

MEDICOLEGAL AUTOPSY – A REVIEW**Dr. Deepti Patel^{*1}, Dr. S. R. Inchulkar² and Dr. Yuvraj Kaushik³**¹1st Year MD Scholar, PG Department of Agad Tantra Evam Vidhi Ayurveda, Govt. Ayurveda College, Raipur (CG).²Professor & Head of Department, PG Department of Agad Tantra Evam Vidhi Ayurveda, Govt. Ayurveda College, Raipur (CG).³Lecturer, PG Department of Agad Tantra Evam Vidhi Ayurveda, Govt. Ayurveda College, Raipur (CG).***Corresponding Author: Dr. Deepti Patel**

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ABSTRACT

An autopsy also called necropsy or postmortem examination, is the examination of a person's body after death. It is an essential part of investigation to determine the cause of death and is used in case of unknown or uncertain death. An autopsy is of mainly two types Medico legal autopsy and clinical autopsy. The main aim of an autopsy is to determine the cause of death, the state of health of the person before he or she died and whether any medical diagnosis and treatment before death was appropriate. Forensic autopsies differ in the purpose and procedure from clinical autopsies but sometimes they overlap with each other at various levels. The autopsy should be carried out by the registered medical practitioner preferably with training in forensic medicine. Requirements for autopsy examination are including instruments and chemicals. Procedure consist of external and internal examination. The aim of this review article is to understand the concept, procedure, types of autopsy, to know about its importance in knowing the exact cause of death is natural, unnatural, accidental. Through this article, we can throw light on autopsy, which will be helpful for the medico-legal aspect and related laws will be easily understandable.

KEYWORDS: Postmortem, Death, Medico Legal, Autopsy, Forensic Medicine Etc.**INTRODUCTION**

Autopsy or necropsy means, postmortem examination of a death body.^[1] Autopsy literally means to see for oneself. A medicolegal autopsy (necropsy) or postmortem examination is a special type of scientific examination of a dead body carried out under the laws of state mainly for the protection of its citizens and to assist the identification and prosecution of the guilty in cases of unnatural deaths. As such, it requires state permission and must meet with certain essential requirements.^[2] In each and every case the autopsy must be complete, all the body cavities should be opened, and every organ must be examined. A complete autopsy is necessary to substantiate the truth of evidence of eyewitnesses. A poor autopsy is worse than no autopsy at all, as it is more likely to lead to a miscarriage of justice.^[3]

TYPES OF AUTOPSY^[4,5]

1. **Academic autopsy-** Dissection carried by students of anatomy.
2. **Pathological, Hospital or Clinical autopsy-** Done by pathologists to diagnose the cause of death or to confirm a diagnosis. Physician cannot order these autopsies without the consent signed by the next of kin.
3. **Medicolegal or Forensic autopsy-** Types of scientific examination of a dead body carried out

under the laws of the state for the protection of rights of citizens in cases of sudden, suspicious, obscure, unnatural, litigious or criminal deaths. The basic purpose of this autopsy is to establish the cause and manner of death.

4. **Virtopsy or Digital autopsy** – It is a bloodless and minimally invasive procedure to examine a body for cause of death. It utilizes imaging techniques (CT and MRI), photogrammetry and 3-D optical measuring techniques to get a reliable, accurate geometric presentation of all findings (the body surface as well as the interior).
5. **Endoscopic autopsy (Keyhole autopsy)** – In this, internal organs are seen through endoscopes or laparoscopes. It is done in cases where the family of the deceased objects to the performance of a conventional autopsy for religious or other reasons. The technique has proven to be accurate, more rapid than conventional autopsy and left the body virtually intact.
6. **Needle autopsy** – A biopsy needle is used to take the samples of tissues and examined microscopically only.
7. **Verbal autopsy** – A protocolized procedure that allows the classification of causes of death through analysis of data derived from structured interviews with family, friends and caregivers.

8. **Psychological autopsy** – It is an investigative procedure of reconstructing a person's state of mind prior to death. This is based upon information gathered from personal documents, police and medical records and interviews with survivors of deceased-families, friends and others who had

contact with the person. The typical case is one in which there is some doubt as to whether death was accidental, self-inflicted or malicious and whether the played an active role in his own demise. Such matters can be especially important in life insurance claims that are void if death was suicidal.

