ORGANIC CORROSIVE

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ORGANIC CORROSIVE

How to differ from mineral acid

- Weaker in action.
- Acting both locally and systemic

CARBOLIC ACID *(PHENOL)*

PHENOL

PHYSICAL PROPERTIES

- Smell
- Short, colorless ,prismatic, needle-shaped crystals.
- On exposure to air it turns pink and liquefy.
- Solubility —it is fat soluble and also soluble in glycerin, ether, alcohol.
- burning sweetish
- Not true acid - litmus test negative
- Specific property— antiseptic or dis-infectant

OTHER MEMBERS OF PHENOL

- Cresol (Lysol)
- House hold phenol
- Dettol (chlorinated phenol)

ROUTES OF ABSORPTION

- Through skin
- Oral ingestion
- Per rectum, vagina, wound etc.
- Respiratory tract by inhalation.

METABOLISM AND EXCRETION

Phenol

↓

Converted by liver

↓

Hydroquinone and *Pyrocatachol*

↓

excreted in urine (both).

↓

turn urine olive green or brown

↓

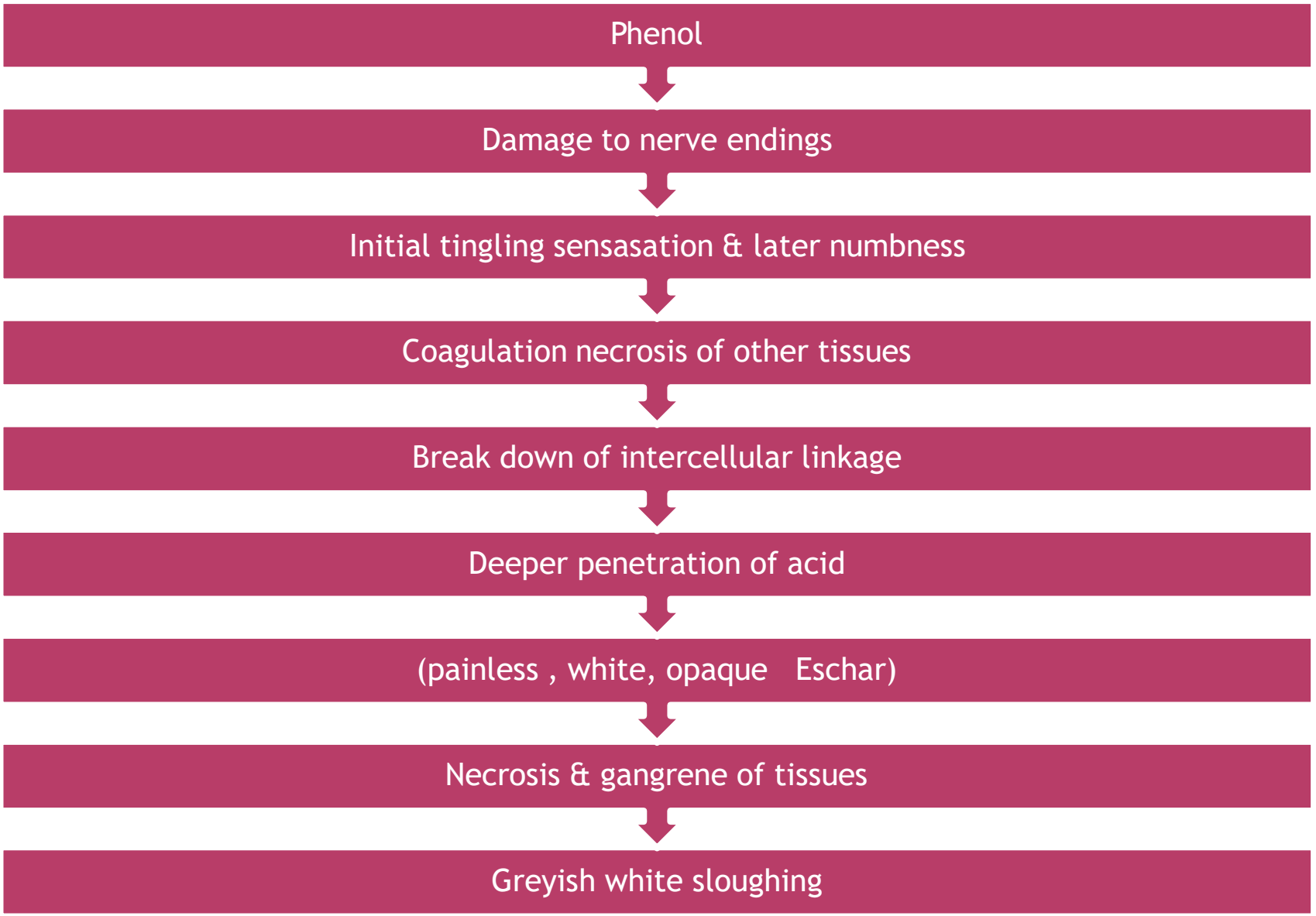
carboluria.

