



Social And Legal Status Of Digital Autopsy In India

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ABSTRACT

This study examines the effects of digital autopsies in India. Technology controls every part of our modern lives, therefore it should come as no surprise that it is also proving to be a great resource for forensic experts who, via their knowledge, give the dead the ability to communicate. With the advent of autopsy suites, virtual, digital, and autopsy imaging are truly becoming true rather than fantasy, and the manual and mental outdated ways are rapidly being replaced by technology. Although forensic radiology has been there since the discovery of X-rays, the technique for analyzing and seeing the mummified remains of individuals who passed away thousands of years ago laid the groundwork for the use of digital visualization which is today known as the "digital autopsy."¹

Keywords: Digital Autopsies, Post-Mortem, Traditional Autopsy, Medical Autopsy and death

Introduction

An autopsy is a scientific technique in which the remains of the deceased are examined in detail to determine the cause of death, the duration of the death, and the identification of the deceased². Necropsy, commonly referred to as postmortem examination or autopsy, and is highly regarded as the core skill in forensic and medico legal settings. A typical postmortem involves accessing holes, dissecting deceased corpses, recording and interpreting the results, and maintaining records. Physicians provide their opinions about the case based on the results. After that, family members get the deceased's body for use in funerals. It becomes extremely difficult and frequently not possible to do a second autopsy in order to confirm earlier results or to look into further.

Traditional autopsy procedures are not entirely accepted in our Indian society and cultural customs, and many religious organizations have not agreed to traditional autopsy, despite the fact that it is essential for medico legal purposes, criminal matters, and civil disputes.

It isn't always straightforward to opine the cause of death in forensic practice. To quote from Professor Stephen Cordner's article published in the *Lancet*, "Substantial delay between injury and death, non-fatal injury precipitating death in a relatively short time from natural causes, a peculiarity of the victim rendering a survivable injury fatal" are realities often encountered in forensic autopsies.³

There was a need for a more sophisticated, specialized autopsy method because of these constraints and the advancement of technology in the medical sciences. This is what gave rise to virtual autopsy. The word "virtopsy" is derived from the two separate terms "autopsy" and "virtual." For this, radiological scanning techniques are applied. It is a process to replace antiquated, laborious, traditional autopsy procedures with more contemporary, digitalized ones in order to improve the scientific value of the results, reduce subjectivity, and elevate the status and significance of forensic medicine as a specialty.

¹ Kaur, Navpreet & Chaudhary, R.K. & Gupta, Prajjawal & Saharan, Baljeet. (2014). Digital autopsy: Moving from fiction to reality. *Journal of Indian Academy of Forensic Medicine*. 36. 195-198.

² Menezes RG, Monteiro FN. Forensic Autopsy. [Updated 2023 Sep 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.

³ Cordner SM. Deciding the cause of death after necropsy. *Lancet*. 1993 Jun 05;341(8858):1458-60.

The goal of virtual autopsy is to eliminate the subjectivity of self-visualization that characterizes traditional autopsy. In traditional autopsy, the doctor is responsible for appreciating the findings; in virtual autopsy, radiological imaging instruments are vital, and the doctor's role is limited to interpretation. In the fields of forensic medicine, pathology, imageology, biophysics, radiology, and biomechanics, virtual autopsy offers a platform for innovative and productive collaborative scientific study.

Autopsy surgeons also commonly encounter cases where the pathological evidence of injury or disease is obliterated by advanced postmortem changes and occasionally cases where the opinion regarding the cause of death is entirely dependent on the interpretation of circumstantial evidence. Moreover, they often see instances with multiple competing potential causes of death in autopsy practice.⁴

As a less time-consuming and more accurate diagnostic method, virtual autopsies are highly specialized surgical procedures that may be used in place of traditional autopsies for a thorough and comprehensive evaluation of the entire body. As an alternative to a typical autopsy, virtopsy offers several benefits. Some restrictions apply. Staff dealing with virtual autopsies must to be knowledgeable on how to evaluate imaging technologies. In the modern era of medical care delivery system all over the world, the use of advanced radiological images in the form of digital X-ray, computed tomography, and magnetic resonance imaging are being used frequently and routinely, and the same needs to be adopted in the practice of forensic autopsy. Hence there is a requirement for clearly defining the role and application. The author in his experience has seen many cases, a few of which are mentioned in the last chapter indicating the potential areas of use of forensic radiology in trauma deaths, foreign body discovery, mass fatality, and body identification post-mortem computed tomography (PMCT) as a substitute for dissection autopsy. The use of images from CT scanning is one possible way of reducing the number of unnecessary dissection in autopsy. Certain faith groups are particularly keen to avoid an autopsy dissection, and many others will be pleased if it's possible to avoid one.