DIFFERENCE BETWEEN FORENSIC AND CLINICAL AUTOPSY^[6,7]

Features	Forensic autopsy	Clinical autopsy
Synonyms	Also called as postmortem examination or medicolegal autopsy.	Also called as Hospital or pathological autopsy or academic autopsy.
Aim	<ul style="list-style-type: none"> To know cause of death To ascertain time since death. To know manner of death, e.g. murder, burns, suicide, drowning etc. To collect evidences. 	<ul style="list-style-type: none"> To know the medical background. To confirm the clinical diagnosis or to arrive at diagnosis.
Consent	Not necessary	Necessary
Conducted by	Forensic expert or any registered Medical Practitioner.	Pathologist.
Requisition	Police officer, Magistrate or a Coroner.	No such requisition is required.
Procedure	Autopsy is always complete	The autopsy may be complete or incomplete (partial) depending upon the consent.
Time of Conducting Autopsy	Done only during daytime.	Can be done at any time of the day.
Histological examination	Usually not done or may be done in some special situations.	Routinely done.
Body handed over to	The Investigating Police officer	Relatives.
Medical Officer to give evidence in court	Required	Not required.

OBJECTIVES FOR MEDICOLEGAL AUTOPSY^[8,9,10]

Who when, where, why, how and what are the questions that the autopsy assist in answering the objective of the determine ^{gautam biswas}

- To determine the cause of death (natural/unnatural).
- To determine the manner of death (homicide, suicide or accident).
- For the identification of unclaimed bodies.
- To determine the time since death.
- To collect evidences to identify the object causing death and to identify criminal.
- To document injuries and to deduce how the injuries occurred
- In case of a foetus, to find its age and viability.
- To correlate with ante-mortem diagnosis.
- To identify unrelated or new diseases.
- To find genetic disorders which might have implications for other members of the family.
- For audit and to know the treatment given.
- To retain relevant organs/viscera and tissues as evidence.

RULES FOR MEDICOLEGAL AUTOPSIES^[11,12,13]

- Permission for Autopsy-** The autopsy is done by the doctor on request of the investigating police officer or a magistrate or some other officer authorized by the state government.
- Issue of the autopsy number-** The body should be labelled as soon as it arrives in the mortuary.

3. **Identification of the body-** The medical officer must establish the identity of the dead body and record the means of identification. The body should be identified by at least one relative in the presence of the police officer, and signature should be obtained on the original autopsy report to this effect.

4. **Codal formalities-** The doctor should complete and check all the codal formalities. If there is any discrepancy, the same should be sorted out with the help of the investigating police officer.

5. All registered medical practitioners(RMP) in government service can conduct the examination. Autopsy is conducted by two doctors where death of a female due to burns or other suspicious reason has occurred within 7 years of her marriage. A panel of doctors is also constituted in case of custodial deaths, death in operation table and second autopsy. Ideally, a board should have odd number of members so that in case of differences, a conclusion can be reached.

6. Conduction of autopsy-

- Autopsy should be thorough and complete. Partial autopsy is not permitted.
 - It should be done in the mortuary as soon as possible after receiving the official request.
 - No unauthorized person should be allowed entry in the mortuary/dissection room at the time of autopsy.
 - Both positive and negative findings should be recorded.
7. The autopsy should be conducted in daylight, since it is said that color changes, such as jaundice,

changes in bruises and postmortem staining cannot be appreciated in the artificial light. Moreover, postmortem is not an emergency, and unless there is serious threat to law and order situation or instruction comes from District magistrate, It should not be done after 5PM. However, certain states (Gujarat and Tamil Nadu) allows postmortem at night in some special circumstances.

8. If the body is received in the mortuary at night, it is preserved at 4°C after noting the date and exact time. A preliminary examination is done to note external appearances, body(rectal) temperature, extent of postmortem staining and rigor mortis. The actual postmortem is conducted on the next day.
9. In exceptional cases, the medical officer may be asked to visit the scene of death where a dead body may be lying. This is usually done when the body is in an advanced state of putrefaction, and its transport will be difficult.
10. After completion of autopsy the body is stitched, washed, and restore to the best possible cosmetic appearance and then handed over to the police constable/IO.

REQUIREMENTS FOR AUTOPSY

For conducting autopsy along with well equipped mortuary, instruments and chemicals required.^[14]

INSTRUMENTS^[15,16,17]

1. **Forceps-** They are also used to stabilize tissues and assist in dissection.
 - Toothed forceps- are useful for stabilizing and moving tissues.
 - Smooth atraumatic forceps
 - De-Bakey forceps
 - Fine toothed Adson forceps- for skin closure

