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Research Article

Saving Lives of Snakopathy Victims During COVID-19 Pandemic without any Mortality: A Clinico-Epidemiological Study from Rural Maharashtra, India (2021)

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A B S T R A C T

Background: Globally, between 81,000 and 138,000 people die each year from snakebite, and up to 400,000 are left permanently disabled or disfigured due to amputations of the bitten parts. India recorded a staggering 1.2 million snakebite deaths in the 20 years from 2000 to 2019, with an average of 58,000 deaths caused by snakebite annually.

Objectives: To study the clinical profile of the snakebite cases reported to the Vighnahar Nursing Home Clinic in Pune during the year 2021 and the outcome among patients during COVID-19 pandemic.

Method: Details of the snakebite cases presented to the clinic were extracted retrospectively from case records of the Vighnahar Nursing Home Clinic in Pune for the year 2021 to study the pattern of morbidity and mortality among the admitted cases.

Results: A total of 196 snakopathy cases presented to the clinic in 2021, the majority of them (70 %, 137) were bitten by venomous snakes, and 30% (59) were bitten by non-venomous snakes. Among venomous snakebite patients, 71 were males and 66 females. 77 were bitten on the hands and 59 on the legs. One bite by C. Krait was on the lateral side of the neck. Among venomous snakes, the majority of patients were bitten by Russell's Vipers (RV), 67% (92) and 15 each by Spectacled Cobra (SC) and Common Krait (CK), 11 by Green Pit Vipers (GPV) and only 4 by Saw Scale Vipers (SSV). CK bites were mostly around midnight, while other snakebites were early morning or early evening. A total of 1126 Anti-Snake Venom (ASV) Vials were used. Though there were only 4 SSV cases, the ASV vials used were highest per patient, i.e., 15.25 vials, followed by SC, 13.5 vials, CK, 8.3 vials, and least for RV, 8.03 vials. No ASV was given to GPV patients as it does not work. Out of the total, 20% were children below 20 years bitten by venomous snakes, and 24% were bitten by non- venomous snakes. No deaths were observed due to the meticulous clinical handling of all snakopathy patients to fulfill the objective of "Mission Zero Snakebite Death" (MZSD).

Keywords: Snakebite, Mortality, Morbidity, WHO, Amputation

Introduction

Snakopathy is an acute, life-threatening time-limiting medical emergency. Globally, each year, approximately 5.4 million people are bitten by snakes, of which 2.7 million are injected with venom. WHO estimates that the number of people who die all over the world each year due to snakebite ranges between 81,000 and 138,000, and up to 4 lakhs are left permanently disabled or disfigured, as a result of being bitten by venomous snakes. In many communities, these permanent injuries result in people being discriminated against and ostracised, ultimately leading to a crippling loss of income, debt, mental health issues, and reduced quality of life.

India recorded a staggering 1.2 million snakopathy deaths in the 20 years from 2000 to 2019, with an average of 58,000 deaths caused by snakebite annually. Around 70% of these deaths occurred in limited, low-altitude, rural areas of eight states — Bihar, Jharkhand, Madhya Pradesh, Odisha, Uttar Pradesh, Andhra Pradesh (including Telangana), Rajasthan, and Gujarat. The study, conducted by the Centre for Global Health Research (CGHR), University of Toronto, Canada, with Indian and UK partners, also points out that half of all the snakebite deaths occurred during the monsoon period from June to September. The paper titled 'Trends in snakebite deaths in India from 2000 to 2019 in a nationally representative mortality study' indicated that most of the envenomation (the process by which venom is injected by the bite or sting of a venomous animal) was by Russell's vipers, followed by kraits and cobras. The study indicated that snakebite deaths occurred mostly in rural areas (97%), and were more common in males (59%) than females (41%), and peaked at productive ages of 15-29 years (25%). The numbers for annual snakebite deaths were highest in the states of Uttar Pradesh (8,700), Andhra Pradesh (5,200), and Bihar (4,500), it further added. The authors wanted to describe how during the days of COVID-19 pandemic, snakebite continued unabated. Here, we present details of the snakebite cases reported to the Vighnahar Nursing Home Clinic in Pune during the year 2021 and examine the symptoms and outcomes.