Historical Perspective

The history of forensic medicine/pathology in India can be traced back as early as 1250-1000 B.C. where there is mention of medico-legal aspects like sexual offences and their punishments, intoxication and the loss of mental capacity, etc. Charaka Samhita is an ancient script that gave guidelines for the training of physicians in treating poisoning cases. Arthashastra of Kautilya outlines the application of medical knowledge in helping the Justice system. It also describes the examination of dead bodies in suspected unnatural death cases⁵. 'Modi's Medical Jurisprudence' traces the evolution of medico-legal work in British India. The earliest incident of custodial death and its certification by medical practitioners was reported in Madras in 1678. A soldier, Thomas Savage, abused his superior officer in a drunken brawl. He was tied to a cot and died. Surgeons John Waldo and Bezaliel Sherman inspected the body and they were the first to issue a death certificate in British India. The first medico-legal autopsy was performed in India by Dr. Edward Bulkley in 1693. However, the first medico-legal case of injury was documented in the form of a medico-legal report by Dr. Bulkley in 1695 in British India.

The evolution of Forensic Medicine/Forensic Pathology/Legal Medicine happened in various other places of the world in a sporadic fashion up to the late 16th century when many places had identified Forensic Medicine as a distinct specialty. During this phase of evolution of forensic medicine, one of the greatest medicolegists or a forensic physician was Paulus Zacchias (1584-1659) who was a papal physician and head of the medical system⁶. His work which was published in three volumes known as the 'Quaestionesmedico-legales' was one of the most important pieces of literature which recorded and established legal medicine as a distinct topic of medicine and as an important specialty. The sporadic evolution of various other countries prior to the 16th century included:

Babylon: The Code of Hammurabi from Babylon, which dates back to about 2200 B.C., mentions medicine and its relation with the legal system.

Egypt: In Egypt, medical experts were required to give opinions at judicial hearings and were requested to carry out autopsy examinations.

Imhotep, who was the personal physician of King Zoster, initially combined law and medicine. Worldwide, the inquest procedure was first done in the colony of New Plymouth, New England, in the year 1635 related to the death of John Deacon. The rule of exclusion was applied here, where the deceased John Deacon had no signs of external violence in the form of blows, wounds, or any other hurt and the conclusion related to the cause of death was given as bodily weakness due to long fasting and extreme climatic variations.

Greece: Hippocrates, who lived in Greece from 460-355 B.C., has given significant contributions to the matter of toxicology, medical ethics, and the prevention of abortion. The Hippocratic Oath is still an important pillar guiding physicians and also a signpost for doctors to avoid negligence in practice.

⁴ Pollanen MS. Deciding the cause of death after autopsy--revisited. *J Clin Forensic Med.* 2005 Jun;12(3):113-21.

⁵ Mathiharan K. Origin and development of forensic medicine in India. *Am J Forensic Med Pathol.* 2005 Sep;26(3):254-60. doi: 10.1097/01.paf.0000163839.24718.b8. PMID: 16121082.

⁶ m Forensic Anthropology and Medicine: Complementary Sciences From Recovery to Cause of Death Edited by: A. Schmitt, E. Cunha, and J. Pinheiro © Humana Press Inc., Totowa, NJ

Rome: Numa Pompilius was a prominent figure in Rome who contributed significantly to medico-legal work. The Lex Aquillia, published in 572 B.C., is an article discussing the significance and lethality of wounds and also provides an expert medical opinion on wounds. After the death of Julius Caesar, the cadaver was examined in the forum of physicians and the examining physician. Antistius found that out of the 23 stab wounds on his body only one was found to be fatal. Pliny the Elder (23-79 A.D.) did significant work on topics like superfetation and suspended animation.

Jerusalem: Godfrey de Bouillon in 1100 A.D. made an important code of laws which introduced the principles of feudalism but took the help of physicians. This made provisions for the courts to order medical examinations by a physician if they felt the need. In cases of death by murder, the dead body was examined for injuries and to determine the possible weapons causing those injuries.

