Approach to the patient of poisoning

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Related terms

- Poison & poisoning
- Toxin & toxicity
- Hazards & risk

The international pictogramme for poisonous substances

The international pictogram for labelling harmful substances and chemical

Introduction

P**oisons** are substances that cause death, injury or harm to organs, by chemical reactions or molecular activities

Introduction

Poisoning is a process in which an organism becomes chemically harmed by a toxic substance or venom of an animal.

Introduction

Acute poisoning is exposure to a poison for one time or for a short period of time. Symptoms develop rapidly related to the degree of exposure.

Chronic poisoning is long-term repeated or continuous exposure to a poison where symptoms develop gradually over a long period

Introduction

Toxins are poisons produced by organisms in nature

Venoms are toxins injected by a bite or sting

Introduction

Toxicity is the degree to which a chemical substance can damage an organism. It is measured by LD50 (the amount of the chemical that caused 50% of the test-population to die)

The term toxicity is synonymous with poisoning in everyday usage.

Epidemiology

- World wide
- 5 million cases/year in USA
- 4th common cause of death in UK, 500 deaths/year
- 10% of all emergency home visits
- 5-10% of medical admission

Epidemiology

Poisoning agents: South-east Asia

- **Pesticide & rodenticide:** OPC & carbamate insecticides
- **Household agents**: Cleaning agents, detergents aluminium and zinc phosphide, canabis
- **Plant & plant product:** Oleander, Datura
- **Chemical & Corrosive:** Industrial poisoning
- **Drugs and alcohol:** Recreational drugs (Amphetamine)
- **Snake venom, sting**

Epidemiology

In the UK

- **Analgesics:** paracetamol, NSAIDs
- **Antidepressants:** TCAs, SSRIs, lithium
- **Cardiovascular agents:** β-blockers, calcium channel blockers and cardiac glycosides
- **Drugs of misuse:** depressants (opiates, benzodiazepines), stimulants and entactogens (amphetamines, cocaine), hallucinogens (cannabis)
- **Carbon monoxide**
- **Alcohol**

Epidemiology

- In hospital the overall mortality from acute poisoning is <1%
- In India, East Asia, and Africa accidental death from snake bite accounts for 30,000 deaths/ year
- **Age:** Bimodal 15 to 45 & >65 years
- **Gender:** Female more common>Male

Epidemiology

Mode of poisoning

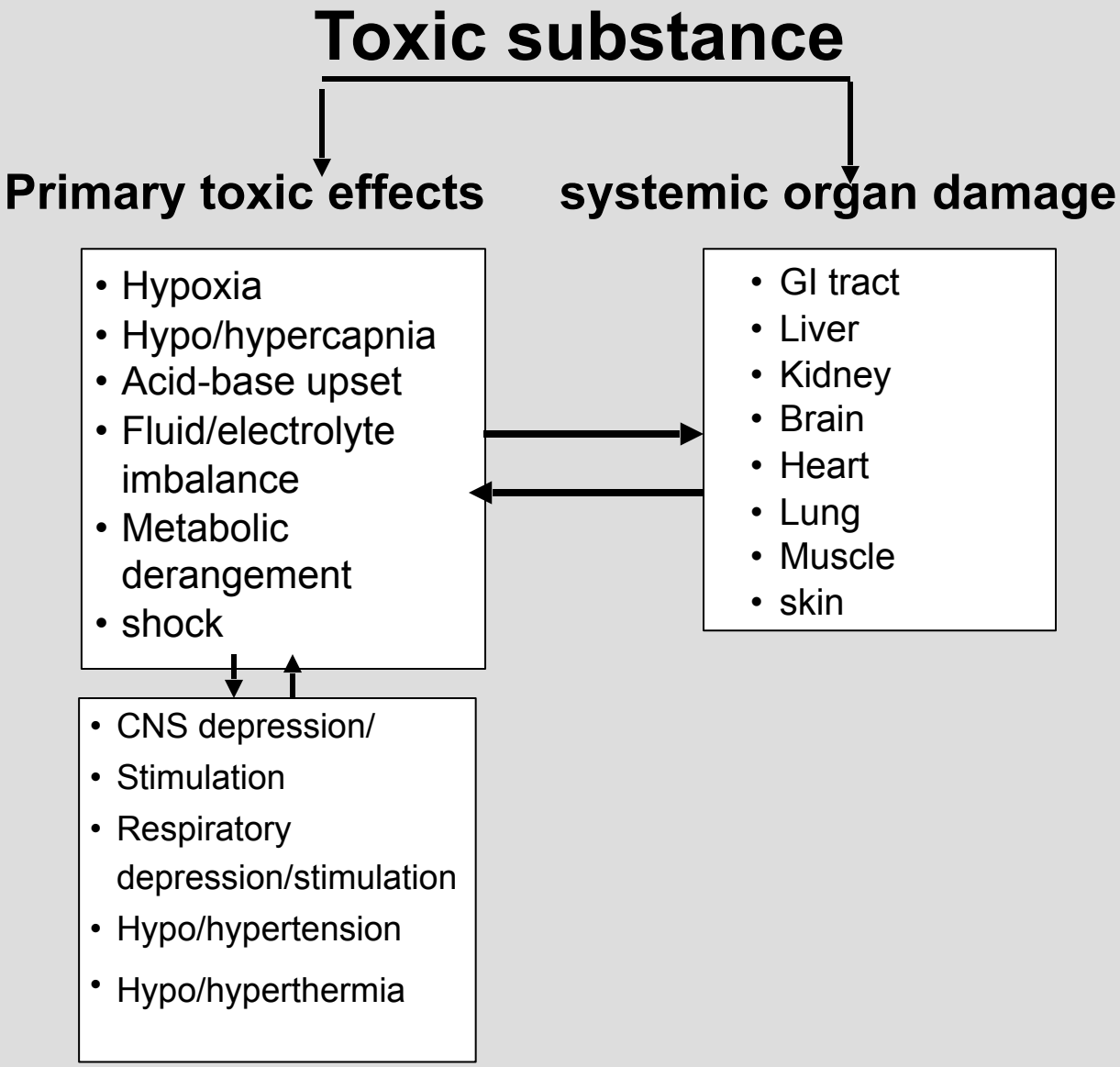
- **Accidental:** Medicine, households, weed killer, CO, arthropods
- **Intentional:** suicidal, homicidal, commuter
- **Chemical plant incident and terrorism**
- **Mass poisoning:** Warfare, environmental

