



## Snake bite in third trimester of pregnancy with systemic envenomation and delivery of a live baby in a low resource setting: A case report



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### ABSTRACT

**Background:** Snake bite in the third trimester of pregnancy with late presentation, systemic envenomation; disseminated intravascular coagulopathy and delivery of a live neonate is uncommon in a low resource setting. **Case:** We present a 22 year old unbooked Gravida 3 Para 1<sup>+1</sup> 1 alive lentiviral positive woman at 32 weeks gestation with snake bite, leg swelling, vaginal bleeding and labour pains. At presentation, there were anemia, tachycardia, hypotension; a gravid uterus with a single fetus in longitudinal lie, cephalic presentation, regular fetal heart rate and cervical dilatation of 3 cm. Preterm labour with antepartum hemorrhage due to venomous snake bite was diagnosed. Multidisciplinary management instituted led to the survival of both mother and baby. **Conclusion:** In resource constrained setting, disseminated intravascular coagulopathy arising from systemic envenomation due to snake bite in pregnancy could be challenging. Obstetric outcome depends on the degree of envenomation, gestational age at presentation, timing, duration and quality of treatment.

### 1. Introduction

Snake bite is a rare event during pregnancy but a large series of hospital admissions from India reported a 1% rate of snake bite in pregnancy [1,2]. It was estimated that one million snake bites, 500,000 envenomation and 10,000–20,000 deaths occur each year in Africa [3,4]. In a region of Nigeria, 497 snakebites were reported among 100,000 populations per year, with a fatality rate of 12.2% [5].

Most snake bites are non-poisonous; however, the saw scaled or carpet viper *Echisocellatus* is responsible for 90% of bites and 60% of envenomation in the savanna region of Nigeria [5]. Others are black-necked spitting cobra (*Najanigricollis*) and puff adder (*Bitisarietans*) [6].

Snake venom contains more than 20 different compounds, mostly proteins and polypeptides. The proteins are responsible for almost all of its biological and clinical effects [7,8]. Pro-coagulant enzymes of viperid and elapid venoms include digestive hydrolases, phospholipases, thrombin-like pro-coagulant, kallikren-like serine proteases that

deplete the body's clotting factors and eventually cause consumption coagulopathy [7–9]. Others are metalloproteinases (hemorrhaging) that damage the endothelial lining of blood vessel walls causing spontaneous local and systemic hemorrhage [7–9]. Phosphodiesterases on the other hand interferes with the cardiac system mainly to lower the blood pressure [7–9].

Snake bite in pregnancy may lead to teratogenesis and spontaneous miscarriages, antepartum hemorrhage, preterm labour and delivery, intrauterine fetal death and neonatal death [7,10,11]. Late presentation with features of local and systemic envenomation coupled with prematurity and delivery of a live baby in a low resource setting makes this case unique for reporting.

### 2. Case description

A 22-year old unbooked Gravida 3 Para 1<sup>+1</sup> 1 alive lentiviral positive woman at 32 weeks gestation was referred to our facility with six

**Abbreviations:** AGA, Appropriate for Gestational Age; APGAR, Appearance Pulse Grimace Activity Respiration; ARV, Anti-retrovirals; HIV, Human Immunodeficiency Virus; INR, International Normalized Ratio; IU, International Units; NHIS, National Health Insurance Scheme; PCV, Packed Cell Volume; PT, Prothrombin Time; aPTT, activated Partial Thromboplastin Time; TSB, Total Serum Bilirubin; WBCT, Whole Blood Clotting Time; WBC, White Blood Count; SPO<sub>2</sub>, Oxygen Saturation Pressure

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days history of snake bite; and one day history of vaginal bleeding and lower abdominal pain. The bite was on the left foot following inadvertent stepping on the snake in her compound. The snake was killed by her relatives and the specie identified. There was slight bleeding from the bite site, dark discoloration of the surrounding skin and swelling of the left foot but no paraesthesia. A day after the bite, she noticed vaginal bleeding necessitating the use of sanitary pads but no liquor drainage. She had abdominal pain, body weakness and dizziness; but no loss of consciousness, difficulty in breathing, cough, and chest or muscle pain. She visited an herbalist who performed incisions on the left ankle and applied local herbs and black stone to the bite site. Increasing quantity of the vaginal bleeding necessitate presentation at a general hospital before referral to our facility. She had normal delivery at home of a live female baby 3 years prior to presentation. There was a history of multiple sexual partners and the index pregnancy was for a new partner. There was no prior blood transfusion or use of tobacco, alcohol or any other recreational drugs.

