

Clinical and hemato-biochemical aspects of honeybee sting in Labrador Retriever- A case report

Ravindra Kaka Jadhav^{1*}, Sambhaji Gulab Chavhan² and Anil Udhavrao Bhikane³

¹Department of Veterinary Clinical Medicine Ethics and Jurisprudence, ²Department of Veterinary Pathology, College of Veterinary and Animal Sciences (MAFSU, Nagpur) Udgir, Dist. Latur, Maharashtra, ³Director of Extension Education, Maharashtra Animal and Fishery Sciences University, Nagpur

Abstract

The present case depicts the symptomatology and hemato-biochemical alterations due to honeybee sting in a dog. A two-year-old Labrador Retriever male dog was admitted to Teaching Veterinary Clinical Complex with history of stung by honeybees four days ago followed by absence of food intake, swelling over testicles, passing black coloured feces and decreased urination. Clinical examination of dog showed fever, swelling over the site of bite, tachycardia, tachypnea, pale conjunctivae, dullness and weakness. Haemato-biochemical analysis showed severe leukocytosis and anemia with increased values of alkaline phosphatase, aspartate aminotransferase, total, direct and indirect bilirubin, blood urea nitrogen and creatinine. The case was treated symptomatically with slow intravenous dextrose normal saline, antihistaminic, vitamin B complex and corticosteroid. The ailing dog succumbed to death within one hour after treatment.

Key words: Honeybee sting, Labrador Retriever, Leukocytosis, Anemia

India is a home to numerous species of honey bees viz., Rock Bee (*Apis dorsata*), Little Bee (*Apis florea*), Indian Bee (*Apis cerana*), European or Italian Bee (*Apis mellifera ligustica*) and Stingless Bees (KishanTej *et al.*, 2017). The honeybees sting once and lose their barbed stinger after stinging followed by their death (Fitzgerald and Flood, 2006). The honeybee venom glands contain various toxins like Mellitin, peptide 401, phospholipase A2, vasoactive amines and apamin. Upon honey bee sting, Mellitin and hyaluronidase causes alteration in cell membrane permeability, peptide 401 produces mast cell degranulation leading to release of histamine and vasoactive amines, a phospholipase A2 is responsible for intravascular hemolysis while vasoactive amines and a neurotoxin apamin produces effects on spinal cord (Conte *et al.*, 2006; Fitzgerald and Flood, 2006). Insect envenomation may lead to local pain and swelling, larger regional reactions, anaphylactic reactions, serum sickness (delayed type hypersensitivity) 3 days to 2 weeks after sting, and occasional delayed toxic reaction within 24 hours in humans characterized by hemolysis, coagulopathy, hepatopathy, thrombocytopenia and disseminated intravascular coagulation (Kolecki 1999; Fitzgerald and Flood, 2006).

Honeybee sting in animals produces pain, swelling, erythema, edema and local induration followed

by pruritus at the site of bite. In dog's honey bee sting is characterized by vocalization, rubbing mouth and eyes on the ground. Repeated stings cause anaphylaxis, salivation, vomiting, diarrhea, circulatory collapse, pallor or cyanosis (Tauer 2021). The literature about clinicopathology of honeybee sting in dogs is scarce. The present case depicts the clinical syndrome and haemato-biochemistry in Labrador dog suffering from multiple honey bee stings.

Case History and Clinical Observations

A 2-year-old male Labrador Retriever dog weighing 20 kg was tied by owner under giant mango tree having honeybee hives. When there was strike of honey bees, owner hurriedly fled away without untying the dog leading to multiple bites on back, ears and inguinal region including testicle. The dog was treated locally for 3 days with antihistaminic and vitamin B complex injections once daily and was admitted to Teaching Veterinary Clinical Complex up on deterioration of health on fourth day of bite. History revealed complete anorexia with reduced water intake, blackish feces and decreased frequency of urination. Clinical examination showed fever (103.5 °F), tachycardia (134 bpm) and increased respiration rate (44/min), pallor of conjunctival mucous membrane (Fig. 1), dry muzzle, slight watery nasal discharge. Nervous demeanour showed dullness and severe weakness (Fig. 2). The areas with honey bee sting were having bite marks/stingers (Fig. 3) and swelling was prominent on testicles

