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Uncovering the Unexpected: Organochlorine Contamination in Viscera in a Fatal Neurocardiogenic Vasovagal Episode

¹Udai Shankar Sinha, ²Praveen Dixit, ³Shweta Saroj

¹ Professor Emeritus, Head of Department, Department of Forensic Medicine, United Institute of Medical Sciences, Rawatpur, Prayagraj – 211012.

² Assistant Professor, Department of Forensic Medicine, United Institute of Medical Sciences, Rawatpur, Prayagraj – 211012.

³ Assistant Professor, Department of Forensic Medicine, United Institute of Medical Sciences, Rawatpur, Prayagraj – 211012.

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ABSTRACT

Inquest is an inquiry or investigation into the cause of death in cases of unnatural deaths, or if there is any suspicion or foul play suspected by the law or investigation agencies. On request of a Police or Magistrate, the forensic pathologist conducts the medico-legal post-mortem examination. Many a time, it leaves the doctor in a dilemma to determine the exact cause of death especially where the history from relatives, police and the facts observed in the autopsy do not match the dots with each other. In these cases, the forensic pathologist sends the viscera for chemical analysis to the FSL (Forensic Science laboratory), which helps the doctor to conclude conclusions. Still, the forensic expert should not stop here giving full recognition to the viscera report only, instead, he should have done the autopsy meticulously and given importance to other factors in the crime scene, keeping all the differentials in his open mind. This case report explores the accidental discovery of organochlorine compounds in the viscera of a deceased patient who suffered a neurocardiogenic vasovagal shock. The Forensic Science Laboratory (FSL) detected these compounds during routine toxicological analysis. The findings were incongruous with the clinical diagnosis of vasovagal shock and prompted further investigation into the potential sources and health implications of these substances. This report underscores the necessity of comprehensive forensic investigation and the potential for environmental contaminants to complicate death investigations.

Introduction:

An inquest is an inquiry or investigation into the cause of death in cases of unnatural deaths or when there is suspicion of foul play, as determined by legal authorities. In India, upon request from the police or a magistrate, a forensic pathologist conducts a medico-legal post-mortem examination, commonly referred to as a Police inquest or Magistrate

inquest. ^(1,2) These terms are defined under Sections 194 and 196 of the Bhartiya Nagarik Suraksha Sanhita 2023 (BNSS), previously outlined under Sections 174 and 176 of the Criminal Procedure Code. ^(3,4)

Upon receiving a request, a registered medical practitioner (RMP), preferably a forensic expert, performs the medico-legal post-mortem examination of the deceased. The primary objectives are to determine the cause of death, the mode

Corresponding author

Email Address: dixitpraveen104@gmail.com

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and manner of death, assist in identifying the deceased, and estimate the time since death (TSD), also known as the post-mortem interval (PMI). Forensic experts often face the challenge of reconciling discrepancies between the history provided by relatives and the police and the findings observed during the autopsy. In such cases, the forensic pathologist may send the viscera for chemical or toxicological analysis to the Forensic Science Laboratory (FSL). While these analyses can be crucial in determining the cause of death, there are instances where the viscera reports reveal false evidence or detect substances accidentally, even in non-poisoning cases. This can mislead the investigation and delay the delivery of justice.⁽⁵⁻⁸⁾ Organochlorines are organic compounds that contain at least one chlorine atom and are used as insecticides. Examples include aldrin, dieldrin, endrin, heptachlor, lindane, and dichlorodiphenyltrichloroethane (DDT). Consumption of organochlorines can lead to symptoms such as nausea, vomiting, hyperesthesia, agitation, headache, dizziness, confusion, myoclonic tremors in both voluntary and cardiac muscles, hyperthermia, dilated pupils, and respiratory depression. The fatal dose can range from 2 to 6 grams, with death potentially occurring within hours to 3 or 4 days after ingestion. Autopsy findings typically include froth from the mouth and nostrils, cardinal signs of asphyxia, a kerosene-like odour in the gastric contents, and congestion of all visceral organs.⁽⁹⁻¹¹⁾ Neurocardiogenic vasovagal shock, also known as vasovagal syncope, is a common and generally benign condition characterised by a sudden drop in blood pressure and heart rate, resulting in a lack of oxygen supply to the body and loss of consciousness. Although typically associated with transient symptoms, severe cases can occasionally result in death if not managed appropriately.⁽¹²⁻¹⁵⁾

This case report details an unusual detection of organochlorine compounds in the viscera of a patient who died from neurocardiogenic vasovagal shock. Identifying these compounds by the Forensic Science Laboratory (FSL) introduces complexities in understanding the cause of death and highlights the need for further investigation into potential environmental or occupational exposures.

