EMC 370
Medical Emergencies

Toxicologic Emergencies Part 2: Toxidromes and Treatments

Patient history

- After : what ? how much ? when ?
- It is possible that the History will be suggestive of the diagnosis / toxin

Hx : Suggestive of ?

- Rarely the history is suggestive of the diagnosis / toxin
- Toxidrome
  - When a typical pattern of symptoms of a toxicologic syndrome may aid in the diagnosis

Hx : Suggestive of CO-Hemoglobinopathy

- Carboxyhemoblobinemia (patients often asymptomatic)
  - headache
  - N/V, flu-like syndrome
  - syncope, tachypnea, tachycardia
  - coma, convulsions
  - CV collapse
  - respiratory failure

PE Suggestive of Dx.

- VS
- Neuro
- Toxidrome
  - Physical signs of a toxicologic syndrome that may aid in the diagnosis

Sympathomimetic Toxidrome

- Hyperthermia
- Tachycardia
- Hypertension
- Dilated pupils
- Warm, moist skin
- Altered mental status
  - agitation, hallucinations, combativeness
  - seizures

Cholinergic Toxidrome

- Profuse salivation
- Bradycardia or tachycardia
- Pinpoint pupils
- Diaphoresis
- Excessive bronchial secretions and bronchospasm
- Hyperactive bowel syndrome
- Urinary or fecal incontinence (or both)
- Muscle fasciculations and weakness
- Altered mental status and seizures

Anticholinergenic Toxidrome

- Hyperthermia (“hot as hades”)
- Tachycardia
- Hypertension [early]
- Hot, flushed, dry skin (“red as a beet”)
- Dilated pupils (“blind as a bat”)
- Dry mucous membranes (“dry as a bone”)
- Diminished bowel sounds
- Urinary retention
- Altered mental status
  (e.g. agitation, hallucinations) and seizures

Narcotic Toxidrome

- Pinpoint pupils
- Respiratory depression
- Altered mental status (e.g. obtundation)

Physical exam

Vital signs (* denotes the earliest sign)

- Tricyclic antidepressants: ↑ temp* ↑ pulse ↓ resp.
- Barbiturates: ↓ temp ↓ BP ↓ resp
- Phenothiazines: ↓ temp ↑ pulse ↓ resp(sometimes)
- Digitalis: ↓ pulse
- Opioids: ↓ BP* ↓ resp ↓ pulse ↓ temp
- Clonidine: ↓ pulse*
  ↑ BP (early) ↓ BP (later)
  ↓ temp ↓resp

Vital signs (* = earliest sign)

- Ethanol: ↓ temp* , ↑ pulse , ↓ BP , ↓ resp
- Isopropanol: ↓ BP* , ↓ resp
- Cocaine: ↑ pulse , ↑ BP , ↑ or ↓ RR , ↑ temp
- Amphetamines: ↑ temp , ↑ pulse , ↑ BP
- Phencyclidine: ↑ temp , ↑ BP , ↑ pulse
- Salicylates: ↑ temp* , ↑ resp
- Iron: ↓ BP
- Petroleum distillates: ↑ temp , ↑ pulse , ↑resp

PE: Breath odor

- Chloroform → fruity
- Phenols, creosol → phenolic
- Cyanide → bitter almonds or silver polish
  (+/- 40 % cannot smell this)
- Chloral hydrate → pear-like
- Arsenic, phosphorous, tellurium, organophosphates →garlic
- Nitrobenzene → shoe polish
- Turpentine → violets
- Carbon tetrachloride → cleaning fluid
- Ethchlovinyl → new vinyl shower curtain
- Hydrogen sulfide → rotten eggs
- Camphor → mothballs

PE : Skin findings

- Opioids
  → needle tracts
- Barbiturates, carbon monoxide
- → pressure sores + bullae
- Boric acid (Harris Famous Roach Tablets)
  → "boiled lobster" skin
- Salicylates, organophosphates, sympathomimetics (e,g, cocaine) sedative-hypnotic withdrawal
  → diaphoresis
- Acetaminophen, mushroom poisoning, arsine gas
  → jaundice

PE : Extrapyramidal signs

- "Parkinsonian" picture: ***TROD***
  - **T** remor, torticollis, trismus
  - **R** igidity
  - **O** pisthotonos, oculogyric crisis
  - **D** ysphonia, dysphagia
- This category of drugs includes:
  - all of the "zines" (thorazine, promethazine, etc.)
  - Haloperidol
  - Metoclopramide (Reglan®)

Cardiac Dysrhythmia

Always monitor / 12 lead every tox patient

- Prolonged QT interval :
  - Phenothiazines
  - Quinidine,
  - lithium, arsenic
- Wide QRS complex :
  - cyclic antidepressants
  - Quinidine
  - β-blockers
  - Ca^{++} channel blockers
  - Propoxyphene (Darvon)
  - cocaine

Cardiac Dysrhythmias

- Sinus bradycardia :
  - Digitalis excess
  - Cyanide
  - Organophosphates / carbamates

Cardiac Dysrhythmias (cont.)

