

Issues Impacting the Reliability, and Authenticity of Medical Evidence relating to Post-Mortem Examination in a Trial

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Abstract: *Post-mortem is a scientific examination conducted post-death in order to find out the cause of death as well as the traces of the perpetrator of the crime if it is homicidal. This examination gives a direction to investigative machinery to start its investigation to find and prosecute the accused and exonerate the innocent accused in the case. Additionally, it is complicated as well, depending upon various essential and important factors, which are vital for the admissibility of medical evidence in a criminal trial and this article focuses on these issues. These essentials factors include the performance of examination only by a registered autopsy surgeon or pathologist; who is an expert in the knowledge of diseases, the carrying out of a detailed and careful examination; on the crime scene and in the mortuary, preparation of the factual and objective medico-legal report; which is free from personal feelings and opinions of the medical expert.*

Key Words: Post-mortem Examination, Medico-legal Report, Autopsy surgeon, Autopsy report, Dead body

Introduction

Autopsy plays an important role in establishing the identity of unknown deceased, solving the question of dead or alive birth in dispute of medical negligence, determining the cause and time of death, differentiating between human and animal remains in mass destruction, composing and compounding of the body in mass destruction. In short, it plays a vital role in saving the innocents from wrongful conviction by finding clues about the real culprit, verifying the truthfulness of the testimony of an eyewitness and providing expert medical evidence in the trial. This examination is complicated depending on various essential and important factors, which are vital for the admissibility of medical evidence in a criminal trial. These essentials factors include the performance of examination only by a registered autopsy surgeon or pathologist who is an expert in the knowledge of diseases, the carrying out a detailed, careful examination on the crime scene and in the mortuary and preparation of the factual and objective medico-legal report, which is free from personal feelings and opinions of the medical expert. Some prerequisites play a significant role in the admissibility of expert medical evidence, such as the availability of essential equipment

used for the examination for conducting a proper examination, handling of evidentiary articles during the examination with care following prescribed protocols, and sending them to the forensic experts for forensic analysis.

Thus, the medical expert should decide all the relevant procedures, such as; they should proceed with the examination of the spinal cord if poison is used to affect the spinal cord, conducting an examination of vital organs and clothing, and keeping safe custody of the clothes of deceased. Their role extends to keeping a complete record of examination, tracking photography of the body, including abnormalities, and noting identification features of the dead body and features that could help determine the time of death (Samar Abbas vs State 2022). The preservation of the dead body in a suitable and proper manner without contaminating it and allowing access to police and forensic scientist for collection of evidence is also expected responsibilities of a medical expert for a criminal dispute under trial. These rules are considered a code of legal requirements for autopsy and medical jurisprudence. Medical expert evidence becomes authentic and reliable evidence only after following these rules otherwise, it is not reliable and can lead to the

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exclusion of expert medical evidence and can lead to wrongful convictions of the innocents accidentally involved in the investigation.

Research Methodology

This qualitative research into the legal study of expert medical evidence is conducted using black letter law research methodology and primary and secondary data is collected for a descriptive and analytical study on the topic. Thus, the primary and secondary data include case laws, law and legislation, journal research articles, newspaper articles, and internet-based data such as webpages information.

Literature Review

"Post-mortem" is an amalgamation of two terms; one "Post" is an English term meaning "After" whereas "Mortem" is a Latin word meaning "Death," so the literal meaning of Post-Mortem is "after-death" (Dictionary 2018). Its anonymous term is Ante-Mortem both of these are Latin expression meaning "before-death," whereas autopsy (Dictionary 2018) is taken from a Greek phrase "Autopsia" implicates "to see with one's own eyes". Thus, a post-mortem examination is type of a special scientific examination of a dead body, which is sanctioned, and carried out under the laws of a state, with the aim of determining the cause of death (NHS United Kingdom 2018). The purpose of the law and the examination under it is to protect its citizens from wrongful persecution and conviction and to assist in the identification of the accused, leading to the prosecution of the perpetrator of the crime. It may be called "Autopsy" or "Necropsy."