*Corresponding author: jadhavrkl1@gmail.com

(Fig. 2). Haematological analysis of blood (Table 1) sample revealed severe leukocytosis ($54.50 \times 10^3/\mu\text{l}$), severe anemia with significant decrease in TEC ($1.19 \times 10^6/\mu\text{l}$), hemoglobin (3.2 gm/dl) and PCV (8.16%) with normal platelet count ($201 \times 10^3/\mu\text{l}$). Biochemical analysis showed increased values of ALP (215 U/L), AST (271 U/L), total bilirubin (1.7 mg/dl), direct (0.58 mg/dl) and indirect bilirubin (1.12 mg/dl), BUN (46 mg/dl) and creatinine (2.7 mg/dl). The dog was treated symptomatically with Inj. Dexamethasone @ 0.2 mg/kg IV, Inj. Vitamin B complex @ 2 ml IV, Inj. DNS @ 10 ml/kg slow IV and Inj. Chlorpheniramine maleate @ 0.2 mg/kg IM. Being severely anemic, the treated dog succumbed to death within an hour after treatment. The post-mortem examination of dog was not performed as dog owner was not ready for post-mortem examination.

Discussion

Honeybee venom consists of mixtures of low molecular substances like biogenic amines, lipids and carbohydrates, cationic peptides which are responsible for local reactions and high molecular weight substances like enzymes (phospholipase, hylauronidases), peptides (mellitin, apamin, mastoparans, bombolitin) called as allergens responsible for systemic reactions (Perez-Riverol *et al.*, 2015). Honeybees bite victim with barbed

stinger which is lost after stinging followed by death of bee. The deaths due to honey bee sting in animals are attributed to immediate hypersensitivity reaction causing anaphylaxis while massive envenomation's can lead to death in non-allergic individuals (Fitzgerald and Flood, 2006).

Massive honeybee envenomation in animals is characterized by elevated temperature, depression, neurological signs like facial paralysis and ataxia, dark brown urine, blood in feces and bloody or dark brown vomitus (Cowell *et al.*, 1991), leukocytosis, thrombocytopenia if DIC is imminent (Fitzgerald and Flood, 2006). Secondary immune mediated hemolytic anemia may be observed in dogs with multiple stings (Noble and Armstrong, 1999). Mughal *et al.* (2014) reported fever, tachycardia, tachypnea, swelling at the site of bite along with leukocytosis, anemia and elevated liver enzymes, creatine kinase, BUN and creatinine in German Shepherd dog massively attacked by honey bees. Similar clinical and hemato-biochemical findings were observed in the present case of honeybee sting in Labrador dog. Treatment generally consists of fluids, oxygen, epinephrine, corticosteroids, antihistamines and analgesics (Buckley *et al.*, 2017). The fate of treatment depends on number of stings, response of host to honey bee venoms and execution of timely treatment.



Fig. 1: Pallor of conjunctival mucous membrane in a Labrador dog suffering from honeybee sting



Fig. 2: Severe dullness, weakness and swollen testicle in a Labrador dog suffering from honeybee sting



