

**Case Report****Investigating the unexpected: Malathion detection in viscera after trauma – A forensic dilemma****Praveen Dixit^{1*}, Uday Shankar Sinha¹**¹Dept. of Forensic Medicine & Toxicology, United Institute of Medical Sciences, Prayagraj, Uttar Pradesh, India.**Abstract**

Death is an inevitable truth and is defined as the permanent and irreversible cessation of all biological functions that sustain life. In India, an inquest is conducted in unnatural or suspected deaths by either the police or a magistrate under Sections 194 and 196 of the Bhartiya Nagarik Suraksha Sanhita (BNSS) 2023 respectively replacing the earlier Criminal Procedure Code (CrPC) 1973. The dead body is subsequently sent for a medicolegal autopsy where the forensic pathologist, after conducting both external and internal examinations provides an opinion regarding the cause of death, time since death, manner and mode of death, and identification of the individual thereby aiding the law investigation agencies to render justice for the victim. However, in certain cases where findings are minimal or obscured, forensic pathologists may send viscera for chemical analysis to the Forensic Science Laboratory (FSL) to detect any poisons or toxins, helping in determining the cause of death. Dependence solely on viscera reports can weaken the doctor's integrity in situations when minute details observed during autopsy are ignored. This case report presents a false and erroneous detection of malathion in the viscera of a victim who succumbed to death resulting from subdural hematoma from a fall from a motorcycle.

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For reprints contact: reprint@ipinnovative.com**1. Introduction**

Death is defined as the permanent and irreversible cessation of all biological functions that sustain life.¹⁻² In unnatural or suspicious deaths, an inquest or enquiry is conducted to determine the cause of death as directed under Sections 174 and 176 of the Criminal Procedure Code (CrPC) 1973,³ now comprehended in Sections 194 and 196 of the Bhartiya Nagarik Suraksha Sanhita (BNSS) 2023.⁴ After making a preliminary report by the police, the body is sent to a medicolegal post-mortem examination to determine the exact cause, manner of death, mode of death, and to identify individuals in cases of unknown, unclaimed, decomposed, or skeletal remains. Another objective of the autopsy is to estimate the post-mortem interval, often called the time since death.⁵⁻⁶ The post-mortem changes in the body along with external examination allow the forensic pathologist to build an initial diagnosis which is polished and expanded upon the examination of internal structures and viscera. In instances where the cause of death remains undetermined or unable to

appreciate via naked-eye examination, the forensic pathologist sends viscera to a Forensic Science Laboratory (FSL) to detect any chemicals, toxins, poisons, or stupefying agents thereby contributing to an accurate determination of the cause of death and facilitating justice for the victim and their family.⁷ However, depending solely on viscera reports from the FSL can sometimes overshadow critical observations made during external and internal examinations. This total dependency on the FSL report can lead to confusion and may disrupt the doctor's credibility ultimately resulting in injustice to the victim's family.⁸⁻⁹ This case report presents an instance in which there was a false detection of malathion poison in the FSL report despite the evidence of death resulting from a head injury due to a fall from a two-wheeler, which happened due to loss of balance on the suddenly inclined large speed breaker.

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2. Case Presentation

A 30-year-old newly married female was sitting on a two-wheeler as a pillion rider when the vehicle suddenly bumped into a large elevated speed breaker. Near passers witnessed that she was violently dispossessed from the motorcycle upon impact leading to immediate loss of consciousness followed by nausea, vomiting, and an episode of bleeding from the ear raising alarm about budding trauma. The patient was then transported to a private hospital and given immediate first aid management. Considering the medico-legal nature of the case, she was referred to a government hospital where the case was registered as a medico-legal case and immediate police intimation was done. The condition of the patient deteriorated rapidly characterized by hypotension, bradycardia, and severe hypoxia and later she was kept on ventilatory support and necessary treatment. A computed tomography (CT) scan of the head was done which revealed a massive subdural hematoma (SDH). The patient's condition remained unstable despite intensive care measures. Over the succeeding days, her blood pressure fluctuated hazardously low and her blood oxygen saturation levels dropped significantly. The patient succumbed to death after five days despite the best efforts. The family members of the patient accused the rider, her husband of riding the motorbike rashly and negligently thereby causing their daughter to die. The case was subsequently registered in the various relevant sections of the Indian Penal Code (IPC) 1860 against the husband. It was also alleged from the relative side to accuse him and his family for dowry death as she was a newly married bride. Subsequently, the police approached the body for a medico-legal post-mortem examination to determine the exact cause of death.¹⁰

