

THERAPEUTIC MANAGEMENT OF AN UNUSUAL CASE OF HAEMOTOXIC SNAKE ENVENOMATION IN HOLSTEIN FRISIAN CROSSBRED CATTLE

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SUMMARY

An adult Holstein Frisian crossbred cattle with history of swelling over right fetlock extending up to thorax since 2 days, red colored urine, reddish feces and inappetence was presented to clinic. Clinical examination revealed pink conjunctivae, normal temperature with tachypnea and tachycardia. Urine analysis confirmed hematuria while fecal examination revealed melena. Haemato-biochemistry showed severe thrombocytopenia ($17 \times 10^9/L$), prolonged capillary blood clotting time (>40 minutes), elevated blood urea nitrogen (34 mg/dl) and serum creatinine levels (2.4 mg/dl). Based on the clinical signs and laboratory investigations, the case was diagnosed for haemotoxic snake envenomation and treated with polyvalent anti-snake venom, meloxicam, antibiotics, vitamin B complex, styptics and dextrose 5% for six days. Complete clinical recovery was seen by sixth day with resolution of swelling, restoration of thrombocyte count and blood clotting time. In conclusion, lately presented and an unusual case of haemotoxic snake envenomation in HF crossbred cattle with haematuria and melena was successfully treated.

Keywords: Envenomation, Haematuria, Haemotoxic, Holstein Frisian, Treatment

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Around 1.4 million to 2.8 million people in India succumb to snake bites every year with 46,000 deaths (Mohapatra *et al.*, 2011). Agriculture workers, farmers, cattle herders are suffering from snakebite as an occupational hazard (Gutierrez *et al.*, 2017). Grazing animals are frequently predisposed to snakebite similar to farmers working in agriculture land. Species of snake decides the severity; with cobra bite being most severe in animals. Animal factors like species, size, age and location of bite also affect the severity of snake envenomation (Constable *et al.*, 2017; Bolon *et al.*, 2019; Bhikane *et al.*, 2020). The region of study has more population of Viperine snakes responsible for envenomation in both humans and animals. The present case report depicts the therapeutic management of lately presented case of viper envenomation in Holstein Frisian crossbred cattle.

A four-year-old lactating Holstein Frisian (HF) crossbred cow weighing 400 kg was presented to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences Udgir, Maharashtra, India with history of swelling on right foreleg, diarrhea, red colored urine and inappetence. Clinical examination of cattle revealed normal body temperature (100.5 °F), increased respiration rate (32/minute) and tachycardia (102 beats per minute) with loud heartbeats, pinkish conjunctival mucous membrane, slight salivation and nasal discharge. Palpation of right foreleg revealed soft, painful swelling over fetlock extending towards dewlap of the cow (Fig. 1). Analysis of blood (Table 1), urine and fecal samples showed severe

thrombocytopenia ($17 \times 10^3/\mu l$), increased capillary blood clotting time (40 minutes), hematuria (Fig. 2) and melena indicative of increased bleeding tendency in the ailing cow. The elevated values of BUN (34 mg/dl) and creatinine (2.8 mg/dl) showed nephrotoxic effects of snake envenomation. Based on the history of ascending swelling on right foreleg extending up to dewlap, severe thrombocytopenia, prolonged capillary bleeding time and elevated BUN and creatinine culminating in melena and hematuria, the cow was diagnosed for haemotoxic snake envenomation.

The HF cow was treated with equine derived polyvalent anti-snake venom @ 20 ml IV diluted in 4 liter Dextrose saline solution IV. Daily treatment included Inj. Dextrose 5% @ 4 lit IV, Inj. Amoxicillin+Cloxacillin @ 10 mg/kg IV, Inj. Meloxicam @ 0.5 mg/kg IV, Inj. Vitamin B complex @ 10 ml IV, Inj. Furosemide @ 1 mg/kg IV and Inj. Carbazochrome salicylate @ 10 ml IM with monitoring of case for resolution of clinical signs. Diuretics help in reducing inflammatory and edematous swelling in bite area. Non-steroidal anti-inflammatory drugs assists in preventing shock and play role in reducing swelling. Carbazochrome salicylate is styptic and might control hemorrhages by stabilizing capillary walls. Antibiotics were used to control any secondary infections from contaminated fangs. Fluid therapy is helpful in preventing shock and also in reducing capillary leak syndrome and acute kidney injury (Udayabhaskaran *et al.*, 2017). Vitamin B complex and hematinics prove effective in correction of anemia induced by hemotoxins. Gradual

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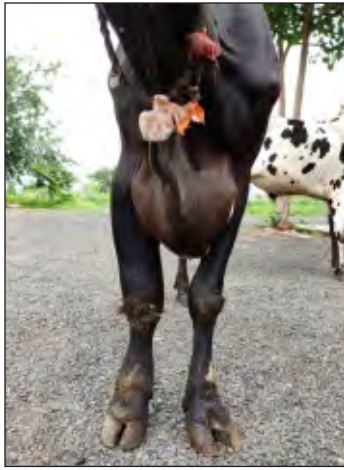


Fig. 1. Ascending swelling on right foreleg extending towards dewlap in HF crossbred suffering from envenomation

Fig. 2. Hematuria in HF crossbred suffering from envenomation.