Method: Details of the snakebite cases presented to the clinic were extracted retrospectively from case records of the Vighnahar Nursing Home Clinic in Pune during the year 2021 with the objective of studying the pattern of morbidity and mortality among the admitted cases.

Results: A total of 196 snakebite cases presented to the clinic in 2021, the majority of them 70 % (137) were bitten by venomous snakes (Table 1), and 30% (59) were bitten by non-venomous snakes. Among venomous snakebite patients, 71 were males and 66 females. 77 were bitten on the hands and 59 on the legs. One bite by C. Krait was on the lateral side of the neck. Among venomous snakes, the majority of patients were bitten by Russell's Vipers (RV), 67% (92) and 15 each by Spectacled Cobra (SC) and Common Krait (CK), 11 by Green Pit Vipers (GPV) and only 4 by Saw Scale Vipers (SSV). CK bites were mostly around midnight, while other snakebites were early morning or early evening. A total of 1126 Anti-Snake Venom (ASV) Vials were used (Table 2). Though there were only 4 SSV cases the ASV vials used were highest per patient, i.e. 15.25 vials followed by SC, 13.5 vials, CK, 8.3 vials, and least for RV, 8.03 vials. No ASV was given to GPV patients as it does not work. Out of total, 20% were children below 20 years bitten by venomous snakes (Table 1) and 24% were bitten by non- venomous snakes. No deaths were observed due to the meticulous clinical handling of all snakebite patients to fulfil the objective of "Mission Zero Snakebite Death" (MZSD).

Among Russell's Viper bite patients who travelled 2-60 Km distance to the Hospital, out of 92, 4 had ptosis and 1 had Dysarthria. Three needed ventilator support for 30 minutes to 18 hours as they suffered cardio-respiratory arrest. Acute Respiratory Failure was seen in 10 patients. In R.V. out of 92 patients, 10 patients (10.86%) had Acute Renal Failure (ARF). Out of them, 4 patients were treated with medical management, and 6 patients (6.5%) required Hemodialysis. Necrosis was seen in 10 patients, 4 of whom required skin Debridement. 5 patients had thrombocytopenia and 3 had hematuria. The minimum Whole Blood Clotting Time (WBCT) was 3 minutes and the maximum was 48 minutes.

In cobra bite, 15 patients travelled a distance of 10 – 100 km. Out of 15, 10 had ptosis, and 9 had Dysarthria or both. Six needed ventilator support for 5- 18 hours as they suffered cardio-respiratory arrest. Another 6 had necrosis, and 3 of them required skin debridement and two of them required skin grafting due to extensive sloughing of tissues at the bitten part.

Among Common Krait bite patients who travelled 2-70 km to the Hospital, out of 15, 7 had ptosis and 4 had Dysarthria. Three needed ventilator support for 18-25 hours as they suffered cardio-respiratory arrest.

Out of 96 viper bite patients, 86 presented with swelling of the bitten part (Table 3). June to July had the highest number of both Venomous and non- venomous snakebites (Fig 1).

