Section: FMT

Case Series

WHEN SNAKEBITE WAS NOT THE CAUSE OF DEATH: AN AUTOPSY - BASED CASE SERIES OF THREE ALLEGED SNAKEBITE DEATHS

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ABSTRACT

Snakebite is an important public health problem in India, but an alleged history of snakebite may not always correlate with autopsy findings. We evaluated three medicolegal deaths with alleged snakebite history at Fakir Mohan Medical College and Hospital, Baleshwar, Odisha. Definite fang marks were absent in all cases. Autopsy and histopathology revealed alternative pathological causes: cirrhosis with ascites and generalized edema; two jejunal perforations with peritonitis; and purulent pericardial effusion with pulmonary inflammation. Venom detection was unavailable, so envenomation was not excluded solely on laboratory grounds. These cases emphasize correlating history, clinical findings, autopsy, and histopathology before attributing death to snakebite.

Keywords: Snake Bites; Envenomation; Autopsy; Histopathology; Cause of Death.

INTRODUCTION

Snakebite envenomation is an important public health problem in India and accounts for many preventable deaths. In medicolegal practice, however, an alleged history of snakebite alone does not establish fatal envenomation. Misinterpretation of circumstances, incomplete clinical assessment, and the presence of unrelated pathological conditions may lead to incorrect attribution of the cause of death. Previous medicolegal reports have demonstrated that deaths initially attributed to snakebite may subsequently be found to have other causes, including choking, poisoning, aspiration, and mechanical asphyxia.[1-4]

Medicolegal autopsy provides an opportunity to evaluate the alleged history, examine the suspected bite site, and identify alternative pathological or traumatic causes of death. This is particularly relevant in regions where snakebite is common and compensation may be available for eligible snakebite deaths. The present case series describes three alleged snakebite deaths in which autopsy and histopathological examination identified significant alternative pathological conditions.

MATERIALS AND METHODS

This descriptive case series included three alleged snakebite deaths subjected to medicolegal autopsy in the Department of Forensic Medicine and Toxicology, Fakir Mohan Medical College and Hospital, Baleshwar, Odisha. Information was obtained from police inquest reports, available hospital records, and circumstantial history provided by relatives or accompanying persons.

Each case underwent detailed external and internal examination. Histopathological examination of relevant organs was performed where indicated. Venom-detection assays and immunological testing were unavailable because of limited laboratory facilities. Therefore, interpretation was based on the available circumstantial, clinical, autopsy, and histopathological findings, and the absence of laboratory confirmation was not used alone to exclude envenomation. The identity of the deceased was kept confidential in accordance with applicable ethical principles.

Case 1

A 55-year-old man was brought for autopsy on 26 October 2023 with an alleged history of snakebite to the little toe of the left foot on 25 October 2023

while attending nature's call outdoors. He was admitted to District Headquarters Hospital, Baleshwar, and died during treatment.

External examination revealed xerotic skin changes and edema of both legs and the genitalia. No definite fang mark was identified at the alleged site or elsewhere. The abdomen was distended and contained approximately 1.5 L of ascitic fluid. The liver was pale, hard, and nodular, while the kidneys and spleen were congested. Histopathology showed cirrhosis developing on a background of fatty liver.

Figure 1: Shows pale, hard and nodular appearance of the surface liver in Case 1.

The findings supported chronic liver disease with cirrhosis and ascites as the principal pathological condition and provided an alternative explanation for death. Fatal snake envenomation could not be substantiated from the available evidence.

Case 2

A 34-year-old man was brought for autopsy on 25 December 2024 with an alleged history of snakebite to the right forefinger while working in a paddy field on 23 December 2024. He was initially treated at a nearby Community Health Centre and subsequently referred to Fakir Mohan Medical College and Hospital, where he died during treatment.

No definite fang mark was identified. Multiple bruises and abrasions, approximately 2–3 days old, were present over the left lower abdomen, flank, palm, and leg. The brain was congested and edematous. Approximately 1 L of yellowish fluid was present in the peritoneal cavity. Two perforations were identified on the anti-mesenteric border of the jejunum, with leakage of intestinal contents into the peritoneal cavity. The liver, kidneys, and spleen were intact and pale.

Figure 2: Shows two perforations on anti-mesenteric border of jejunum with leaking intestinal contents in Case 2

Figure 3: Shows peritoneal cavity containing about 1 litre of yellowish fluid in Case 2.

The principal finding was traumatic jejunal perforation with peritoneal contamination and peritonitis. The associated abdominal and flank injuries provided a plausible mechanism for blunt abdominal trauma and intestinal perforation. These findings offered a more convincing pathological explanation for death than the alleged snakebite.