Examination revealed a young woman with Glasgow Coma Scale Score of 15, mild pallor, afebrile and anicteric. There was unilateral left leg edema, with discoloration, excoriation, desquamation and nodules on the dorsum of the foot. Hyperpigmented bluish macules were visible on the dorsum of the left forefoot and dorsal surfaces of the little and fourth toes of the same foot. There were also fang marks on the little toe, a black stone placed on the wound with circumferential scarification marks on the lower third of the left leg (Fig. 1). There was no bleeding from the nose, oral cavity or intravenous cannula site; the muscle tone and reflexes were normal. The pulse rate was 140 beats per minute; blood pressure was 90/60 mmHg and first and second heart sounds were heard and normal. The respiratory rate was 24 cycles per minute and the chest was clear clinically.

Symphiseo-fundal height was compatible with 32 weeks pregnancy, the fetus was in longitudinal lie and cephalic presentation. There were two contractions palpable in 10 min lasting 35 s. Fetal heart rate was 152 beats per minute and regular. Her vulva was stained with blood and digital examination was deferred. A clinical assessment of preterm contraction with antepartum hemorrhage due to venomous snake bite was made to rule out placenta praevia. Ultrasound scans excluded placenta praevia and vaginal examination thereafter revealed a cervical dilatation of 3 cm with intact fetal membranes.

Multidisciplinary management was instituted in conjunction with the physician, hematologist and neonatologist. Laboratory investigations revealed packed cell volume (PCV) of 22%; White Blood Cell

Count (WBC) count 9500 cells/mm<sup>3</sup> and platelet count 75,000 cells/mm<sup>3</sup>. Bedside clotting time (20WBCT) was prolonged on admission which later reduced to 4 min after treatment was instituted. Prothrombin time was also prolonged (PT was 21 s) with the international normalized ratio (INR) of 1.3, while the activated partial thromboplastin time (aPTT) for patient was 60s and that of the control was 45 s. Patient had a total of four units of fresh whole blood transfused. Lentiviral screening was positive; electrolyte urea and creatinine, liver function test were within normal limits while urinalysis showed mild proteinuria (1 +). Polyvalent anti-snake venom 10 ml in 250 ml of Normal saline was infused intravenously every 6 h until bedside clotting time was normal. The bite site was cleaned and dressed. She received anti-tetanus serum 1500 IU and intramuscular tetanus toxoid 0.5 ml in separate buttocks. Intramuscular dexamethasone 12 mg 12 hourly for two doses; oral erythromycin, metronidazole and anti-retrovirals were also commenced. She had 10 ml of 10% Calcium gluconate after the fourth pint of blood. Fetal and maternal vital signs were monitored along with laboratory investigations until bedside clotting time, clotting profile and platelets became normal.

The bite site was cleaned and dressed. Fetal membranes were left intact, the labour progressed spontaneously to full cervical dilatation and subsequent vaginal delivery of a live male neonate with Apgar scores 3, 4 and 6 at first, fifth and tenth minute respectively. Standard precaution and specific intervention to prevent mother to child transmission of HIV was instituted. The third stage of labour was actively managed, estimated blood loss was 400 ml (in our facility) and there was no retroplacental clot observed. Six hundred microgram of misoprostol was passed rectally to prevent postpartum hemorrhage.

Subsequent management included oral hematinic, antibiotics and analgesics as well as antiretroviral treatment. The packed cell volume (PCV) before discharge on the sixth day postpartum was 27%. She was lost to follow-up in the postnatal and medical clinics.

The baby was admitted into the Special Care Baby Unit, ventilated via bag and mask for 10 min after which he sustained spontaneous respiration. There were also dyspnea, tachypnea, hypoxia (SPO<sub>2</sub> of 73% in room air), poor suck and grasp reflexes. Birth weight was 1.78 kg, anthropometric parameters were appropriate for gestational age (32 weeks) estimated by Ballard's score. The neonate had intravenous fluid and antibiotics (Ceftazidime and Gentamicin), intramuscular Vitamin K stat, oral Nevirapine and Oxygen by nasal prongs at 0.5 l/min. He developed jaundice on the third day of life with a total serum bilirubin (TSB) of 10.8 mg/dl and conjugated fraction of 0.75 mg/dl which was



Fig. 1. Left leg showing edema, incision site with herbal medicine and black stone applied on the little toe.

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managed with phototherapy. Later, there were late onset sepsis and anemia (PCV 28%) managed with transfusion of packed red cells with resolution of the problems. No specific clinical or laboratory effects of snake venom or anti-venom used were seen in the fetus or neonate. He was discharged on parents' request on the seventeenth day of life but was lost to follow-up.

