Journal of Sustainable Veterinary & Allied Sciences
P-ISSN-2695-2661 e-ISSN: 2811-1346
JoSVAS 2026 March Vol. 8 Issue 1: 101-105

Case Report

MANAGEMENT OF A CASE OF SNAKE ENVENOMATION IN A YEAR-AND-ONE-MONTH-OLD PEDIGREE PREGNANT BOER BOEL

***UKAHA, R.O. & AHAOTU I.J.**
Department of Veterinary Surgery & Radiology, College of Veterinary Medicine, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
**Correspondence:* ukaha.rock@mouau.edu.ng; +2348061530565

ABSTRACT
The objective of this clinical case study was to present a successful treatment of a snake-bite in a year-and-one-month-old pure-bred pregnant Boer boel bitch. Following a general examination, the patient was stabilised with fluid administration. Supportive treatments given comprised antibacterial, anti-inflammatory, and analgesic agents. The exudating wound around the bite site was cleaned and dressed with topical antibacterial spray. The treatment was successful and the patient recovered from the envenomation and resumed normal life about a week following intervention. Fluid and drug use is also an effective means of managing snake bite in the dog. Clinical relevance of the present article is the demonstration of the potential use of fluid therapy and supportive drug treatment in the effective management of snake envenomation, especially in the absence of (specific) anti-snake venom.

Keywords: Fluid therapy, Boerboel, Snake envenomation

INTRODUCTION
Globally, snake bite has been reported as a common and very important, public health problem especially in the rural tropical populations (Dehghani *et al.*, 2014a; Dehghani *et al.*, 2014b). Whenever they occur, snake bites should be taken very seriously as a matter of life and death. However, some bites are non-venomous which likely cause local swellings, whereas others are venomous bites which can lead to death, if not quickly and carefully treated (Ahmed, 2008; Dehghani *et al.*, 2014a; Gwaltney-Brant, 2016; Omogbai *et al.*, 2016). Venomous snakes possess fine, needle-like fangs connected to venom glands (a modified salivary gland), injecting venoms into the skin or deep into the muscles depending on fang length, which extend from the upper jaw (Gutierrez *et al.*, 2017).

Snake venoms vary widely in toxicity and may broadly be categorized as neurotoxin (e.g. elapids such as cobras, kraits, mambas), haemotoxin (e.g. vipers, adders), cytotoxin (e.g. some vipers), and myotoxic venom (e.g. some sea snakes). Neurotoxic venom affects the nervous system causing gradual neuro-paralysis, initially affecting eye and facial muscles, leading to ptosis, blurred vision, and diplopia, and also respiratory muscle and diaphragm paralysis (Ranawaka *et al.* 2013; WHO, 2016). Snake haemotoxins cause haemolysis, swelling, pain, and coagulation abnormalities (vascular damage, platelet dysfunction, consumptive coagulopathy). This can lead to severe bleeding, epistaxis, haematuria, intracranial haemorrhage, and hypovolaemic shock (Rucavado *et al.*, 2005; Isbister *et al.*, 2010). Cytotoxic envenomation damages body cells and tissues leading to local tissue damage and necrosis, while myotoxic venoms affect muscles and cause muscle pain, weakness, and necrosis (Warrell, 2010). Snakebite outcomes vary with such factors as venom presence and its toxicity. Clinical features range from fang marks to bleeding, swelling, pain, and necrosis at the bite site.

Fatal snakebites are more common in dogs than in other domestic animals because dogs are naturally curious animals and are not afraid of snakes. Most snake bites occur on the extremities and mortality is generally higher in bites to the thorax or abdomen than bites to the head or extremities (Gwaltney-Brant, 2016). Horses and cattle seldom die as a direct result of snakebite due to their larger

http://doi.org/10.54328/covm.josvas.2026.273

sizes, but bites on the muzzle, head, or neck may result in death following dyspnea from excessive swelling. The hoof may slough off if an animal is bitten near the coronary band (Gwaltney-Brant, 2016).