Italy: Autopsies and other medico-legal examinations were very common in Italy. Pope Innocent III, in 1209 A.D., initiated appointments of doctors in the courts of law for interpretation of the nature of wounds sustained. Pope Gregory IX, in 1234 A.D., initiated the Nova Compilatio Decretalium which is a collection of previous councils and Popes' decisions in medical matters relating to marriage, nullity, impotence, delivery, caesarean section, legitimacy, sexual offences, abortion, crimes against the person, and witchcraft.

China: The earliest mention of post-mortem examination in China was during the 1250s A.D. in the book named His Yuan Lu. The contents of the book were mainly related to autopsy techniques, post-mortem guidelines, injuries caused by blunt and sharp objects, and identification of death due to drowning and thermal burns.

France: In 1260 A.D. the book of common law of St. Louis highlighted the role of surgeons and medical experts in helping the law to come to a conclusion on medico-legal matters by taking the role of witness. In Paris, recognized medical experts were part of the preparation of injury reports and other medico-legal reports. Reports by these surgeons were founded on external inspection of the body and of any wounds on it, with at most superficial incisions. No autopsy was made.

Medical experts took the role of expert witnesses addressing the medico-legal matters in courts of law relating to injury reporting, weapons examination, toxicology cases, the examination of sexual offences, and pregnancy. The right of conducting an autopsy was granted to the Faculty of Montpellier by the Pope in 1374 A.D. The Constitution Criminalise Carolina in Germany (1532) and the ordinance of Francois I focused on bridging the gap between medicine and law which was later further strengthened by Henri IV and other kings.

Germany: In 1507 A.D., a systemized code of penal law and procedure was made under George, Prince Bishop of Bamberg. This code emphasized and required evidence from a medical expert in cases related to violent deaths. Under Emperor Charles V a similar code was adopted in almost all states of Germany. The Constitution Criminalis Carolina came to being in 1532 A.D., and it was based on the Codex Bambergensis. It dealt with aspects like injuries, murder, suicide, infanticide, abortion, pregnancy, poisoning, etc. It also recognized the significance of medical examination in cases of insanity among the accused. It also showed the importance to the courts to consider medical evidence and understand its significance. It paved the way for the practice of medico-legal autopsies by allowing the opening of dead bodies for examination. Legal medicine which also included public health in those times with all these changes started emerging as a separate and important branch which was later recognized by prominent universities. In North America, the first autopsy was conducted by Champlain's surgeon, Estienne, near the initial periods of the 17th century.

During the embalming procedure, postmortem dissections were commonly carried out in ancient Egypt and Mesopotamia. Sushruta, an early practitioner of ayurveda (the Indian art of medicine), performed autopsies and dissections in India in the sixth century B.C. Greek researchers employed autopsies in the third century B.C. to deepen their knowledge of anatomy and illness. The efforts of Vesalius and others during the Middle Ages and Renaissance brought similar methods back to Europe. The seats and causes of illnesses explored by anatomy, written by 79-year-old Giovanni Batista Morgagni in 1761, was the first structured book on pathological findings at autopsy. The basis of contemporary post-mortem science is this book, which details around 700 autopsy the author conducted.

OBJECTIVES AND SCOPE OF THE RESEARCH

This study is dedicated to a rigorous examination and interpretation of prevailing legal doctrines, statutes, precedents, and academic commentaries related to the social and legal ramifications of digital autopsy within India. The scope encompasses a comprehensive review of Indian laws and regulations governing autopsy practices, including the Indian Penal Code, Criminal Procedure Code, and relevant judgments from the judiciary. The research will scrutinize the doctrinal foundations, interpretations, and implications of these legal provisions in the context of digital autopsy, aiming to elucidate the inherent legal challenges, ethical considerations, and potential avenues for legal reforms.

Specifically, the research aims to:

1. Evaluate the existing legal doctrines, statutes, and regulations in India concerning autopsy procedures, focusing on their applicability and adequacy for digital autopsy.
2. Conduct a comprehensive doctrinal analysis of relevant judgments, precedents, and legal commentaries to understand the judicial interpretations and implications of digital autopsy in India.

3. Investigate the ethical dimensions associated with digital autopsy, assessing the alignment of current practices with ethical standards and identifying areas of concern.
4. Compare the legal frameworks and practices related to digital autopsy in India with international jurisdictions to identify best practices, challenges, and potential reforms.
5. Examine the viewpoints of key stakeholders, including medical professionals, legal experts, policymakers, and the public, regarding the social implications and perceptions of digital autopsy.

