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Diagnosis of poisoning in living and dead person

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Abstract

The systematic examination of the poisoning in living and dead person is one of the most challenging tasks in forensic toxicology. In the suspected case of poisoning, case history and autopsy findings are very helpful, external and internal examination of the body is carried out to determine the cause of death. Case history, circumstantial evidences and autopsy findings become important part too in this review; information has been assembled on the basis of external and internal finding in live and dead case as well. On the basis of duration of exposure, sign and symptoms, medical practitioner can categorize the poisoning in fulminate, acute, and chronic.

Keywords: poisoning, systematic examination, toxicology, biological system

Introduction

Poisoning refers to exposure to any agent which is capable of producing an adverse response in a biological system. It may results into slight irritation, serious deleterious effects and even may cause death. Poisoning is common but modes of poisoning varies i.e. it may results from the attempt of suicide, homicide and accidents At home, drugs or household chemicals are most likely the main cause of accidental exposure to children and adults Accidentally ingestion of contaminated food, poisonous plants or animals and stinging and biting are the other causes of accidental poisoning in adult While, criminal poisoning occurs when individual or group of individuals intentionally attempts to cause destruction of life on others by using poison. Homicidal poisoning is the killing of a human being by the administration of poison. On the other hand' suicidal poisoning defines as the self infliction by poison with the intention of committing suicide.

Diagnosis of poisoning in living person in acute & chronic case

There is no single symptom and no definite group of symptoms which are absolutely characteristic of poisoning.

Following should arouse suspicion of poisoning.

In Acute poisoning symptoms appears immediately or within a short period after the suspected food or drink, has been taken. The symptoms are uniform in character & rapidly Increase in severity. When several people eat/ drink from same source of food/ drink at the same time all suffer from similar symptoms at same time. Poison can be detected in the Ingested food, in Vomitus material, or in excreta it is strong proof of poisoning.

a. Indicative symptoms of acute poisoning: Sudden onset of Abdominal pain, nausea, vomiting, diarrhea burning sensation in mouth, throat, esophagus, and stomach, intense thirst, tenesmus, difficulty in swallowing, blood with vomiting, headache, vertigo, paleface, dizziness, drowsiness, insensibility, Restlessness, agitation, cramps, numbness & tingling sensation, convulsion, delirium, hallucination, pupil dilated/constricted, imperfect vision & hearing, collapse, shock, unconsciousness, suffocation, difficulty in breathing, impaired respiration, cyanosis, pulse rapid/ feeble/slow, hematuria, burning micturition, oliguria.

Acute symptoms in many natural diseases may closely resemble those of a poisoning symptom. Such as peptic ulcers, appendicitis, intestinal obstructions, tetanus, cholera, epilepsy, hysteria. Example, Aconite poisoning is resembles as heart attack or myocardial infarction, arsenic poisoning resemble with cholera, strychnine poisoning with Tetanus etc.

b. Indicative features of chronic poisoning: - Symptoms are Exaggerate after the administration of suspected Food, drink or Medicine, Malaise, Cachexia, depression & gradual deterioration of general condition., Repeated attack of diarrhea & Vomiting,

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Symptoms disappear after removal of patient from his usual surroundings, Traces of poison found in urine, stool, Blood or vomit.

Management of Poisoning Case

In poisoning case if the poison is known, specific treatment must be started. If not, treatment is given on general lines to save the life of patient/victim.

Main aim of treatment: Help the patient to stay alive by attention to Respiration & circulation, while he is assisted in getting rid of the poison by metabolism or excretion.

Air way is established by positioning, suctioning or insertion of pharyngeal airway or endotracheal intubation.

Breathing is provide by artificial respiration and oxygen inhalation, measure the pulse & B.P. and Place patient on continuous ECG Monitoring, fluid therapy given to combat fluid loss, maintain Blood Presser, Nutrition & Electrolyte balance, cardio- respiratory stimulants and Cortico steroids are given to enhance function of brain heart, lungs & prevent shock.

Main objects of Treatment:

- Removal of unabsorbed poison: It depends upon the route of entry of the poison & for these following principles should be kept in mind.
- In case of inhalation of gaseous poison the patient should be removed to fresh air, Ensure clear airway and Artificial respiration and oxygen should be given.
- For Contact Poisons--Immediate washout with plain water and neutralize it by applying a suitable antidote.
- For Injected poison—a torn equate may be applied immediately above the point of injection, immersion limb in water below 10 degree temperature
- For Ingested Poisons-In such cases stomach wash /gastric Lavage is done or induces vomiting
- Administration of Antidotes: to –neutralize effect of poison suitable antidotes are administered.
- Elimination of absorbed poison or metabolic products done by use of Diuretics, Purgatives, and Diaphoretics.
- Symptomatic treatment & maintenance of patient's general condition according to symptoms & need of patient.

Diagnosis of Poisoning In Dead Person

Evidence of poisoning will depend on postmortem examination, chemical analysis, experiments on suitable animals and circumstantial evidence.

