

January - June 2026

Volume 35

Issue 1

PRINT ISSN: 2277-1867

ONLINE ISSN: 2277-8853



JOURNAL OF FORENSIC MEDICINE SCIENCE AND LAW

Official Publication of Medicolegal Association of Maharashtra

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**MULTISPECIALITY, MULTIDISCIPLINARY, NATIONAL
PEER REVIEWED, OPEN ACCESS, MLAM (SOCIETY) JOURNAL
Indexed with Scopus (Elsevier)**

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JOURNAL OF FORENSIC MEDICINE SCIENCE AND LAW

(Official Publication of Medicolegal Association of Maharashtra)

Email.id: mlameditor@gmail.com

PRINT ISSN:

2277-1867

ONLINE ISSN:

2277-8853

Editorial

Need of Non-invasive Autopsy Centre as Adjuvant to Traditional Autopsy at Tertiary Care Institutions

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1. Introduction

Postmortem examination or Autopsy (or necropsy) is a specialized surgical procedure in which an expert examines the body of deceased carefully both internally and externally aiming to identify diseases, injuries and provide exact cause of death. It also facilitate to determine manner of death and appropriate documentation which will be useful to assist the legal investigations. The traditional autopsy involves complete external and internal examination of the deceased with preservation of necessary samples at autopsy and documenting all findings in the specific format abiding the experience and expertise of autopsy surgeons. Abiding the section 194 Bhartiya Nagrik Suraksha Sanhita (BNSS), 2023 a police inquest is done to do inquiry into the cause of death. Magistrate's Inquest done in certain cases (Death in custody, dowry deaths, etc.) abiding section 196 BNSS, 2023 and deceased forwarded for autopsy to on duty autopsy surgeon to concerned authorized postmortem centre as a standard practice, as off now.¹

Non-invasive autopsy is newer advanced development where the postmortem examination of the deceased done with use of high end machineries with technological advancement such as Computerized Tomography (CT) scan, three-dimensional (3-D) scans, Magnetic resonance

imaging (MRI) scan, Postmortem CT-Angiography, etc.^{2,3} In such autopsies the traditional cutting may avoided in certain cases. Implementing this may decrease the burden of cutting each and every deceased and the resources will be saved. Around 60-70 % of autopsy may be completed successfully using this advanced technique and only highly sensitive and homicide cases may be completed using traditional autopsy technique in addition to non-invasive autopsy, if such non-invasive autopsies permitted by State Government with appropriate Ordinance for its implementation.^{4,5}

2. Need of Non-invasive autopsy

There are thousands of autopsies done at various postmortem centres attached to tertiary care healthcare institutions. Out of these autopsies around 40 to 50 % autopsies are generally of natural deaths without any bodily surface injuries. 20 to 30 % deaths are associated with accidental, suicidal Injuries (Road traffic accidents, Railway accidents, burns, etc.) and 20-30% are sensitive cases including homicidal deaths.

With use of non-invasive autopsy technique using newer advanced machinery the body images can be taken and even three- dimensional virtual models can be created which are easy to detect abnormality and document such things by expert appropriately.

How to cite this article: Deokar RB, Patil SS, Bhise SS. Need of Non-invasive Autopsy Centre as Adjuvant to Traditional Autopsy at Tertiary Care Institutions. J Forensic Med Sci Law. 2026;35(1):1-3. doi: [10.59988/jfmsl.vol.35issue1.1](https://doi.org/10.59988/jfmsl.vol.35issue1.1)

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Article Info: Received on: 11.04.2026; **Accepted on:** 20.06.2026. doi: [10.59988/jfmsl.vol.35issue1.1](https://doi.org/10.59988/jfmsl.vol.35issue1.1)

It will have a great evidentiary value in court of law to establish the causal relationship of history, things happened and the positive findings. The cause of death can be given in many pathological diseases (natural deaths) and injury documentation can be done more efficiently and accurately in vehicular accident, railway accident cases, burn cases, etc.^{6,7}

Here, with use of non-invasive autopsies, we may curtail the complete postmortem in around 50-60 % cases and give cause of death and better documentation of evidentiary findings which may further required in court of law. Also, it will be useful in other cases for record of important evidences before sending the deceased for traditional medicolegal forensic autopsies by complete dissection (Invasive autopsies).

In many communities cutting of bodies is objectionable. Families are more willing to cause-of-death investigations, if it is done by non-invasive methods. It facilitates the justice with dignity as there is no unnecessary cutting of dead bodies.

3. Forensic and legal reasons for positive acceptance of non-invasive autopsies

- a. Natural deaths: Many pathological conditions are revealed better using CT scan, MRI and other advanced modalities as compared to gross naked eye examination.
- b. Injury/ Trauma cases: Non-invasive / virtual autopsies are gold standards for road traffic accidents, railway injuries, firearm, fall from height, burns cases.
- c. Mass disaster: in mass disaster cases the injury pattern is similar. Multiple cases can be handled and postmortem examination can be completed speedily with securing the necessary evidences appropriately.⁸
- d. Court acceptance: As it is easy to understand, it is well accepted in court of law.
- e. Infectious deaths: There is minimal risk to the autopsy surgeon and support staff in cases of highly communicable diseases like Tuberculosis, COVID, HIV, anthrax positive deceased.
- f. Decomposed or burned dead bodies: In spite of destruction of soft tissue, the bony injuries, fracture may be detected and appropriate cause of death may be given and manner of death may be predicted.
- g. Workload management: It can handle a huge workload in less time with a great workload at autopsy centre.

- h. Training and research: It can be used for training and further educational research purposes.

4. Key medicolegal issues: Administrative and Legal challenges

- a. The main key medicolegal issues are as follows
- b. Appropriate ordinance from state Government for its smooth implementation and acceptance as evidence in court of law.
- c. Standard algorithms are lacking.
- d. Training: Trained expert's availability through appropriate initial training workshops.
- e. With advancement and implementation of artificial intelligence (AI) in Healthcare appropriate standard operating procedures and ethical standard guidelines needed.⁹

5. Steps in implementation of Non-invasive autopsies

- a. The State Government need to bring appropriate legal reforms and bring an ordinance for policy change.
- b. Purchase of advanced technological equipment's and infrastructure facility development of the postmortem centre of the tertiary care institution is required.
- c. Appropriate standard ethical guidelines and standard operative protocols to be prepared through series of deliberations from committee/group of senior experts.
- d. Trained staff: Before implementing the system appropriate training is required to forensic and radiology experts.
- e. All dead body subjected to non-invasive autopsies and only in sensitive cases (homicidal, negligence, abuse cases, custodial deaths, etc.) further traditional autopsy can be performed.

6. The limitations

- a. Costly machineries: equipment cost is high.
- b. Trained staff required to handle the machinery and analyse the data.
- c. Vascular lesions, soft tissue injuries and histopathological changes are not always adequately captured through advanced imaging modalities.¹⁰
- d. It is a complementary tool rather than a replacement for traditional autopsy in all cases.

7. Conclusion:

Non-invasive autopsy is the transformative advancement in forensic medicine. It offers a non-invasive, accurate, and reproducible method of

evaluation of deceased with pathological diseases or trauma cases. Nowadays, imaging technologies are more accessible and affordable. It facilitates the integration of non-invasive autopsies into routine forensic analysis, alongside traditional autopsy to aid in administration of justice.

Starting a Non-invasive autopsies as a complimentary to the traditional autopsy at every tertiary care centre is need of hour. It holds great promise for enhancing diagnostic accuracy, improving legal documentation, and upholding ethical considerations.

Conflict of Interest: None declared.

Source of Funding: None declared.

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