Based on the research findings, formulate specific recommendations for legal reforms, policy interventions, and procedural guidelines to address the social and legal impact of digital autopsy in India.

The scope of this research is limited to rigorously examine the existing legal structures, regulations, and judicial interpretations governing digital autopsy practices within India's jurisdictional boundaries. Adopting a doctrinal approach, the analysis delves into the intricacies of Indian legal doctrines and their application to digital autopsy, without encompassing broader international comparisons or empirical studies. Furthermore, while acknowledging the multifaceted perspectives of stakeholders such as medical professionals and policymakers, the research chiefly prioritizes their insights and contributions as they pertain to the Indian socio-legal landscape.

Autopsy and its types

An autopsy or post-mortem examination is a systematic examination of a person's dead body, which is conducted by a doctor or by a medical board consisting of doctors to ascertain the cause, manner, and time of death for legal reasons, which is called a legal autopsy. Autopsies are also taught in medical school and used for various research purposes. Autopsies are of the following types:

- i. Medico-legal: This refers to the post-mortem examination of a dead body performed by a doctor or by a medical board of doctors under the legal jurisdiction of the State. The consent of the deceased's relatives is not required in such cases.
- ii. Academic/Anatomical: These are carried out by medical students to learn about the anatomy of the human body. This type of autopsy is done on human cadavers kept preserved in special chemicals specifically for this purpose.
- iii. Pathological/Clinical: These are conducted by pathologists to diagnose or confirm the cause of a patient's death in cases where the physician is not certain of the same. However, this type of autopsy can only be done with the consent of the next of kin. These autopsies are not ordered by any legal authorities. Once the autopsy is done, the body is handed over to the deceased's relatives. Ancillary investigations such as microbiology, histology, etc., are routinely carried out by the pathologist conducting the autopsy.

UNDERSTANDING DIGITAL AUTOPSY

Autopsies, also known as post-mortems, are traditionally performed on deceased bodies by making many incisions and using a few specialized procedures. The purpose of the examination, which might be pathological or medico-legal, is to ascertain the method, cause, and timing of the death as well as identification (e.g., in a mass tragedy), documentation, and expert testimony. When dealing with fully burned, decayed bodies and pieces of mangled, severed bodies, forensic pathologists have challenges. In certain cases, the conventional method results in physical storage issues. Generally speaking, most people find autopsies unsettling, particularly when a baby has died. Some religious organizations prohibit autopsies unless required by law.

COMPARISON OF THE ADVANTAGES OF VIRTUAL AUTOPSY OVER CONVENTIONAL AUTOPSY

A virtual alternative to the traditional autopsy, conducted with scanning and imaging technology, or virtopsy, mostly makes application of computed tomography after death (PMCT). In India, it is now in its infancy. In most circumstances, the conventional autopsy method is not only unnecessary but also harsh and inhumane. They expressed a strong belief that most of the time, a full body autopsy is not necessary and that the number of autopsies performed in Delhi alone is significantly higher than the number performed in many Western countries. This is primarily due to the fact that the majority of cases are referred for autopsy without the application of mind. Due to the limitations of our forensic labs and the amount of work they have, in addition to the lack of infrastructure and personnel at all levels, this not only affects the output of forensic labs but also renders the exercise of autopsy pointless. As a result, autopsies are typically performed and prepared in a mechanical manner, negating the purpose of autopsy altogether. As a result of recent technological developments, full body autopsies have decreased globally⁷. Rather, slightly invasive or non-intrusive autopsies are now more necessary due to the rise of new scientific techniques like CT scanning, MRIs, and digital x-rays that can replace traditional autopsies. The conventional method of postmortem examination in humans is represented by the invasive "body-opening" autopsy. Modern cross-sectional imaging methods, however, can complement conventional autopsy methods and possibly even partially replace them. Computed

⁷ Mathiharan K. Origin and development of forensic medicine in India. *Am J Forensic Med Pathol.* 2005 Sep;26(3):254-60. doi: 10.1097/01.paf.0000163839.24718.b8. PMID: 16121082.

tomography (CT) is the preferred imaging modality for the two- and three-dimensional documentation and analysis of autopsy findings, such as fracture systems, pathologic gas collections (e.g., air embolism, subcutaneous emphysema following trauma, hyperbaric trauma, decomposition effects), and gross tissue injury.

