CORROSIVES II

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Hydrochloric Acid

- Spirit of salts

Physical Appearance

- Hydrochloric acid is a colourless, fuming liquid which may acquire a yellowish tinge on exposure to air

Uses

- Bleaching agent
- Dyeing industry
- Metal refinery
- Metal cleaner, drain cleaner
- Laboratory reagent

Clinical features

- Dermal contact – mucus membrane readily corroded & destroyed
- Inhalation- Coughing, dyspnea, sneezing, suffocation
- Eyes-Lachrymation, Photophobia

- *Fatal Dose*- 30 to 40 ml

Diagnosis

- *Litmus test*
- If an open bottle of concentrated ammonia solution is placed near the stomach contents or vomitus, copious white fumes of ammonium chloride will come

- Rx – same

- PM findings

Mucosal folds of stomach discolored brownish

Carbolic Acid (Phenol)

- Colourless, needle-like crystals which turn pink and liquefy when exposed to air
- Commercial phenol is a brownish liquid containing impurities

like cresol.

Household phenol (often sold as phenyle) contains 5% phenol in water. It has a characteristic, aromatic odour (“hospital odour”)

- Cresol—is a methyl phenol with meta, ortho and para isomers
- Lysol—is 50 per cent solution of cresol (3-methyl phenol) in saponified vegetable oil
- Dettol—chlorinated phenol+ turpineol
- Thymol—alkyl derivative of phenol

Uses

- *Antiseptic and disinfectant*
- *Preservative (*glucagon, pethidine, neostigmine, quinidine, and epinephrine)
- *Pharmaceuticals*

Medical uses

- “Face peel” in plastic surgery
- Neurolysis for spasticity (by injecting phenol solution into neuromuscular junctions)

- Phenol is still used in preparations for treatment of localised skin disorders (Castellani’s paint), and as a local anaesthetic.

Mechanism of Action

- Phenol has local as well as systemic action

- Locally it acts as corrosive agent and when absorbed, it causes CNS depression, metabolic acidosis and renal failure.

Fatal Dose

- 50 to 500 mcg/kg

Clinical Features

Acute Poisoning

- *Local*: Skin or mucosal contact results in mild corrosion with hardening and whitish discolouration.
- white eschar -brown stain.
- Locally there may be burning pain followed by tingling, numbness, and anaesthesia.

Systemic:

- GIT—Burning pain, vomiting
- CNS—Vertigo, convulsions, coma. Pupils are constricted
- RS—Tachypnoea, bronchospasm, pulmonary oedema
- CVS—Tachycardia, hypotension, cardiac arrhythmias
- Blood—Haemolysis, methaemoglobinaemia
- Metabolic—Hypothermia, with cold and clammy skin, metabolic acidosis

- Hepatorenal—Oliguria, with scanty urine which turns greenish or brownish on exposure to air because of phenolic metabolites (hydroquinone and pyrocatechol). Later there is renal and hepatic failure

Chronic Poisoning (*Phenol Marasmus*)

- It is characterised by anorexia, weight loss, headache, vertigo, dark urine, and pigmentation of skin and sclerae (*ochronosis).*

Diagnosis

- Typical odour in the vicinity of the patient.

- Urine collected and stored in a transparent container shows

a gradual change in colour to brown or green

- To 10 ml of urine, add 1 ml of 10% ferric chloride. A purple or blue colour which persists even on heating indicates phenol poisoning

Treatment

- Decontaminate skin by copious washing
- Stomach wash can be done preferably with sodium or magnesium sulfate solution
- Activated charcoal
- Treatment of methaemoglobinaemia (with methylene blue)
- Convulsions can be managed with benzodiazepines or barbiturates
- Supportive measures

Autopsy Features

- Distinct odour of phenol, especially around the mouth and in the stomach contents
- Corroded areas are at first white, but if death has been delayed they turn brownish
- Gastric mucosa is greyish white, swollen, and hardened (leathery)

MLI

- Suicidal
- Accidental
- criminal abortion

ALKALIS

- Alkalis commonly encountered in poisoning include ammonia

(usually in the form of ammonium hydroxide), carbonates of sodium and potassium, and hydroxides of sodium, potassium, and calcium

Physical Appearance-

- Most of these occur as white powders or colourless solutions
- Ammonia gas is colourless with a pungent, choking odour

Uses

- *Ammonia gas*—Smelling salts
- *Ammonium hydroxide* - Paint, oil, and dirt remover, refrigerant
- *Sodium hydroxide* (*caustic soda*)—Drain cleaner, oven cleaner
- *Potassium hydroxide* (*caustic potash*)—Drain cleaner, hearing aid batteries
- *Sodium carbonate* (*washing soda*)—Household cleaning agent, detergent
- *Potassium carbonate*—Household cleaning agent
- *Sodium hypochlorite*—Household bleach

Fatal Dose

- 10 to 15 gm for most alkalis
- 15 to 20 ml for ammonia

Mode of Action

- Locally, alkalis produce liquefaction necrosis which results in extensive penetrating damage because of saponification of fats and solubilisation of proteins.

Clinical Features

- Corrosion of GI mucosa with greyish pseudomembrane formation
- dysphagia, vomiting, drooling, and haematemesis
- Stridor
- Abdominal pain, diarrhoea, tenesmus
- Motions
- Skin involvement results in greyish, soapy, necrotic areas without charring
- Esophageal stricture

Diagnosis

- In stomach contents:

a. White, solid, slimy lumps, flakes, or granules.

b. Turns litmus paper blue.

c. Becomes warm on addition of water.

d. If exposed to air, becomes moist and gets dissolved.

Treatment

- Oxygen
- Diluents such as milk or water
- Demulcents
- The following are absolutely **contraindicated** : *emesis, gastric lavage, catharsis,* and *activated charcoal*
- Assess fluid and electrolyte balance

Autopsy Findings

- Mucosa of mouth, tongue, esophagus and stomach is bleached and sodden with areas of necrosis

- Esophagus may show esophagitis or perforation

Medicolegal Importance

- Accidental poisoning
- Vitriolage
- Suicide

MCQ

Leathery stomach is seen in poisoning with:

A. HCl

B. H2SO4

C. Carbolic acid

D. Oxalic acid