Post-mortem and autopsy are sometimes very confusing terms and seem to be synonymous for ordinary people but in fact, the post-mortem inspection is a general term and involves a vast circle whereas the autopsy is restrained to only dissection and inspection of the dead body and organs during dissection of the dead. The autopsy examination starts from the very moment when the forensic pathologist incised the first cut in the dead body, and it lasts until the preparation of the medico-legal report. Whereas the post-mortem starts from the moment of the recovery of the dead body on the crime scene, where the investigation officer or medical officer or both examine the body in reference to the surroundings, it ends with the writing of the medical report of examination. A post-mortem is expert medical evidence after an examination of a dead body to find out the cause of the death. This examination must be conducted by the forensic pathologists or autopsy surgeons only, who are skilled in histopathology (The Royal College of Pathologists 2018). This is the knowledge of understanding the nature and cause of the effect of disease on the human body. Only an expert autopsy surgeon or pathologist should conduct the examination of the dead body; however, his relevant staff called Dieners (Life Science 2018), can assist him in the examination but they should not participate in the examination of the dead body. The term Diener comes from the German word "leichendiener" its literal meaning is the "servant of the dead" (Waters 2009). Their duties are to make the arrangements for autopsy surgery, to clean the equipment for re-use, and to assure health and safety in the room (Waters 2009).

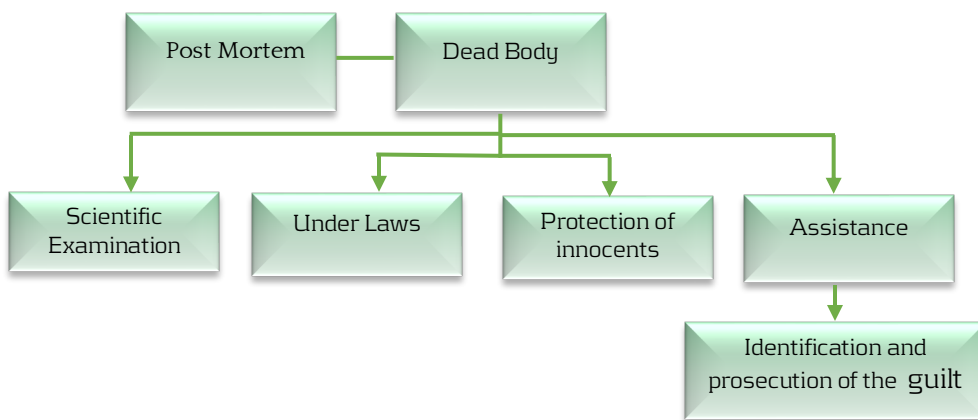


Figure 1:

In the United Kingdom, a post-mortem is requested by the coroner if the death seems to be

suspicious and any crime is suspected in connection with the body. A coroner can open the

inquest to the death of an individual [HTA Human Tissue Authority 2011]. However, in India and Pakistan, police officials called an investigation officer (hereinafter called as I.O) might request to conduct the examination. Post-mortem, before burial or exhumation of the dead body, may be ordered by the procurator fiscal, area Magistrate, or a judge. However, without having any connection of crime with the dead body, the hospital doctor may request the examination to do further research or invent the ways of treatment for the newly discovered disease or for training and education of the medical students, knowing the intensity of the illness. Any patient, after expectant imminence of his death, may request the examination of his body and he/she may donate any organ to the improvement of any person. The defence can also request a post-mortem examination when the medico-legal results are doubtful and he is not agreed with the findings of the forensic pathologist. In this situation, the attorney or legal counsel of the accused person can file a petition in the court for a second post-mortem examination [The Royal College of Pathologists 2018]. In India and Pakistan, the medical board will take on to conduct a second post-mortem examination by order of the court [Amir Khan vs District Magistrate Chakwal 1998].

Post-mortem examination plays a very important role in the criminal justice system. It is an

important duty and inordinate responsibility of the connected persons, whether they belong to the investigation machinery or medical experts, because, without performing the proper examination of the dead body, no investigation is complete and satisfactory. Procedure for post-mortem gives a proper direction to the investigation machinery to start its investigation and encompass the limited circle of people avoiding the public at large. The circumstances in which a death is caused can be known by using the examination of the body [Loewy, 1935]. The cause of death of the deceased can be determined by conducting the examination of whether the death was natural or unnatural. If it is natural, then the question may arise whether it is self-inflicted or homicidal, conducted by the other person, or whether it was an accidental death. In the situation when the death is homicidal, the autopsy plays an important role in finding out the traces of the perpetrator of the crime, such as in the case of murder using a dagger by the criminal, leaving his fingerprints on the handle of the dagger. Other traces such as blood, semen, saliva, any chemical from the mouth or nose, blood and skin of a criminal can also be found on the body of the victim.