↓

Complete elimination occurs in 36 hours.

Carbolism

LOCAL SKIN EFFECTS



GASTROINTESTINAL TRACT EFFECT

When taken ORALLY-

1. initially- Burning Sensations
   Tingling & numbness
   Later- anesthesia

2. Vomiting rarely seen on consuming dilute solution of phenol

SYSTEMIC TOXICITY

- Inhalation of phenolic vapours
- Laryngeal and pulmonary edema
- Stertorous breathing and cyanosis

- Phenol is fat soluble.
- It attacks on the nervous system tissue
- Paralysis of respiratory and cardiovascular center
- DEATH

Respiratory Tract Effects

CNS and CVS Effects

SIGNS AND SYMPTOMS

- Headache, Giddiness, Tinnitus
- Vomiting, diarrhoea and pain abdomen
- **Clammy, cold, sweating body**
- **Pupils dilated**
- **Muscular spasms** —convulsions
- Stertorous breathing with cyanosis
- **Collapse** — unconsciousness, coma

SIGNS AND SYMPTOMS

- **If survives for 48 hr —**

  passes dark, smoky urine which soon turns olive green on standing carboluria followed by anuria.

- **Death, may result from respiratory and circulatory failure**

PHENOL

Fatal Dose :

10-15 grm

Fatal period:

2-12 hrs

DIAGNOSIS

Corrosions on face, around and inside the mouth (grayish white if phenol or brownish if Lysol)

Phenolic odor (Breath / Vomitus)

Carboluria

Dilated pupil

Stertorous breathing.

TREATMENT

It depends on route of administration.

CASE OF POISONING THROUGH SKIN ABSORPTION

- Remove the contaminated garments
- Cleanse the site by mopping with wet cloth and wash with soap and water.
- Apply — Olive oil/Methylated spirit/ 10 percent ethyl alcohol, which can prevent further absorption
- Shift the victim to fresh atmosphere and make him breath in fresh air
- Give normal saline + sodium bicarbonate (iv drip).

CASE OF POISONING THROUGH ORAL ROUTE:

- Gastric lavage
- Plenty of lukewarm water
- Animal charcoal
- Olive oil
- Magnesium
- Sodium sulphate
- Saccharated lime,
- Soap solution,
- 10% glycerin, etc.

CASE OF POISONING THROUGH ORAL ROUTE:

- Give egg white- Epsom salt/demulcents orally.
- Symptomatic
- Artificial respiration
- Tracheal respiration of froth/secretions
- Glucose saline to induce diuresis.

POSTMORTEM FINDINGS

EXTERNAL

Greyish or brownish corrosions at the angle of the mouth

- Chin (tracks) front of the body,
- Arms and hands (splashes)with characteristic **phenolic odour**.

INTERNAL

Corrosion of gastrointestinal mucosa, laryngeal and pulmonary edema has been observed in all orally ingested poisoning cases.

Stomach changes

- Marked corrosion of gastric mucosa
- Swelling of mucosal folds with coagulated greyish or brownish silvery mucus on it
- Intervening normal mucosal folds appear dark red in color.
- Hardening of the stomach wall —leathery stomach. Phenolic odor.
- Vomitus and gastric lavage collection: May show partially detached gastric mucosa.

Kidney changes

Hemorrhagic nephritis
(only if the victim survives for some time after poisoning).

MEDICO-LEGAL IMPORTANCE

- Usually consumed accidentally
  (mistaken for medicine) or spilt over the body.
- Suicidal and homicidal —
  rare due to the strong Phenolic odor.
- Abortifacient — occasionally, used to induce criminal abortion.