Case 3

A 7-year-old boy was brought for autopsy on 27 April 2025 with an alleged history of snakebite to the left foot while sleeping on 26 April 2025. He was brought to Fakir Mohan Medical College and Hospital, where he was received dead. There was a history of fever for approximately five days before death.

No definite fang marks were identified. Multiple old, small abrasions and scratches were present over the face, hands, knees, and legs. The pericardial sac contained approximately 500 mL of purulent fluid, with purulent deposits over the epicardium. The left lung was collapsed and the right lung was consolidated. Massive intestinal infestation with *Ascaris lumbricoides* was also noted.

Figure 4: Shows purulent deposits over epicardial surface of the heart in Case 3

Figure 5: Shows pericardial sac containing approximately 500 ml of purulent fluid in Case 3.

Histopathology demonstrated chronic inflammatory changes, congestion, lymphocytic infiltration, and peribronchiolar fibrosis in the lungs. The pericardium showed necrosis with acute and chronic inflammatory cell infiltration, including macrophages. A thrombus was present in the aorta. The findings supported acute suppurative pericarditis with associated pulmonary inflammatory pathology as the cause of death. The Ascaris lumbricoides infestation was an associated finding and, in the absence of obstruction, perforation, or another direct fatal complication, was not considered the cause of death. No specific autopsy or histopathological findings supporting fatal systemic snake envenomation were identified.

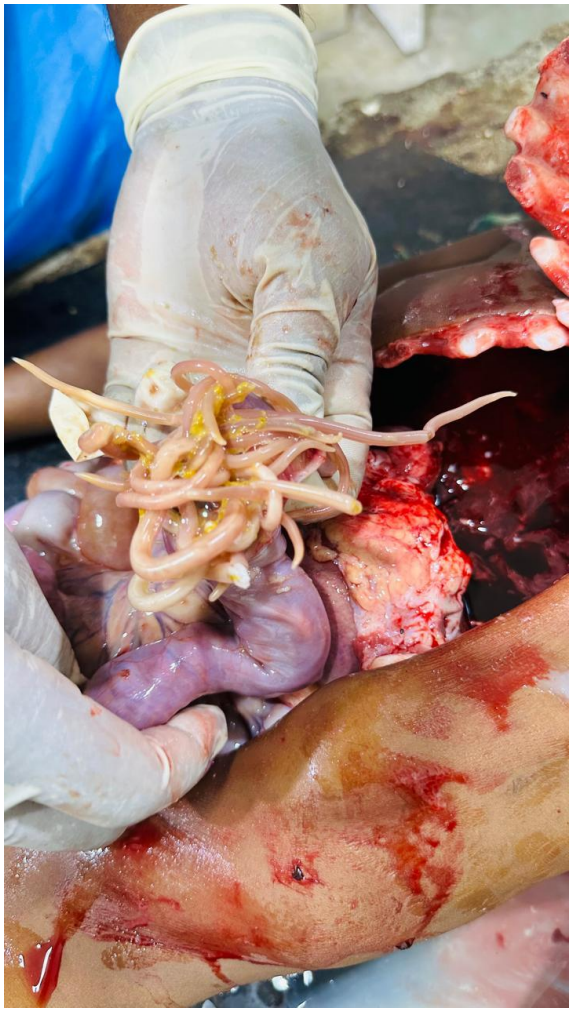

Figure 6: Shows massive helminthic infestation of intestine with roundworms in Case 3

Table 1: Comparison of Alleged Snakebite Findings

Parameter	Case 1	Case 2	Case 3
Age/Sex	55/M	34/M	7/M
Alleged Bite Site	Left little toe	Right forefinger	Left foot
Fang Marks	Absent	Absent	Absent
Local Envenomation Signs	Absent	Absent	Absent
Systemic Envenomation Signs	Absent	Absent	Absent
Major Autopsy Findings	Cirrhotic liver, ascites	Multiple bruises and abrasions on left lower abdomen, flank, palm and leg Jejuna perforation Peritonitis	Purulent pericarditis Lung consolidation
Histopathology	Liver cirrhosis	Not significant	Inflammatory pathology
Final Cause of Death	Complications of liver cirrhosis	Chemical peritonitis	Cardio-pulmonary inflammatory pathology

DISCUSSION

Snakebite remains a major public health concern in India. In medicolegal cases, however, an alleged history of snakebite must be interpreted in conjunction with the circumstances, clinical manifestations, examination of the alleged bite site, laboratory investigations where available, and complete autopsy findings.

