14TH NYAYAVALOKAN TRIAL ADVOCACY AND JUDGMENT WRITING COMPETITION, 2025-26

REFERENCE STUDY MATERIAL FOR PARTICIPANTS

SVKM's
PRAVIN GANDHI COLLEGE OF LAW
विद्या ददाति विनयं
EDUCATION BESTOWS HUMILITY

TECHNICAL NOTE – PRESERVATION OF VISCERA IN SUSPECTED POISONINGS

- In cases of suspected poisonings, preservation of viscera following post-mortems is critical in order for chemical examination to be done by the Forensic Science Laboratories
- The materials for analysis should be collected in clean, wide-mouthed, white glass bottles, fitted with glass stoppers. Both bottle and stopper should have identical serial numbers etched on them.
- Viscera should be cut in smaller pieces to ensure penetration of the preservative used.
- The quantity of viscera and preservative should not exceed two-thirds of the volume of the bottle. This is to ensure safety of the contents even in cases of gas build up due to decomposition over time
- Stoppers of bottles must be greased with petroleum jelly / Vaseline to ensure they do not stick. The stopper should be securely fixed in position with tape or string, the ends of which should be sealed, in the presence of the authorized official.
- A label detailing the name of the deceased, the viscera preserved should be attached to each bottle.
- A 'reference sample' of the preservative used must be sent with the viscera exhibit, for chemical analysis
- The sealed viscera bottles should be placed in a lined, padded wooden 'Viscera Box', marked with a serial number, issued by the Forensic Science Lab-Chemical Examiner. The lid of this box is locked with a key by the medical officer (the duplicate key lies with the chemical examiner). A label is placed over the keyhole and bears the details of the case number, date, time, and seal.
- The Viscera box is labelled as per the forwarding letter, with details of the case number, the date, number of bottles enclosed. Sealing with the medico-legal seal
- Specimens to be collected at post-mortem in case of suspected poisonings:

  Routine:

  1. Stomach and all its contents (approx. 300 ml)

2. Small intestine and its contents (approx. 100 ml)
3. Liver – 400-500 gms
4. Spleen – half
5. Kidneys – half of each
6. Brain – 400-500 gms
7. Blood – 10-20 ml from femoral vein / right side of heart
8. Vomit – 300 ml

   Additionally:
9. Urine and faeces – if available
10. Skin & muscle tissue – if site of administration of poison is visible
11. Long bone – in case of chronic poisoning
12. Plucked hair – in case of chronic poisoning

- **Common Preservatives used for viscera:**
  1. Rectified spirit / absolute alcohol EXCEPT in cases of suspected alcohol, carbolic acid, chloroform, ether poisonings
  2. Saturated solution of sodium chloride (common salt)
- Blood preservation with sodium fluoride which acts as an anticoagulant and controls bacterial growth
- **DOCUMENTATION:**
  1. Forwarding letter authorizing analysis by Forensic Science Lab – Chemical Examiner
  2. Copy of F.I.R
  3. Copy of post-mortem report
  4. Information collected by the I.O. regarding the patients name, gender, age, food last taken, state of consciousness, ability to speak, presence of vomit
  5. Findings of medical officer & Signature of medical officer

TECHNICAL NOTE - CARBOLIC ACID (PHENYL) POISONING

Basic information on Carbolic Acid

Carbolic acid is a sweet-smelling clear liquid. It is added to many different products. Carbolic acid poisoning occurs when someone touches or swallows this chemical. Phenol is the harmful substance in carbolic acid. (2,6)

Carbolic acid can be found in: adhesive dyes, lubricating oils, perfumes, textiles, various antiseptics, disinfectants, germicides.

Features of Carbolic Acid (7)

Physical state and appearance: Solid.

Odor : Distinct, aromatic, somewhat sickening sweet and acrid

Taste : Burning.

Molecular Weight : 94.11 g/mole

Colour : Colourless to light pink

Symptoms of Carbolic Acid Poisoning (6)

Below are symptoms of carbolic acid poisoning in different parts of the body. (6)

BLADDER AND KIDNEYS

- Blue or green-coloured urine; decreased to no urine output

EYES, EARS, NOSE, MOUTH, AND THROAT

- Severe burns in the mouth and food pipe (oesophagus), yellow eyes (jaundice)

STOMACH AND INTESTINES

- Abdominal (stomach) pain – severe; Bloody stools, Diarrhoea
- Nausea and vomiting - possibly bloody

HEART AND BLOOD

- Low blood pressure (shock), Rapid heart rate

LUNGS AND AIRWAYS

- Deep, rapid breathing, Wheezing, Trouble breathing

NERVOUS SYSTEM

- Coma (decreased level of consciousness and lack of responsiveness)
- Seizures (convulsions); Lack of alertness (stupor)

SKIN

- Blue lips and fingernails (cyanosis); Burns; Yellow skin (Jaundice)

Fatal Dose and Fatal Period

Probable oral lethal dose is 50-500 mcg/kg. 25 to 50 ml of household phenol can cause death in few hours to days. (9,10,11,12).