OXALIC ACID

Acid of Sugar

OXALIC ACID

- Source :

Vegetable

Kidney stone

Bacteria

- Use :

Commercial

Domestic

Illegal

OXALIC ACID *(ACID OF SUGAR)*

Physical properties

- Colorless,
- Transparent,
- Prismatic crystalline substance

Resembling

- Magnesium sulfate ($MgS0_4$)
- Zinc sulfate ($ZnS0_4$)

DIFFERENCE

Properties	*Oxalic acid*	*$MgSO_4/ZnSO_4$*
Taste	**Sour and acidic**	Bitter
Reaction	**Strongly acidic**	**Neutral**
On heating: with sodium	**Sublimates**	**Not so**
with bicarbonate	**Effervesces**	**Not so**
with ink stains	**Disappears**	**Not so**

OXALIC ACID

- ***Fatal dose*** 15-20 mg
- ***Fatal period*** 1 to 2hrs
- ***Toxicity rating*** 4

ACTION

- Acts **locally** as a corrosive on both skin and mucosa (more severe)
- **Remotely** on absorption into blood affects several systems, the important ones are:

- **Cardiovascular system-**

  Shock

  Death

- **Electrolyte system -**

  Extracts tissue calcium- Hypocalcaemia

  Renal system - Tubular necrosis

  Uremia - Death

SIGNS & SYMPTOMS

Fulminating

- With large doses (15 gm or more) orally
- lead to sour and acidic taste, followed by a sensation of constriction around throat and burning pain from mouth to epigastrium, which radiates all over the abdomen.
- There will be tenderness in the epigastrium, nausea, followed by vomiting (coffee ground colored vomitus) severe thirst, diarrhea, electrolyte imbalance and death.

SIGNS & SYMPTOMS

Acute

All findings are mainly due to hypocalcaemia —

- Muscle irritability,
- Tenderness,
- Tetany,
- Convulsions,
- Tingling of extremities,
- Coma,
- Collapse and death.

SIGNS & SYMPTOMS

Delayed

- **Findings will be of uremia.**
- Urine will be scanty with traces of albumin, blood and calcium oxalate crystals.
- Microscopically seen as **envelope-shaped crystals**.

TREATMENT

Gastric lavage with calcium lactate
(2 teaspoon per lavage)

Antidotes –

- lime water,
- **calcium lactate**,
- **calcium gluconate,**
- **calcium chloride,**
- **chalk suspension in water or milk, etc.**, may be given orally, **act as specific antidotes, which form insoluble calcium oxalate and excreted easily.**

TREATMENT

- 10 ml **calcium Gluconate** I/V frequently
- **Parathyroid** extracts —100 units I/M
- **Demulcent** drinks
- Bowel wash by **enema and purgatives** (castor oil)
- **Symptomatic** measures.

POSTMORTEM FINDINGS

External

No specific findings.

Burns of the face and skin rarely seen.

Internal

(specific findings)

Mucosa of the mouth, tongue, pharynx, esophagus are bleached (whitened/scaldy /red).if a strong solution is consumed.

STOMACH CHANGES

- The stomach mucosa is reddened and punctate due to erosions giving "velvety red" or blackish appearance.

- Wall of the stomach is softened, but no perforations.

- Contents –**gelatinous brown**
  (due to Acid Hematin formation).

KIDNEY CHANGES

- Swollen and congested.
- Tubules on histo-pathological study reveales to be filled with oxalate crystals.
- All other viscera — congested

MEDICO-LEGAL IMPORTANCE

- Usually consumed **accidentally** (mistaken for magnesium sulfate)
- **Suicidal or homicidal** uses are rare due to the taste
- **Abortificient**
- Used for **illegal erasure of signatures**
- It is detected in certain **vegetables as oxalates**, e.g. spinach, rhubarb, cabbage, etc. (rarely produces poisoning)

COMMERCIAL USES:

- Cleaning or bleaching leather.
- Calico printing.
- Removal iron moulds from linen.
- Removal ink stains.

CORROSIVE ALKALIS

STRONG-ALKALIES

- Sodium carbonates 15 -30 gm
- Potassium carbonates 15 -30 gm
- Liquor ammonia 10 ml.