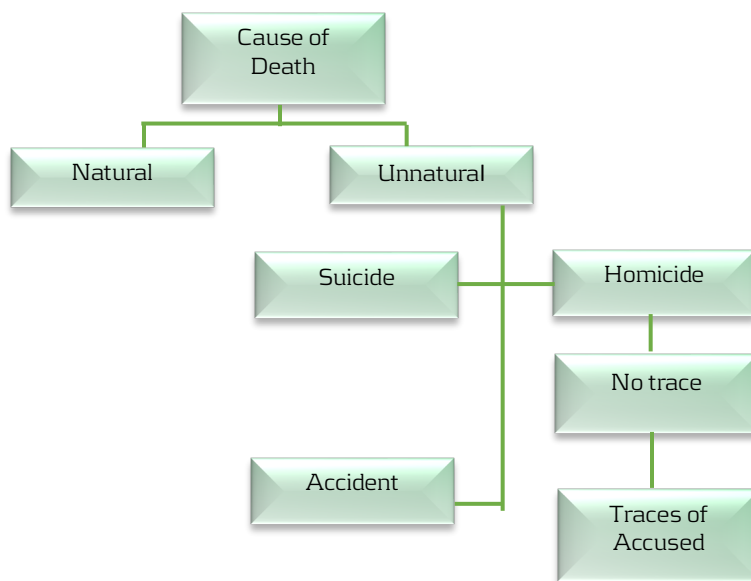


Figure 2

One objective of the autopsy is to find out the abnormalities, malformations and diseases [Saukko and Knight 2016]. These abnormalities

may be inborn such as the birth of twins babies physically attached to each other. Any bleeding from the ear, nostrils, mouth, penis, anus, and any

irritation in his mouth if a poison ([Nusrat Jan vs State 2021](#)) is administered to the victim. All signs should be noted.

Formalities of a post-mortem Examination

There are some formalities observed before the conducting the post-mortem Examination, such as

Body property

If there is no criminal background or any type of suspicions of the unnatural death of the deceased, the dead body is the property of the heirs. In this situation, the consent of the legal heirs is necessary for commencing the post-mortem examination. In the absence of consent, the medical examiner can face a legal problem. The medical officer should get this permission in writing from the heirs of the deceased.

Example

The post-mortem examination of the dead body for the purpose of the scientific research regarding the illness, unexpected deaths of the patients or organ donation are examples of the dead body without criminal background or suspicion. An autopsy is also conducted for the training of education of the medical students in medical laboratories (Stöppler & Marks 2018).

However, in the situation of a criminal background and any suspicion of a crime resulting in the death of the victim, the body is the property of the state and the authorization of the state is required for conducting the autopsy examination of the dead body. The I.O takes the body of the deceased and hands it over to the autopsy surgeon. The autopsy surgeon hands over the body to the I.O. Thereafter, it is handed over to the heirs.

The identity of the deceased

The satisfactory identity of the deceased should be conducted. A dead body can be identified by scars, moles, tattoos ([Imran vs. State, 2018](#)), marks, injury marks and deformities. Other factors such as age, sex, race, height, the colour of skin and hairs, teeth, hairs on various parts of the body and their length are also examined.

A situation when the body is not identified

If a body is not identified by friends, relatives, family members of the deceased or anybody, fingerprints from the balls of the fingers are acquired and these prints are used for the identification of the deceased as these fingerprints are matched with the available

central system of the database in a country ([Samar Abbas vs State 2022](#)).

DNA profiling of samples

For the identity of the deceased can be conducted by DNA analysis. In developed countries, the samples for the analysis of the DNA are obtained from the body of the deceased and analyse and the result of the sample is matched with the central DNA database.

Identification tag on the dead body

An identification label showing the particulars such as name, age, sex, case number, date of death ([Rab Nawaz vs State 2019](#)), admission time and date, height and weight is affixed to the plastic sheet covering the dead body or on the toe thumb through a string. Sometimes a wristband is used with the information tag ([UNODC 2018](#)).

Essential requirements of a post-mortem examination

Essential equipment for examination

For conducting the post-mortem examination, some equipment is required from the stage of crime scene examination to completion of it and for the preparation of the medico-legal report. Their numbers can differ from country to country according to their code of conduct for examination and routine. *Pekka Saukko and Bernard Knight* have attempted to lay down different equipment lists for this purpose ([Saukko & Knight, 2016](#)) as under:

- Disposable waterproof aprons to save the surgeon from germs of a putrefied body.
- The autopsy table stretcher and its height should be adjustable according to the needs of the autopsy surgeon.
- Proper daylight or artificial light when the autopsy room is situated in the basement.
- Disposable masks for covering the nose and mouth during the process.
- Disposable rubber gloves.
- Thermometer for checking the temperature of the dead body. Rectal, nostrils and ears temperature is to obtain.
- Needles and syringes for obtaining the urine samples from the bladder or any chemicals from any part of the body.
- Scalpel for cutting (Dictionaries 2018).
- Sterile swabs for taking blood samples or semen samples from the body of the victim if it is a sex crime.
- Autopsy dissection apparatus including saws, both hand-operated or mechanical.