- Stout toothed Bonney forceps- for facial closure.
2. **Knife blades-** In India, Bard-Parker knife blades no. 10,11,15,20,22 are commonly used.
 3. **Needles-** is used for sewing up the body after autopsy.
 - Straight needles
 - Curved needles- half circle needle, three-eighths circle needle, five-eighths circle needle, quarter circle needle, swaged needle.
 - Large needle
 - Needle tips- are either tapered or cutting.
 4. **Dissecting scissors-** cutting of tissues, general purpose cutting.
 - Iris scissors- used for delicate dissection and cutting.
 - Mayo scissors- used for cutting thick or dense tissues, such as fascia, scar or tendons.
 - Richter Dissecting scissors- useful for reaching inaccessible areas.
 - Scissors with one pointed and one blunt end- used for cutting tough tissues, fibrotic scars etc.
 5. **Saw-** for removing the skull cap.
 - Hack saw
 - Councilman's blade saw
 - Rachiotomy saw
 - Electric autopsy saw
 6. **Chisel-** is used to separate the top of the calvarium from the lower skull, thus exposing the brain and the meninges.
 7. **Hammer-** is used with the chisel to separate the calvarium from the lower skull.
 8. **Rib shears-** are used to cut through the ribs prior to lifting off the sternum.
 9. **Other instruments** that should be available- Probe, Thermometer, Hand lens, Torch, Sponges, Glass slides, Bowls, Trays, Test tubes.



Fig - 1: Postmortem Kit.

EXAMINATION OF AUTOPSY^[18,19]

A. EXTERNAL EXAMINATION

1. The identification of the body- In case of an unknown body
 - Note the general features describing age, sex, height, weight, hair distribution, scars, tattoo marks.
 - Record fingerprints
2. Condition of the body – muscular, emaciated, rigor mortis, decomposed.
3. Clothes – examined for
 - Stains of blood, saliva, semen, vomit or faecal matter, hair.
 - Cuts, burns(by fire or acids), holes and blackening(from firearms).
4. State of natural openings – Eyes, ear, mouth, nostrils, anus, urethra and vagina.
5. Injuries – Nature and exact position, measurement and direction.
6. State of limbs, contents of hands, bone and joints.
7. Genitalia, Breasts

B. INTERNAL EXAMINATION

• **SKIN INCISION**

Following are the various type of incision used for autopsy^[20]

1. **I-Shaped Incision or standard midline incision-** The incision starts from just under the chin in midline and goes up to the pubic symphysis, sparing the umbilicus. The umbilicus is spared as it consists of dense fibrous tissue which is difficult to stitch. it is most common incision.
2. **Y-Shaped Incision-** The incision starts from two acromian processes, which form two limbs of ‘Y’. It moves medially to meet at the level of xiphisternum, from then downwards up to the pubic symphysis.it is done in case of neck injuries.

• **EVISCERATION METHODS^[21,22]**

Various method for the removal of body organs

Method	Virchow’s Method	Letulle’s (en-masse)	Ghon’s (en-block)	Rokitansky’s (in-situ)
Procedure	Each organ is removed separately one by one and then studied individually.	Removing all the internal organs in a single mass.	Organ systems are removed separately from the body en-block eg. GIT, Cardiovascular excretory system.	<ul style="list-style-type: none"> • Organs are dissected within the body, without removing them. • Used when the body is infected and will pose a serious health hazard.
Advantages	<ul style="list-style-type: none"> • Quick 	<ul style="list-style-type: none"> • Rapid • Retains continuity • Organs system can be studied together. 	<ul style="list-style-type: none"> • Relatively quick • Inter-organ relationship is retained. 	<ul style="list-style-type: none"> • Quick • Less infectious • Good in children.
Disadvantage	<ul style="list-style-type: none"> • Loss of continuity • Multiple organs can not be studied together. 	<ul style="list-style-type: none"> • Produces massive bulky mass • Further dissection of organs is time consuming. 	If disease involves more than one organ system, the relationship between the organs is lost.	<ul style="list-style-type: none"> • Details cannot be studied • Not used routinely • Difficult in adults.

All the internal organs, cavities, membranes are examine carefully to see their abnormalities like hemorrhages, inflammation, injuries, location of wound sign of disease

3. **Modified/Small Y-Shaped Incision-** This incision is the same as a Y-Shaped incision from sternal notch downwards. Above the sternal notch, it bifurcates into a Y, going to the mastoid process. It is used in female.
4. **Inverted Y-Shaped Incision-** This incision is commonly given in foetus and newborn children as it preserves the umbilical arteries. This incision starts from chin in the midline and goes up to just above the umbilicus, from where the two limbs go down to the inguinal region on both sides.
5. **T-Shaped Incision-** A straight mid-line incision is given from the suprasternal notch till the pubic symphysis, (like an I-Shaped incision). From the suprasternal notch, the incision is extended horizontally on both sides to the acromian processes. It is used to explore base of neck.



Fig – 2: Skin Incision.