Pesticides


LILLY MILLER
Malathion
KILLS MICE
ORTHO
RosePride
Orthenex Insect
& Disease Control
LILLY MILLER
Diazino
Insect Spray
GOPHER
KILLER

Drugs

Pathogenesis



Diagnosis of poisoning

- History
- Physical examination
- Syndromic approach: Toxidrome
- Investigations
- Assessment of severity

History

- **Agent/s & amount:** What toxin(s) have been taken and how much?
- **Time & route:** What time were they taken and by what route?
- **History from witnesses & circumstances:** family, friends, ambulance personnel

History

- **Mode of poisoning:** Homicidal, accidental, environmental suicidal or apparent self-harm
- **Past medical/psychiatric history:** drug history and allergies, social and family history

Syndromic diagnosis of poisoning

Toxidrome: Features suggesting a particular poisoning

- **Coma, dilated pupils, divergent squint, tachycardia,↑muscle tone,↑ reflexes & extensor planter:** TCA or Orphenadrine poisoning

Syndromic diagnosis of poisoning

- **Coma with hypotension:** respiratory depression, and↓muscle tone; suggest barbiturate, benzodiazepine, with alcohol or severe TCA poisoning
- **Coma with slow respiration and pinpoint pupil:** is typical of opioid poisoning

Syndromic diagnosis of poisoning

- **Tinnitus deafness, hyperventilation sweating, nausea, and tachycardia:** salicylate poisoning
- **Agitation, tremor, dilated pupil, tachycardia:** amphetamine, ecstasy, cocain, sympathomymatics, TCA, serotonin reuptake inhibitors

Clinical examination

- **Neurological assessment**
  - Level of consciousness, pupil
- **Respiration**
- **Cardiovascular function**
  - Hypotension due to volume depletion, myocardial depression, severe brady-and tachyarrythmias and metabolic acidosis

Clinical examination

- **Other features**
  - Hypothermia
  - Hyperthermia
  - Skin blister
  - Rhabdomyolysis
  - Peroneal and radial nerve palsy

Laboratory investigation

- **Clinical biochemistry**
  - Arterial PH, oxygen and Carbon dioxide
  - Blood glucose
  - Plasma potassium, calcium
  - Liver function test
- **Quantitative laboratory toxin analysis**
  - Plasma concentration of drugs