- Needles and threads for sewing the body when a post-mortem is finished.
- Formalin jars for keeping save the organs for further detailed examination of them.
- Sealable plastic bags or plastic envelopes with a tag affixed on them for collecting the different articles from the dead body and surroundings for sending to concerned experts such as fingerprint experts, ballistic experts, chemical examiners, and forensic scientists for their inspection, analysis and matching with other articles.
- Writing a small notebook and pen or pencil for making notes and labels on plastic bags or envelopes.
- Sketchbooks, or sketches papers for pointing out different injuries on the sketches. In some countries such as in, Pakistan and India readymade sketched of dead bodies are available like any form on which different sketches are printed already. The medical examiner can easily mark injuries on the specified part of a body of sketch and write measurements on the side of the part of the body. This practice saves time to concentrate on the dead body.
- Measuring tape for measuring the size of injuries and wounds.
- Magnifying lens and electronic torch for examining any part with the close quarter.
- Digital Dictaphone.

Performed by a registered autopsy surgeon or forensic pathologist

The post-mortem examination should not be conducted by an ordinary medical officer but by the registered medical practitioner who should be autopsy surgeon or pathologist. No untrained or inexperienced person should participate in the autopsy examination except Diener who can assist the surgeon. Autopsy surgeons are called in the criminal trial as expert witnesses for their testimony and corroborating medico-legal report and forensic reports such as ballistic expert [[Iftikahr Khan alias Khari vs. State 2021](#)].

Careful and detailed examination

It should be very careful and detailed. If the death seems to be caused only in the stomach such as in the case of death by administration of the poison [[Nusrat Jan vs. State 2021](#)], in that case not only stomach rather entire body including vital organs are to be examined. Autopsies may consist of two to four hours [[Johns Hopkins](#)

[Medicine 2018](#)] but depending on the cause of death, it may last more than four hours. For the purpose of examination, the entire body is opened whereas, in the non-criminal background of the dead body, the area of the examination is decided by the permission of the heirs or the donor. For instance, if a person gives permission before his death for the examination of his body to the extent of only head glob so the surgeon will limit his examination to the head and face only excluding the neck.

Detailed information

The information regarding the details of examination [[Rafeed Niaz vs. State 2021](#)] must be supported by; written remarks, notes, sketches, and relevant photographs. These notes will help the medical expert witness during the cross-examination to refresh his memory. Sometimes radiography of the body is conducted if the death is caused by shots and stabbing of an instrument in order to detect the exact position of the bullet. The detail of this process will also be needed to support medical expert evidence regarding radiology [[Tariq Mahmood vs. State 2019](#)].

Factual and objective medico-legal report

This Report must be factually based on facts during the observation of the examination of the dead body. This report should contain objective observation and opinion, not influenced by the personal feelings or opinions of the surgeon or anybody involved in the examination. As this report is sent to investigation agencies for further investigation and inquiries relating to the crime committed, therefore, in order to trace and prosecute the perpetrator of the crime the personal opinion of expert would lead it to inadmissible piece of evidence [[Rafeed Niaz vs. State 2021](#)]. In Pakistan, this report of medical expert is also sent to court with the police report under section 173 of Criminal Procedure (Cr.P.C. 1898) for the trial of an accused person. This report is used for the corroboration of the ocular testimony and any discrepancies between the testimony of eyewitnesses and medical evidence will create a doubt in the prosecution case [[Muhammad Idrees vs. State 2021](#)], and ultimate benefit of the doubt always goes in the favour of accused person [[Nadeem-ul-Haq vs. State 1985](#); [Rab Nawaz vs. State 1994](#)] as the prosecution has to prove its case beyond reasonable doubts [1956 *PLD* 1956 F.C 93] it should not stand on the weakness of the defence.

Evidentiary material during the examination

Evidentiary material collected during the post-mortem examination will be collected, preserved, and sent to the court as a court property. Different articles such as bullet, dagger, or any other instrument should be saved in separate envelopes, which are sealed carefully.

Rules of the post-mortem examination: Factors leading to reliability and authenticity evidence

To conduct the examination, a medical officer has to follow certain rules in order to present authentic and reliable evidence in the court. These rules play a pivotal role in preparing the examination, on the other hand without observing these rules the examination report may be considered unauthentic and unreliable [*Rafeed Niaz vs. State 2021*]. That means an inadmissible medical evidence, if considered to support prosecution case, that may lead to wrongful conviction and abuse of the process of law. Moreover, the examination report having defects in its preparation is sometimes discredited during the cross-examination during the trial.