Usually 24 hours

Shortest reported 3 hrs

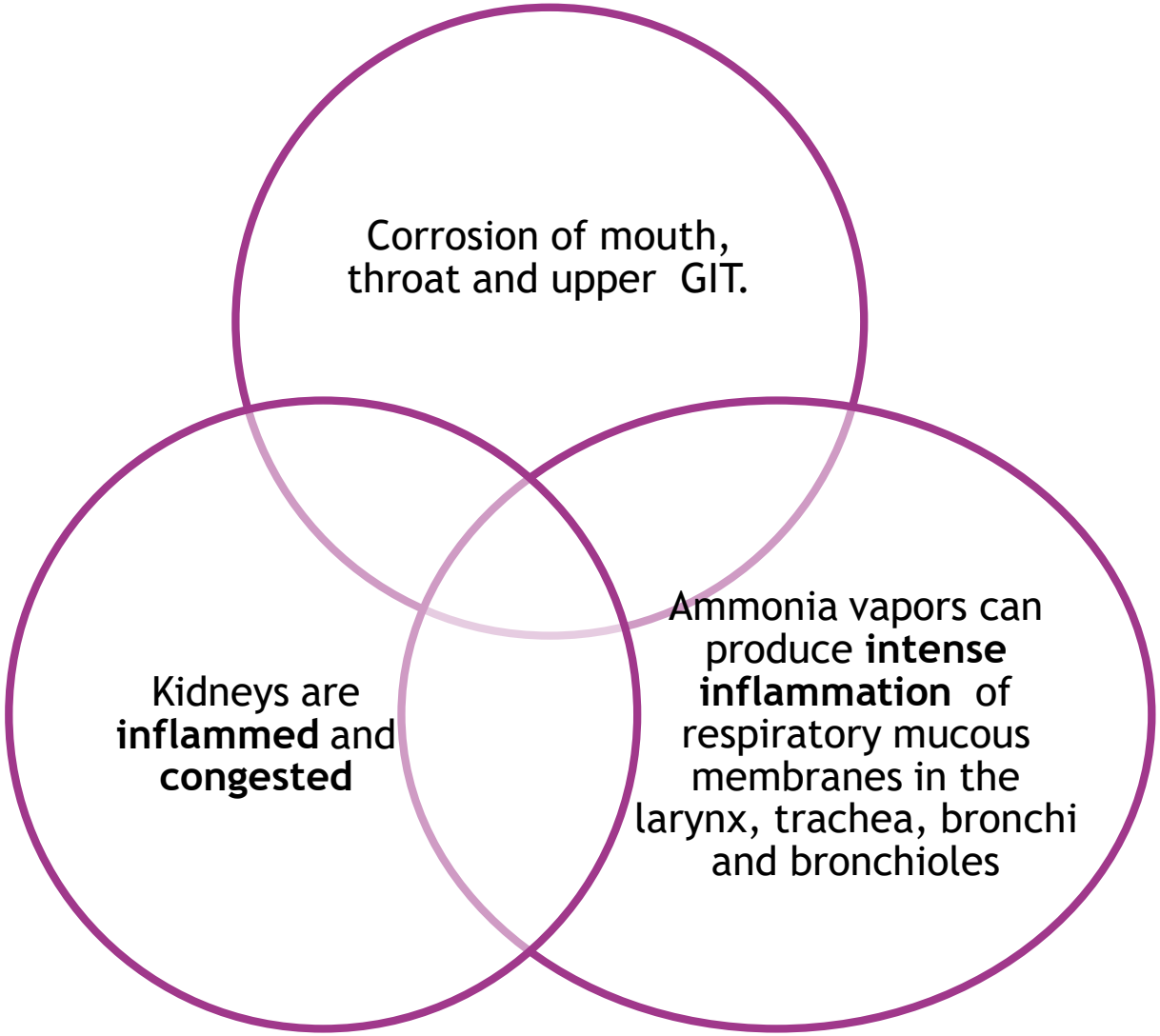
Fatal dose

Fatal period

TREATMENT

- ***Do not perform gastric lavage or give emetics.***
- Give dilute vegetable acids like vinegar.
- Provide protein-containing foods like milk, egg white, etc. (demulcents)
- Morphine may be given cautiously to relieve pain.

POSTMORTEM APPEARANCES



MEDICO-LEGAL IMPORTANCE

Accidental poisoning more common

Homicidal poisoning rarely used due to Distinct irritant odour of ammonia.

However, ammonia may be preferred to commit suicide, though the death is agonising

Industrial accident involving alkalies occur from time to time,

THANK YOU