Comprehensive evaluation of the poisoned patient

1 Airway, breathing, circulation
Respiration rate, oxygen saturation, pulse, BP, dysrhythmias

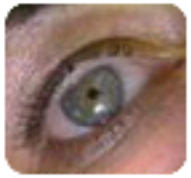
2 Level of consciousness
Presence of seizures, delirium, agitation or psychosis

3 Chest
Evidence of aspiration, bronchoconstriction

4 Movement and muscles
Tone, fasciculations, myoclonus, tremor, paralysis, ataxia

5 Reflexes
Tendon reflexes, plantar responses, inducible clonus

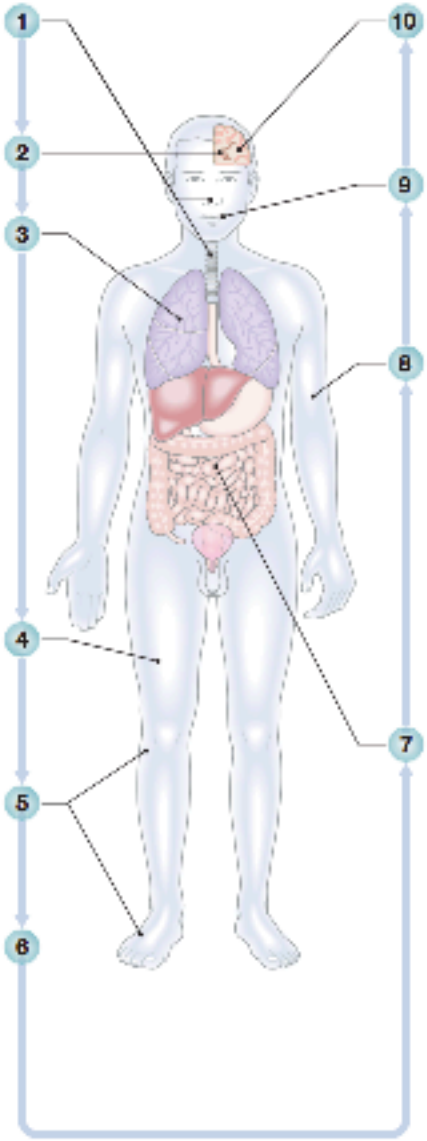
6 Eyes
Miosis or mydriasis, diplopia or strabismus, lacrimation



Pinpoint pupil

Injected conjunctiva

7 Abdomen
Hepatic or epigastric tenderness, ileus, palpable bladder



10 Psychiatric evaluation
Features of psychiatric illness, mental capacity

9 Mouth
Dry mouth, excessive salivation

8 Skin
Temperature, cyanosis, flushing, sweating, blisters, pressure areas, piloerection, evidence of self-harm

Self-cutting

Chemical burn

Needle tracks

Image: (Self cutting) From Douglas G, Nicol F, Robertson C (eds). Macleod's Clinical examination, 11th edn. Churchill Livingstone, Elsevier Ltd; 2005. (Chemical burn) www.firewiki.net (Needle tracks) www.depositphotos.com. (Pinpoint pupil) http://drugrecognition.com/images. (Injected conjunctiva) http://knol.google.com.

Comprehensive evaluation

1. **Airway, breathing, circulation:** Respiration rate, oxygen saturation, pulse, BP, dysrhythmias
2. **Level of consciousness:** Presence of seizures,Presence of seizures, delirium, agitation or psychosis
3. **Chest:** Evidence of aspiration, bronchoconstriction