Not without authorization

The examination should not be conducted without the proper authorization by the concerned authority (section 174, Code of Criminal Procedure 1898). There are two situations i.e. deaths having criminal background and deaths having no criminal background. In the situation of suspicion of any crime related to the deceased, the body should be in the custody of the state and the permission of the state is required for conducting the examination of a dead body. This permission is given by the I.O on the behalf of the state. I.O is that official who hands and takes over the dead body to and from the Autopsy Surgeon. Instead of criminological background, the body is the property of the legal heirs of the deceased and surgeon should acquire the permission for the examination from heir. It is better to rely on written consent instead of verbal consent so that in the situation of any later complication, it can be presented as proof in the court confirming the consent of the heirs. Without the authorization by the concerned heirs, the conducting of examination can involve the medical officer in litigation. There may happen a situation where the deceased gave the permission of examination

prior to his/her death such as when a patient falls prey to a fatal disease and its treatment is not yet discovered, the patient allows the medical hospital to conduct examination for further research in the field of medical science. Sometimes, a dying person before his/her death donated his/her body for the training of medical students.

Conducted by autopsy surgeon or forensic pathologist

The expert medical officer who has specialization in pathology and autopsy must conduct the examination. The autopsy conducted by an ordinary medical officer is not reliable and considered unauthentic. Decision based on the unauthentic and unreliable examination can lead to wrongful conviction [[Article 59, Qanoon-e-Shahadat Ordinance 1984](#)]

Safety precautions in Mortuary

A mortuary is a place where an autopsy is conducted. The murder of the person can be caused by employing different substance so as these substances can be injuries to the health of autopsy surgeons and Dieners so the autopsy room should be properly cleaned according to medical health of safety rules [[UNODC 2018](#)] including

- The mortuary room should be properly vaccinated against diseases such as hepatitis B etc.
- Staff should not consume food and drinks in the surgery room.
- If more than two surgeons are working on the dead body, they should avoid disturbing each other's working.
- They should avoid splashing to themselves and other colleagues.
- They should take care while using sharp-edged instruments, disposable blades, and needles and take care of while handling them. They should not touch from the edge or needle but from the handle. These instruments should be in proper place when they are not used. Syringes should be capped and destroyed in proper place after using them.
- Cutting instruments and scissors should not be blunt but properly sharpened.
- Always use properly dressing before the starting of the autopsy. In the situation of any accidental contact with blood or any chemical wash the affected area with anti-bacterial wash hand using plenty of water.

- Staff should avoid touching their open surfaces such as eyes, ears or any portion of cheeks during autopsy procedure.
- Water should not be stored on the floor of the mortuary and any staff member may fall.
- After removing the gloves, wash hands with anti-bacterial liquid or soap using plenty of water even if any chemical has not touched the skin of hands. Dispose of rubber gloves safely to the proper place. Use new rubber gloves for handling new dead body.

The police report and crime scene

Before conducting the post-mortem in the situation of the suspected criminal case, the medical officer should read the police report [[Rao Ishtiaq Khurshid vs. State 2018](#)] carefully so that Autopsy surgeon should be aware of the all facts and circumstances for the recovery of the dead body. In this situation, he becomes also aware of the apparent cause of the death such as, if a dead body is recovered from a room hanging with the fan, the apparent death can be assumed by the hanging and the autopsy. Surgeon can start the examination from the pressure abrasion on the

neck to the examination of other vital organs to find out the exact nature of the death. The report should corroborate the medico legal certificate.

Daylight or artificial light

The autopsy should be conducted in daylight only but sometime situations happen when it is not possible to conduct an examination in daylight such as in the emergency situation when the mass destruction occurs and the surgeons have to work day and night for the examination of a large number of bodies or when autopsy laboratories are situated in the basements, in these situations artificial lights can be used.

A complete record of the examination

Record of the post-mortem examination should be complete with relevant sketches, identification marks, birthmarks, tattoos [[Imran vs. State 2018](#)], exact date and time of the examination, detailed measurements of the wounds [[Akhtar Ullah alias Akhtar Ali vs. State 2021](#)] such as length, breadth, depth, diameter and their exact position on the body of the deceased which will lead to identification of accused [[Samar Abbas vs. State 2022](#)].

