THE ROLE OF THE DOCTOR IN CASES OF POISONING
WHAT IS A POISON:

any substance (solid, liquid, gas) which if assimilated in the living body or brought into contact with any part thereof, will lead to deterioration of health or may eventually lead to death by its constitutional or local effects.

Any agent could be or become a poison when a sufficient dose is reached. E.g. alcohol, water, oxygen, and certain drugs etc.
### TYPES OF POISONING

<table>
<thead>
<tr>
<th>INTENTIONAL</th>
<th>UNINTENTIONAL</th>
<th>UNDETERMINED</th>
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<td>A person taking or giving a substance with the intention of causing harm</td>
<td>If the person taking or giving a substance did not mean to cause harm</td>
<td>When the distinction between intentional and unintentional is unclear</td>
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Doctor’s duties in suspected poisoning
In all cases of poisoning, the doctor must record the preliminary particulars (full name with address, age, sex, occupation, date and time, brought by whom, history, etc.).

Many patients are brought to hospital in an unconscious/semiconscious condition & if he/she was conscious and alert, he/she is usually uncooperative and even hostile, since the majority of hospital admissions are cases of attempted suicide.
He should at once treat him after finding out the nature of the poison so that appropriate and timely treatment is instituted.

If the nature of the poison is not known, treatment is instituted on general lines (removal of poison, supportive care, use of antidotes, treat general sign symptoms.
The physician is obligated to report each and every case of suspected poisoning to the police and the question of suicide/accident/homicide is to be considered by them. This will be in the interest of the doctor and will avoid complications arising therefore some later stage as failure to inform.

It is advisable to maintain a proper written record of the doctor’s findings and treatment administered.
In every case of suspected poisoning, the doctor must keep and maintain the detailed records of the case. He must collect and preserve all the evidence such as the vomited matter or stomach wash and samples of urine and faeces passed in his presence and suspected food, drink or medicine in separate wide glass bottles or jars with tightly fitting glass stoppers.
In case of death the doctor must determine the mode, manner, cause of death to arrange and record the dying declaration.

DYING DECLARATION An oral or written statement by a person on the point of death concerning the cause of his death. Recording of dying declaration is necessitated when the patient is serious.
In accidental poisoning, if there is any indication of danger to the general public, e.g. food poisoning or contamination of public drinking water, Physician must notify the public health authorities immediately.

**NOTES**

A medical practitioner must be very cautious in giving his opinion about poisoning; he should never give a verbal or a written opinion until and unless he is sure about the case.
AUTOPSY
Autopsy

- Autopsy means examination of a body after death.

- types of autopsy:
  1. Pathological autopsy
  2. Medicolegal autopsy
**Pathological Autopsy**

Done by the Department of Pathology and request comes from the relatives, who are the consenting part. In these cases, the doctor conducts a partial or complete autopsy of the organ or cavities where the pathology is suspected to find out the cause of death.

**Medico-legal Autopsy**

Conducted in the Department of forensic medicine. The request comes either from the authorities. The consent of the relatives is not required. The doctor conducts a full and complete postmortem to find out the cause of death and other relevant questions asked by the Investigating Officer.
The forensic pathologist conducts the autopsy to determine:

- The forensic autopsy involves not only the actual examination of the body at the autopsy table, but consideration of other aspects such as the crime scene.
- The history of the case should be obtained from the investigating police officer or the Sub-divisional magistrate.
- Identity the deceased if unknown.
- The time of death and/or injury.
- Identity the cause, mode & manner of death.
- The forensic pathologist should know the circumstances leading up to and surrounding the death prior to the autopsy.
- To collect trace evidence.
The forensic autopsy differs from the pathological autopsy in its objectives

The pathological autopsy also known as “clinical autopsy” is done to:

• diagnose the disease that has caused the death
• These autopsies, are indicated when foul play is not suspected
• further advance scientific knowledge of the condition, even if the disease is known prior to death
To behave at the scene