- a) Post Mortem Examination: it is done by the doctor externally & internally to find out the cause of death. Especially the alimentary system should be examined as signs of corrosive and irritants poisons likely to be found. These signs may manifest as hyperemia, softening, ulceration and perforation may be present. In case of doubt histological examination should be done.

i. External Findings:- it consists:

- Surface of body & clothes are examined for any evidence of stain, struggle& injury mark, Injections mark/ Insect bite.
- Natural orifices- examine for the presence of poisonous substance (mouth, nostrils, anus, vagina, urethral, orifice.)

- Color of Skin & Mucous Membrane is examined to identify the specific poisoning agent.--yellow skin color indicate- phosphorous poisoning, bright cherry red indicates carbon mono oxide poisoning, gray & black color indicates—sulphuric acid, hydro chloric & Acetic Acid, Brown & Yellow Color in – nitric acid, gray-white color in- carbolic acid & caustic alkalis. gray-black color in- oxalic acid, bluish- white color in mercuric chloride, whitish color in zinc-chloride.
- Color of Post Mortem Staining- Cherry red color in carbon monoxide, deep blue color in carbon dioxide, bright red/pink in cyanide poisoning, dark brown/yellow in phosphorus or copper and black color in opiates poisoning.
- Odor / Smell: Smell or Odor indicates about the substance which is used for poisoning. Garlicky Smell - Phosphorus, arsenic, parathion, Malathion, aluminum Phosphide (Celphos), sweet & fruity smell-- ethyl alcohol, chloroform, and nitrites. Acrid smell-- Chloral hydrate, formal-dehyde, rotten egg smell - di-sulphiram, hydrogen sulphide, bitter almond odor – indicates- hydro-cyanic acid (prussic acid).

ii. Internal Findings - It is done during process of postmortem of the body.

- Odor / Smell- In suspected case of poisoning skull should be opened first to detect unusual odor in the Brain because body mask such odors
 - Mouth-& Throat - Mouth & Throat examine for any evidence of inflammation, erosion, or staining.
 - Upper respiratory tract- Corrosive—may cause edema, of glottis & congestion of mucous membrane of trachea & bronchi.
 - GIT- (Esophagus, Stomach, Intestine)- Irritant poison produce marked inflammation, hyperemia of mucous membrane of G.I. Tract & Corrosive may cause perforation of stomach.
 - Liver- Hepato-toxic-poisons- Arsenic, phosphorus, chloroform, Alcohol, chlorpromazine, thallium, aluminum Phosphide, zinc Phosphide. Fatty Liver in arsenic poisoning.
 - Kidney- Nephro Toxic poisons-- Arsenic, mercury, Oxalic Acid, Carbolic Acid, Thallium, Aluminum Phosphide, Zinc Phosphide, Turpentine, and Cantharides.
 - Spleen, urinary bladder, rectum seen for any changes
 - Heart & brain- are examined properly for any inflammation, ulcer, staining or any changes if present noted clearly. Sub endo cordial Hemorrhage in Lt. ventricle seen in poisoning with Arsenic, Mercury, Phosphorous, Viper bite, Heat stroke, traumatic Asphyxia, Influenza.
- b) **Chemical Analysis:** The most important proof of poisoning is the analytical detection of poison in the parenchyma of the organs of the body. The finding of poison in the food, medicine, or fluid alleged to have been taken is corroborative.
 - c) **Experiments on Animals:** The Suspected material (food, medicine, fluid or poison) extracted from viscera can be fed to domestic animals, such as dogs, cats- and signs are noted. The poison affects these animals in the same way as human beings.

d) Circumstantial Evidence: Clues regarding from, relatives, friend, recent purchase of poison by the victim or accused, his behavior, suicide note, history of quarrel, financial problems may provide valuable information.

Failure to Detect Poison

In some cases, no trace of poison is found on analysis, although from other circumstances, it is almost or quite certain that poison was the cause of illness or death.

Possible explanations for negative findings:

Poison may have been eliminated by vomiting and diarrhea rapidly metabolized and eliminate from the system. Wrong or insufficient material may have been sent for analysis.

Medico Legal Aspect of Poison

There is no boundary between medicine and a poison, for a medicine in a toxic dose is a poison and a poison in a small dose may be a medicine. The dose makes the substance poison.

In law the real difference between medicine & poison is the intent with which it is given. If given with intention to save life it is Medicine & if given with intention to cause bodily harm than it is poison.

Punishment for Accused Persons Under Various Sections of IPC

Section 284 IPC deals with Injury causes with NEGLEGENT conduct with respect to poisonous substance & shall be punished with imprisonment up to 6 month and fine up to 1000/-.

Section 328 IPC deals with administration of any poison with INTENT to cause hurt & offence shall be punished with imprisonment up to 10 years & fine. (Sec. 284, 299, 302, 304A, 306, 324, 326, 328 IPC deals with offences regarding administration of poisonous substances to human beings.

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