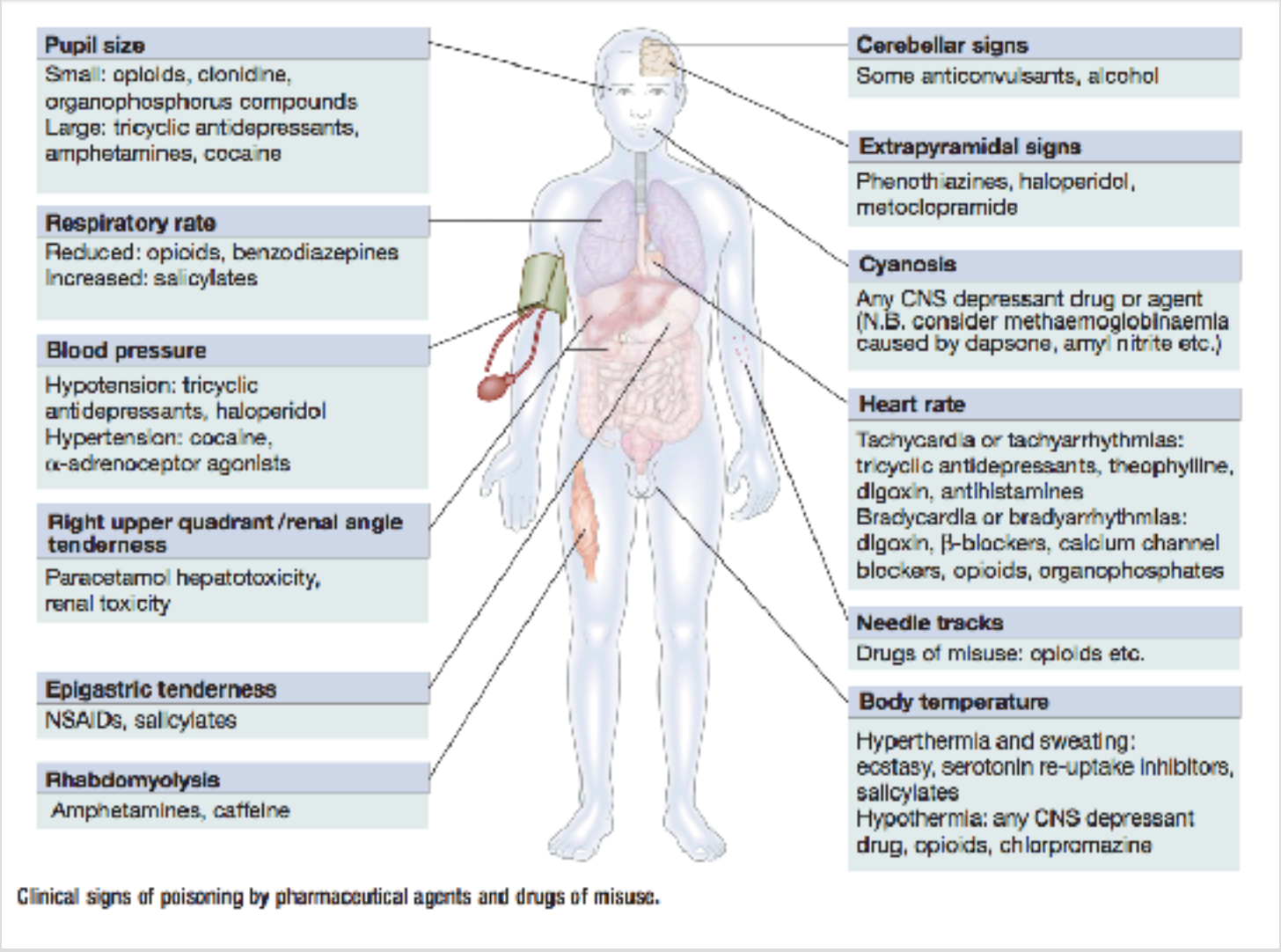
Comprehensive evaluation

4. **Movement and muscles:** Tone, fasciculations, myoclonus, tremor, paralysis, ataxia
5. **Reflexes:** Tendon reflexes, plantar responses, inducible clonus
6. **Eyes:** Miosis or mydriasis, diplopia or strabismus, lacrimation
7. **Abdomen:** Hepatic or epigastric tenderness, ileus, palpable bladder

Comprehensive evaluation

8. **Skin:**Temperature, cyanosis, flushing, sweating, blisters, pressure areas, piloerection, evidence of self-harm - Self-cutting, Chemical burn, Needle tracks
9. **Mouth:** Dry mouth, excessive salivation
10. **Psychiatric evaluation** Features of psychiatric illness, mental capacity, delirium, agitation or psychosis

Comprehensive evaluation of poisoned patient



Clinical signs of poisoning by pharmaceutical agents and drugs of misuse.