Fatal Dose: Literature report of human LDLO by the oral route range from 0.14 to 14 g/Kg. (9,12). U.S. Department of health and human services records that the minimal lethal oral dose of phenol is approximately 70 mg/kg in adults. Other estimates indicate that an oral dose as low as 1,000 mg could be fatal in humans, but patients occasionally survived doses as high as 65,000 mg (10).

Fatal Period: Fatal period of phenol is 3-4 hours. (3-14)

Normal / Reference Values

Phenol is a normal constituent of urine. The total phenol concentration in the urine of unexposed individuals does not exceed 20 mg/L and the mean is usually <10 mg/L. (10,11)

Biomarkers for Phenol Poisoning

Biomarkers are broadly defined as indicators signalling events in biologic systems or samples. They have been classified as markers of exposure, markers of effect, and markers of susceptibility. Measurement of total phenol in the urine is the most useful biomarker following inhalation exposure to phenol (ACGIH 2001). The test is nonspecific and should not be used when workers are exposed to benzene, to household products, or to medications containing phenol. Dermal exposure may also result in overestimation of inhalation exposure. Dark urine occurs in individuals exposed to phenol. Phenol can also be measured in the urine after oral exposure, although a dose-response relationship between oral exposure to phenol and phenol in the urine has not been established. Specific biomarkers used to characterize effects caused

by phenol have not been identified. The biological monitoring for exposure to phenol is possible by measuring blood or urine levels of the parent compound whose toxicity is suspected. The sample of urine to be tested can be stored in the refrigerator for 4 days or frozen for at least 3 months before analysis. (10)

Diagnosis of Phenol Poisoning: Diagnosis of phenol poisoning can be made by

1. Typical odour.
2. Initial colourless urine that changes in colour to green or black.
3. To 10 ml urine add 1 ml of 10% ferric chloride. A purple or blue colour appears that persists even on heating.

CASE STUDY #1 (1)

A 41-year old agriculture labourer, who is a chronic alcoholic, found lying unconscious in bedroom by his wife. A toilet cleaner bottle is found lying in the room. He was rushed to nearby local hospital, given supportive treatment and referred to our centre. He presented with vomiting and altered sensorium with a Glasgow coma scale of E2 V2 M4 on admission. He was hypotensive (80/60mmHg) and tachypneic with bilateral constricted pupils. He succumbed next day morning hours. On autopsy his face appears congested with black discoloration of lips and chin. Rigor Mortis was present throughout the body. Post mortem Lividity seen over the back and fixed. No other external injuries seen. Mucosa of oesophagus and larynx appeared grey in colour. Stomach contained 200ml of grey colour fluid with partially digested food particle with peculiar odour of phenol. Mucosa appeared congested with areas of corrosion in the fundus region. Kidneys appear congested with well demarcation of cortico- medullary junction. Histopathological examination of kidney showed glomerular congestion and acute tubular necrosis. Liver showed periportal steatosis and lymphocytic infiltrates accounts for the chronic alcoholism. A sample of urine drawn showed greenish grey colour. The chemical analysis of routine viscera reports detection of phenol in stomach, intestine and its contents,

liver and kidney but absent in the blood sample. The cause of death was opined as death due to acute tubular necrosis following phenol poisoning.

CASE STUDY # 2 (5)

A 28-year-old male individual was brought to ENT OPD with alleged c/o of dysphagia and difficulty in speaking. On examination and subsequent perusal, the patient admitted that he had consumed phenyl (household toilet cleaner) one day earlier. On further examination, the patient was found to be hypotensive and tachypneic with bilateral constricted pupils. He was immediately admitted in the ICU, but after 4-5 hours he succumbed. The dead body was brought to the author for autopsy. On external examination there were no external injuries marks present over the body. There was corrosion and greyish discoloration present at the angle of mouth and inner aspect of lips. On internal examination, the tongue was white and swollen. Mucous membrane of oral cavity was also sodden with ash grey discoloration. The mucosa of the oesophagus was tough and greyish-white. Mucosa of the stomach was softened, blackened, tarry, corroded, grossly haemorrhagic, ulcerated and congested as compared to typical feature of phenol ingestion cases where the stomach inner surface is brown and leathery with haemorrhagic spots, corrugated and prominent rugae. All internal organs were congested. The stomach contained about 100 ml of phenol odour emitting fluid. The entire peritoneum along with small and large intestine found to be congested and discoloured. During autopsy, viscera and different samples were preserved for toxicological examination. Histopathological examination showed exfoliation of oesophageal mucosa and coagulative necrosis of gastric mucosa along with features of glomerular congestion and acute tubular necrosis in kidney, congested and oedematous lungs and congested brain. The chemical analysis of routine viscera reports showed presence of phenol. The cause of death was opined as death due to acute tubular necrosis following phenol poisoning.

CASE STUDY #3 (23)

A 68 yrs old Hindu male was found lying at the floor of his residence with history of ingestion of dark brown colour liquid substance with pungent odour. During local enquiry It was learnt

that he was suffering from mental depression for last 3 years for his family problem issue with history of repeated suicidal attempts previously and treated with antipsychotic drugs. Then he was taken to the N.R.S.M.C&H and declared as brought dead at 11.20 pm on 10th October 2013 and the body was sent for postmortem examination. History from family members, the neighbours, inquest report, photographs and post-mortem examination reveals that the person died due to the effects of carbolic acid poisoning.

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