Case report:

A 26-year-old female was declared dead upon arrival at the government hospital, having been brought in by her relatives. Following standard procedures, a medico-legal report was prepared, and the police were informed. Subsequently, the body was sent for a medico-legal post-mortem examination. The relatives alleged that the deceased had been poisoned homicidally via intravenous injection. Upon reviewing the case history, the police were requested to provide a crime scene investigation report. This report revealed that multiple drugs, approximately 8 to 9 packets of different compounds, were found in the deceased's handbag. During the external

examination of the body, the doctors observed cyanosis of the lips and nails but found no other signs of poisoning via oral, nasal, or intravenous routes. Internal examination showed that the normal appearance of the mouth, oral cavity, pharynx, oesophagus, nose, nasal cavity, larynx, trachea, vocal cords, and tracheobronchial tree. Congestion of the visceral organs was noted and documented by the forensic pathologists performing the autopsy. Given the absence of a definitive cause of death, the doctors were unable to establish a conclusive diagnosis and thus preserved the viscera for chemical analysis. The Forensic Science Laboratory (FSL) subsequently detected the presence of organochlorine compounds in the viscera, introducing an element of complexity into the case. After consulting with senior police officials, the court decided to seek a medico-legal opinion on the cause of death. This decision was made after thoroughly reviewing the case history, crime scene investigation, autopsy report, and FSL chemical examination results. The head of the department convened a board of doctors. Under the head's leadership, the board addressed all queries posed by the senior police officials honestly, firmly, and boldly. The board concluded that the cause of death was neurocardiogenic vasovagal shock and determined that the presence of organochlorine compounds in the viscera was an erroneous, false, and accidental finding.

Discussion:

Based on extensive experience comprising approximately 16,000 medico-legal post-mortem examinations, 100 medico-legal opinions, 72 papers published in renowned national and international journals, and five books on medical jurisprudence, the leader of this case firmly asserts that every poison or toxin in the body leaves some form of evidence, detectable through both external and internal examination. This is supported by Locard's Principle of Exchange, which posits that there is always a transfer of material when two entities come into contact with each other. Consequently, it can be confidently stated that no poison acts in the body without producing observable signs and symptoms. It is inconceivable that any poisoning case would present without indications of toxicity. In this instance, however, no videography or photography of the post-mortem examination was conducted, which might suggest potential negligence or inaccuracies in the post-mortem process. The crime scene investigation did not reveal any evidence suggestive of suicide or accidental ingestion of poison, as no empty bottles, pouches, substances, poison tablets, suicide notes, or traces of such evidence were recovered from the scene. The possibility of homicidal poisoning was also ruled out due to the absence of external injuries, including defensive wounds, and no signs of forced entry into the residence or disruption of the typical room environment, key indicators typically associated with homicide. Furthermore, various drug compounds,

such as paracetamol, chlordiazepoxide, antidepressants, and some herbal and homeopathic remedies, were found in the deceased's handbag, with some doses missing. This indicates that the deceased was likely undergoing treatment for chronic depression or a similar mental health condition. The post-mortem report documented the normal appearance of the mouth, oral cavity, pharynx, oesophagus, nostrils, nasal cavity, larynx, vocal cords, and the entire tracheobronchial tree, confirming that no poison was ingested or inhaled. Additionally, the absence of needle marks on the body ruled out intravenous poisoning.

The detection of organochlorine compounds in the viscera was erroneous, false, and accidental, based on the author's considerable experience with numerous post-mortem examinations. The cause of death was ultimately determined to be neurocardiogenic vasovagal shock, exacerbated by the deceased's unstable mental condition. This condition could have led to a decreased heart rate, low blood pressure, reduced oxygen supply, and loss of consciousness, resulting in an asymptomatic death. Neurocardiogenic vasovagal shock is usually triggered by a stressor that leads to a temporary decrease in heart rate and blood pressure. Common triggers include prolonged standing, emotional stress, or pain. The condition is generally self-limiting, but in rare cases, it can lead to significant complications if not managed promptly.⁽¹⁵⁾
⁽¹⁶⁾ In this case, the sudden collapse and death of the patient were consistent with a severe vasovagal episode, especially given the absence of trauma or other clear pathological findings.