Fig. 3: Honeybee stinger at the site of bite in ear of a Labrador dog

Table 1: Haematological parameters in Labrador Retriever Dog with Honeybee sting

Sr. No.	Parameter	Case values	Normal values
1.	TEC (X 10 ⁶ /μl)	1.19	4.95-7.89
2.	Hb (gm %)	3.2	11.9-18.9
3.	PCV (%)	8.16	35-57
4.	MCV (fl)	68	60-77
5.	MCH (pg)	27	21-26.2
6.	MCHC(g/dl)	39.4	32-36.3
7.	TLC (X 10 ³ /μl)	54.50	5-14.1
8.	Neutrophils (%)	73.9	58-85
9.	Monocytes (%)	6.4	2-10
10.	Lymphocytes (%)	19.7	8-21
11.	Thrombocytes (X 10 ³ /μl)	201	211-621
12.	ALP (U/L)	215	1-114
13.	AST (U/L)	271	13-15
14.	ALT (U/L)	48	10-109
15.	Total Bilirubin	1.7	0-0.3
16.	Direct Bilirubin	0.58	0-0.1
17.	Indirect Bilirubin	1.12	0-0.2
18.	BUN (mg/dl)	46	8-28
19.	Creatinine (mg/dl)	2.7	0.5-1.7
20.	Calcium (mg/dl)	11.5	9.1-11.7
21.	Phosphorus (mg/dl)	5.7	2.9-5.3

(Merck Veterinary Manual, 11th Edition)

Buckley *et al.* (2017) successfully treated 9-year-old intact female mixed breed dog suffering from multiple honey bee stings (about 10) and having pre-existing mild chronic renal degenerative process which was transformed into acute decompensation during bee envenomation. Massive honeybee attacks in dogs may produce severe pathology like rhabdomyolysis, hemolysis and acute renal failure from direct tubular toxicity (Cowell *et al.*, 1991). In present report, the case of Labrador dog with honey bee sting was admitted to clinics on fourth day after deterioration in health condition, hence late treatment was not beneficial in minimizing the pathology. The pathological changes could have occurred over first 3 days. The death in treated dog could be attributed to severe anemia, severe leukocytosis and renal failure induced by honey bee toxins.

In conclusion, a case of massive attack of honeybee sting in Labrador Retriever was reported with characteristic febrile response, severe leukocytosis, mild

thrombocytopenia, anemia and swelling over the site of bite.

References

- Buckley, G.J., Corrie, C., Bandt, C. and Schaer, M. 2017. Kidney injury in a dog following bee sting-associated anaphylaxis. *Canadian Vet. J.*: **58**: 265-69.
- Conte, T.C., Grisotto, L.S.D, Mendes, G.E., Castro, I., Baptisa, M.A.S.F., Alves, V.A., Yu, L. and Burdmann, E.A. 2006. Mechanisms of bee venom induced acute renal failure. *Toxicon*: **48** (1): 44-54.
- Cowell, A.K., Cowell, R.L., Tyler, R.D. and Nieves, M.A. 1991. Severe systemic reactions to Hymenoptera stings in three dogs. *JAVMA*: **198**: 1014-16.
- Fitzgerald, K.T. and Flood A.A. 2006. Hymenoptera stings. *Clinical Tech. Small Anim. Pract.*: **21**: 194-204.
- KishanTej, M., Aruna, R., Mishra, G. and Srinivasan, M.R. 2017. Beekeeping in India: In Industrial Entomology, DOI: 10.1007/978-981-10-3304-9_3.

- Kolecki, P. 1999. Delayed toxic reaction following massive bee envenomation. *Ann. Emerg. Med.*: **33**: 114-116.
- Mughal, M.N., Abbas, G., Saquib, M. and Muhammad, G. 2014. Massive attack by honey bees in German Shepherd dog: description of a fatal case and review of literature. *J. Venomous Anim. Toxins including Trop. Dis.*: **20**: 55.
- Noble, S.J. and Armstrong, P.J. 1999. Bee sting envenomation resulting in secondary immune mediated haemolytic anemia in two dogs. *JAVMA*: **214**:1026-27.
- Perez-Riverol, A., Justo-Jacomini, D.L., ZollnerRde, L. and Brochetto-Braga, M.R. 2015. Facing Hymenoptera venom allergy: From Natural to Recombinant Allergens. *Toxins (Basel)*: **7**:2551-70.
- Tauer, D. 2021. Wasp, Bee and Ant Stings to Animals. In: The Merck Veterinary Manual, <https://www.msdsvetmanual.com/toxicology/venomous-arthropods/wasp,-bee,-and-ant-stings-to-animals>.

Received : 12.01.2022

Accepted : 25.05.2022