Viper bites at the limb produce intense local reaction and swelling less than 15 minutes of bite and the swelling becomes massive within 3 days. The swelling may persist for up to 3 weeks spreading rapidly from the bitten site to the whole limb and adjacent trunk. However and occasionally, swelling does not occur till about 2 hours following a viper bite, and in such cases, it is safe to assume that there was no envenomation (Weatherall *et al.*, 1996). Bruising, blistering and necrosis may appear over a few days following the viper bite. Patients also develop ophthalmia if spat at by spitting elapids. Microflora in the oral cavity and saliva of the snakes will result in secondary bacterial infection of bitten patients (Weatherall *et al.*, 1996).

Other common clinical signs of snake envenomation, depending on snake type and the animal bitten, are flushing, breathlessness, palpitations, and dizziness, airway obstruction, sweating and acroparaesthesiae, heaviness of eyelids, blurring of vision, hypersalivation, congested conjunctivae and 'gooseflesh', cramping abdominal pain followed by diarrhoea and collapse, headache, a thick feeling of the tongue, thirst, nausea and vomiting (Weatherall *et al.*, 1996). Other systemic features of snake bite include clotting defects (resulting in persistent bleeding from puncture wounds, namely: epistaxis, haematemesis, cutaneous ecchymoses, and haemoptysis); reversible neurotoxicity (resulting in airway obstruction, muscle paralysis and respiratory failure; but these neurotoxins do not cross blood brain barrier and hence, do not affect the patient's consciousness); myotoxicity; cardiotoxicity manifesting as arrhythmias, bradycardia, tachycardia or hypotension; nephrotoxicity; shock prompted by fright, hypovolemia (due to extravasation of fluids and blood loss) (Reid & Theakston, 1983; Weatherall *et al.*, 1996).

Traditional first aid treatments of making local incisions at the site of the bite, suctioning venom out of the wound, use of tight bands (tourniquets) around the limb, and/or local application of ice packs have no proven medical benefit. Incision, suction, electric shocks, cryotherapy, or washing of the wound are contraindicated, as any interference with the wound is likely to introduce infection, increase bleeding, and hastens absorption of the venom (Ahmed *et al.*, 2008; WHO, 2010).

Laboratory tests are useful for prognostic purposes and for making decisions about specific interventions (Hawgood & Hugh, 1998). Specific examinations include the following: (a) 20-min whole blood clotting test (20 WBCT), a simple coagulopathy test to differentiate viper envenomation from elapid bite. The test requires a new clean, dry glass test tube that has not been washed with detergent. If fresh venous blood is placed undisturbed in the test tube for 20 min and the blood remains liquid after 20 min (evidence of coagulopathy), it is then confirmed that the patient was bitten by a viper. Bites of elapids (cobras or kraits) do not cause antihaemostatic symptoms (Ho *et al.*, 1986); (b) **e**nzyme linked immunosorbent assay **(**ELISA) tests which are now available to identify the species involved, based on antigens in the venom (Reid, 1982). These tests, however, are expensive and not freely available and thus have limited value in diagnosis; at present, they find use mainly in epidemiological studies.

Non-specific blood work may show anaemia due to haemolysis, especially in bites of vipers; haemo-concentration due to increased capillary leak; neutrophilic leukocytosis signifying systemic venom absorption; thrombocytopenia; and increased levels of serum creatinine, serum amylase and creatinine phosphokinase suggesting muscle damage (Warrell, 1999).

Snakes do not generally attack their victims (man or animal) unless they are provoked and threatened. However, once a patient is bitten by a poisonous snake, a wide range of clinical signs is evident prompting early and adequate medical management. Intravenous administration of antivenin is the only specific and most effective treatment for snake envenomation. Analgesics, anti-inflammatory agents, fluid therapy, and antibiotic treatment are supportive and equally used (Gutierrez, 2017; WHO, 2016). Unfortunately, antivenin is expensive, usually scarce or unavailable and its use is not unconnected with the risk of hazardous associated immune reactions (WHO, 2005). Novel therapeutic alternatives based on recombinant antibody technologies and new toxin inhibitors are being explored (Gutierrez, 2017). In the present case study, we treated a snake-bitten patient with fluid infusion in addition to supportive medication.

CASE PRESENTATION

The client complained that his pregnant dog was weak, depressed with a swollen hind limb, unable to get up and lacked appetite the previous night. History further revealed that the dog was bought as a puppy in the United Kingdom and later flown to Nigeria. The client also stated that the bitch was successfully crossed by a male pure-breed Boer boel, three weeks previously. According to the owner, the dog was usually placed in chain during the day but released at night to the fenced compound, for security purposes. The client said he discovered that the dog was bleeding early that morning without a clear cut in the skin. Medical records (anti-rabies vaccination and routine deworming/treatment) of the patient were up-to-date.