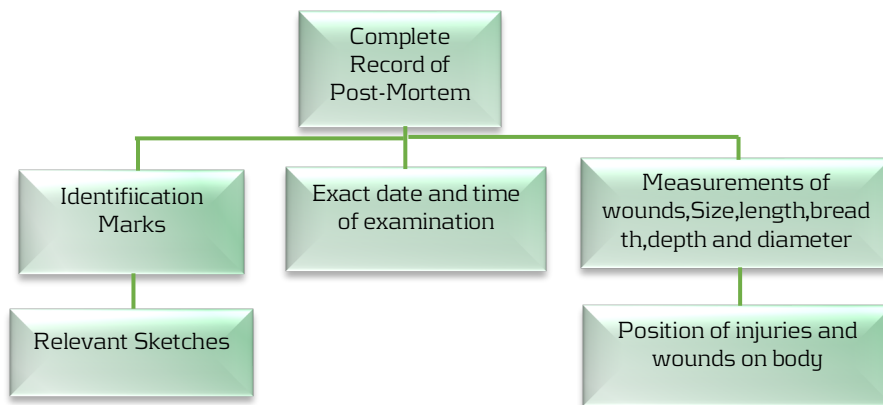


Figure 3:

Photography of the dead body

The photography of the dead body is conducted for maintaining the complete record of the case. It can be conducted by the police as well as autopsy surgeon. On the crime scene, the police officer takes photographs on the crime scene and

mortuary whereas medical officer can take photographs on the crime scene as well as on the autopsy room. The medical officer should take photographs with and without clothes. In the situation of any abnormalities, injuries and wounds, the photographs should be captured in the close-up mode.

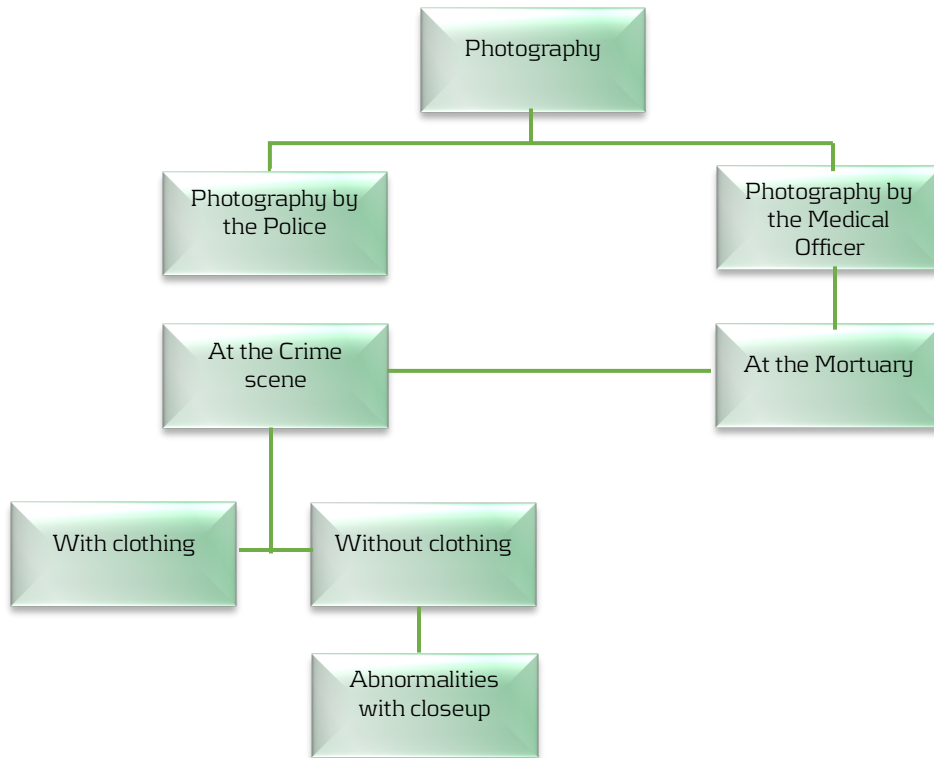


Figure 4:

Examination and custody of outfits of deceased

At first, before opening the body, it should also be examined with clothing for example in the case of death by stabbing or gunshots. The outfits of deceased should not be disposed-off but keep them save for the police and forensic scientist for the further examination and analysis of different samples found on the clothing such as semen, saliva, and blood. These samples are sent to the forensic scientists for the analysis of DNA and its matching with the central DNA database. The disarrangements of outfits are also indicative of the scuffle of the victim with the perpetrator.