The ability to show soft-tissue damage, organ trauma, and non-traumatic diseases has improved with the use of magnetic resonance imaging (MRI). Forensic medicine's primary goals are to clearly present scientific medical results in court for both live and deceased patients by documenting, analyzing, and explaining them. It is important to compare the Virtopsy results obtained from surface scanning and radiologic analysis with those of standard autopsies to validate the effectiveness of this innovative technique. Whether a death was caused by an accident, suicide, homicide, or natural causes should all be ascertained with the use of the new technique. This decision must be supported by a forensic examination of the corpse and the surrounding circumstances.

1. It's a non-invasive method.
2. It requires less time.
3. For pneumothorax, emphysema, and embolism, the method is better than traditional autopsy.
4. No chance of infection while interacting with bodies afflicted with hepatitis and HIV.
5. High level of acceptability among the deceased's family because it's non-invasive.
6. For a second opinion, data can be saved and viewed later.
7. Beneficial in determining the course of gun-related injuries without destroying evidence⁸.

CHALLENGES IN IMPLEMENTING DIGITAL AUTOPSY

Initially, obtaining funding is a huge challenge because of the high expense of establishing the necessary hardware and software, as well as the infrastructure, which includes a CT scanner. As virtual autopsy is a relatively new technology, medical practitioners require appropriate training in order to utilize it appropriately. Dedicated work is still necessary, however training programs can help overcome this obstacle. The Indian medico-legal system is not quite clear about accepting virtual autopsies as admissible evidence in court. Virtual autopsy results are not legally accepted since the Indian Evidence Act of 1965 does not directly cover medical imaging evidence. This leaves room for interpretation when it comes to the admissibility of digital evidence. In order for virtual autopsies to be properly adopted and utilized in the Indian medical industry, it will be imperative to overcome these challenges.

Social Implications of Digital Autopsy

1. Digital autopsy, which involves the use of technology to perform post-mortem examinations, has several social implications.
2. It can improve the efficiency and accuracy of forensic investigations, leading to more reliable and timely results .
3. Digital autopsies can also help in preserving the dignity of the deceased, as they are non-invasive and do not require the body to be dissected.
4. The use of digital autopsies can potentially reduce the backlog of cases in forensic departments, allowing for faster resolution of legal matters.
5. It can also facilitate remote consultations and collaborations among experts, enabling access to specialized knowledge and improving the quality of forensic analysis.
6. However, the implementation of digital autopsies may face challenges related to infrastructure, training, and acceptance by stakeholders
7. .There may be concerns regarding data security and privacy, as digital autopsies involve the storage and transmission of sensitive medical information.
8. Public awareness and education about the benefits and limitations of digital autopsies are crucial to ensure acceptance and trust in this technology.

Legal aspects of virtual autopsy in India

The main objectives of a medico-legal autopsy include the determination of the cause and manner of death, confirmation of the identity of the dead person, and collection of all possible evidence needed for investigation or legal process in case of any suspected foul play or future litigation. A medico-legal autopsy is conducted under Sections 174 and 176 of The Code of Criminal Procedure (CrPC), 1973. The law directs the investigating officer to take the body of the deceased to the concerned designated hospital/post-mortem centre for autopsy. The nature and extent of the post-mortem examination procedure are not formulated or described in these sections of the CrPC, the Indian Penal Code, or any other law in India. Virtual autopsy (VA) reports are exactly the same as traditional autopsy reports with the only difference being that advanced radiological imaging techniques are used to examine the findings instead of invasive internal dissection of the body. The following legal sections of law in India support the admissibility of electronic documents or evidence in a court of law. It will also be applicable to virtual Autopsy documents or evidence. It is a well-

⁸ <https://www.ijfnt.com/>

settled fact that CT scans and X-ray reports have already been accepted as scientific evidence in a court of law in India.

Section 3, Indian Evidence Act, 1872:

It states that all documents including electronic records produced for the inspection of the court are called documentary evidence.

Section 2 (1) (t), The Information Technology Act, (IT Act), 2000:

It defines 'electronic record' which means data, record, or data generated, image or sound stored, received, or sent in an 'electronic form' or microfilms or computer generated

Section 6, The Information Technology Act, (IT Act) 2000:

It provides for the use of electronic records and electronic signatures in the Government and its agencies.