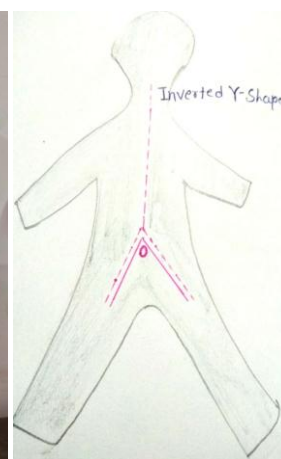


Fig – 3: Skin Incision.

etc. and suspected organ or viscera’s should be sent for examination.

C. LABORATORY INVESTIGATIONS

While conducting autopsy, the medical officer may need laboratory support for arriving conclusion and opinion.^[23,24,25]

1. Sample collection- Blood, CSF, Vitreous humor, Lungs, Urine, Bone, Hair, Nails, Skin, Maggots, etc.
2. Preservation of viscera – In all cases of suspected poisoning, viscera is sent to the Forensic Science Laboratory for toxicological analysis. Commonly used preservatives are common salt, saturated sodium chloride solution, rectified spirit, potassium fluoride.^{BARDALE, REDDY[15,16]}
3. Laboratory examination - Histopathology, Bacteriologic examination, Smears Virological examination Blood, urine, Vitreous and CSF examination, Enzymes, Faeces, Bite marks, Vaginal and anal swabs, Urethral discharge.

D. OPINION – It includes:^[26]

- Cause of death
- Time since death
- Duration of injuries (time between causation of injury and death)
- Whether injuries are ante-mortem or post-mortem.
- Weapon used etc.

OBSCURE AND NEGATIVE AUTOPSY^[27]

In about 20% of all postmortem examination cases, the cause of death may not be clear at the time of dissection of the body, and there are minimal or indeterminate findings or even no positive findings at all. These are a source of confusion to any forensic pathologist.

- In many of these cases, the cause of death can be made out after detailed clinical and laboratory investigations and interview with persons who had observed the deceased before he died.
- These autopsies are more common in the younger age group. an example is the obscure syndrome seen in Thailand, Singapore, China, Japan and Hongkong wherein young workers suddenly die with no demonstrable pathology.

Causes of Obscure Autopsy

1. **Natural diseases** – epilepsy, asthma, paroxysmal fibrillation.
2. **Concealed trauma** – Concussion, blunt injury to the heart, reflex vagal inhibition.
3. **Poisoning** – Anesthetic overdose, narcotic, neurotoxic, cytotoxic or plant poisoning.
4. **Biochemical disturbances** – uremia, diabetes.
5. **Endocrinal disturbances** – adrenal insufficiency, thyrotoxicosis.
6. **Miscellaneous** – Allergy, drug idiosyncrasy.
7. **SIDS**(Sudden Infant Death Syndrome).

SECOND AUTOPSY^[28,29]

Second autopsy or re-postmortem examination is the autopsy conducted on an already autopsied body. Though it is common in the western world, its incidence is relatively uncommon in India. A committee set up by the Nation Human Rights Commission recommended

that the following rules be observed in respect of a second postmortem;

- It is usually done on the order of the Magistrate or a Court of Law.
- It should be conducted by a board of two forensic medicine specialist.
- If necessary, after exhumation the body is brought to the place of second postmortem.
- A copy of the first postmortem report, along with all other documents, eg. Photographs, videographs, toxicology report(if available) etc. should be obtained before starting the second autopsy.
- If possible, the doctor who conducted the first autopsy should be present at the time of the second autopsy.

Indication of second autopsy

- Relatives are not satisfied with the first autopsy.
- Cause of death cannot be opined in the first instance.
- Expert opinion wherein some question left unanswered or some issues unattended.
- Suspicion of doctor conducting the postmortem coming hand-in-glove with the accused.
- Involvement of the police in concealing the facts.

EXHUMATION^[30]

Exhumation means lawful digging out a body, which has already been buried from a grave. The power of to order exhumation is contained in section 176(3) of the criminal procedure code 1973. Exhumation may be required to establish the identity of a dead person, in civil or in a criminal case. It may also require to recover some papers or documents or other evidential material buried with the dead body. Exhumation is carried out to known the cause, manner, and nature of death.

CONCLUSION

Medico legal autopsy can be helpful to the family and relatives to known about the cause of death, their relatives and it might also comfort future age group of the family if deceased person died because of an genetic disorders. Government must liberalize the protocols pertaining to the authorization of conducting forensic autopsies and encourage all educated person to conduct clinical autopsies for results and reports public education and information targeted at the advantage of clinical autopsies for the person in specific and to the society in general. The community always accepts and welcome things which are favorable to it making postmortem essential on all the uncertified death. The main motto of postmortem examination is cause, manner, time since death and also to identify the victim and accused.

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