Environmental observation disclosed heaps of stones, (broken) blocks, and other building materials kept in places within the compound which could serve as possible hideouts for reptiles.

Physical examination of the patient revealed cold extremities but normalcy in most vital parameters as shown in Table I. The animal was very weak and laterally recumbent with laboured breathing and resisted attempts to get it on its feet. The left hind limb was swollen, painful and there was a visible pair of fang marks on the dorsal surface of the left hind paw (Figure Ia and b) with some discharges from the bite site (Figure Ib), supporting the suspicion that the animal might have been bitten by a snake that night with possible envenomation. Physical findings also included enlargement of nipples and slightly swollen belly which could be early signs of pregnancy.

TABLE I: PHYSIOLOGICAL PARAMETERS OF THE PATIENT FOLLOWING PHYSICAL EXAMINATION

Vital Parameter	Patient Values	Normal Range
rectal temperature	41^0C	37.9^0C - 39.9^0C
heart rate	84 beats/minute	70 – 120 b/m
pulse rate	82 beats/minute	70 – 120 b/m
respiratory rate	28 cycles/minute	18 – 34 c/m
mucous membrane	pale	pink

DIAGNOSIS

Abscessation, traumatic injury due to a kick or missile, fungal infection, cellulitis, neoplasia and snakebite are differential diagnoses. These conditions are associated with some or all of the observed clinical features, namely: pain, limb swelling, fever, anorexia, weakness, cold extremities, laboured breathing, lameness and recumbency (refusal to stand up). Abscesses, neoplasia, fungal infections, and celluiltis develop over time and do not result in lateral recumbency or inability of the patient to stand. Trauma of canine limb involves bruises, laceration, contusion, and or facture(s). It is only snakebite that is associated with presence of fang marks. Therefore, the tentative diagnosis is snake envenomation.

MEDICAL TREATMENT

The patient was immediately placed on fluid therapy using infusion, 500ml 5% dextrose (Fidson Healthcare PLC, Nigeria) and 2 ml iron dextran (HebeiHuarun Pharmacy Co., China) administered intravenously *statim* (at once). Injectable drugs administered to the dog were dexamethasone (Dexona®, Goodfaith Pharma Impex-Enterprises, India) given at 0.3 mg/kg intramuscularly *bis in die* (twice a day) 3/7, furosemide (Furosecare®, AdvacarePharma, USA) 0.25 mg/kg intramuscularly *semel in die* (once daily) 2/7, long acting oxytetracycline hydrochloride (Oxytetra 200 LA®, Pantex, Holland) at 10 mg/kg intramuscularly *statim* (at once), and a single treatment of diclofenac sodium (Philodic®, Hubei Tianyao Pharmaceutical Co., China) at 1 mg/kg intramuscularly. The bite wound was cleaned with ethanol (50% solution) and irrigated with topical antibacterial spray (Oxytetravet aerosol®, The Arab Pesticides and Veterinary Drugs Manufacturing Co., Jordan).

Figure Ia: Recumbent patient showing site of the snake bite (fang marks unclear in picture) on the dorsolateral aspect of affected left hind paw (black arrow)

Figure 1b: Close-up image of the swollen left hind limb and exudating bruises on dorsum of the affected left hind paw (white arrow)

Figure IIa: Patient receiving medical treatment including fluid infusion

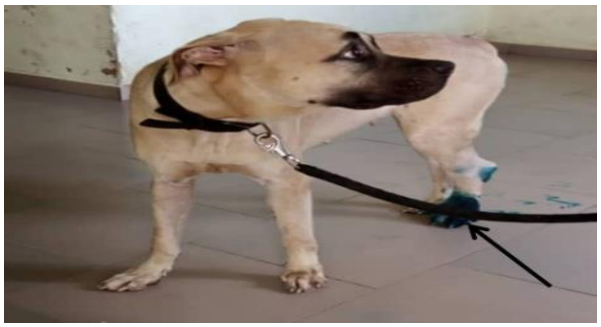

Figure IIb: The dog back on its feet and alert showing the affected, but dry, left hind paw (black arrow)

