Diagnosis of Poisoning

9 common pathophysiology toxic mechanism

	Effect	Agent
Local tissue	Tissue damage	Corrosive agent
lungs	Aspiration Systematically	Hydrocarbons Paraquat
CNS	Coma Convulsion	Opioids, sedative hypnotic Cocaine, Amphetamine
ANS	Cholinergic Anticholinergic	Organophosphorus, Carbamates, insecticides
Heart	Myocardial dysfunction Dysrhythmias Hypertension Hypotension	TCA Quinidine Cocaine, Amphetamine BB, CCB
Liver	Damage	Paracetamol
Kidney	Damage	Metals
Interfere with transport of O2	Hypoxia	Cyanide, Hydrogen sulphide, Carbon monoxide
Acid-base balance	Metabolic acidosis	Methanol
Haematology	Bleeding	Warfarin , super-warfarin

Diagnosis:

I. Taking history

A. Personal history
B. Intoxication history
C. Past history
D. Family history

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N.B: Ask about respiratory, GIT, CVS, Neurological and Genitourinary

II. Physical examination

A. General finding and vital signs (Toxidromes): finger prints of toxicology.

Syndrome	Medication caused	Clinical manifestation	Antidote	Treatment
Sympathomimetic	Cocaine Amphetamines	**MATHS** **Mydriasis** **Agitation, Arrhythmia, Angina** **Tachycardia** **Hypertension, Hyperthermia** **Seizure, Sweating.** **High (BP, HR, T, RR)**		• Treat agitation, HTN, and seizures with **benzodiazepines.** • **Avoid pure BB** due to unopposed alpha agonism.
Opioid syndrome		**CPR-3H** **Coma** **Pinpoint pupils (not w meperidine)** **Respiratory depression** **Hypotension, Hypothermia,** **Hyporeflexia.** **Low (BP, HR, T, RR)**	**Naloxone**	Naloxone and ventilation.
Cholinergic	Organophosphate Carbamate Physostigmine	**DUMBLES** **Diarrhea** **Urination** **Moises** **Bradycardia, Bronchospasm** **Lacrimation** **Emesis, Excitation** **Salivation** **Low (T, RR)**	**Atropine**	
Anticholinergic	Atropine Benztropine	**Flushed and dry skin** **Urinary retention**	**Physostigmine**	

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	Antihistamine Antidepressants	**Constipation** **Mydriasis** **Tachycardia** **Hallucination** **Agitation** **High (HR, T)**		
Serotonin	Antidepressant • SSRIs • SNRIs • Bupropion • TCA • MAOIs • Lithium • Cocaine • Amphetamines	Confusion, Agitation or restlessness Dilated pupils Headache Changes in BP and body temperature Nausea and Vomiting Diarrhea Tachycardia and Tremors		• Skeletal muscle relaxants to control agitation, seizures and muscle stiffness. • Serotonin-production blocking agents for blocking serotonin production. • IV fluids and Oxygen • Antihypertensives – Beta blockers
Neuroleptic malignant	Neuroleptic drugs Antipsychotics	hyperthermia Confusion and altered mental status Muscle rigidity Autonomic dysfunction.	**Dantrolene**	• Using cooling blankets or ice packs for hyperthermia. • Supportive care. • **Dantrolene** as muscle relaxant. • Dopaminergic agents such as bromocriptine, apomorphine and amantadine may be used.
Malignant hyperthermia	Inhaled general anaesthetics **Halothane** **Desflurane** **Enflurane, Isoflurane** **Sevoflurane** **Succinylcholine.**	Serious muscle spasms. Muscle rigidity. Rapid, shallow breathing and low oxygen and high carbon dioxide. Tachycardia Dysrhythmia Severely high body temperature. Extreme sweating	**Dantrolene**	• **Dantrolene** a skeletal muscle relaxant used to treat the reaction by blocking the discharge of calcium ions into the muscle. • correct the metabolic imbalance.
Sedative hypnotic & ethanol		**Low (BP, HR, RR)**		

