

REVIEW ARTICLE

Forensic Analysis: Focus on Collection and Preservation of Viscera and Biological Sample in Poisoning Cases

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ABSTRACT

In offences involving the human body, Laboratory analysis of material obtained from the victim or the accused can prove vital to proper investigation of the case. In case of poisoning, Viscera and Biological Sample are the main physical evidences which play very important role to solve the crime. Unfortunately, Medical Officers are often not aware as to the exact nature or quantity of samples to be taken, nor the correct manner of preservation or packing that should be followed. Collection and preservation of viscera for chemical analysis, it is a duty of doctor to collect and preserve the viscera and other exhibits property. The aim of this literature is to be helpful to medical officers & police personals in Collection and Preservation of Viscera and Biological Sample in Poisoning cases to solve crime.

KEYWORDS

• Viscera • Collection • Preservation • Poisoning

INTRODUCTION

Viscera come from Latin word "viscus" which means the inner part of the body. Study of viscera is called *splanchnology*. Soft internal organs of the body such as lungs, heart, and organs of digestive, excretory and reproductive systems have been collected after postmortem for toxicological analysis. Criminal cases which leaves no such evidence or the case

which seems like murder but the criminal is successful leaving the evidence, in those cases viscera can be taken for examination to know the cause of death.¹⁻⁴ Prof. VL Deshpandey has advice to go to the mortuary, to examine the body externally, to see the clothes, do not touch, do not remove, whatever you can see externally record your finding and say if it is really so that you cannot proceed with the

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examination and when the optimal condition of lighting, say the daylight, is available, then you will start to proceed with the examination. For this, Police officer's presence in the mortuary at the site of the autopsy will necessarily have to be there. Most often, Police officers, mostly head constable or constable who is there, he will submit the body in the mortuary end then he goes to do other work because he is otherwise also a very busy person due to many multifaceted work, which is thrust on, him. The medico legal autopsies in a medico legal Investigation of death are must. They say there are two types of autopsies. Autopsy is a postmortem examination of the dead body. It is a word that is Identical to the word, i.e., necropsy. There are two types of autopsies that are there, one is medico legal autopsies, with which we are primarily concerned where stales come into picture because a crime has occurred or a suspected crime has occurred or at least it is certain that the death that has occurred, it cannot be said with certainty that the death is due to natural causes. Other is the clinical autopsy or pathological autopsy that is done after obtaining the consent of the nearest kin or nearest relative. This consensual autopsy, this clinical autopsy, this pathological autopsy can be part autopsies also. If relations want that only the heart should be opened and seen 'whether myocardial infarction has taken place, the doctor is authorized to do only that part of the examination of the human body; he is not allowed to do other things. This clinical autopsy can be a partial autopsy, but postmortem examination in medico legal cases cannot be partial autopsies; they have to be complete autopsies.⁵

Under the following circumstances, where analysis of viscera to detect poison may be necessary:

1. Death is suspected to be due to poisoning on the basis of the inquest.
2. Death is suspected to be due to poisoning by the medical officer during the course of autopsy.
3. Deceased was intoxicated at the time of death, or was under the influences of any drug.
4. No other cause could be ascertained for the death after detailed autopsy.
5. Deceased was burned to death, or was retrieved from the scene of a fire.
6. Death due to burn, if the patient died within 48 hours after receipt of the injury
7. Advanced decomposition.
8. Accidental death involving the driving of a vehicle, or operation of machinery.
9. Body retrieved from water, but classical signs of drowning are absent.
10. Death due to hanging or drowning

Preservation of viscera

For preservation of viscera, the following preservatives are recommended (a) Saturated solution of common salt: It is the commonly used preservative except in cases of poisoning by mineral acids, alkalies, metallic poison and aconite (b) Spirit rectified: This should not be used in cases of poisoning by alcohol, acetic acid; phenol, paraldehyde and phosphorus.⁶⁻⁷ This is because organic acids are soluble in alcohol, and phosphorescence of phosphorus is diminished by alcohol. Moreover, they should not be stored in formaldehyde because of extraction of poisons, especially non- volatile organic.

Visceras to be preserved in such a manner: *piece of Stomach and stomach contents, The upper part of small intestines and its contents.* As most common route of administration of poison is oral, the poison may be manifested in the content of the stomach and intestines, *piece of spleen and Liver not less than 50 gram, Kidney half of each side, Uterus with appendages and upper part of vagina is preserved in case of criminal abortion.* Sticks and foreign bodies found in the genital tract are preserved separately, *Brain and spinal cord* are preserved in cases suspected of strychnine poisoning, *Bones and nails* are sent in cases of heavy metals and arsenic poisoning, *Urine* not less than 30 cc, *Blood*, 5 cc. is collected from the peripheral sites. It is never collected from abdominal or pleural cavities. Visceras to be preserved has been tabulated in table 1 and table 2.⁷ Preservative is not necessary in the following situations (a) if viscera can be analyzed within 24 hours or can be refrigerated or placed in an ice box (b) In the case of material like bone and hairs (c) In the case of lung for detaching inhaled poisons.²