Sections 65A and 65B, Indian Evidence Act, 1872:

This details the admissibility of electronic records as evidence and states that the information contained in an electronic record that is printed on paper, stored, recorded, or copied in optical or magnetic media produced by a computer shall also be deemed to be a document and shall be admissible in any proceedings.

National Human Rights Commission (NHRC) guidelines:

The NHRC has issue guidelines for post mortem examination in custodial deaths. In India the post –mortem reports and procedure even in state medico- legal manual are broadly based on these guidelines. The NHRC also issued an advisory for upholding the dignity and protecting the rights of the dead, keeping in view the large number of deaths during the second wave of the COVID-19 Pandemic. National Human Rights Commission, India in its 'Advisory for Upholding the Dignity and Protecting the Rights of the Dead' at page 5, point 6: A-IV, it states that:

The Government/National Medical Commission may consider adopting a partial autopsy method in cases where the complete autopsy is not necessary, arrangements of techniques, experts and training of the forensic experts shall be conducted to promote advanced methods of the autopsy

It encourages the use of minimally invasive methods in autopsy using advanced techniques like virtual autopsy.

Kehar Singh & Ors vs. State (Delhi Admn)⁹

The Honourable Supreme Court observed that:

It is not always necessary to have a complete post-mortem in every case. Section 174 CrPC confers discretion to the Police Officer not to send the body for post-mortem examination if there is no doubt as to the cause of death. If the cause of death is certain and beyond the pale of doubt, or controversy, it is unnecessary to have the post-mortem done by Medical Officer. In the instant case, there was no controversy about the cause of death of Mrs. Gandhi. A complete post-mortem of the body was therefore uncalled for.

This statement supports the case to avoid unnecessary autopsy where the cause of death is very clear and fulfils the requirement of the law. In such cases, VA could be the right scientific option to document the findings by digital imaging techniques without opening the body and preserve the document for future reference in case any dispute arises.

LEGAL IMPLICATIONS OF IMPLEMENTING DIGITAL AUTOPSY IN INDIA

In India, autopsies are conducted only after obtaining a police officer's signed directive or magistrate authorized under Section 174 or 176 of the Criminal Procedure Code (CrPC) . Autopsies are preferably conducted during daylight hours and not after dark. Post-mortems performed after dark can make it more difficult to identify post-mortem hypostasis and color changes in injuries, among other problems. In India, routine medico-legal autopsies have never been performed after dusk but night autopsies are already being¹⁰ performed in some states and hospitals have the required facilities for performing them. The Ministry of Health and Family Welfare, Government of India, issued a notification regarding the “Conduct of post-mortem in hospitals after sunset” on November 15, 2021, which highlights the need to consider the matter in the context of organ donation and the feasibility of digital autopsy. Autopsies in COVID cases are currently discouraged by the Indian government and international scientific bodies. Autopsy is an important part of police investigation in case of an unnatural death in India under Section 174 of CrPC, and can take anywhere between 30 minutes and three days depending on the complexity of the case and availability of experts¹¹. Virtual autopsy is becoming popular due to its advantages, including quick results and the ability to save time

⁹ 988 AIR 1883, 1988 SCR Supl. (2) 24

¹⁰ Yadukul S, Parmar P, Mada P, Reddy D. Medico-legal autopsies after sunset: Ethical issues. *Indian J Med Ethics*. 2023 Jul-Sep;VIII(3):224-225. doi: 10.20529/IJME.2023.012. Epub 2023 Feb 4. PMID: 36945852.

¹¹ Kanchan T., Krishan K., Atreya A. India and the problem of “needless autopsies” *Egyptian J Forensic Sci*. 2018;8:30. doi: 10.1186/s41935-018-0061-y.

and manpower. AIIMS was among the first institutions in India to set up a digital X-ray machine in the forensic unit in 2016, which is utilized in cases of firearm deaths, blast injuries, penetrating injuries, and hidden fractures among others. The Indian government is interested in developing multiple centers of virtual autopsy labs across the country. Autopsies after sunset can only be conducted if they are specially permitted by law enforcement agencies.

