

Acute Alcoholic Intoxication:

Presentation: • Unawareness • Unresponsiveness • Stupor • Hypotension • Gastritis
• Hypoglycemia • Respiratory depression • collapse, coma & death

Management:

- (i) Gastric lavage (only when patient is brought soon after ingesting alcohol, which is rare)
- (ii) Maintain patent airway.
- (iii) Prevent aspiration of vomitus.
- (iv) Tracheal intubation & positive pressure respiration if required.
- (v) Maintenance of fluid & electrolyte balance
- (vi) Correction of hypoglycemia by glucose infusion till alcohol is metabolized
- (vii) Thiamine (100 mg in 500ml glucose solution infused i.v.).
- (viii) Haemodialysis hastens recovery.
- (ix) Insulin + fructose drip accelerates alcohol metabolism

Withdrawal Syndrome: Appears within one day of stoppage of alcohol

Presentation: • Anxiety • Sweating • Tachycardia • Tremor • Confusion
• Impairment of sleep • Hallucinations • Delirium tremens • Convulsions • Collapse

Management: • Psychological & medical support

- Benzodiazepines are the preferred CNS depressant
- Naltrexone: - weakens reinforcing effects of alcohol
- helps prevent relapse of alcoholism by reducing alcohol craving.

• In patients who sincerely desire to leave drinking habit $\Rightarrow$ Disulfiram
aversion therapy:

- (i) Make sure that patient has not consumed alcohol in the last 12 hours
- (ii) Disulfiram 500 mg/day for 1 week followed by 250 mg/day
- (iii) Sensitization to alcohol develops 2-3 hours after 1st dose & lasts for 7-14 days after stopping it ($\because$ inhibition of aldehyde dehydrogenase with disulfiram is irreversible & fresh enzyme is required for return of activity)
- (iv) Distressing symptoms that appear on drinking (Aldehyde Syndrome):
 - Flushing, burning sensation, throbbing headache, perspiration, uneasiness, tightness in chest, dizziness, vomiting, visual disturbances, confusion, postural fainting, circulatory collapse.

Methanol Poisoning: [Methanol: mild CNS depressant]

→ methanol is itself not toxic; its metabolites formaldehyde & formic acid are toxic.

Clinical Features:

Features due to methanol: • Nausea • Vomiting • Abdominal pain • Headache • Vertigo • Confusion
• Obtundation • Convulsions, coma

Features due to formic acid: • Metabolic acidosis • Retinal injury — clouding & diminished vision, dancing & flashing spots, dilated / fixed pupils, hyperemia of optic disc, retinal edema, blindness

• Rapid breathing • Myocardial depression • Bradycardia • Shock • Anuria

Diagnosis: • Measurement of serum methanol level which is usually $> 20 \text{ mg/dL}$
• Large anion gap • low serum bicarbonate • elevated serum formate • elevated osmolal gap

Management:

- In early stages: — gastrointestinal decontamination (gastric lavage with NaHCO_3)
— correction of systemic acidosis with NaHCO_3
- KCl infusion in case of hypokalemia due to alkali therapy
- Ethanol therapy: indicated in patients with visual symptoms or methanol level $> 20-30 \text{ mg/dL}$
[ethanol blocks conversion of methanol to formic acid by inhibiting alcohol dehydrogenase]
 - administered through nasogastric tube
 - Loading dose: 0.7 mL/kg
Maintenance: 0.15 mL/kg/hour
- Haemodialysis: indications — methanol level $> 50 \text{ mg/dL}$
 - visual signs
 - metabolic acidosis unresponsive to NaHCO_3

- **Antidote:** 4-methylpyrazole or fomepizole (alcohol dehydrogenase inhibitor)
 - Loading dose: 15 mg/kg infused i.v. over 30 min.
 - Maintenance: 10 mg/kg every 12 hours till serum methanol falls below 20 mg/dL
- **Co-factor therapy:** Folic acid (leucovorin) $\Rightarrow$ enhances the rate of degradation of formic acid to CO_2
 - Calcium leucovorin 50 mg injected 6 hourly

Anticholinesterase Poisoning: Anti-ChEs are extensively used as agricultural & household insecticides

- Manifestation:
- Irritation of eye, lacrimation
 - Sweating
 - Salivation
 - Copious tracheo-bronchial secretions
 - Miosis, blurring of vision
 - Bronchospasm
 - Colic
 - Involuntary defecation & urination
 - ↓ in BP
 - Cardiac arrhythmia
 - Muscular fasciculations
 - Weakness
 - Respiratory paralysis
 - Irritability, disorientation
 - Convulsions, coma
 - Death due to respiratory failure

acute cholinergic syndrome

Management:

- ① Airway should be cleared of excessive secretions & secured
- ② Assess breathing & circulation & record 15-point Glasgow Coma Scale
- ③ Make patient lie down in left lateral position (with head lower than feet)
- ④ Administer oxygen (intubate in case of respiratory depress)
- ⑤ Set-up an infusion of 0.9% normal saline (Aim: SBP = 80 mmHg ; urine output > 30 mL/h)
- ⑥ Remove contaminated clothes & thoroughly wash skin with soap & water
- ⑦ Perform gastric lavage once patient is stabilized
- ⑧ Give activated charcoal (50g in 200 mL)

Drugs used: • Atropine • Pralidoxime (2-PAM) • Benzodiazepines

In case of uncertain diagnosis, perform atropine test: inject 0.6-1 mg IV atropine $\Rightarrow$ if pulse rate goes above 25/min or skin flushing develops $\Rightarrow$ mild/no OP toxicity.

Atropine Bolus: inject 1.8-3 mg (3-5 mL) of atropine bolus

$\rightarrow$ Check pulse, BP & chest crepitations after 5 min.

[Aim: HR > 80/min, SBP > 80 mmHg, clear chest, no pinpoint pupils, dry axillae]

$\rightarrow$ If not achieved, double dose of atropine every 5 min & review

$\rightarrow$ Once parameters start improving, repeat last dose/smaller dose

$\rightarrow$ On persistent satisfactory improvement, plan atropine infusion

Atropine Infusion: calculate total dose of atropine required for rapid atropinization

→ start hourly atropine infusion at 10-20% of total dose required

(most patients do not need >3-5 mg/hr of atropine infusion)

→ Use 3-point checklist to reduce infusion rate by 20% every 4 hourly once the patient is stable

[Secretions, Heart Rate, Pupils] (Bronchorrhoea is the most important sign for dose titrating)

Atropine Toxicity: Absent bowel sounds + fever + confusion

→ stop atropine for 60 min

→ re-start infusion at lower rate once temperature comes down

→ if atropine is C/I ⇒ use glycopyrrolate for bronchorrhoea.

{ Pralidoxime is ineffective as an
antidote to carbamate anti-
ChEs.

Pralidoxime (ChE reactivator): by removing phosphoryl group deposited by the OP.

→ Bolus dose: 30 mg/kg (1-2g for adults) in 100mL Normal saline over 15-30 minutes

→ Maintenance dose: continuous infusion of 8-12 mg/kg/hr

→ administer pralidoxime until atropine is no longer required

Benzodiazepines: Diazepam 10mg slow IV push repeated as necessary (upto 30-40mg diazepam/day can be given) ⇒ for agitation & seizures

Ventilatory support: if patient develops respiratory failure

Intermediate Syndrome: About 20% cases of OP poisoning develop weakness that spreads rapidly from ocular muscles to muscles of the head & neck, proximal limbs & muscles of respiration

→ develops 1-4 days after exposure

→ no specific treatment

OP-induced Delayed Polyneuropathy (OPIDN): rare complication that occurs 2-3 weeks later

→ mixed sensory/motor polyneuropathy

→ **Presentation:** muscle cramps followed by numbness & paraesthesia → flaccid paralysis of limbs (with wrist & foot drop & high-stepping gait) → paraplegia

→ regular physiotherapy is indicated

Alzheimer's Disease:

Supportive Therapy: - Cognitive Rehabilitation

- Exercise programs
- Occupational therapy

Drugs used:

- Tacrine: 80-160 mg/day
- Donepezil: 5-10 mg/day
- Rivastigmine: 6-12 mg/day
- Galantamine: 20-50 mg/day

→ Memantine $\Rightarrow$ acts by blocking over-excited NMDA channels

→ SSRIs are used due to their low anticholinergic side effects

Newer Developmental Agents:

- Immunization against β -amyloid.
- Huprine X-acetylcholinesterase inhibitor.
- Xanomeline patch - m1/m4 muscarinic receptor agonist
- AIT-082 (purine hypoxanthine derivative) $\Rightarrow$ increases neurotransmission
- COX-2 inhibitors $\Rightarrow$ neuroinflammation therapy
- Protease inhibitors $\Rightarrow$ target gamma-secretases to prevent amyloid formation.