### 3. Discussion

Snake bite is uncommon in pregnancy, when it occurs; it is associated with fetal and maternal complications depending on the degree of envenomation [7–11]. Langley in his review of literature on snake-bite in pregnancy reported maternal case-fatality of 4.2% and fetal death rate in the range of 43–58% when there is envenomation [1]. According to several reports from India and West African Sub-region; delay in seeking medical care resulted in fetal deaths after snakebite [1,2,5,6]. In the third trimester, fetal death is often due to acute fetal hypoxia from placental abruption as a result of systemic envenomation. Delivery of a live baby despite late presentation in a low-resource setting therefore makes this case unique for reporting.

Our patient presented after six days, having visited traditional healers who had complicated the situation by using potentially harmful remedies with no evidence of benefits (incisions and “black or snake stone”). Administration of herbal concoction can cause vomiting, sepsis, hypoglycemia and thereby complicate renal and cerebral functions [4,7]. Immediate interventions like suction, massage, incision, ice packs and washing of the bite site may also encourage systemic absorption of venom from the bite site and infection [4,14]. She was given prophylactic antibiotics for infection control.

The maternal and obstetric complications observed were obstetric hemorrhage, preterm labour and delivery, DIC, hypotension, hypovolemic shock and anemia; while fetal and neonatal complications included tachycardia, prematurity, neonatal jaundice, anemia and sepsis. Maternal and fetal survival with late presentation and systemic envenomation in low resource setting is uncommon. This was observed in this case probably because the snake venom was slow-acting, the amount of venom injected was small or the bite site location limited rapid absorption of snake venom. It could also be because the abruption placenta that occurred was mild and hence did not cause fetal death; or the interventions carried out contributed in reducing morbidity and prevented mortality in both the mother and the fetus. A combination of these factors may have played out in this case.

In developing countries where blood products are not readily available, when transfusion with clotting factors are required; fresh whole blood is transfused alternatively especially in patients with or at risk of anemia. In most rural areas in developing countries where there are no hematologists, clinicians rely on 20-minute whole blood clotting test (20WBCT); a simple and rapid test of blood coagulability which can be done by the bedside and has been found to correlate well with fibrinogen concentration [4–6].

Anti-snake venoms (ASV) are scarce, expensive and may have potentially dangerous side effects for the mother and fetus [6,7,10–13]. Its use in pregnancy should therefore be with caution and only when there is threat to life as seen in this patient with local and systemic envenomation. Monovalent ASV are more specific and preferred where the offending snake is identified, otherwise, polyspecific (polyvalent) anti-snake venom should be administered. Scarcity of ASV in rural areas of developing countries results in high morbidity and mortality following envenomation while many die before arrival to the hospital.

The cost of ASV in Nigeria ranges between \$110 and \$220 per ampoule depending on the manufacturer (Pasteur and EchiTab are the commonly available brands). Considering the fact that multiple vials are often required with additional cost of other medication, investigations and admission fee, the overall cost of treatment was too expensive for this patient to bear in a country where more than half of the population lives on less than \$1 per day and health insurance coverage is

virtually non-existent for the majority. Expansion of the National Health Insurance Scheme (NHIS) to cover the majority of the populace or establishment of community health care program and financing will help to reduce needless deaths from snake bite in our country [15].

Prompt recognition of complications, availability of facility to diagnose DIC and monitor response to treatment, use of ASV, early referral for specialist care, safe delivery with the use of existing guidelines in the management of snake bite will limit complications and reduce deaths. Community participation in ensuring access to care through early and appropriate health seeking attitude and transportation of affected individuals to the hospital for treatment rather than an herbalist or a witch doctor's home should be encouraged. This will save lives and prevent severe or life threatening morbidities and maternal as well as perinatal mortality.

### 4. Conclusion

Snake bite in pregnancy, especially in the third trimester, is a rare event with potential morbidity and mortality for the fetus, neonate and mother. Early presentation and diagnosis, availability of resuscitative measures and anti-snake venom with optimal supportive care are important in saving life.

### Disclosure and conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript. All authors have approved the final article. The patient in this study gave informed consent for the photographs used in this manuscript.

### Authors' contributions

1. Dr. Adewole A.A.A. contributed in the management of this case. He initiated the conception, design and writing of the article. He also coordinated the article preparation, drafting and critical review.
2. Dr. Ugiagbe A. contributed in the management of the study patient, conception and critical review of the article. He also coordinated the team in the management of the patient.
3. Dr. Onile T. G. contributed in the management of the study patient, conception and critical review of the article.
4. Dr. Joseph G. contributed in the management of the study patient, conception and critical review of the article.
5. Dr. Kassim O. D. contributed in the management of the study patient, conception and critical review of the article.
6. Dr. Medupin P. contributed in the management of the baby, article preparation, drafting and critical review.
7. Dr. Adeniran S. A. contributed in the critical review of the article.

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