DISCUSSION

Occasionally, venomous snake can bite without injecting venom into the body of the victim resulting in dry bites (Grenvik *et al.*, 2000). Typical symptoms of the bite from a non-venomous snake are pain and scratches or irritation at the site. Grenvik and co-workers (2000) noticed that some dry non-venomous bites of vipers, elapids and sea snakes come with small puncture wounds arranged in an arc. According to these authors, the presence of two puncture wounds, or fang marks, usually indicates a bite by a poisonous snake. Excruciating pain may develop immediately after the envenomation and spread proximally up the bitten limb. Neighbouring lymph nodes rapidly become inflamed and painful. In the present case, however, the history of bleeding in the foot without a visible tissue cut and physical findings of generalized weakness, swollen and painful limb may probably be a case of envenomation.

Previous authors reported that snake venoms are polytoxic mostly made of enzymes, non-enzyme peptide toxins and non-toxic proteins, and that most venom do not cross blood brain barrier (Reid & Theakston, 1983; Grenvik *et al.*, 2000). The World Health Organization (WHO) published in 2005 that the most effective treatment for snakebite is the administration of mono-specific anti-snake venom. However, this therapy is not always available in clinical practice because of its high cost, scarcity, and the difficulty in correctly identifying the snake (Weatheral *et al.*, 1996), which was why antivenin could not be accessed to treat that patient. Moreover, according to Weatheral *et al.* (1996) and other reports, not every envenomation merits the administration of antivenin due to associated risk of serum sickness (Huang *et al.*, 2010).

According to Ahmed *et al.* (2008), fluid therapy (normal saline, Ringer's lactate) should be given to all snake-bitten patients, probably to rehydrate the patient and to enhance haemo-dilution and excretion of the toxic venom which usually consist mainly of proteolytic enzymes (phosphatidase, cholinesterase and neurotoxin). In the present case, 5% dextrose/iron dextran solution was administered to the patient intravenously using a cephalic vein. The colloid was administered in response to the clinical sign (pale mucous membrane) identified during physical examination of the dog. Diclofenac sodium, a non-steroidal anti-inflammatory-analgesic-antipyretic drug, was given to counter the pain in the affected limb. Other medications given were a diuretic, furosemide and dexamethasone for the control of the oedematous and inflammatory swelling of the affected limb.

The World Health Organization (2005) disclosed that snakes harbor both aerobic and anaerobic bacteria in their mouths, and that a prophylactic course of penicillin (or erythromycin for penicillin-hypersensitive patients) and a single dose of broad spectrum antibiotic course with a dose of tetanus toxoid are recommended. In this clinical case, a single dose of long-acting oxytetracycline hydrochloride injection was given to the patient to forestall any event of secondary bacterial infection.

The patient was closely monitored and just before completion of fluid infusion, the dog became sternally recumbent, and got up a short while later. The patient was followed up for 5 days within which period the swollen limb normalized, and other clinical signs of the envenomation disappeared. The external wound was cleaned and dressed on alternate days using the antibiotic spray. The dog recovered, became active again and resumed normal physical activities, an evidence of successful treatment.

The client was advised to remove all piles of broken blocks, stones and woods (from his premises) which have formed an attractive hiding place for snakes and other dangerous animals.

CONCLUSION

Snakebite leads to significant morbidity and mortality of humans and animals, globally, due to poor healthcare accessibility and unavailability of anti-snake venom. In resource-limited settings, as in many rural clinical scenarios, managing snakebites without antivenin focuses on clinical signs control and prevention of complications. In such a circumstance, fluid therapy is treatment of choice. Administration of intravenous fluids helps to maintain blood pressure, support circulation, prevent shock, and enhance renal excretion of the toxin. In the present case, other supportive care measures were equally given to the patient resulting in the positive treatment outcome recorded. In other words, fluid therapy in conjunction with supportive and symptomatic treatments may be effective method of treating snake envenomation.

REFERENCE

Ahmed, S.M., Ahmed, M., Nadeem, A., Mahajan, J., Choudhary, A. & Pal, J. (2008). Emergency

treatment of a snake bite: Pearls from literature. *Journal of Emergencies, Trauma, and Shock* 1(2), 97-105.