Digital autopsy is an innovative approach that can revolutionize the legal and police proceedings in the future. However, the introduction of digital autopsy may impact the existing legal framework in several ways. One significant advantage of digital data, such as post-mortem imaging, is the ability to easily store, retrieve and produce it on demand. Besides, it may also reduce the number of required exhumations by providing accurate and conclusive evidence through the use of postmortem CT¹². Since advanced digital techniques are already being used as evidence in the court of law, there is no reason for not extending the applicability of such technology in cases after death. Moreover, it complies with all the relevant legal requirements as provided in various laws such as S.174 CrPC, IT Act, IEA act, SWGDE guidelines, SWGIT guidelines. Therefore, the implementation of digital autopsy could improve the accuracy and efficiency of the legal framework while reducing the time and cost involved in conducting traditional autopsies. However, it is essential to evaluate the potential legal implications and ethical issues associated with digital autopsy before fully integrating it into the legal system.

POTENTIAL CHALLENGES AND CONTROVERSIES RELATED TO THE USE OF DIGITAL IN LEGAL PROCEEDINGS IN INDIA

Despite the potential benefits of digital autopsy in legal proceedings, its use in India may face several challenges and controversies. One major concern is the accuracy and reliability of digital autopsy when compared to traditional autopsy methods. While digital autopsy has the advantage of being non-invasive and less time-consuming, its effectiveness in identifying cause of death and detecting certain medical conditions is still under debate. Another challenge is the lack of awareness and understanding among the general public and legal professionals about the potential benefits and limitations of digital autopsy. This can lead to skepticism and hesitation in using digital autopsy as evidence in legal proceedings. Furthermore, the use of digital autopsy may also face resistance from traditional autopsy practitioners and their professional organizations. They may view digital autopsy as a threat to their profession and expertise. Additionally, digital autopsy is not yet recognized by law in India and there is a lack of clear guidelines and regulations for its use in legal proceedings. This can create confusion and uncertainty among legal professionals about the admissibility and reliability of digital autopsy evidence in court. As digital autopsy technology continues to develop, it is important for India to address these challenges and controversies to ensure its effective use in legal proceedings.

The social and legal impact of digital autopsy in India is an important topic of discussion that requires attention from legal professionals, traditional autopsy practitioners, and policymakers. The introduction of digital autopsy technology has the potential to revolutionize the way autopsies are conducted and evidence is presented in legal proceedings. However, its implementation may face resistance from traditional practitioners and their professional organizations, who may view it as a threat to their profession and expertise. Additionally, there are concerns regarding the accuracy and reliability of digital autopsy as compared to traditional methods, which may lead to skepticism and hesitation in using it as evidence in legal proceedings. To ensure the effective use of digital autopsy in legal proceedings, India needs to address these challenges and controversies¹³. It is important to establish guidelines and protocols for the use of digital autopsy, which can help to promote its acceptance and reliability. Policymakers should also consider the potential impact of digital autopsy on the existing legal framework, and work towards integrating it in a way that is consistent with the principles of justice and fairness. Overall, digital autopsy has the potential to enhance the accuracy and objectivity of autopsies, and can contribute to the advancement of forensic science in India. However, its implementation requires careful consideration and collaboration between legal professionals, traditional practitioners, and policymakers.

Privacy Concerns and Data Protection

- The digitalization of medico legal processes in India raises concerns about privacy and data protection.
- The storage and transmission of sensitive medical information in digital autopsies may pose risks to patient confidentiality.
- There is a need for robust data protection measures to ensure that personal health information is securely stored and accessed only by authorized individuals.
- Adequate encryption and access controls should be implemented to prevent unauthorized access or data breaches.
- Public awareness and education about the importance of data privacy and the measures taken to protect personal information are crucial.

¹² Ahuja, P., & Ansari, N. (2022). Virtopsy: A New Era in Forensic Medico-Legal Autopsies. *IntechOpen*. doi: 10.5772/intechopen.103781

¹³ Westphal SE, Aplitzsch J, Penzkofer T, Mahnken AH, Knüchel R. Virtual CT autopsy in clinical pathology: Feasibility in clinical autopsies. *Virchows Arch*. 2012;461:211–9.

- Compliance with relevant data protection laws and regulations is essential to safeguard patient privacy in the digitalization of medico legal services.