Forensic Implications

The accidental detection of organochlorine compounds complicates the interpretation of the cause of death. While neurocardiogenic vasovagal shock was the primary diagnosis, the presence of these chemicals suggests the need for a comprehensive investigation into potential environmental or occupational exposures. The Forensic Science Laboratory's findings highlight the importance of considering all possible factors in death investigations, including the potential impact of environmental contaminants.⁽¹⁶⁾

Conclusion:

This case report highlights the complexities of forensic investigations when unexpected toxicological findings emerge. The accidental detection of organochlorine compounds in the viscera of a patient who died from neurocardiogenic vasovagal shock underscores the necessity for a comprehensive examination of all potential contributing factors. These findings advocate for a more inclusive approach in forensic toxicology, incorporating environmental and occupational exposure histories to

comprehend the implications of such cases fully. It is further recommended that forensic experts maintain an open and broad perspective when determining the cause of death. The mere presence of poison in the viscera, despite the absence of external or internal signs of poisoning, may complicate the investigation. Therefore, forensic professionals must consider various differential diagnoses to facilitate the delivery of justice.

References

1. Reddy KSN, Murty OP. The essentials of forensic medicine and toxicology. 35th ed. New Delhi: Jaypee Brothers Medical Publishers; 2022. p.
2. Anil Agrawal book.-
3. The Bharatiya Nagarik Suraksha Sanhita. New Delhi: Gazette of India; 25, December 2023. No. 46 of 2023. Available from: https://www.mha.gov.in/sites/default/files/250884_2_english_01042024.pdf (Accessed September 23, 2024).
4. Dixit P, Kumari M, Aravindan U, Chawla H. Exploring amended Indian laws in context of forensic medicine: A comprehensive review. *IP Int J Forensic Med Toxicol Sci* 2024;9(2):66-72
5. Kotabagi RB, Charati SC, Jayachandar D. Clinical Autopsy vs Medicolegal Autopsy. *Med J Armed Forces India*. 2005 Jul;61(3):258-63.
6. Subramanyam BV Modi's medical Jurisprudence and Toxicology, 22nd edn, 1999; New Delhi, Butterworth's India; 1- 24
7. Kotabagi RB, Pathak PR, Charati SC; Common medico-legal problems faced by medical officers of Armed Forces Medical Services; *MJAFI* 2002;58:234-40.
8. Bhullar DS, Gorea RK, Aggarwal AD. Medico-legal autopsy by panel of doctors present scenario. *Journal of Indian Academy of Forensic Medicine*. 2004;26(3):113-8.
9. Kamalesh T, Kumar PS, Rangasamy G. An insights of organochlorine pesticides categories, properties, eco-toxicity and new developments in bioremediation process. *Environmental Pollution*. 2023 Jun 26:122114.
10. Jayaraj R, Megha P, Sreedev P. Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment. *Interdisciplinary toxicology*. 2016 Dec 1;9(3-4):90-100.
11. Singh Z, Kaur J, Kaur R, Hundal SS. Toxic effects of organochlorine pesticides: a review. *American Journal of BioScience*. 2016 Mar;12(3):11-8.
12. Gracie J, Newton JL, Norton M, Baker C, Freeston M. The role of psychological factors in response to treatment in neurocardiogenic (vasovagal) syncope. *Europace*. 2006 Aug 1;8(8):636-43.
13. Fenton AM, Hammill SC, Rea RF, Low PA, Shen WK. Vasovagal syncope. *Annals of internal medicine*. 2000 Nov 7;133(9):714-25.
14. Sutton R, Petersen ME. The clinical spectrum of neurocardio-

- genic syncope. *Journal of cardiovascular electrophysiology*. 1995 Jul;6(7):569-76.
15. Grubb BP. Pathophysiology and differential diagnosis of neurocardiogenic syncope. *The American journal of cardiology*. 1999 Oct 21;84(8):3-9.
16. Boulassel B, Sadeg N, Roussel O, Perrin M, Belhadj-Tahar H. Fatal poisoning by vanadium. *Forensic science international*. 2011 Mar 20;206(1-3):e79-81.