The medically important venomous snakes in India include the common krait (*Bungarus caeruleus*), Indian cobra (*Naja naja*), Russell's viper (*Daboia russelii*), and saw-scaled viper (*Echis carinatus*), commonly referred to as the "big four." Clinical manifestations of envenomation vary according to the species and venom and may include local swelling, pain, bruising, bleeding, blistering, necrosis, neurotoxicity, coagulopathy, hemorrhage, renal injury, cardiovascular complications, or respiratory failure.

A significant common finding in all three cases was the absence of definite fang marks. However, absence of fang marks alone cannot exclude snakebite or envenomation, particularly because some bites may produce minimal or inconspicuous local findings. Previous reports have similarly highlighted the difficulty of diagnosing or excluding snakebite when the history is positive but local findings are absent or nonspecific.[3,4] Accordingly, the present cases were not interpreted solely on the basis of absent fang marks. Instead, the overall clinical, circumstantial, autopsy, and histopathological evidence was considered, particularly the presence of alternative conditions capable of explaining death.

In Case 1, marked ascites, edema, and a pale, hard, nodular liver, together with histologically confirmed cirrhosis and fatty change, demonstrated significant chronic liver disease. In Case 2, jejunal perforations with leakage of intestinal contents, together with abdominal and flank injuries, established a plausible traumatic mechanism followed by peritoneal contamination and peritonitis. In Case 3, purulent pericardial effusion, epicardial purulence, pulmonary consolidation and collapse, and corresponding inflammatory histopathological changes supported severe suppurative inflammatory disease involving the pericardium and lungs.

Several authors have reported cases in which deaths initially attributed to snakebite were subsequently found to have other causes. Dhruv et al. described a case in which a six-year-old girl brought with an alleged history of snakebite was found at autopsy to have died from choking associated with a roundworm in the respiratory tract.[1] Chouksey et al. reported a case of a 15-year-old girl in which an alleged accidental snakebite was ultimately determined to be a suicidal death due to poisoning.[2] Naveen et al. described an alleged snakebite case in which autopsy revealed fatal myocardial infarction and antemortem aspiration rather than evidence supporting snakebite as the cause of death.[3] Yadav et al. reported two alleged neurotoxic snakebite deaths in which, despite the history and circumstantial findings suggestive of snakebite, autopsy findings indicated smothering and manual strangulation.[4]

The medicolegal autopsy should therefore include careful examination of the alleged bite site as well as systematic examination of all body systems. Findings such as puncture marks, swelling, bruising, bleeding, blistering, or necrosis should be documented, but their absence or presence should not be interpreted in isolation. Where clinically indicated and available, appropriate laboratory investigations may provide additional evidence of envenomation.

In resource-limited settings, meticulous autopsy examination and targeted histopathology remain particularly valuable for identifying alternative causes of death. Previous reports have emphasized that the autopsy surgeon may face considerable difficulty in both confirming and excluding neurotoxic snakebite, particularly when the diagnosis is based largely on history and circumstantial evidence.[3,4]

Strengths

The principal strength of this case series is the demonstration of three distinct alternative pathological conditions in alleged snakebite deaths: chronic liver disease with cirrhosis and ascites, traumatic jejunal perforation with peritonitis, and acute suppurative pericarditis with pulmonary inflammatory pathology.

Limitations

The study is limited by the small sample size of three cases and therefore has limited generalizability. Venom-detection and immunological tests were unavailable, so envenomation could not be excluded solely on laboratory grounds. The initial histories were based partly on circumstantial information from relatives or other informants and may have been incomplete. Some clinical and laboratory records were also unavailable.

CONCLUSION

An alleged history of snakebite should not automatically be accepted as the cause of death in medicolegal cases. The present cases demonstrate that significant pathological or traumatic conditions may coexist with, or be mistaken for, alleged snakebite. Careful evaluation of the clinical history, alleged bite site, complete autopsy findings, and histopathology is essential for accurate determination and certification of the cause of death. Such systematic assessment is important not only for medicolegal accuracy but also for reliable mortality statistics and appropriate administration of snakebite-related compensation.

Recommendations

1. Thorough medicolegal autopsy should be performed when fatal snake envenomation is not adequately established clinically.
2. The alleged bite site should be carefully examined and documented.
3. Histopathological examination should be considered when the cause of death remains uncertain.
4. Venom-detection or other appropriate laboratory investigations should be used where available and clinically indicated.
5. Healthcare professionals and investigating agencies should recognize that an alleged history of snakebite may coexist with, or be mistaken for, another fatal pathological condition.

Conflict of interest

The authors declare that there is no conflict of interest.

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Ethical considerations

All procedures were conducted in accordance with ethical standards. The identity of the deceased individuals has been kept confidential.

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