Legal Framework and Regulations

- Currently, there is no specific mention of the legal framework and regulations regarding the digitalization of medico legal services in India in the provided sources.
- However, it is important to note that the implementation of digitalization in the healthcare sector would require adherence to existing laws and regulations related to data protection, privacy, and security.
- The Indian government has enacted various laws and regulations to protect personal data, such as the Information Technology Act, 2000, and the Personal Data Protection Bill, 2019.
- These laws aim to safeguard the privacy and security of personal information and provide guidelines for the collection, storage, and processing of data.
- Additionally, the Supreme Court of India has recognized the right to privacy as a fundamental right under Article 21 of the Constitution, which further emphasizes the importance of data protection and privacy in the digital era.
- It is crucial for healthcare institutions and forensic medicine departments to comply with these legal requirements and ensure the proper handling and protection of medico legal data in the digitalization process.

Standard operating procedure of virtual autopsy

Case selection for virtual autopsy

This is one of the first and most important steps of the whole procedure. There are many cases in which a non-invasive/ minimal invasive autopsy can be a very good alternative to the conventional autopsy upholding the humanitarian aspect of dignified management of the dead without compromising on the scientific medico-legal purpose of conducting an autopsy. The assessment of the suitability of the case for virtual autopsy will vary from case to case keeping in view all the relevant circumstantial evidence, medical records and investigative findings. The autopsy surgeon has to look into all the relevant scientific facts and circumstantial evidence of the case while selecting the suitability of the case for virtual autopsy¹⁴. The following case criteria need to be taken into consideration while selecting cases for virtual autopsy:

Hospital admitted and treated cases of natural/accident/suicide deaths with complete history and treatment records.

- Sudden natural death cases with a history of long-term illness with medical records and clear PMCT findings corresponding to the history and eye witness, for example - cases with a history of headache with evident intracranial haemorrhage in PMCT, chest pain with evident heart wall rupture in PMCT, or chest pain with evident coronary calcifications and occlusion.
- Accidental deaths with eyewitness and clear PMCT findings corresponding to the history/eye witness, for example - road traffic accidents with polytrauma, falls from a height, choking while eating, etc.
- Suicidal/homicidal/unnatural death cases examination can be done using PMCT if the conclusion can be drawn as for the law.
- Apart from the above-mentioned case criteria, the following points also need to be considered:
 - Explain the procedure of non-invasive Virtual autopsy to the relatives.
 - Assessment of foul play after perusal of initial investigative findings.
 - Biological samples/evidence requested by the investigating officer that requires invasive procedure/internal dissection of the body. Is it a medical negligence case?
 - The perusal of all treatment records.
 - Is external examination consistent with the alleged history, treatment records, and internal findings of PMCT?
 - Whether PMCT is showing clear demonstrable internal injuries that are sufficient to conclude the cause of death and answer medico-legal queries for investigation and the court of law.

Advantages of Digital Autopsy in Forensic Investigations

Over the past century, traditional autopsies have not altered much. They still involve external inspection and evisceration, major organ dissection for the purpose of identifying macroscopic diseases and injuries, and histology if necessary. The traditional autopsy can destroy important forensic evidence and be less accurate in some forensic circumstances than a virtual post-mortem examination. A thorough investigation of the death scene, the ligature material, its configuration, the number of wrappings around the neck, the location of its locking mechanisms, and the postmortem results all require careful attention. The method of death can be impacted by each incorrect interpretation and deletion of forensic evidence.

¹⁴ Roberts IS, Benamore RE, Benbow EW, Lee SH, Harris JN, Jackson A, et al. Post-mortem imaging as an alternative to autopsy in the diagnosis of adult deaths: A validation study. *Lancet*. 2012;379:136–42.

The benefits of the Virtopsy are as follows:

- It provides actual-size documentation, observer independence, objectivity, and minimally invasive data archiving.
- It is also nondestructive, minimally invasive, and allows for the examination of bodies contaminated by infection, toxic substances, radionuclides, or other biohazards.
- The forensic evidence is not required to be touched, and the nondestructive method provides 3D geometry that is accurate in xyz-axis or space documented, real data based, and the basis for sound scientific reconstruction.
- It offers an additional or alternative examination tool for "difficult body area autopsy," such as the face, neck, or pelvis.
- It can be used in cultures and situations where autopsies are forbidden by religion or rejected by family members for psychological reasons.

Conclusion

In conclusion, the social and legal status of digital autopsy in India is still evolving. While there is a growing acceptance of the technology, there are still challenges that need to be addressed for its widespread use. With the Supreme Court recognizing digital autopsy as a valid method of post-mortem examination, it is expected that there will be further developments in its legal status in the future. However, there is a need for a comprehensive regulatory framework and awareness programs to ensure the proper use and acceptance of digital autopsy in India.

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