Status Epilepticus: when seizure activity occurs for > 30 min or ≥ 2 seizures occur without recovery of consciousness

- (i) Maintain patency of airway
- (ii) 20-50 ml of 50% dextrose i.v. to correct hypoglycaemia
- (iii) Lorazepam 4mg (children: 0.1 mg/kg) injected i.v. at the rate of 2mg/min }
 → Repeat after 10 mins if required or
 Diazepam 10mg (0.2-0.3 mg/kg) injected i.v. at 2mg/min }
 → Repeat after 10 mins if required.
- (iv) Fosphenytoen 100-150 mg/min i.v. infusion (maximum: 1000 mg) under ECG monitoring or (15-20 mg/kg)
 Phenytoen sodium 25-50 mg/min.
- (v) Phenobarbitone sodium 50-100 mg/min. i.v. (maximum: 10 mg/kg)
- (vi) In case of failure of response to lorazepam + fosphenytoen within 40 min. of seizure onset
 i.v. midazolam / propofol / thiopentone anaesthesia
- (vii) • Maintenance of airway • normal BP
 • Oxygenation • Euglycaemia
 • Normal cardiac rhythm • Fluid & electrolyte balance

Acute Morphine Poisoning:

Manifestations: • Stupor/coma • Flaccidity • Shallow & occasional breathing • Cyanosis • Pinpoint pupils • fall in BP
• Shock • Convulsions • Pulmonary edema (at terminal stage) • Death (due to respiratory failure).

Management:

Respiratory support (positive pressure ventilation also opposes pulmonary edema formation)

Maintenance of BP (using i.v. fluids & vasoconstrictors)

Gastric lavage with potassium permanganate

Specific Antidote - Naloxone 0.4-0.8 mg i.v. repeated every 2-3 mins till respiration picks up

Morphine Dependence & Withdrawal:

Manifestations of abstinence: • Lacrimation • Sweating • Yawning • Anxiety • Fear
• Restlessness • Aggression • Gooseflesh • Mydriasis • Tremor • Insomnia • Diarrhoea
• Abdominal colic • Rise in BP • Dehydration • Palpitation • Rapid weight loss

Management:

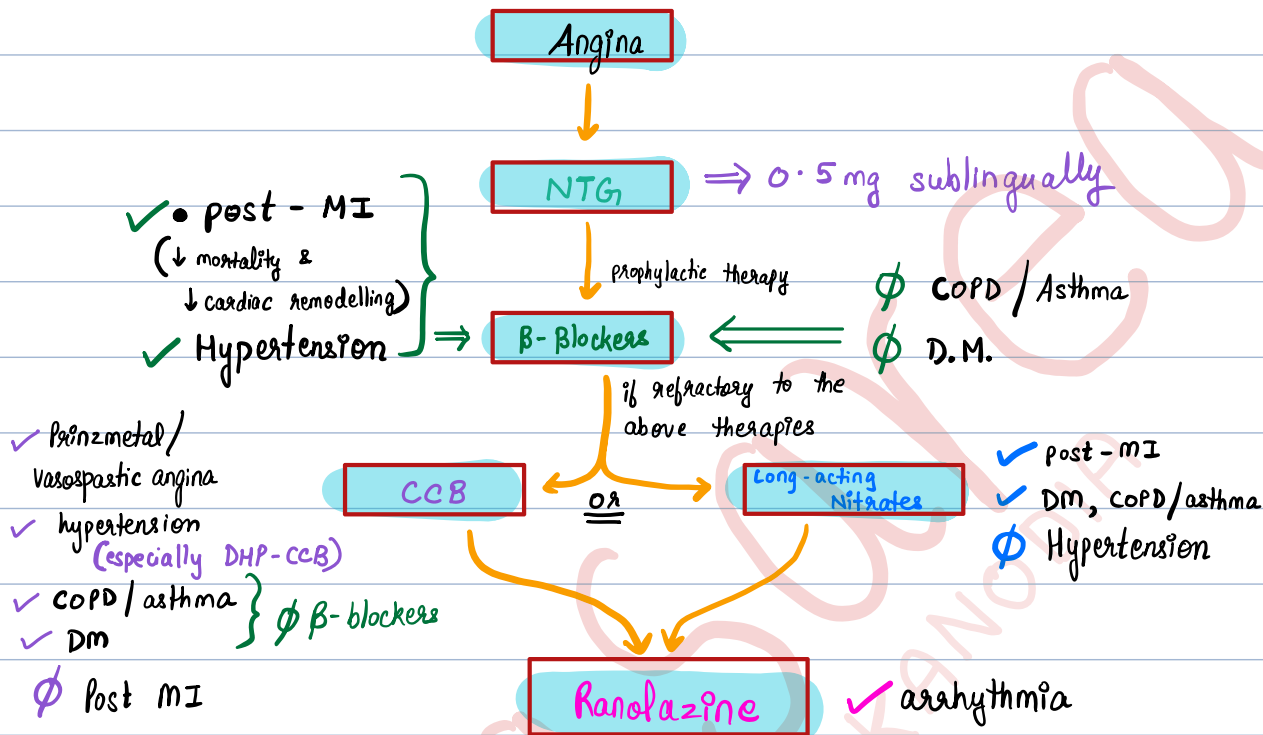
- Withdrawal of morphine
- Substitution with oral methadone followed by gradual withdrawal of methadone