Management

General approach to the poisoned patients

- Assessment of severity
- Triage (order of treatment) and resuscitation
- General management
- Supportive therapy
- Specific management/antidote
- Psychiatric assessment

Assessment of severity

- Best assessed clinically and by laboratory
- Forms the baseline of patients condition
- Determine the magnitude of disturbance of vital function

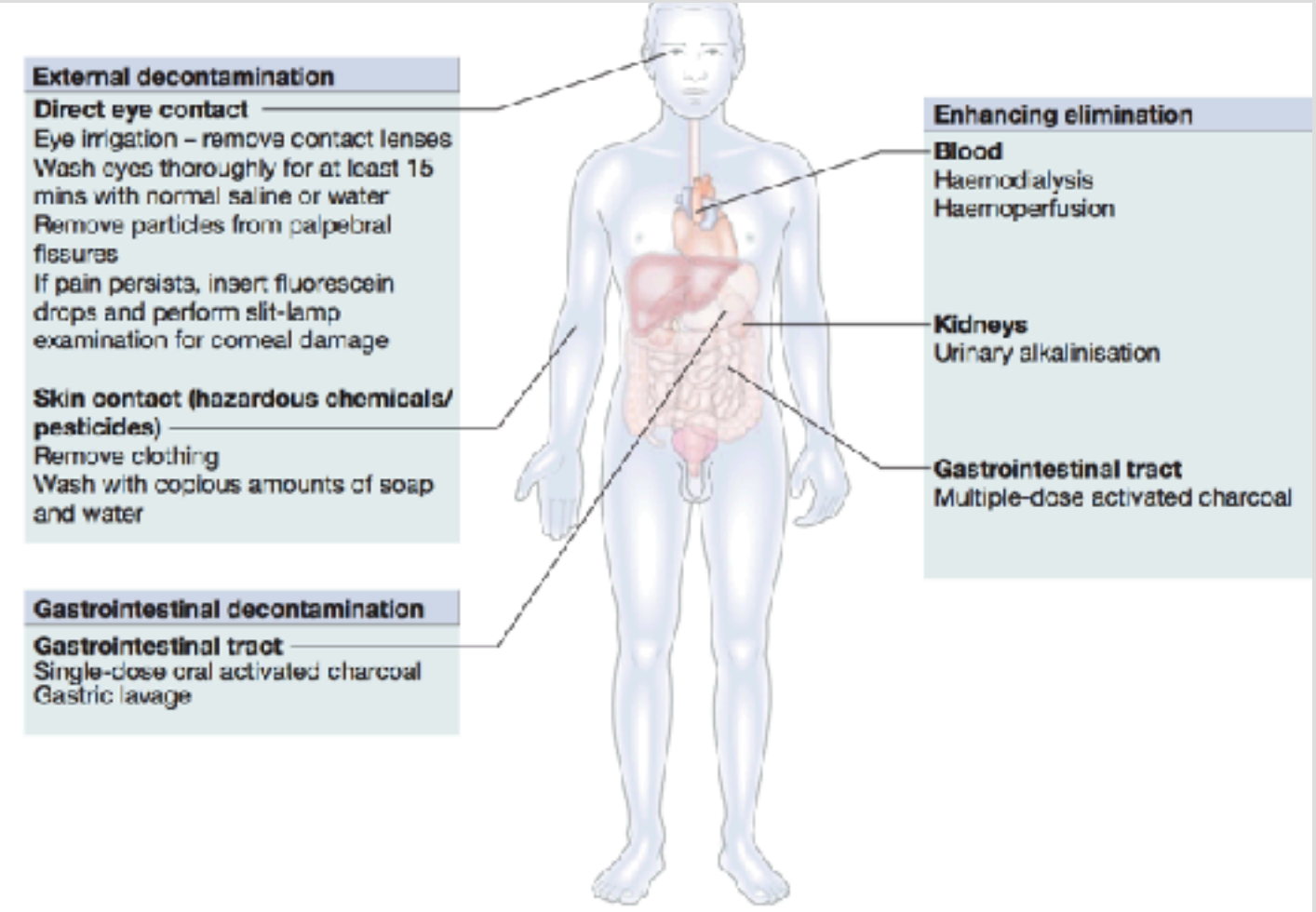
Triage and resuscitation

- Immediate assessment of vital signs
- Identify poison(s) & adequate information
- Identify patients at risk of further attempts of self-harm
- Remove any remaining hazards

Triage and resuscitation

- **GCS/AVPU scale alert/verbal/painful/ unresponsive scale:** to assess conscious level
- **ECG:** patients with cardiovascular features
- **Decontamination**
- **Resuscitation:** critical ill patient
- **Antidotes** if indicated

Decontamination and enhanced elimination



Decontamination and enhanced elimination

Decontamination

- **Direct eye contact:** Eye irrigation-wash eyes thoroughly for at least 15 mins with normal saline or water
- **Skin contact (chemicals/ pesticides):**

  Remove clothing

  Wash with copious amounts of soap and water

Decontamination and enhanced elimination

Enhancing elimination

- **Blood:** Haemodialysis, Haemoperfusion
- **Kidneys:** Urinary alkalinisation
- **Gastrointestinal:** Activated charcoal, Gastric lavage, bowel irrigation

MANAGEMENT

In case of emergency , be ready with these items..

