

MANAGEMENT OF ONION TOXICITY IN A DOG

G. Daniel Risheen¹, G.R. Bhojne², V.M. Dhoot³ and C.G. Panchbhai⁴

¹Ph.D. Scholar, ²Professor, ³Professor & Head, ⁴Associate Professor, Department of Veterinary Clinical Medicine, Ethics & Jurisprudence, Nagpur Veterinary College, MAFSU, Nagpur- 440006 (MHS).

DOI 10.29005/IJCP.2024.16.2.130-132}

[Received: 10.10.2024; Accepted: 26.11.2024]

How to cite this article: Risheen, G.D., Bhojne, G.R., Dhoot, V.M. and Panchbhai, C.G.(2024)., Management of Onion Toxicity in A Dog. Ind. J. Canine Pract., 16(2): 130-132.

For centuries, *Allium* species such as *Allium cepa* (onion), *Allium porrum* (leek), *Allium sativum* (garlic) and *Allium schoenoprasum* (chive), which are used for cooking and ethnomedical purposes, are among the biological toxins which affect dogs. A case of 2 years old, 25 kg female labrador was brought to Veterinary Clinical Complex (VCC), Nagpur, with a complaint of anorexia, weakness, depression, vomition daily twice or thrice, severe dehydration), dark coloured urine and melena, information regarding diet was examined in detail, the history of ingestion of onion, two days ago, prior to presentation, by dog was confirmed. Neutrophilia and thrombocytopenia were determined according to the haematology studies, dark coloured urine, melena, and history supported the suspicion of onion intoxication.

Keywords: *Allium*, Dog, Toxicity, Onion.

Onion toxicosis is reported worldwide in several animal species, cats and dogs are relatively more susceptible to onion-induced oxidative damage, followed by cattle, horses, sheep, goats, rats, and mice, in order of increasing resistance (Hatzade and Waghmare, 2020). The toxic effects are by damage to tissues due to the presence of organosulfur compounds such as disulfides, trisulfides and thiosulfates in onion. The most toxic substance in their content is N-propyl disulfide, which affects erythrocytes. N-propyl disulfide and other sulfur compounds show oxidative activity by affecting the two enzymes which have a critical role in cell membrane integrity, namely glucose-6-phosphate (G6P) and glucose-6-phosphate dehydrogenase (G6PD). These oxidative toxins damage the hemoglobins and cause Heinz bodies to occur inside erythrocytes. The formation of Heinz bodies and eccentrocytes increases erythrocyte fragility and extravascular hemolysis. The affected erythrocytes are removed from the blood circulation by the spleen and the reticuloendothelial system and accordingly they become fewer in number, thus anemia occurs eventually leading to jaundice. The anemia which occurs is hemolytic anemia due to the presence of Heinz bodies which is not common in dogs,

but onion toxicosis should be considered as one of the potential causes. Although marked Heinz body formation may be present within a day after onions are ingested, the anemia typically develops several days later. Direct oxidative damage to the erythrocyte cell membrane and its sodium-potassium pump or the oxidative production of hemin also contributes to cell lysis. Oxidation of the heme ion and associated methemoglobinemia results in a left shift of the hemoglobin-oxygen dissociation curve, decreased blood oxygen transportation capacity, and, ultimately, impaired delivery of oxygen to the tissues. This severe and rapid oxidative hemolysis of erythrocytes induced by Onion consumption causes anemia, methemoglobinemia, agglutination, impaired oxygen transportation and hemoglobinuria (Zhao *et al.*, 2017).

Case history and Observations

A case of 2 years old, 25 kg female Labrador breed dog, brought to - Veterinary Clinical Complex (VCC), Nagpur, with the history of anorexia since 2 days, weakness, depression, vomition daily twice or thrice, severe dehydration, icterus, tachypnea, tachycardia, weakness, exercise intolerance, abdominal pain, dark coloured urine and melena. Information regarding diet was

examined in detail, the history of eating Onion (*Allium cepa*), two days prior to presentation as: was confirmed. Neutrophilia and thrombocytopenia were determined according to the haematology studies, dark coloured urine, melena, and history supported the suspicion of onion intoxication. Clinical, haematological, biochemical and ultrasonographic and radiographic examinations were carried out. The X – Ray

showed no abnormalities whereas ultrasonography revealed Liver – Hyperechoic hepatic parenchyma with enlarged portal vein, Kidneys were normal shape and size, and spleen was iso-echoic with normal shape and size. Blood smear showed haemolytic anemia and neutrophilia. Table No. 1 shows haematological, liver and kidney values recorded on various days following treatment.