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Table 1.Age-wise distribution of snakebite cases at Vighanhar Nursing Home Clinic, Pune 2021 where snakes were identified or brought dead by victim's relatives

AGE(yrs)	Cobra Bite	Krait Bite	Saw scale V.	R.V.Bite	Green pit V.	Non venomous
0-10	02	00	00	07	00	03
10-20	02	03	00	13	00	11
20-30	04	06	00	24	03	12
30-40	03	06	00	21	03	11
40-50	01	00	00	07	01	09
50-60	01	02	01	11	01	06
60-70	02	00	02	10	03	06
70-80	00	00	01	01	00	01
TOTAL	15	15	04	92	11	59

Table 2.Average ASV used in different snakebite cases at Vighanhar Nursing Home Clinic, Pune 2021

Snake	Patient	ASV vials used	Average ASV vials used
R.V.Bite	92	738	8.03
Krait Bite	15	125	8.3
Cobra Bite	15	202	13.5
Saw scale V.	04	61	15.25

Tabke 3.Swelling in Bitten part in Russell's Viper bites cases at Vighanhar Nursing Home Clinic, Pune 2021

Swelling	Patient
Mild	27
Moderate	24
Severe	35
Normal	06
Total	92

Discussion

Mostly patients bitten by venomous snakes present to the clinic and as observed from this analysis, most of the krait bites are around midnight as CK are most active at night and can enter human habitations and bite human beings even while sleeping, as a case of bite by CK on the lateral side of neck is indicative of this. The rest of the snakebites either early morning or early evenings. Majority of males are bitten than females and a fourth of the bites were in children. Russell's viper bite cases account for 67% of total snakebite cases. RV bites were most debilitating in terms of Acute Renal Failure (ARF) and skin/ tissue damage and necrosis. Though there were only 4 SSV cases, the ASV vials used were highest per patient, i.e., 15.25 vials.

Fig 2 shows a 14-year-old girl having RRV bite on the Rt foot near the ankle with severe local necrosis. The tendon is necrosed. Debridement was done twice. Flap cover Tendo Achilles. ARF managed. Vacuum Assisted Closure (VAC) of wounds done and Flap Released. The patient were recoveredcompletely over 5 months.

Similar blistering and necrosis were also seen in some patients of the Cobra bite. Fig 3 shows 60-year-old male with a cobra bite having a local wound at the bite site with severe necrosis at the right foot, debridement done twice. He was given 24 vials of ASV and remained on ventilator support for 1 day. Fig 4 shows 60-year-old male with diabetes Mellitus (DM) severe sepsis, and debridement done twice followed by skin grafting. Fig 5 shows a 20-year-old female bitten by Saw Scale Viper, 5 months pregnant, admitted in shock after 54 hours of the bite. The Whole Blood Clotting Test (WBCT) was more than 55 minutes, having hemetemesis and gum bleeding, and two units of blood. 20 vials of ASV were given. She recovered completely with the normal fetus and delivered normally later. Fig 6 shows a 60-year-old female with C Krait bite during sleep at 1: 30 AM and was brought immediately within 3 hours to the clinic with complaint of abdominal pain, vomiting in semi-conscious state of mind with severe ptosis. Pulse was 122/Mnt, and Blood Pressure (BP) was high at 170/119 mm of Hg, She was given immediate ventilator support and had minimal response on day 3 with complete recovery by

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day 8. Therefore, early ventilator support can save lives, and wasting time to reach a health facility can be fatal. Fig 7 shows amputations that were necessitated after RV bites. Fig 8; What's wrong First Aid on the part of patients showing active bleeding from cuts made as first aid after Viper bite and bad practice of tight tourniquet on the bitten part, that may lead to gangrene formation and may require amputation of the bitten part. Fig 9 depicts the need for ventilators with reference to the type of snake and Fig 10 shows the time of bite with reference to the type of snake. These case studies with pics are must to make people aware of dos and don'ts in case of snake bite.

