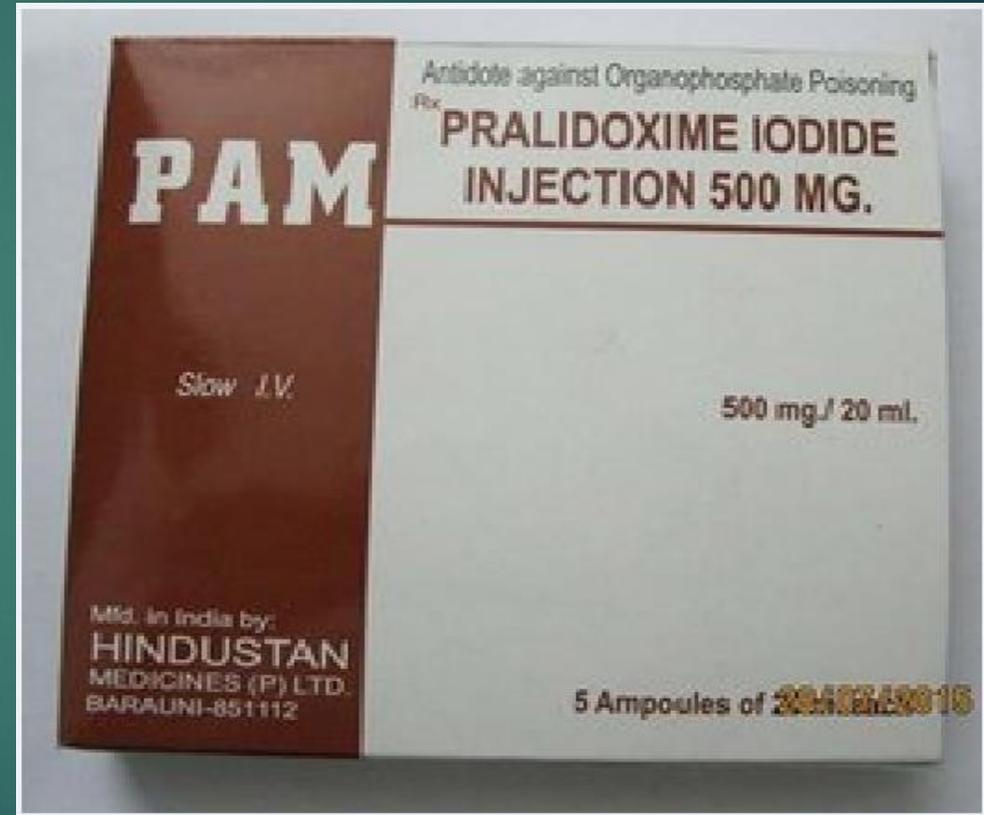
Poor vascular access

Significant coagulopathy

Toxin not bound to activated charcoal

Focused Therapy

Although the majority of poisonings require supportive care alone, *in selected ingestions specific antidotal therapy may be available*



Selected Antidotes and Their Indications

ANTIDOTE

INDICATION (POISON)

N-acetylcysteine

Acetaminophen

Fomepizole (4-MP)/ethanol

Methanol/ethylene glycol

Oxygen/hyperbarics

Carbon monoxide

Naloxone

Opioids

Physostigmine

Anticholinergics

Atropine/pralidoxime (2-PAM)

Organophosphates

Methylene blue

Methemoglobinemia

Nitrites/hydroxycobalamin

Cyanide

Deferoxamine

Iron

Dimercaprol (BAL)

Arsenic, lead

Succimer (DMSA)

Lead, mercury

CaEDTA

Lead

Fab fragments

Digoxin, crotalids

Glucagon

β -blockers

Sodium bicarbonate

Salicylates, tricyclic antidepressants

Calcium, insulin/glucose

Calcium channel antagonists

Dextrose, glucagon, octreotide
pyridoxine (vitamin B₆)

Oral hypoglycemic agents
Isoniazid (INH)

Intravenous fat emulsion

Local anesthetic systemic toxicity
Certain fat-soluble medications

Table 3 : Obsolete antidotes

Agent	Indication
Copper sulfate	Phosphorus
Cysteamine	Paracetamol
Diethyldithiocarbamate	Thallium
Fructose	Ethanol
Levallorphan	Opiates
Nalorphine	Opiates
Silibinin	Amanitin
Tocopherol	Paraquat
Universal antidote	Ingested poisons

Table 3.22: Adjunctival Antidotes

<i>Agent</i>	<i>Indication</i>
Activated charcoal	For most poisons (Refer Table 3.18)
Benztropine	Dystonia
Chlorpromazine	Psychotic states
Corticosteroids	Acute allergic reaction, laryngeal oedema
Diazepam	Convulsions
Diphenhydramine	Dystonia
Dobutamine	Myocardial depression
Dopamine	Myocardial depression, vascular relaxation
Epinephrine	Anaphylactic shock, cardiac arrest
Furosemide	Fluid retention, left ventricular failure
Glucose	Hypoglycaemia
Haloperidol	Psychotic states
Heparin	Hypercoagulability
Lidocaine	Ventricular arrhythmias
Mannitol	Cerebral oedema, fluid retention
Oxygen	Hypoxia
Pancuronium	Convulsions
Promethazine	Allergic reactions
Salbutamol	Bronchoconstriction
Sodium bicarbonate	Metabolic acidosis

Admit to an intensive care setting

Patients with severe toxicity

seizures, persistent cardiovascular instability, airway compromise, or significant metabolic derangements

Admit to an inpatient setting

Patients who are asymptomatic on arrival but have ingested a potentially dangerous

discharge after visit

patients who are asymptomatic after an ingestion of a minimally toxic substance and for whom other ingestions and psychiatric issues have been addressed

Nontoxic exposure

Thanks for your attention

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تقدیم به شما



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