Dehghani, R., Fathi, B., Shahi, M.P. & Jazayeri, M. (2014a).Ten years of snakebites in Iran. *Toxicology*, 90, 291–298.

Dehghani, R., Mehrpour, O. & Shahi, MP. (2014b). Epidemiology of venomous and semi-venomous snakebites (Ophidia: Viperidae, Colubridae) in the Kashan city of the Isfahan province in Central Iran. *Journal of Research in Medical Sciences*, 19(1), 33–40.

Hawgood, B.J. & Hugh, A.R. (1998). Investigation and treatment of snakebite. *Toxicology*, 36, 431–46.

Ho, M., Warrell, M.J., Warrell, D.A., Bidwell, D. & Voller, A. (1986). A critical reappraisal of the use of enzyme-linked immunosorbent assays in the study of snakebite. *Toxicon*, 24, 211–214.

Huang, C.Y., Hung, D.Z. & Chen, W.K. (2010). Antivenin-related Serum Sickness. *Journal of the Chinese Medical Association*, 73(10), 540–542.

Grenvik, A.K.E., Ayers, S.M., Holbrook, P.R., & Shoemaker WC (editors) (2000). Injuries by venomous and poisonous animals. In: Textbook of Critical Care 4thedn: IWB Saunders, Philadelphia pp. 224-233.

Gutierrez, J.M., Calvete, J.J. & Habib, A.G. (2017). Snakebite envenoming. *Nature Reviews Disease Primers*. 3, 1-21.

Gwaltney-Brant, S.M. (2016). Overview of snakebites. MSD Veterinary Manual: Available at: https://www.msdvetmanual.com/toxicology/snakebiteRetrieved on 2/12/2021.

Isbister, G.K., Scorgie, F.E. & O'Leary, M.A. (2010). Factor deficiencies in venom-induced consumption coagulopathy resulting from Australian elapid envenomation: Australian Snakebite Project (ASP-10). *Journal of Thrombosis and Haemostasis*, 8, 2504-2513.

Omogbai, E., Nworgu, Z., Imhafidon, M, Ikpeme, A., Ojo, D. & Nwako, C. (2002). Snake bites in Nigeria: A study of prevalence and treatment in Benin City. *Tropical Journal of Pharmaceutical Research*, 1(1): 39-44.

Ranawaka, U.K., Lalloo, D.G., & de Silva, H.J. (2013). Neurotoxicity in snakebite – The limits of our knowledge. *Public Library of Science Neglected Tropical Diseases*. 7, e2302.

Reid, H.A. (1982). In: Manson FI & Bahr PE, eds Manson's Tropical Diseases 18th edn: London, Balliere-Tindall pp. 544–6.

Reid, H.A. & Theakston, R.B.G. (1983). The Management of Snakebite. *Bulletin of the World Health Organisation*, 61(6), 885–895.

Rucavado A, Soto M & Escalante T (2005). Thrombocytopenia and platelet hypoaggregation induced by Bosthropsasper snake venom: Toxins involved and their contribution to metalloproteinase-induced pulmonary haemorrhage. *Journal of Thrombosis and Haemostasis*, 94, 23-131.

Warrell DA (1999). WHO/SEARO Guidelines for the clinical management of snakebite in the

Southeast Asian Region. *Southeast Asian Journal of Tropical Medicine and Public Health*, 30, 1–85.

Warrell DA (2010). Snakebite. *Lancet*, 375, 77-88. Doi: 10.1016/50140-6736(09)61154-2

Weatherall DJ, Ledingham JGG & Warrell DA(1996). Injuries, Envenoming, Poisoning, And

Allergic Reactions Caused By Animals. Oxford Textbook of Medicine 3rdedn: I. Oxford Medical Publications, Oxford pp. 1126–1139.

WHO (2005). The Clinical Management of Snake Bites in the Southeast Region Asia World.

Health Organization, Regional Office for South-East Asia. Available at: http://www.searo.who.int/LinkFiles/SDE_mgmt_snake-bite.pdf.

WHO (2016). Guidelines for the management of snakebite 2nd edn. World Health Organization. https://apps.who.int/iris/handle/10665/249547

WHO (2010). Guidelines for the prevention and clinical management of snakebite in Africa; WHO https://apps.who.int/iris/handle/10665/204458