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Vital signs

	Effect	Medication caused
Pulse	**Bradycardia**	**BB,** Anticholine esterase**,** Digoxin, Opiate, Barbiturate.
	Tachycardia	**Anticholinergic** (Atropine, Benztropine, Antihistamine, Antidepressants TCA), **Sympathomimetic,** theophylline, digoxin. **May be with metabolic disturbance, hypoxia and hypoglycemia.**
BP	**Hypotension**	**BB, GIT fluid loss.**
	Hypertension	**Sympathomimetic, Anticholinergic, scorpion, phencyclidine.**
Body Temp.	**Hypothermia**	**COOES: Carbon monoxide, Opiates , Oral hypoglycemics/insulin, Ethanol, Sedatives.**
	Hyperthermia	**Sympathomimetic, Anticholinergic, Antidepressants due to muscle activity, impaired thermoregulation, hypermetabolic.**
Respiratory Rate	**Bradypnea**	**CNS depressants (opiate, ethanol, sedative)** **Paralytic agents (NM blocker, paralytic plant toxin, botulism)**
	Tachypnea	**Toxic hypoxia (CO, Cyanide, H2S), Metabolic acidosis (methanol, salicylate), aspiration pneumonia in irritant gas inhalation.**

B. Consciousness and mental status **(Coma)**

Causes				Diagnosis	Treatment
Toxicological		**Pathological**	**Traumatic**	Rapid evaluation of the level of consciousness by **AVPU system.** **Glasgow com scale to measure the depth of coma**	**Coma cocktail:** • **Dextrose** For hypoglycemia • **Thiamine** Prevent Wernickes syndrome • **Naloxone** For respiratory depression **Flumazenil** if benzodiazepine is the cause of coma
CNS depressants • Anticholinergics • Antihistamines • Barbiturates • Phenothiazines • Benzodiazepines • Carbamazepine • Alcohols • TCA • Opiates	**Cellular hypoxia** • CO • Cyanide • Hydrogen sulfide • MetHb-emia **Others:** • Hypoglycemic agents • Salicylate	• Renal failure • Liver cell failure • Metabolic (hypoglycemia) • Hypertensive encephalopathy • Infections (encephalitis, meningitis)	• Head injury		

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C. Eye findings

Miosis	Mydriasis
• **Sympatholytic agent** (Clonidine, opiates, phenothiazines) • **Cholinergic agents** (Organophosphates, carbamate) • **Pontine Hemorrhage** (Not response to naloxone)	**SHAW** **S**ympathomimetic **H**allucinogens **A**nticholinergics, **A**tropine, **A**ntidepressant TCA **W**ithdrawal of opioids, sedative, ethanol

D. Abdominal findings (perforation, obstruction, vomiting)

E. Skin findings

F. Odours

Odor	Drug or Toxin
✓ Acetone	Acetone, isopropyl alcohol
✓ Bitter almonds	Cyanide
✓ Garlic	Arsenic, organophosphates, selenium, thallium
✓ Mothballs	Naphthalene,
✓ Rotten eggs	Hydrogen sulfide
✓ Wintergreen	Methyl salicylate

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III. Lab tests, Toxicology screening and Abdominal X-ray

Laboratory		Radiological
Routine	**Specific**	
• CBC • Renal function (Urea, Cr) • Liver function (AST,ALT) • Arterial Blood Gases (ABG) • Glucose & Electrolytes (K^+, Na^+)	Detection of the drug or toxin and its metabolites in blood or urine	• ECG • Abdominal U/S • X-ray (chest, abdomen) • CT • MRI

- **DD of Radio-opaque substances (X-Ray): - (COINS)**
  - **C**ocaine packets
  - **O**pium Packets
  - **I**ron
  - **N**euroleptic agents (phenothiazines)
  - **S**ustained released drugs