Access to police and forensic scientist

The autopsy surgeon in charge of the dead body conducting its examination should allow the police, chemical examiner, and forensic scientists to collect different samples such as hair, fibres, nails, blood, saliva, semen, any fluid coming from natural orifices for DNA and chemical examination or bullets for ballistic examination [*Iftikahr Khan alias Khari vs. State 2021*]. The urine should be taken by using the syringe from

the bladder so the examination by toxicology experts and serology for detection of any deadly chemical or intoxication substance. Forensic expert for ballistic examination should be involved for firearm identification [*Iftikahr Khan alias Khari vs. State 2021*].

Internal examination of the body

The internal examination of the body should be complete in all respects. The brain may also be included in the examination. If the neuropathological examination is necessary because of any suspected brain disorder, its examination is conducted but in normal conditions, it is not performed because of its lengthy procedure covering at least two weeks [The End of Life Care Group 2018]. The great cavities such as head, thorax and abdomen should be examined even if the cause of death is connected with only one of cavities [*Iftikahr Khan alias Khari vs. State 2021*]. Different vital organs such as trachea, oesophagus, heart, thoracic iota, and lungs other glands such as thyroic gland, parathyroid glands are separated from the dead body. Bile duct, spleen, adrenal glands, urethras, kidneys, liver, bladder, and reproductive organs

are also collected for further detailed examination. Sometime autopsy surgeon removes the entire liver or sometimes a part of the liver. The examination of all vital organs will find the exact death if the main cause of death is associated with other small causes such as if caused of death seems to be a slaying by the dagger. The examination of other organs such as kidneys and bladder will show the fact whether before the death of the victim, he was furnished any intoxication substance or poison ([Nusrat Jan vs. State 2021](#)).

Preparation of medico-legal report

The examination report should be prepared as soon as possible without any delay ([Khalid Mehmood vs. State 2021](#)) because delay can be a source of contamination of the dead body. The autopsy surgeon should take care of some important rules in preparing the report ([Rafeed Niaz vs. State 2021](#)). The documents of the examination should be prepared as soon as possible because in the beginning, memory is fresh and it is very easy to write the report without relying on the memory of the surgeon. He should not do delay in preparing it or relying on the memory because with the passage of time the impressions of facts on memory become diminished. His notes should also be matched with the report. Any discrepancies between notes and report may make evidence unauthentic and non-reliable. In this situation, benefit of the doubt can go to the favour of the criminal or against the innocent leading to wrongful conviction. Autopsy surgeon should take extra care in preparing the report without erasing or altering anything from the report. If he needs to alter anything, he must do initial on the alteration for confirming this fact that particular fact has been altered by him. He should also avoid overwriting during the preparation of the report ([Wajid Hussain vs. State 2022](#)). It should be very clear and without ambiguity.

Identification features of the dead body

The autopsy surgeon should note all identification features of the dead body such as sex, age, tattoos ([Imran vs. State 2018](#)), birthmarks, any abnormalities, height, the colour of eyes, colour and the length of hair on different parts of body etc. He should also note any piercing, surgical scars, amputations, severance, circumcision, on the body of the disease. He should note the difference between old and new injuries marks and this report of autopsy should not clash with medico legal certificate ([Wajid Hussain vs. State 2022](#)). Any false or artificial parts of the body such as

stoned eye, plastic limbs, lenses, any metal on any tooth should be noted.

Time of death

He should note the time of death. Time of death can be detected by the life cycle of the maggots in the body. Autopsy surgeon has detailed life cycle of the maggots. When they find the development of the maggots in the putrefied dead body, the medical officer matches the age of maggots with the life cycle chart to find out the time since death. The reports of autopsy surgeon and medical officer should be matched in order to establish the case ([Wajid Hussain vs. State 2022](#)).

The body should not be disturbed in any way

Dead body should not be disturbed before taking the evidence from the body. No ordinary person from the public should approach the crime scene. The crime scene should be circled by the boundaries prohibiting the access of public. Professional experts of investigation bodies and professional medical officers should handle the body. Articles found on or nearby the body should be collected and saved for sending them to fingerprinting experts for fingerprinting matches, to the chemical examiner for the examination of fluids, to a forensic scientist for DNA matching and identification of the dead body and bullets for ballistic examination ([Uftikahr Khan alias Khari vs. State 2021](#)). On the crime scene, the evidence is collected with the permission of the I.O whereas in the autopsy room by the permission of the autopsy surgeon.

Hospital admitted bodies

In the situation of a death in the hospital admitted cases, no relevant therapeutical needles, bandages, urinal drainage tubes, attached to the dead body, should be disturbed in any way. Any medical negligence and removal of any of these items should be taken into notice and disturbed part of the body should be photographed with close up for maintaining the record.