Other dysrhythmias have been associated with:

- Cyclic antidepressants
- Carbon monoxide
- Cyanide
- Cocaine
- Propranolol
- Phenol
- Arsenic
- Quinine

Rapid, Deep RR

For every patient with Kussmaul breathing suspect poisonings or a metabolic disorder with ***metabolic acidosis***

Metabolic Acidosis

Poisonings and metabolic disorders associated with metabolic acidosis (and a high anion gap [>16mEq/L] acidosis)

MUD PILES

- **M**ethanol
- **U**remia
- **D**iabetic or alcoholic ketoacidosis
- **P**araldehyde / Puking
- **I**soniazid / Iron
- **L**actic acid
- **E**thylene glycol (ethanol may produce a small gap)
- **S**alicylates, solvents

PE: Coma and Pinpoint Pupils

- Differential diagnosis of pinpoint pupils
  - Opioids
  - Phenothiazines
  - Clonidine
  - Cholinergic agents
  - Organophosphates / carbamates

PE: Pulmonary Edema

DRUGS CAUSING PULMONARY EDEMA *(" CARDIAC SHOCK")*

- ***C*** **C** yclic antidepressants
- ***A*** **A**SA
- ***R*** **R** espiratory Inhalants (hydrocarbons) (Phosgene)
- ***D*** **D** rugs (***D***arvon, ***A***mphetamines, ***M***orphine, *P* araquat)
- ***I*** **I** ron (negative **I**notropes Dig., Beta, and Ca^{++} blockers)
- ***A*** **A** llergic reaction / urticaria
- ***C*** **Q** uaaludes

- ***S*** **S** edatives
- ***H*** **H** eroin; opiates
- ***O*** **O** rganophosphates
- ***C*** **C** arbon Monoxide
- ***K*** **K** ocaine

General Treatment Measures

- Elimination of unabsorbed toxin (Administration of activated charcoal has become the first line therapy in GI decontamination)
  - Activated charcoal (AC): ***THE*** method of choice
    - Action: binds the toxic agent and prevents absorption
    - Dose: 1gm/kg
    - Charcoal is ***NOT*** useful for the following ingestions
      - Lithium
      - Alkalis/acids (absolutely contraindicated)
      - Heavy metals
      - Iron
      - Tylenol - activated charcoal ***can*** be given early in acetaminophen overdose.
        - » Allow 1-2 hrs. before administering N-acetylcysteine.

Whole Bowel Irrigation (WBI)

- Polyethylene glycol (Colyte, Go-***L***ytely)
- to wash toxins from GI tract
  - Before they are absorbed
- May be useful with: / WBI INDICATIONS
  - L ithium
  - S tuffers (body stuffers)
  - H eavy metals
  - I ron
  - T ime-released or sustained-release drugs

Whole-bowel Irrigation

Polyethylene glycol

- If given at appropriate rates
  - 2 L / hr in adults and 0.5 L/hr in children
- speeds the transit of substances through GI tract, thus decreasing their systemic absorption
- ***not*** associated with any adverse concomitant fluid/electrolyte shifts
  - Unlike cathartics (e.g. magnesium sulfate)
- Indications
  - Life-threatening ingestions of sustained-released drugs
  - Life-threatening ingestions of medications or toxins that are not absorbed by activated charcoal
  - Ingestions or drug vials, bags, or packets

Emesis

- Indication:
  - awake patient
  - with a relatively recent ingestion (≤ 30-60 min.)
  - of an agent that is moderately or highly toxic
  - in whom emesis is not contraindicated.
- Ipecac:
  - Adults: 30cc
  - Children: 15cc
- Ipecac Contraindications
  - Coma
  - Absent or depressed gag reflex
  - Seizures
  - Certain ingestions

Gastric Lavage

- Indications
  - Known/suspected serious ingestion and
  - Time of ingestion is < 1 hr.
- Contraindications
  - Lack of airway protection
  - Ingestion of caustic agents or highly-volatile hydrocarbons
  - Nontoxic ingestion

Consider gastric lavage for:

- Large ingestions of medications or toxins that have ***high lethality***
- Life-threatening ingestions of medications or toxins for which there is ***no antidote***
- Life-threatening ingestions of medications or toxins that are ***not bound*** to activated charcoal

Alkalinization therapy with IV sodium bicarbonate

Alkalinization of the blood may help to improve/prevent

- Dysrhymias
- Conduction blocks
- Improves hypotension
- Cyclic antidepressants
- Salicylates
- Barbiturates
- Chlorpropamide

Summary

We have discussed:

- incidence, morbidity and mortality of toxic emergencies
- Identification of risk factors predisposing to toxic emergencies
- pathophysiology of the entry of toxic substances
- Clinically correlating abnormal findings (toxidromes) with the common poisonings
- general methods of management of toxicologic emergencies
- the contraindications and disadvantages of inducing vomiting