ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

WHEN FEAR TURNS FATAL : UNRAVELING SUDDEN DEMISE FOLLOWING A NON VENOMOUS SNAKE BITE

YASHAS B.P, Dr. Chinmayi Y

ORCID ID: https://orcid.org/0009-0003-6556-603X
Associate Professor, Department of Forensic Medicine and Toxicology
Name and address of the institution: Adichunchanagiri Institute Of Medical Sciences, B.G. Nagara-571448, Nagamangala Taluk, Mandya District, Karnataka.
corresponding author: **YASHAS B.P**, INTERN
Phone number : 9739290903
Email address : yashasbp2001@gmail.com

ABSTRACT

Snake bite envenoming is a public hazard often faced by the rural population in the tropical countries like India. A 59 year old man was brought for post mortem examination with alleged history of non venomous snake bite after which he collapsed within 2 minutes. Autopsy revealed fang marks over the dorsum of left hand middle finger, a few ante mortem injuries and no other significant findings. The cause of death in a venomous snake bite could be due to respiratory failure, shock or hemorrhage with fatal period ranging from a few hours to even days. Many people are terrified of snakes believing that bite by almost any species can cause rapid death. Sudden death after a snake bite may not be attributable to envenoming. We believe that the cause of death in this case was most likely a vaso - vagal attack in response to fear and pain of the snake bite that triggered cardiac arrest. Importance of history and correlation with the autopsy findings helped us in arriving at the cause of death.

KEYWORDS: Snake bite, fear, vaso - vagal attack

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

INTRODUCTION:

The 2023 World Health Organization (WHO) report estimates that about 5 million snakebites occur each year resulting in up to 2.7 million envenomings. There are reports suggesting that between 81,000 and 138,000 deaths occur each year due to snakebite. It is also responsible for more than 400,000 amputations and other permanent disabilities.[1] It is a preventable public health hazard often faced by the rural population in the developing countries like India where the agricultural workers and children are the most affected. Snakes can be venomous or non venomous. There are more than 2000 species in the world, about 300 in India and out of which around 52 are venomous. Venomous snakebites can cause paralysis that may prevent breathing, bleeding disorders that may lead to fatal hemorrhages, irreversible kidney failure and tissue damage that can cause amputations and other permanent disabilities. The cause of death in a venomous snakebite could be due to respiratory failure, shock or hemorrhage with the fatal period varying from a few hours to even days.[2]
Here, we report a case of sudden death following a non venomous snakebite for which the cause of death was given after post mortem examination, histopathological examination and Forensic Sciences Laboratory examination.

CASE DETAILS:
A 59 year old apparently healthy man with no known co morbidities was brought for post mortem examination with alleged history of snake bite. Patients attenders gave history that the patient was working on the farm when he was bitten by a supposedly non venomous snake on his hand and he had intense pain. He tried to run, but sustained injuries and collapsed within 2 minutes. Autopsy revealed two punctured wounds over the dorsum of left hand middle finger each measuring 0.5cm x 0.5cm separated by a distance of 1.5 cm, indicating fang marks (Figure 1), an abrasion measuring 3cm x 3cm over middle of the forehead (figure 2) and another abrasion measuring 4cm x 2cm over the right iliac region (figure 3). These abrasions were ante mortem in nature. There was no redness or edema and there were no other external injuries. On internal examination, larynx and trachea were intact. Lungs were congested, brain was intact and no other significant changes were observed. Other causes of sudden death were ruled out by Histopathological and Forensic Science Laboratory examination. Heart was sent for histopathological examination where there was a 25% lumen obstruction in the left anterior descending artery and aorta showed fatty streaks. Blood and viscera were sent for Forensic Sciences Laboratory examination to rule out poisoning.
The cause of death was given as vaso vagal shock due to snakebite.

DISCUSSION:
Envenomation is the exposure to a poison or toxin resulting from a bite or a sting from an animal. More than 80% of the snakebites are not envenomated. This includes bites from a non venomous snakes or when a venomous snake fails to inject venom (dry bite). In India, percentage of non venomous snake bite ranges from 32 to 46%.[3] Snake venoms are complex mixtures of proteins and peptides used for prey subjugation. In India, around 90% of snakebites are caused by the infamous ‘big four’ namely – Common krait, Indian cobra, Russel’s viper and Saw scaled viper. Venom can be broadly classified as neurotoxic, hemotoxic and myotoxic. Neurotoxic venom is found in elapid snakes like cobra and krait. Hemotoxic venom is found in Vipers and myotoxic venom is found in seasnakes.[4]

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

In the present case, the victim died within minutes of the bite. Death occurred too rapidly to be attributable to envenoming. Only two explanations seem plausible. One is anaphylaxis and the other is a vaso vagal shock triggered by the pain and fear of the snakebite. However there were no features of anaphylaxis like edema, redness and the larynx along with trachea were intact on internal examination. In cases of death thought to be possibly caused by anaphylactic reactions, postmortem measurement of serum tryptase may help prove the diagnosis. Tryptase is released by mast cells during anaphylactic reactions and its levels tend to rise over time in the postmortem period, and thus blood for testing should be drawn as soon as possible after death when anaphylactic reactions are suspected.[5] However, this facility was not available at our setup and could not be done.

