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Childhood Tetanus Complicating Snakebite: A Case Report From a Semi-urban Area, Northwestern Nigeria

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Abstract

For more than 6 decades, snakebite has been recognized as an important global public health problem. Such bites can be complicated by mortality and various forms of morbidities including tetanus. Tetanus as a complication of snakebite is rare, more so among children. We present a case of a 13-year-old adolescent male rural dweller with lockjaw and spasms a week following snakebite. He had no immunization in infancy and was not administered tetanus toxoid after the incidence. Important findings at presentation were healed ulcer on the left big toe, board-like rigidity of the anterior abdominal wall, and spasms. He was managed for tetanus complicating snakebite and discharged home after a total of 26 days of hospitalization. The case demonstrates the need to strengthen immunization coverage in rural communities while improving health-seeking behaviors through health education. Victims of snakebites should be encouraged to seek orthodox care and be administered intramuscular tetanus toxoid.

Keywords: Snakebite, tetanus, Northwestern Nigeria, immunization

Introduction

For more than 6 decades, snakebite has been recognized as an important global public health problem in rural and agricultural communities, particularly in the tropics.[1] Snakebites can be complicated by such morbidities as limb gangrene, blister formation, flaccid neuromuscular paralysis, compartment syndrome, acute kidney injury, and tetanus among others.[2] Tetanus complicating snakebite is a rare occurrence globally, even in the tropics including Nigeria.[3,4] This is partly because the amount of tissue damage that follows most cases of snakebites is less compared to that following bites from other animals like dogs;[3] the more the tissue damage, the higher the risk of infection with the *Clostridium tetani*. Also, majority of snakebites do not involve envenomation, which may lead to high tissue damage.[2]

Reported cases of tetanus complicating snakebites in children are relatively uncommon and rare in the medical literature.[1,3,5] Affected children are commonly males who tend to be more exposed to rural farmwork,[6] in addition to not routinely receiving booster doses of tetanus toxoid beyond infancy.[7] The case fatality rate is usually high because of inadequate immunity and resources to manage these snakebite patients, particularly in the tropics.[3,8] Here, we report a case of a 13-year-old male child with tetanus complicating snakebite from a semi-urban area, Northwestern Nigeria. The case portrays one of the inadequacies in our healthcare delivery in the area of immunization as the patient was an adolescent who was neither immunized nor took the recommended 10-yearly booster tetanus toxoid.

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Case Presentation

The case was a 13-year-old boy who presented to the Emergency Paediatric Unit of Federal Medical Centre, Birnin Kebbi, with a history of snakebite to the left big toe 17 days before presentation, neck stiffness and lockjaw for 10 days, and spasms for 7 days. He was bitten by a snake while working on the family farm. The snake was identified historically based on a typical description of a long, black-hooded snake as a cobra. He had evidence of local envenomation, pain, and swelling in the bitten limb. The bite site was incised, and the snake venom was "sucked out" by a traditional healer, who then applied topical herbal preparation to the bite site. He was not administered tetanus toxoid or antitetanus serum. The last wound sustained by the child before this event was more than 6 months.

Eleven days following the snakebite, he developed pain and rigidity in the neck and back. The onset of trismus was noted during the next 4 to 6 hours, and 3 days later, spasms developed. There was no associated fever. He was initially managed at a general hospital for 6 days before referral to our facility due to high frequency of spasms that were difficult to control.

He only received oral polio vaccines (OPVs) on the national immunization days (NIDs) but was not administered routine immunization during infancy. The family is of low socioeconomic status and resided in a village.

At presentation, risus sardonicus and spasms were observed. He was afebrile (temperature = 36.9°C), mildly pale, conscious with generalized hypertonia, and had board-like rigidity of the anterior abdominal wall. Respiratory and pulse rates were 44 cycles per minute and 124 beats per minute, respectively. The lung fields were clear, and there was no cardiac murmur. There was a healed ulcer scar, about 4 cm by 2 cm, over the left big toe.

Investigations requested included complete blood count (parameters were essentially normal and packed cell volume was 30%), wound swab for microscopy, culture and sensitivity (no microorganism was isolated), serum calcium (10.1 mg/dL normal), and serum

potassium (2.9 mmol/L low value), which was corrected, and the repeat value after correction was normal at a value of 3.9 mmol/L.