Table No. 1

Sr. No.	Name of the Test	Observed values on 1 st day	7 th day	14 th day	Normal range
Blood parameters					
1	Hb	15.8	14.5	14.0	12- 18
2	WBC	19.8 ×1000	13.5 ×1000	9.1×1000	6-17×1000
3	RBC	5.8 ×1000	5.6 ×1000	5.3×1000	5-8 ×1000
4	PCV	45.8 %	43.4%	41.2%	37-55
5	Neutrophil	96.9	71.5	57.6	60-70
6	Lymphocyte	2.0	23.6	31.9	12-30
7	Monocyte	0.2	3.0	9.5	3-10
8	Eosinophil	2.0	2.0	2.6	2-10
9	MCV	79 um ³	79 um ³	77 um ³	60 -77³
10	MCH	27.2 pg	27.2 pg	26.0	19.5-24.5 pg
11	MCHC	34.4 g/dl	34.4 g/dl	34.0 g/dl	32-36 g/dl
12	Platelets	173 10 ³ /mm ³	283 10 ³ /mm ³	395 10 ³ /mm ³	200-500³/mm³
Liver Function Test					
12	ALT	2922 IU/L	506.6 IU/L	192.5 IU/L	10-88 IU/L
13	AST	109 IU/L	68 IU/L	18.2 IU/L	10-88 IU/L
14	Total protein	3.6 gm/dl	4.0 gm/dl	4.2 gm/dl	5.4-7.7 gm/dl
Kidney Function Test					
15	BUN	20.8 mg/dl	17.5 mg/dl	15.2 mg/dl	12-25 mg/dl
16	Creatinine	1.31 mg/dl	1.12 mg/dl	1.00 mg/dl	0.5-1.5 mg/dl
17	Ammonia	485 ug/dl	256.6 ug/dl	97.7 ug/dl	120 ug/dl

Treatment

No specific antidote is available for *Allium* species toxicosis. Treatment involves gastrointestinal decontamination and flushing the *Allium* species toxins, providing general supportive care. The dog was administered lactated ringer's solution (RL) -100 ml- I/V and dextrose and sodium chloride solution (DNS) 100 ml - I/V. Ondansetron (0.5 mg/kg I/M, once in 12h) as an antiemetic and ranitidine (2mg/kg S/C, once in 12hr) B complex vitamins (1 ml IM, once a day) were also administered as supplementary treatment. In addition to ursodeoxycholic acid tablet and lactulose syrup, liver tonic and

Carica papaya extract syrup were administered, 7day course of therapy.

Results and Discussion

When consumed in sufficient amounts, onions have the potential to be extremely poisonous and even fatal. Due to variations in their haemoglobin structure and defensive enzymes, cats are particularly vulnerable. Some dog breeds, particularly Japanese ones, have hereditary traits that might greatly worsen the toxicosis. Since onions often produce regenerative Heinz-body haemolytic anemia, the prognosis is favourable with supportive treatment and recovery usually occurs in 10 to 14 days. No

specific antidote is available for *Allium* species toxicosis as also mentioned by Yipel, *et al.*, 2016

References

Hatzade., R.K. and Waghmare, S. (2020).

Therapeutic management of onion (*Allium cepa*) poisoning in a bullock: A case report. *The Pharma Innovation Journal*, **9**(9): 154-156.

Yipel, F. Altinok, Yipel, M., and Tekeli, I.O.

(2016).. *Allium* spp. toxicosis in small animals: a case report. *Acta Horticulture ISHS Proc.*1143, 311-314

Zhao, Jinghua, Ming, Zhang, Yue, Li, Zhiheng, Zhang, Mingzi, Chen, Tao, Liu, Jiantao, Zhang and Anshan, Shan. (2017). Therapeutic effect of hydrogen injected subcutaneously on onion poisoned dogs. *Journal of Veterinary Research*, **61**: 527-533..