Acute myocardial infarction is a rare complication of snakebite with a few reported cases in literature. Snake venom may also cause coronary vasospasm, thus causing ischemia to the myocardium. In addition, cardiac output may be reduced owing to myocardial necrosis caused by the snake venom. The other causes of cardiac arrest after snakebite may be hyperkalemia due to acute kidney injury, vascular collapse and hypovolemic shock due to bleeding.[6] The postmortem histopathological study of the heart revealed a 25% lumen obstruction in the left anterior descending artery and fatty streaks in the aorta which are not significant to cause a myocardial ischemia. However, coronary vasospasm with or without atherosclerosis may be responsible for reduced coronary blood flow and therefore leading to myocardial infarction. There is no histopathological evidence of coronary vasospasm causing myocardial infarction except maybe at an ultrastructural level. Krahn et al. reported that 11% of patients experienced cardiac arrest due to vasospasm. Moreover, a postmortem autopsy study showed similar findings with 12 % of patients that were found to have coronary vasospasm as a cause of cardiac arrest. There is a 2% risk of sudden cardiac death in a patient with multi vessel spasm.[7]

In our case, death occurred within 2 minutes of the snake bite and the patient had no features of envenomation. It is likely that the patient suffered from a vaso vagal attack in response to the emotional shock of being bitten and also due to the pain of snakebite. This lead to vasodilatation, bradycardia and hypotension. Death occurred due to cardiac arrest as a result of vasospasm.

CONCLUSION:

Many patients are terrified of snakes believing that bites by almost any species can cause rapid death. The element of surprise and the associated threat to life may cause extreme stress and anxiety in the victim which may prove to be fatal as we learned in this case. Importance of history and correlation with autopsy findings helped us in arriving at the cause of death. This case highlights the importance of community education about snakebites that not all bites are due to venomous snakes and can cause death. The WHO **RIGHT** strategy (**R**eassurance, **I**mmobilization, **G**et to **H**ospital Immediately and **T**elling the doctor about emergence of symptoms) should be followed in the first aid management of any snakebite.

REFERENCES:

1 World Health Organization. Snakebite envenoming [Internet]. 2023 Sep 12 [cited 2024 Aug 29]. Available from : https://www.who.int/news-room/fact-sheets/detail/snakebite-

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

envenoming#:~:text=An%20estimated%205.4%20million%20people,are%20caused%20by%20snakebites%20annually.

2 Seifert SA, Armitage JO, Sanchez EE. Snake Envenomation. N Engl J Med. 2022 Jan 6;386(1):68-78. doi: 10.1056/NEJMra2105228.
3 Sahu RK, Chakraborty SS, K S, Gupta S. Nonvenomous Snakebite in Pediatric Age Group-Wolf under a Sheep's Coat. Indian J Plast Surg. 2022 Jul 5;55(3):299-301. doi: 10.1055/s-0042-1750376.
4 Pillay VV. Textbook of Forensic Medicine and Toxicology. 20th edition. Hyderabad (India): Paras Medical Publisher; 2023.
5 Norris, Robert & Wilkerson, James & Feldman, Joanne. (2007). Syncope, Massive Aspiration, and Sudden Death Following Rattlesnake Bite. Wilderness & environmental medicine. 18. 206-8. 10.1580/06-WEME-CR-012R.1.
6 Namal Rathnayaka RMMK, Nishanthi Ranathunga PEA, Kularatne SAM. Sudden Death Following Hump-Nosed Pit Viper (Hypnale hypnale) Bite. Wilderness & Environmental Medicine. 2021;32(1):125-127. doi:10.1016/j.wem.2020.09.007
7 Aissaoui H, Boutaybi M, Ikbal A, Elouafi N, Ismaili N. Fatal Multi-Vessel Coronary Vasospasm: A Case Report. Cureus. 2020 May 25;12(5):e8271. doi: 10.7759/cureus.8271.

Figure 1 : Autopsy finding of 2 punctured wounds over the dorsum of left hand middle finger

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

Figure 2: Autopsy finding of an ante mortem abrasion over the forehead

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 9, 2024

Figure 3: Autopsy finding of an ante mortem abrasion over right iliac region