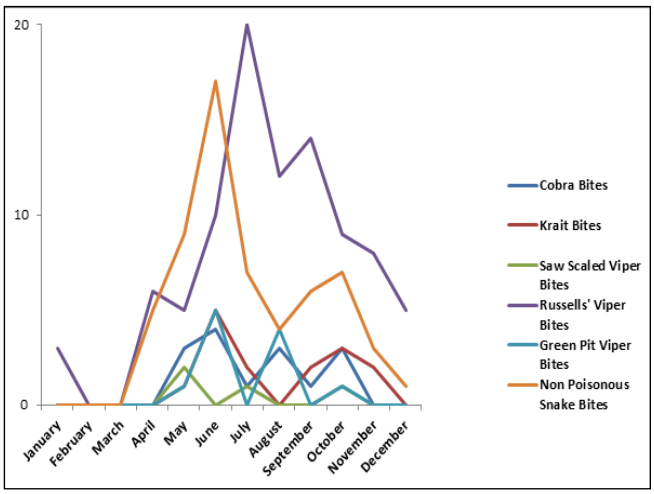

Figure 1.Seasonal Variations in Snakebite cases at Vighanhar Nursing Home Clinic, Pune 2021

Figure 2. Blistering and necrosis in a 14-year-old girl patient having RV bite

While WHO has given a call to half snakebite related mortality and morbidity by 2030 it cannot be done unless all involved are responsible in their behaviors and actions as above case studies explain. Special strategies need to put in place to achieve this WHO objective. Patients need to be educated for prevention of snakebite, relevant first aid, and early transfer to appropriate hospital. Transport services like 108 ambulance service in India need to be equipped with trained EMTs and ASV in cases of emergency. Designated snakebite hospitals (DSHs) need to be established based on data of Snake Bite Envenomation (SBE) well equipped with trained doctors and staff along with ventilators. Ventilators that are now available in remotest of hospitals for COVID 19, need to be kept working for snakebite cases because in our experience early ventilator support in case of snakebite can save a life. Primary Health Centers (PHCs) must have ASV to manage patients as per national protocol and refer patients as envisaged in National Protocol. PHCs must have glass test tubes for doing WBCT and also need to have inj. Neostigmne and inj. Atropine as emergency drugs. Snakebite management should be an integral part of MBBS curriculum and a compulsory internship of 3 weeks on snakebite management should be given to doctors/ nurses in a designated snakebite hospital. As per data compiled by Jitender Sharma et al (Personal Communication, 2014) as against requirement of 2.5 Million ASV Vials we have supply for 1.85 Million ASV vials i.e. Shortage of ASV production in India is 56.56% which in fact means 1 out of every 2 snake bite victims does not have access to ASV. The need to have monovalent species specific antivenoms and region specific. ASVs has been highlighted in many recent publication and need to be taken seriously by the policy makers if we wish to achieve WHO objective of reducing by 50% snakebite related mortality and morbidity in India.

Figure 3. 60-year-old male with cobra bite and local wound at bite site with severe necrosis at right foot

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Figure 4.60-year-old male with diabetes Mellitus (DM) and severe sepsis, debridement done twice followed by skin grafting

Figure 5.20-year-old female bitten by Saw Scale Viper, 5 months pregnant admitted in shock after 54 hours of bite, having hemetemesis and gum bleeding. WBCT is 55 mts

Figure 6.60-year-old female with C Krait bite during sleep with complaint of abdominal pain, vomiting with severe ptosis

Figure 7.Amputations after gangrene that were done after RV bites

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Figure 8.The wrong First Aid on the part of patients showing active bleeding after Viper bite and bad practice of tight tourniquet that may lead to gangrene formation and may require amputation of the bitten part