A diagnosis of generalized tetanus complicating snakebite was made. He was administered intravenous phenobarbitone (5 mg/kg/dose 6 hourly), chlorpromazine (5 mg/kg/day in 6 hourly 4 divided doses), and diazepam (0.3 mg/kg for breakthrough spasms) in addition to intravenous metronidazole (7.5 mg/kg/dose 8 hourly). Antitetanus serum (10 000 IU) was also administered after a test dose.

Sedatives were converted to oral after 13 days following an initial spasm control. The spasms, however, became more frequent, necessitating the recommencement of intravenous medications which were administered for another 4 days. The medications were eventually converted to oral route following satisfactory control. He finally recovered but had residual stiff-man syndrome on discharge after a total of 26 days of hospitalization for which physiotherapy was initiated. His parents were properly counseled at discharge, and the child was administered intramuscular tetanus toxoid. He was subsequently fully immunized against tetanus with a full series of tetanus and diphtheria toxoid-containing vaccines. He was seen 3 times in the follow-up clinic and thereafter discharged from the clinic after a satisfactory improvement. Written informed consent was obtained from the father of the child and verbal assent was also obtained from the child.

Discussion

The clinical presentation of the patient was typical of tetanus with rigidity, spasms, and trismus. The possible origin of *C. tetani* in a snakebite patient could be the snake's venom or oro-pharynx, the patient's skin/clothing, materials applied to the wound as first aid and self-treatment, soil contamination, or unsterile instruments used to incise the wound.[5] In our case, the origin was difficult to determine. He was bitten on the lower extremity (left toe) barefooted. Hence, soil contamination is possible. The patient also had some interventions by a local medicine man which involved incision with a suspected unsterile instrument and application of herbal preparations. These were also possible sources as shown in a report by Ehui et al.[9] The snake venom as a source of the *Clostridium* was reported by Arroyo et al[10] who isolated *C. tetani* from wild *Bothrops asper* snake venom in Costa Rica and Shek et al[11] who isolated various *Clostridium* species from Chinese cobra (*Naja atra*) and bamboo pit viper (*Trimeresurus albolabris*) in Hong Kong SAR, China. This might, however, be snake species specific or geographic location related. While there are no local studies on the microorganic composition of snake venom in this part of the world, this route could also be considered in this patient.

The prevalence of tetanus has reduced in the tropics due partly to increased immunization coverage of the tetanus vaccine which is both effective and safe.[4] However, the rural communities particularly in tropical Africa still have poor coverage.[4] This is due mainly to the inaccessibility of these communities and ignorance among other factors. This may explain why the index patient had no vaccinations except for the OPVs during the NIDs. Ugwu in a series of childhood tetanus following snakebites noted low immunization coverage among the affected children as well.[3] There is therefore a need for improved immunization coverage, especially among rural dwellers.

Tetanus complicating snakebites is rare.[5] Only a few cases were reported in the medical literature. For instance, only 3 cases were seen among children over a 10-year period in a Southern Nigeria study.[3] Ehui et al[9] also reported a case of a 13-year-old rural African child. Also, only 4 cases were reported from 2 tertiary institutions in Northern Nigeria, though among adult population, the duration of the study was not specified.[4] Furthermore, Suankratay et al[5] reported a case of an adult from Thailand. In our center, this is the first case of tetanus complicating snakebite in a child.

The index case had frequent spasms similar to the finding by Habib in Kano, Nigeria.[4] It could be that the snake venom has a synergistic effect of inhibiting the release of inhibitory neurotransmitters resulting in the observed frequent spasms. Tetanus complicating snakebite is associated with high morbidity and mortality.[3,4] Even though our patient survived, he developed stiff-man syndrome at the point of discharge similar to that reported from an adult victim.[4]

Conclusion

Tetanus is a rare complication of snakebite either from the unorthodox intervention or from the snake venom. There should be increased awareness of the importance of immunization particularly among rural dwellers. The need for tetanus toxoid boosters every 10 years should be emphasized among adolescents or be made part of a comprehensive school health program. Finally, victims of snakebites should be encouraged to seek orthodox care and should be administered intramuscular tetanus toxoid except for those with abnormal bleeding.

Informed Consent: Written informed consent was obtained from the father of the child and verbal assent was also obtained from the child.

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