- The body should be handled a very little at the scene.
- In all gunshot mortalities and severely burned bodies, X-rays or preferably a CT should be undertaken. This is especially important in gunshot wounds in which the bullet appears to have exited. This is because the bullet may not have exited but rather only a piece of bullet or bone may have exited.
- In cases of violent deaths, paper bags should be secured around the hands so that no trace evidence will be lost. Plastic bags should not to be used to cover the hands, as it can collect humidity and ruin the evidence.
- The body should be wrapped in a clean, white sheet or plastic bag
- When fingerprints are to be taken for identification purposes, it should be done only after the examination of the hands
STEPS OF AUTOPSY

Permission for Autopsy

Preparation for Autopsy

Procedure of Autopsy
Permission for Autopsy

A written request must come from the authorities
Steps of Autopsy

Preparation for Autopsy

- The Investigating Officer should fill the perform 'Request for Postmortem' and should submit the body in the mortuary.
- Autopsy should be done without delay.
- The I.O. and relatives should identify the body.
- Autopsy is conducted in the mortuary of a governmental hospital.
- The mortuary should have good lightening, equipments, facility of cold storage and proper drainage system along with the manpower.
STEPS OF AUTOPSY

Preparation for Autopsy

• The Forensic Pathologist should take the history from I.O. and should carefully go through the inquest papers.
• The autopsy is done during the daytime.
• No unauthorized persons should be present in the autopsy room. The I.O. may be allowed if required.
• The autopsy is also carried out in a decomposed, mutilated, fragmented and skeletonized bodies as certain important information still may be found after examination.
Steps of Autopsy

Procedure of Autopsy

• External examination and internal examination
EXTERNAL EXAMINATION
• Sex, race, physique, height, weight and nourishment.
• Congenital malformations.
• clothing.
• The presence of vomitus in the nostrils and mouth.
• Any significant scars, tattoos, moles (identification).
• If there is any evidence of disease, it should be recorded.
• Evidence of injuries.
• Note the presence of teeth and or presence of any dental plates.
• Describe the degree and distribution of rigor mortis and postmortem staining.
• The color of the eye, the hair and the appearance of the eyes should be noted.
• Any unusual appearance of the ears, nose, or face, petechial hemorrhages.
• The presence of trace evidence such as powder, soot, grease or car paint etc.
• Evidence of recent medical and/or surgical intervention should also be recorded.
INTERNAL EXAMINATION
Internal examination

1. Incise the body

What are the types of incision in autopsy???
1. Incise the body

2. Inspect the organs

3. Examination of the cavities

4. Weighing and measuring of the organs.

5. Checking for any pathology.

6. Putting the organs back in and padding.

7. Suturing.

I-SHAPE INCISION

extends from the chin straight down to the symphysis pubis passing either on the left or right side of the umbilicus
INTERNAL EXAMINATION

1. Incise the body

goes from the tips of the shoulder on each side obliquely down, joining at the middle of the chest, or progresses downwards towards the xiphoid process, roughly between the nipples, and the incision is then continued down vertically along the midline of the front of the body, stopping at the pubis.

Y-SHAPE INCISION
1. Incise the body

From each side behind the ears, join in the suprasternal notch, extends to symphysis pubis.

Modified Y-shape incision
INTERNAL EXAMINATION

2. Inspect the organs

THORCIC: heart and lungs
ABDOMEN: stomach, intestine, liver, spleen, pancreas, gallbladder, kidney, bladder, prostate and uterus or prostate.
SKULL and BRAIN
INTERNAL EXAMINATION

3. Examination of the cavities
4. Weighing and measuring of the organs.
5. Checking for any pathology.
6. Putting the organs back in and padding.
7. Suturing.
**Internal Examination**

1. Incise the body
2. Inspect the organs
3. Examination of the cavities
4. Weighing and measuring of the organs.
5. Checking for any pathology.
6. Putting the organs back in and padding.