Angina Pectoris:

TREATMENT ALGORITHM: (IN ANGINA)

(ϕ = caution)

($\checkmark$ = preferred indication)



Thyroid Storm (Thyrotoxic Crisis): emergency due to decompensated hyperthyroidism

① **Propranolol:** • 1-2 mg slow i.v.

• 40-80 mg oral 6 hourly

② **Propylthiouracil:** 200-300 mg oral 6 hourly

③ **Iopanoic acid:** (iodine containing radiocontrast medium)

↳ 0.5-1g OD oral one hour after propylthiouracil

④ **Corticosteroids:** • Hydrocortisone 100 mg i.v. 8 hourly

• Oral prednisolone

⑤ **Diltiazem:** 60-120 mg BD oral ⇒ given if tachycardia is not controlled by propranolol alone

⑥ **General measures:** • Rehydration

• External cooling

• Anxiolytics

• Appropriate antibiotics

Diabetic Ketoacidosis (DKA):

① Regular insulin: • bolus dose of 0.1–0.2 U/kg i.v.

- 0.1 U/kg/hr infusion

- rate is doubled if no significant fall in glucose occurs in 2 hrs

② IV fluids: • Normal Saline (NS) infused i.v. at 1L/hr initially

- Gradually reduce to 0.5L/4 hrs

③ KCl: • Add 10–20 mEq/hr KCl to i.v. fluids after 2–3 hours

④ Sodium bicarbonate: if arterial blood pH < 7 & acidosis is not corrected spontaneously

- 50 mEq of sod. bicarb. added to i.v. fluids

⑤ Phosphate: 3–4 mmol/hr of potassium phosphate infusion (when serum PO_4 is in low-normal range)

⑥ Antibiotics & supportive measures

Myocardial Infarction (MI):

① Pain, anxiety & apprehension:

→ 3 doses of **GTN** given 5 mins apart

→ If still not relieved ⇒ **opiod analgesic** (morphine) or **diazepam** parenterally.

② Oxygenation: O_2 inhalation

→ assisted respiration (if required)

③ Maintenance of Blood Volume, Tissue Perfusion & Microcirculation: slow i.v. infusion of saline/dextrose

④ Correction of Acidosis: i.v. sodium bicarbonate infusion

⑤ Prevention & Treatment of Arrhythmias: prophylactic administration of a β -blocker

→ for tachyarrhythmias: **lidocaine** / **procainamide** / **amiodarone**

→ bradycardia & heart block: **atropine** or **electrical pacing**

⑥ Pump failure: furosemide: indicated if pulmonary wedge pressure is > 20 mm Hg

→ vasodilators: **GTN** slow i.v. infusion

→ Inotropic agents: **Dopamine** / **Dobutamine** i.v. infusion

⑦ Prevention of thrombus extension, embolism & venous thrombosis:

→ **Aspirin** (162-325 mg) ⇒ given for chewing & swallowing as soon as MI is suspected
⇒ continue as 80-160 mg/day

→ Antiplatelet drugs: **Clopidogrel** / **Prasugrel** / **Ticagrelor** ⇒ use as add-on therapy

→ Anticoagulants: **Heparin** / **fondaparinux** followed by oral anticoagulants ⇒ to prevent deep vein thrombosis (DVT)

⑧ Thrombolysis & Reperfusion: fibrinolytic agents: plasminogen activators — **alteplase** / **tenecteplase** ⇒ indicated in STEMI or high-risk NSTEMI

→ Preferred method: **Primary percutaneous coronary intervention (PCI)** with stenting.

⑨ Prevention of Remodelling & Subsequent CHF: **ACE inhibitors** / **ARBs** (started as soon as patient is hemodynamically stable)

⑩ Prevention of Future Attacks:

i) Platelet inhibitors: Aspirin / Clopidogrel

ii) β -blockers: reduce risk of reinfarction, CHF & mortality

↳ unless contraindicated, given for at least 2 years

iii) Control of hyperlipidemia: dietary substitution with unsaturated fats & use of hypolipidemic drugs (especially, statins)