Fig. 3. Recovered HF crossbred cow after treatment (Note subsidence of swelling over right foreleg and dewlap region)

reduction in swelling over right foreleg and brisket region started from second day of treatment in treated cow. Hematuria and melena were still present on second day; hence one vial of anti-snake venom (10 ml) was repeated on second day along with supportive therapy. From third day onwards, there was improvement in fecal consistency and color indicative of reduction in mucosal bleeding with persistent hematuria. Feed intake and rumination was resumed on fourth day of treatment with restoration of fecal consistency to normal soft formed feces without any red tinge as well as clear urination indicative of subsidence of melena and hematuria. On sixth day, cow showed restoration of normal feed and water intake with reduction

in swelling up to 90%, absence of melena and hematuria indicative of good clinical recovery.

Complete blood count analysis showed restoration of normal thrombocyte count, capillary blood clotting time (10 minutes) but development of severe anemia (Hb-3.3 g/dl) due to continued loss of blood in the form of melena and hematuria in the ailing cow over a treatment period. As cow showed clinical improvement with improved feed and water intake and complete subsidence of swelling, hematuria and melena (Fig. 3) supported by adequate thrombocyte count and restored capillary blood clotting time (Table 1) to near normal, blood transfusion was not undertaken. The cow was discharged with advice to

Table 1

Haematological parameters in HF cross-bred cow suffering from viper envenomation

Sr. No.	Parameter	Before treatment (0 day)	Post therapy (6 th day)	Normal values Constable <i>et al.</i> , 2017
1.	TEC (X 10 ⁶ /μl)	4.45	1.52	5-10
2.	Hb (gm %)	8.9	3.3	8-15
3.	PCV (%)	23.7	8.83	24-46
4.	MCV (fl)	53	58	40-60
5.	MCH (pg)	20	21.8	11-17
6.	MCHC(g/dl)	37.7	37.6	30-36
7.	TLC (X 10 ³ /μl)	9.39	10.26	4-12
8.	Neutrophils (%)	51.6	60.1	15-65
9.	Monocytes (%)	0.3	4.9	2-7
10.	Lymphocytes (%)	38.2	35.0	45-75
11.	Thrombocytes (X 10 ³ /μl)	17	543	100-800
12.	BCT (Min)	40	8	7
13.	BUN (mg/dl)	34	18	6-27
14.	Creatinine (mg/dl)	2.8	1.4	1-2

continue Inj. Vitamin B complex for 7 days with oral haematinics for 21 days. Feedback regarding the status of health of treated cow one month later from owner telephonically revealed complete clinical recovery.

Snake bite in farm animals is common in areas in which snake populations are more. Morbidity rate is low in farm animals with around 20% of mortality rate being recorded in a small group of bitten animals. They are characterized by local swelling at the site of bite, pain, excitement and anxiety with dyspnea if snake bite occurs over face (Constable *et al.*, 2017). In the present crossbred Holstein Frisian cow, typical findings observed were ascending swelling on bitten leg extending upwards towards dewlap region and thrombocytopenia which are in agreement with findings reported by Bhikane *et al.* (2020).

Viperine snake envenomation in human is characterized by haemotoxicity leading to cardiovascular and/or haemostatic effects (Slagboom *et al.*, 2017). Bleeding syndrome in Viperine envenomation has also been incriminated to venom induced consumption coagulopathy characterized by low or undetectable levels of fibrinogen resulting in incoagulable blood (Maduwage and Isbister, 2014). Viper venoms produce local and hemotoxic manifestations in humans characterized by hematuria, renal failure, edema, melena, hemorrhages and anemia (Kumar *et al.*, 2006). Rodriguez *et al.* (2016) also reported more severe clinical signs with increased bleeding tendencies, thrombocytopenia and prolonged clotting time in cattle with viper envenomation. Due to delayed presentation of cow for the treatment, toxins might have produced pathological effects through hemotoxic components leading to development of hematuria and melena with elevation of blood urea nitrogen and creatinine in the ailing cow, which are in agreement with findings reported by Sasikala *et al.* (2016), Bhikane *et al.* (2020) in animals while Kumar *et al.* (2006) in human counterparts. Delay in the treatment of ailing cow might have led to development of severe envenomation leading to internal haemorrhages culminating in severe anemia in spite of treatment.

The treatment of lately presented HF cow with hemotoxic snake envenomation using anti-snake venom might neutralized unbound venom distributed in the body of cow thereby increasing the probability of survival through ASV and supportive treatment which included

fluid therapy to flush the kidneys, styptics for controlling bleeding, non-steroidal anti-inflammatory drugs for reducing the release of inflammatory mediators as well as to reduce the swelling, diuretic to reduce the edematous swelling over bitten part.

In conclusion, lately presented case of viperine envenomation in HF crossbred cow with hematuria and melena was diagnosed and treated successfully.

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