- Body cavities should be cleaned and made free from blood, fluids etc.
- Organs are placed back in and excess space is packed with cotton/cloth etc. (Neck/Pelvis).
- Dissection flaps are closed and sutured.
- Skull is filled with cotton and absorbent material and the skull cap is placed back in and the scalp is stitched.
Internal examination

1. Incise the body
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7. Suturing.
8. Body is washed with water, dried, covered with clothes and handed over to the police officials.
**Samples:**

The internal organs like liver, lung, brain etc. are taken for histological examination. It is not being done routinely but if after gross examination some pathology is suspected then 1-2 mm thick tissue can be removed along with the surrounding normal area. It is preserved in 10% formalin or 95% alcohol. The amount of preservative should be enough not to dry the tissues inside the container.
• the stomach and intestines are preserved in a one glass jar filled with saturated solution of common salt up to 3/4th of its volume & The second jar is used to preserve the liver, spleen and kidney.
• Blood is kept separately in a bottle.
• All the jars and bottles are sealed and kept in a wooden box which is finally sealed and handed over to the I.O. for onward transmission to the laboratory along with the sample seal.
• The polyethylene bags or containers can be used but the volatile poisons may diffuse through it.
• In cases where lungs have to be preserved for analysis like that of volatile poisons, nylon bags should be used and the blood should be kept in plastic capped tubes.
ARTIFACTS
In Forensic Pathology, the artifact is any change caused or a feature introduced into a body after death that is likely to lead to misinterpretation of medicolegally significant antemortem findings. It is the duty of the pathologist to interpret artifacts correctly.
The misinterpretation may lead to:
1. Unnecessary spending of time and effort as a result of misleading findings
2. Wrong manner of death
3. Wrong cause of death
4. Halt in the investigation of a homicide and non detection of murder
5. Miscarriage of justice
Types of artifacts

- Introduced between death & autopsy
- Introduced during autopsy
INTRODUCED BETWEEN DEATH & AUTOPSY
I. Agonal
II. Resuscitation
III. Embalming
IV. Interment & Exhumation
V. Decomposition
VI. Miscellaneous
VII. Toxicological
Regurgitation and aspiration of the gastric contents. It's a very common artifact seen in forensic practice. This may occur in natural deaths as a terminal event, from handling of the body or during resuscitation, this may result in physicians in wrongly giving aspiration of gastric contents as cause of death.
The body may reveal injection marks, bruises and fractures etc, when the body is subjected to resuscitative attempts.

- The injection marks are usually seen in the cardiac region or on the extremities.
- The intracardiac injection may be associated with bruising of the heart and collection of some blood in the pericardium.
- The defibrillator applied over the body produces ring like bruises over the chest.
- The ribs may sometimes be fractured from external cardiac massage (CPR).
- Fat or bone marrow embolization, Which is frequently associated with fractures of ribs or sternum with external cardiac massage (CPR).
- The positive pressure breathing apparatus used for resuscitation tend to leave the evidence of acute emphysema, occasionally with subpleural blebs, air in the mediastinum and even Tension pneumothorax.
the chemical treatment of the dead body to preserve it. It’s done through an incision by using a device called a trochar, thus creating a new wound site simulating a stab or gunshot wound, or using an existing wound which would change the dimensions. The embalming fluids may cause confusion for the forensic scientists when analyzing the viscera for drugs or chemicals. Embalming fluids generally contain formaldehyde, methyl alcohol and sometimes other interfering compounds.
Interment and Exhumation

Is the process of unearthing buried human corpses. Fungus growth is common at body orifices, eyes and site of open injuries. The underlying skin is discolored simulating bruising. During the digging damage can happen to the corpse mostly producing new bone fractures.
Decomposition of the biological material often causes apparent alterations in the constituents of the tissue. The pancreas is one of the first organs to undergo autolysis, because of the proteolytic enzymes within it. The autolysed tissue is often hemorrhagic and can easily be mistaken for acute pancreatitis. Autolytic rupture of the stomach can occur postmortem in both child and adult. This so-called ‘gastromalacia’ appears as a slimy brownish black disintegration of the fundus with release of the stomach contents into the peritoneal cavity mimicking pneumoperitoneum.
INTRODUCED BETWEEN DEATH & AUTOPSY

Patches of hemorrhage, sometimes quite large and confluent, can occur in the tissues behind the esophagus in the neck. These lie on the anterior surface of the cervical vertebrae and are caused by distension and leakage from the venous plexuses that lie in this area. Their importance lies in confusion with deep neck bleeding in strangulation.
Heat fractures of the bones, either skull plates or long bones, may be seen in victims of severe fires, but are not evidence of ante-mortem violence.