X-ray

An x-ray of the affected part of the body should be taken when it is necessary such as in the cases of gunshots and stabbing wounds. X-Ray plays important role in locating the exact position of the bullet if the bullet is still in the body. X-ray is also taken in the death by the accidents when the tyres of the vehicle run on the body of the deceased and victim have imprint and impact abrasion on his body ([Tariq Mahmood vs. State 2019](#)).

Handing and taking over of the dead body

The handing and taking over of the dead body among the investigation personnel, medical officer and heirs is conducted by the I.O. The I.O hands over the body to autopsy surgeon. Autopsy surgeon takes over the dead body and conducts the examination. Autopsy surgeon hands over the dead body after the examination to the Investigation officer. Investigation officer takes over the body from autopsy surgeon and hands over the body to heirs of deceased (section 173 & 174 Code of Criminal Procedure 1898).

Preservation of dead body

A dead body can be preserved for the reasonable period depending on the nature of the cause, the age of the deceased and the atmosphere and the circumstances, where to find the cause of death is very complicated ([Iftikahr Khan alias Khari vs. State 2021](#)) and autopsy surgeon needs more time for the examination of the body. The body should not be preserved for more than 72 hours and where there is storage and electricity facilities, the body should not be preserved at all.

Detailed examination

The examination should be detailed ([Gul Muhammad vs. State 2021](#)) and complete and no any examination is complete until all parts of the body are completely examined. In the internal examination the ribs cage is removed from the chest and all organs such as thyroid gland, trachea, parathyroid glands, oesophagus, heart, thoracic iota, lungs, entire liver or part of the liver are removed from the dead body. Other important organs not covering the definition of vital organs such as the spleen, kidneys, intestines are also removed from the body in order to conduct a detailed examination of them for finding out the traces of death. Internal examination of the hands or legs is not necessary until the bullet is present in any of these parts of the body. Any part can be opened for the obtaining of the bullet to send it to a ballistic expert for the matching of the bullet with the firearm acquired by the I.O from the accused to corroborate the testimony of eyewitnesses with the ballistic report ([Muhammad Idrees vs. State 2021](#)).

Examination of spinal cord

Examination of the spinal cord is not usually conducted, however, in some circumstances such as suspicion of injury into vertebral column, injury because of spinal poison or any disease by the Tetanus.

Time Limit of Exhumation of a dead body

Sometimes when a body is buried without informing the committed crime against that body, and later on after the burial of the dead body, on receiving any authentic information about the commission of the crime to the deceased, the dead body can be exhumed for the post-mortem examination in order to find out whether it was natural death or unnatural and if it is unnatural whether it is homicidal. If it is homicidal, the investigation machinery started an investigation of the committed crime. In any complaint or even in the situation of small ground of suspicion, the court can order the exhumation of dead body ([Sajid Mehmood v Additional Session Judge, Rahim Yar Khan, etc., 2015](#)). The time limit for the exhumation of the dead body is connected with the laws of the states. In some countries, the criminal procedures fix some limited whereas some do not fix any limit for the exhumation of the dead body. There is no time limit for the exhumation of a dead body in Pakistan, England and America whereas the time limit in France is 10 years, in Scotland is 20 Years, and in Germany is 30 Years. After the exhumation of the dead body the samples of hair from the head and pubic region, nails, teeth, bones, heart, liver, kidneys, intestines, spleen, some earth from below and inside of a coffin, are obtained and sent to autopsy surgeon for the examination. Exhumation of dead body without any justification may be opposed to any religion and can hurt the feelings of followers of that religion ([Yar Muhammad vs The State 2016](#)) because everybody should have respect for the dead (Radio Poland 2018). This situation happened in Poland when court ordered for exhumation of air crash victims in 2010 and two widows of deceased challenged the orders ([Radio Poland 2018](#)).

Conclusion

The medical expert evidence in post-mortem is crucial in criminal trial because lack of legal requirements in medico legal certificate or the medical report will weaken the prosecution's case, which leads to ultimate benefit to the accused in terms of benefit of doubt. The details of medical report is compulsory and comprehensive in this respect that not only the observations of the medical expert is mandatory in it but, the detail of the procedure of the examination and the personal notes of the medical officer are also of crucial and used in corroboration for each other. Any discrepancy in the details as to their inter se notation will affect the admissibility of the medical report. Moreover, the medical evidence of the

medical examiner in the witness box will be required to affirm the report, its details, and the details of the conduct of examination in the personal notes of the medical examiner. This

procedure is so comprehensive and procedural cross check maintains the reliability and validity of the medical evidence.

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