

CORROSIVES

DEFINITION

Any substance that in contact with living tissue will cause destruction by chemical action. It includes substances at both extremes of pH, i.e. acids and alkalis.

ACIDS

- NAMES

Acetic acid, Carboic acid, Hydrochloric acid, Formic acid, Nitric acid, Oxalic acid, Phosphoric acid, Sulphuric Acid, Monochloroacetic acid.

- COMMON HOUSEHOLD PRODUCTS

Toilet bowl cleaners, drain cleaners, metal cleaners and antirust compounds, gun bluing agents, automobile battery fluid, smoldering fluxes, Engraver's acid (industries).

ALKALIES

- NAMES

NaOH, KOH, Ammonium Hydroxide, Calcium Carbonate, Calcium Hydroxide, Sodium Hypochlorite, Calcium Oxide.

- COMMON HOUSEHOLD PRODUCTS

Drain cleaner, household ammonia (hair products, jewelry cleaner, household cleaner), automatic dishwasher detergent, Clinitest tablets, oven cleaners, swimming pool sanitizers, household bleach products, hair relaxer products, cement (CaO), paint remover, washing powder, miniature/button batteries, paint remover, washing powder, miniature/button batteries.

PATHOPHYSIOLOGY

Acids-coagulative necrosis (except HFI that causes liquefactive necrosis by combining with Ca and Mg in the tissues)

Alkalis-liquefactive necrosis

Three pathophysiologic phases characterize both acid & alkali ingestion:

1. Acute Inflammatory Phase

- 4 to 7 days
- vascular thrombosis & cellular necrosis
- destruction of columnar epithelium, sub mucosa & muscularis
- injury peaks in first 24-48 hrs
- necrotic mucosa sloughs by 3rd or 4th day and ulcer forms

2. Latent Granulation Phase

- begins at middle of 1st week
- fibroplasia develops
- fresh granulation tissue fills area of sloughed mucosa
- collagen replaces granulation tissue by end of 1st week
- perforation most likely in this phase
- lasts 2 weeks after injury

3. Chronic Cicatrization Phase

- begins 2-4weeks after injury
- formation of scar tissue around sub mucosa & muscularis
- primary goal is to prevent stricture formation

DETERMINANTS OF INJURY

- type of substance ingested
- volume
- contact time
- volume of liquid & material in stomach
- concentration & p H of substance

MANAGEMENT

• EYE CONTACT

- Irrigate for at least 20-30 mins & until eye fluid p H is 7
- Topical ophthalmic anesthetic agents (proparacaine, tetracaine)
- Do NOT use neutralizing solutions
- Complete eye examination with slit lamp
 - Evaluate for corneal burns & foreign bodies
 - Assess visual acuity
 - Fluorescein staining (for corneal & conjunctival abrasions/ulcerations)
- Depending upon severity
 - Cycloplegic drops
 - Antibiotic drops
 - Artificial tears
- Steroid eye drops in consultation with ophthalmologist

• SKIN CONTACT

- Flood with water for 15 mins
- No chemical antidote to be used
- Treated as thermal burns with
 - debridement
 - topical antibiotic ointment
 - non adherent sterile gauze
 - wrapping

- Deep 2nd degree burns may benefit from silver sulphadiazine
- Hydrofluoric Acid burns
 - soak in benzalkonium chloride solution or
 - apply 2.5% Calcium gluconate gel or
 - inject 0.5ml of 5% Calcium gluconate/cm² under burned area

• INHALATION

- Removal from environment
- Administer humid supplemental Oxygen
- Intubation and respiratory support may be needed
- Observe for airway obstruction & noncardiogenic pulmonary edema
- Radiograph, Arterial Blood Gases

• INGESTION

DILUTION

-Use milk or water (limited to 8oz for adults & 4 oz for children due to danger of heat generated by exothermic reaction)

- Removal of stomach contents by using nasogastric tube in large volume ingestion
- Flexible endoscopy promptly to evaluate burns
- Substances NOT to be used
 - Emetics, neutralizing agents, bicarbonate, activated charcoal
- Gastric lavage NOT to be done

SUPPORTIVE CARE

- Corticosteroids for preventing stricture formation, however use is controversial
- Antibiotics for documented infection
- Oral liquids not to be started until endoscopy shows extent of injury
 - 1st degree burns-when stable
 - 2nd degree burns-not for 2-3 days
 - 3rd degree burns-require surgically placed jejunostomy tube

INDICATIONS FOR SURGERY

- perforation
- peritonitis
- major bleeding