Also in conflagrations, the 'heat hematoma' within the burned skull can resemble an extradural hemorrhage of antemortem origin.

The site is often at the vertex or occiput; however, unlike the usual parietal hemorrhage, there is no fracture line crossing the middle meningeal artery, the usual cause of a true extradural bleed.

The frothy brown appearance of the false clot, together with heating effects in the adjacent brain, should indicate the true diagnosis.

Shrinkage of the dura due to heat may cause it to split, with herniation of the brain tissue into the extradural space.

Severe burns of the body surface may lead to heat contractures of the limbs with tears over joints such as the elbow also skin cracks. These must not be confused with antemortem lacerations or incised wounds.
INTRODUCED BETWEEN DEATH & AUTOPSY
Dark red discoloration of the posterior part of the myocardium is usually due to post-mortem gravitational hypostasis, not early infarction. Similarly, segmental patches of dark red or purple discoloration of the intestine is hypostasis, not infarction. The latter tends to be a single continuous length.
INTRODUCED BETWEEN DEATH & AUTOPSY

• Animal bites which could resemble stab wounds.
• Postmortem hemorrhage (hypostasis): The finding of the extravasation of blood in the tissues or even pools of blood in the body cavities does not necessarily mean that the hemorrhage was from ante-mortem trauma.
• Blackish brown discoloration of the liver at the site of contact with the large bowel is fairly common. This is a postmortem change, the result of substances passing from the bowel to the liver and depositing sulfides in the adjacent liver tissue. Similarly, bile also produces staining of the liver surface.
Decomposition of the biological material often causes apparent alterations in the constituents of the tissue.

- It is generally known that the alcohol is produced postmortem because of putrefaction (enzymatic decomposition, especially of proteins, with the production of foul-smelling compounds) of the tissues and the fact that many of the bacteria can produce alcohol. However, it must be emphasized that the levels of alcohol generated by putrefaction are usually less than 100mg. If the levels are more than 100mg it should arouse the suspicion of alcohol ingestion prior to death.
Combustion of the body tissues and other materials associated with the burned body produces several gases. An investigation on gases generated in experimental fires demonstrated the presence of ammonia, carbon monoxide, hydrogen cyanide, hydrogen sulfide, nitrogen, oxides of nitrogen and sulfur dioxide. Combustible material like silk and wool produces high concentrations of several of these gases because their nitrogen content is high. Some of these gases may be detected in the body tissues and the results of toxicological analysis may raise false alarms. Cyanide levels in the blood of the burn victims were reported between 17-220mg per 100ml.
Types of artifacts

- Introduced between death & autopsy
- Introduced during autopsy
INTRODUCED DURING AUTOPSY
Introduced During autopsy

- one of the commonest artifacts is the introduction of air bubbles into the vessels at the top of the brain.
- In the majority of cases while the dura is being pulled in the sagittal line, air gains access to the blood vessels.
- Likewise postmortem introduction of air into the veins of the neck during the incisions of the skin is also very common.
- In cases of suspected air embolism following a criminal abortion, artifactual presence of air bubbles in the vessels of the brain and neck may initiate confusion.
Introduced During Autopsy

Toxicological Artifacts

- Faulty Technique in Collecting Samples
- Faulty Technique in Storage
- Use of Preservatives
Blood samples are sometimes drawn from the heart with a long needle and this may result in contamination of sample with gastric contents and tests particularly for alcohol may be misleading.

Artifacts may be introduced by cutting the organs with instruments contaminated by stomach contents or by putting the samples of tissue in contaminated Containers.

The use of the preservatives can also add to the artifacts. It should be emphasized that preservatives such as EDTA (ethylene-diamine tetra- acetic acid), formalin, heparin and methanamine give a positive test for methanol and these should not be used as anticoagulants for blood if an analysis for methanol is required.
RAMADAN KAREEM
THANK YOU