OROPHARYNGEAL AIRWAY USED

AMBU VENTILATION & ET TUBE

GASTRIC LAVAGE

ACTIVATED CHARCOAL

Stomach wash/lavage tube

General approach to the poisoned patients

Supportive therapy

- Appropriate nursing
- Symptomatic treatment
- Treatment of complications
- Monitoring: preferable in HDU/ICU if the patient is unconscious

Symptomatic/complication management

Symptoms	Agent	Management
Coma	Sedative agent	• Appropriate airway protection and ventilatory support • Oxygen saturation and blood gas monitoring • Pressure area and bladder care • Identification and treatment of aspiration pneumonia
Hypotension due to • Vasodilation • Myocardial suppression	• Vasodilators Anticholinergic TCA • Beta Blocker CCB TCA	• IV fluids • Vasopressors (rarely indicated • Optimisation of volume status • Inotropic agents
Seizure	NSAIDs Anticonvulsants TCAs Theophylline	• Appropriate airway and ventilatory support • IV benzodiazepine (e.g. diazepam 10–20 mg, lorazepam 2–4 mg) • Correction of hypoxia, acid–base and metabolic abnormalities

Symptomatic/complication management

Symptom	Agent	Management
Ventricular tachycardia • Monomorphic, associated with QRS prolongation	• Sodium channel blockers	• Correction of electrolyte and acid–base abnormalities and hypoxia • Sodium bicarbonate (e.g. 50 mL 8.4% solution, repeated if necessary)
• Torsades de pointes, associated with QT_C prolongation	• Anti-arrhythmic drugs • Antimalarials • OPC • Antipsychotic agents • Antidepressants • Antibiotics (erythromycin)	• Correction of electrolyte and acid–base abnormalities and hypoxia • Magnesium sulphate, 2 g IV over 1–2 mins, repeated if necessary
Acute dystonias	Typical antipsychotics Metoclopramide	Procyclidine, benzatropine or diazepam

Antidote

- An **antidote** is a substance that can counteract the effects of poisoning
- They act by neutralising he poison, antagonising its effects, blocking the site of action, etc

Some common antidote

	Antodote	Poison
1	Antimuscarinic drugs: Atropine, Pralidoxime (PAM)	OPC, carbamate, nerve agents, mushrooms
2	Warfarin	Vitamin K, FFP, Clotting factors
3	Paracitamol	Acetylcystine, Metheonine
4	Opioid	Naloxen
5	Methanol	Ethanol
6	Benzodiazepine	Flumazenil

Some common antidote

	Antidote	Poison
7	Activated charcoal with sorbitol	For many oral toxins
8	Chelators: EDTA, dimercaprol, penicillamine	Heavy metal poisoning
9	Deferoxamine mesylate	Iron poisoning
10	Digoxin Immune Fab antibody (Digibind & Digifab)	Digoxin poisoning, Oleander ingestion
11	Activated charcoal with sorbitol	For many oral toxins

Psychiatric assessment

- Past H/O psychiatric illness
- Personality
- Previous attempt of suicide
- Personal, family, employment history, job satisfaction

Cause of death in poisoning

- **Asphyxia/hypoxia:** Obstruction in airway - sedative-hypnotic, narcotic, poisoning
- **Cardiovascular toxicity:** hypotension, peripheral shock, fatal arrhythmia, depressed cardiac function- ephedrine, amphetamine, digitalis
- **Cellular hypoxia:** due to transport or utilisation of oxygen by the cell - carbon monoxide poisoning, cyanide hydrogen sulphide poisoning

Cause of death in poisoning

- **Seizure, muscular hyperactivity, rigidity**: pulmonary aspiration, hyperthermia, renal failure from myoglobin from muscle breakdown - antidepressant, cocaine, amphetamine
- **Organ system damage:** Massive hepatic necrosis, Pulmonary fibrosis - acetaminophen, mushroom, paraquat
- **Behavioural effects:** Injury, accident Alcohol, hallucinating agents, sedative

Outcome

Depend on poisoning agent and its effects

- Complete recover without complication
- Recovery with residual organ damage/ disability
- Progressive long term complication
- Death