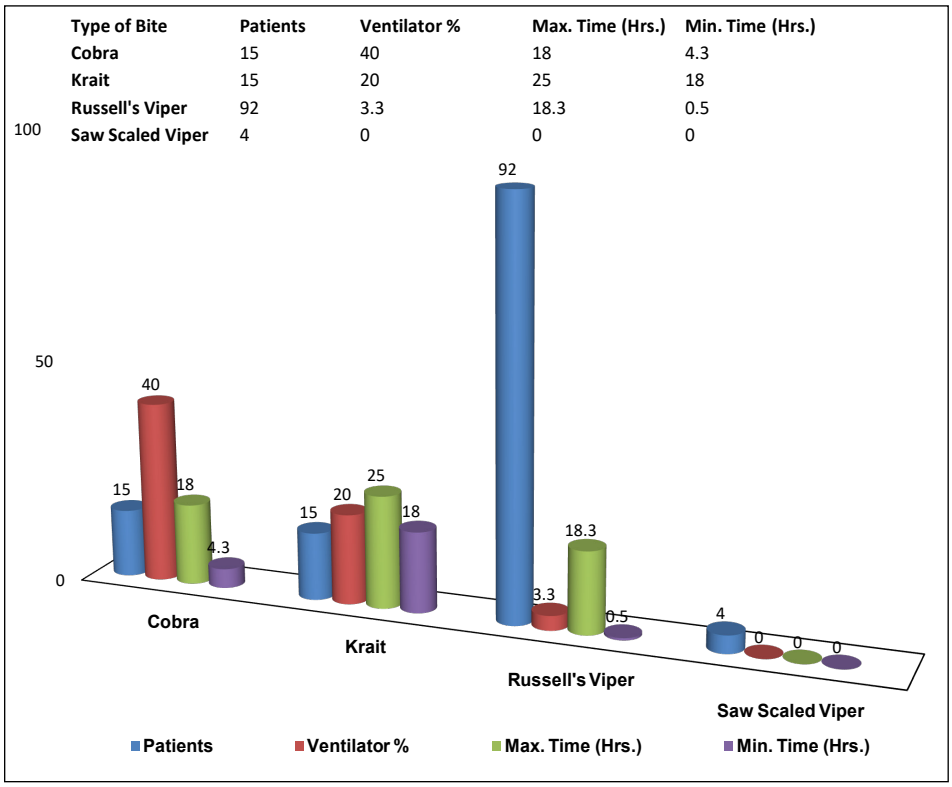

Figure 9.Need for Ventilators

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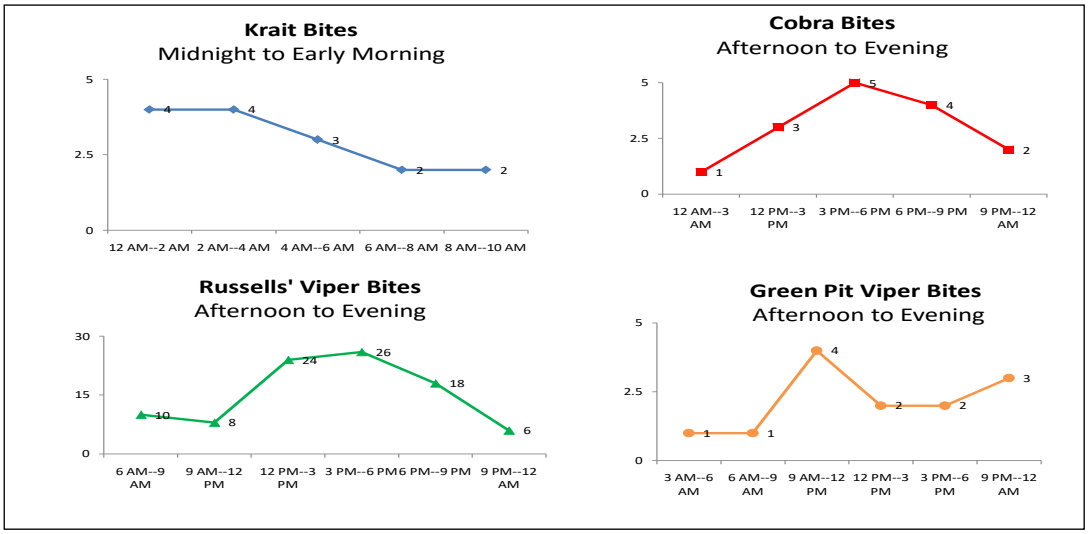

Figure 10.Time of Snake Bites

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