Collection and preservation of routine viscera and body fluids

Table 1: Collection and preservation of routine viscera and body fluids in vial at autopsy⁶

Specimens	Quantity
Piece of Stomach	50-100 gram
Piece of Small intestine and its content	50-100 gram
Piece of liver with gall bladder	50-100 gram
Pieces of kidney	One half of each kidney in adult
Piece of spleen	50-100 gram
Stomach contents	50-100 gram
Blood	10-20 ml
Urine	30-50 ml

Table 2: Additional Collection and preservation of following viscera and body fluids at autopsy

Specimens	Quantity	Indication
Adipose tissue	50-100 gram	Insecticides, thiopental
Heart	whole	Cardiac poison
Brain	100 gram	Neurotoxic poison, strychnine, alkaloids and volatile organic poison, organophosphate, anesthetics, CO
Bile	All available	Opiate, paracetamol
Lungs	One half of each	Methadone, Gaseous poison, HCN, Alcohol, chloroform, inhalants etc.
Vitreous humor	All available	Digoxin, electrolyte, glucose, Alcohol and chloroform
Bone (femur)	10 cm	Heavy metals and arsenic, thallium, radium and mercury etc.
Uterus	-	Chemical abortion
Skin (with underlying tissue)	Affected portion (2.5 square)	Corrosive, injected poison, snake bite
Hairs (plucked)	15-20	Heavy metals

Nails	All available	Heavy metals
Muscles	Specially thigh muscles	All poison, When internal organs are badly putrefied
Spinal cord	Entire length	Strychnine, in case of cerebral or spinal poison
Cerebro-Spinal Fluid (CSF)	10 ml	Alcohol intoxication
Body fats	50-100 gram	Endrin, DDT (Organochlorines)
Urine		Narcotics drugs

Important points: Collection, Preservation and sending of Viscera and Biological Sample

The following point should be consider during Collection, Preservation and sending of Viscera and Biological Sample in Case of Poisoning such as

1. Only 2/3rd of the capacity of the bottle/vial should be filled with viscera and preservatives to avoid bursting of the bottle/vial if gases of decomposition are formed.
2. The stoppers of bottles/vials should be well fitted and sealed.
3. Bottle/vial should be labeled with the name of the victim, organ, date and place of autopsy.
4. Sample of preservative is preserved separately and tested to rule out any kind of poison being present in the preservative as contaminant.
5. Sealed bottles/vials containing viscera in preservative are put in a box which is locked and sealed.
6. Blood should be collected separately in a screw capped bottle. In case of volatile poisoning such as alcohol, blood sample should be packed in air tight container or layer of paraffin (to prevent escape of gas).
7. All material should be packed, preserved, and sealed properly. Use individualized department seal for sealing and not coins, keys, rings, etc.
8. The covering letter should bear a specimen seal for reference.
9. All material must be packed in suitable containers, and each container should have a label affixed to it mentioning relevant

details - nature and quality of contents, preservative used (if any), name of the deceased, crime number, police station to which the case belongs, postmortem number, date of the autopsy, name of the hospital, name and designation of the medical officer, etc.

10. The exact type of analysis required should be mentioned in the covering letter.
11. The exact preservative used as well as the quantity should be mentioned in the forwarding letter. A sample of the preservative used should also be sent separately (3-7).

Submission of viscera in forensic science laboratory

The following documents should be sent/ submitted to examiner in forensic science laboratory by investigating officer or police personal during submission of viscera sample:

- a. The requisition letter from the police or magistrate, as well as a copy of the inquest report must invariably be sent along with the forwarding letter.
- b. A copy of autopsy/Post Mortem report
- c. A copy of inquest (Panchnama) report
- d. Additionally, a copy of FIR/ GD
- e. Medical report
- f. Seal sample: specimen seal for reference

CONCLUSION

Currently, Unfortunately, Medical Officers are often not aware as to the exact nature or quantity of samples to be taken, nor the correct manner of preservation or packing that should be followed and also not aware to collect and preserve exact part of viscera of forensic interest. Police personal should also be trained and aware about viscera collection and preservation about which, what, why, and how much viscera should be collected and preserved for chemical analysis. The present review shows that procedure of Collection and Preservation of Viscera and Biological Sample in Case of Poisoning that has great potential to be explored in the

improving of result of chemical analysis and others analytical characteristics. This way, procedure of Collection and Preservation of Viscera is a creative field for getting a good result. Eventually, Collection and Preservation of Viscera and Biological Sample in Case of Poisoning should be improved which play very important role in the better extraction as well as qualitative & quantitative analysis. This practice will be very helpful to examiner for chemical analysis in forensic science laboratory.

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