3. Autopsy Findings

Six antemortem injuries over the body were documented with a distinguished focus on a head injury that was consistent with the trauma described in the accident. The subdural hematoma was also appreciable as evident in the CT head report. The external examination did not find any evidence of poisoning as the structures including the mouth, oral cavity, pharynx, oesophagus, stomach, nasal cavity, larynx, trachea, and other components of the respiratory system appeared normal, suggestive that no poison was either ingested or inhaled. However, at the frequent request of family members and police officials, the viscera were preserved and sent to FSL to rule out the possibility of toxic exposure despite the absence of signs of poisoning on external as well as internal examination. The FSL reported the presence of malathion poison raising questions due to the absence of any clinical signs of poisoning before or after death. This unexpected finding contradicted the clinical presentation and the autopsy findings. To resolve the matter and to reach the conclusive stage, the higher police authorities of the district administration pursued the opinion from the medico-legal expert of the state of that time, who after perusal of the crime

scene investigation report, clinical case history of the patient documented by hospital and autopsy report concluded the presence of malathion poison in FSL report to be a false and erroneous beyond reasonable doubts.

4. Discussion

Malathion is an organophosphate pesticide employed in agriculture for pest control due to its effectiveness and comparatively less toxicity to humans relative to other compounds of its class. However, accidental poisoning can lead to serious complications like respiratory failure, neurological impairment, and death in severe cases. The false and erroneous results of malathion in the FSL report were supported by the following facts.

4.1. Autopsy findings

The absence of signs of poisoning during the external and internal examination raises significant concerns about the accuracy and reliability of the FSL report. As a general rule, the presence of a toxic substance must correlate with clinical symptoms. According to Locard's principle of exchange, there is always a transfer of material from one to another when two entities come into contact. That's why it was firmly asserted that there was no ingestion or inhalation of poison because the examination of both oral and nasal routes found no abnormalities in the post-mortem examination. Therefore, it would not be incorrect to state that no poison or toxin was taken through either the mouth or nose.

4.2. Implications of malathion detection

The detection of malathion in the viscera may be due to either post-mortem contamination or a mistaken lab result. The absence of clinical evidence of acute poisoning during the hospitalization additionally emphasizes the necessity for reevaluation of the settings surrounding the toxicological findings. Contamination could be from environmental sources or inappropriate handling of the viscera and therefore the result came as a false positive.

4.3. Evident CT report

Documentation of a massive subdural hematoma in the CT report signed by a radiologist and examinations of the patient by both a neurophysician and neurosurgeon during hospitalization establishes the cause of death as subdural hematoma which is sufficient to cause death in the ordinary course of nature.

4.4. Additionally

The failure to preserve visceral organs for histopathology confines the ability to confirm or refute the presence of poison.

5. Conclusion

This case highlights the challenges faced in medicolegal investigations especially when multiple factors such as

accidental trauma and unpredicted FSL findings complicate in reaching the definitive cause of death. It highlights the need for complete, meticulous, rigorous and transparent post-mortem examination as well as adherence to established forensic protocols. Additionally, this case serves as a crucial reminder of the intricacies inherent in forensic medicine and the necessity for continuous training and vigilance among medical professionals involved in dealing with medico-legal practices.¹⁰ The inferences of this case extend beyond the medical and legal communities as it highlights the importance of interdisciplinary collaboration in understanding and interpreting cases that overlap the borders of medicine and law.

6. Source of Funding

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7. Conflict of Interest

None.

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