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## Therapeutic management of onion (*Allium cepa*) poisoning in a bullock: A case report

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### Abstract

A seven year old bullock was presented to the Teaching Veterinary Clinical Complex (TVCC), Post Graduate Institute of Veterinary and Animal Sciences (PGIVAS), Akola with the complaint of passing black colour faeces, dark red urine and anorexia since last 4-5 days. History and clinical examination revealed accidental ingestion of large quantity of onions (*Allium cepa*), slight rise in rectal temperature (100.2 °F), tachycardia, increased respiratory rate, pale mucous membrane, passing of black colored feces, anorexia, weakness, lethargy and staggering. The laboratory examination revealed low Hb, PCV and TEC. The case was diagnosed as an onion poisoning on the basis of history, signs, clinical examination and laboratory findings. The bullock was treated with the parenteral administration of plasma volume expander, phosphorous, vitamins and haematinics preparation. Bullock showed clinical improvement on second day and recovered completely within two weeks.

**Keywords:** Onion poisoning, bullock, anemia, haematinics

### 1. Introduction

The onion toxicosis in cattle may occur mainly where culled cultivated onions are inadvertently fed to livestock or where animals have accidental access to places where onions are stored [1]. Many workers reported hemolytic anemia in cattle, sheep, dogs, cats and horses caused by spontaneous ingestion of onion (*Allium cepa*) [2]. Severe methemoglobinemia is associated with onion toxicosis leads to cyanosis, hemolytic anemia with the formation of Heinz bodies and death [3]. The clinical signs in cattle with onion toxicosis included inappetence, staggering, abortion, onion odor of the breath and feces, elevated heart and respiratory rates, pale mucous membranes, jaundice and brown colour urine [4]. More than one toxic principle is involved in Onion-induced hemolytic anemia [5]. In the present case report a case of onion poisoning in a old bullock was successfully treated and discussed.

### 2. History, Clinical examination and Diagnosis

A seven year old bullock from village Alegaon, Taluka Patur, district Akola, was presented to the Teaching Veterinary Clinical Complex (TVCC), Post Graduate Institute of Veterinary and Animal Sciences (PGIVAS), Akola with the complaint of passing black colour faeces, dark red colour urine and anorexia since last 4-5 days. History and clinical examination revealed accidental ingestion of large quantity of onions (*Allium cepa*), slight rise in rectal temperature (100.2 °F), tachycardia on auscultation, pale mucous membranes, passing of black colored feces, dark red colour urine, anorexia, weakness, lethargy and staggering. The laboratory examination revealed low Hb (4.8 gm/dl), PCV (20.8%) and TEC (3.92/ cumm) indicated hypochromic anemia. The case was diagnosed as an onion poisoning on the basis of history, clinical examination and laboratory findings.

### 3. Treatment and Result

In the present case, the bullock was fed excess quantity of onions, which resulted into onion toxicosis. As the animal was severe anemic and need blood transfusion. However blood transfusion could not be managed as suitable donor was not available due to COVID-19 pandemic lock down and inclusion of Akola in the red zone. The case was treated with Parenteral administration of Vetplasma (Hydroxyethyl Starch, an Plasma Volume Expander), at the dose rate of 1500 ml/day intravenously for three days, injection phosphorous (Sodium Acid Phosphate) 10 ml daily for three days, iron dextran 10 ml IM single dose, vitamins B-complex (Inj. Tribivet) 15 ml daily for 5 days, Dextrose 5% IV and haematinics preparation orally for 15 days, metronidazole at the dose rate of 10 mg/kg body weight orally for five days.

The owner advised complete withdrawal of onion from the diet. Bullock showed improvement in clinical signs on second day itself and recovered completely in a two weeks period.



**Fig 1:** Hydroxyethyl Starch Infusion



**Fig 2:** Bullock Started Feeding

#### 4. Discussion and Conclusion

The onion toxicosis in cattle is uncommon and occurs where culled cultivated onions are inadvertently fed to livestock. It may also occur due to accidental ingestion of excess quantity of onion [1]. Sometime it may cause oesophageal obstruction in cattle. In the present case, the clinical signs shown by the animal were anorexia, passing black colour faeces, red colour urine, pale mucous membrane, weakness, staggering, lethargy, increased respiratory rate. Similar clinical signs were also reported by many workers in onion poisoning [1].

The onion poisoning is associated with methemoglobinemia leads to cyanosis, hemolytic anemia with formation of Heinz bodies and finally death of the animal [3]. The hemolytic anemia in onion poisoning could be attributed to the presence of toxic substance present in onion such as disulfides, n-propyl disulfate and S-methyl and S-prop(en)yl cystein sulphoxides (SMCO) derived from amino acids [6]. The anaerobic bacteria in rumen hydrolyse these SMCO to thiosulfonate which further metabolized to dipropyl disulfides and dipropenyl disulfides. These disulfides causes oxidative damage in erythrocytes [7] resulted into oxidation of heme iron to ferric state producing methemoglobin in affected animals. This methemoglobin is unable to transport oxygen [8]. The oxidative damage of erythrocytes also results in aggregation and precipitation of hemoglobin and it's binding to the cytoplasmic membrane forming Heinz bodies [9]. The intraerythrocytic Heinz bodies are phagocytosed by splenic

and hepatic macrophages, resulting in extravascular hemolysis [10]. The extravascular hemolysis may also be due to decreased deformability of erythrocytes due to Heinz bodies, thus erythrocytes burst when passing through sinusoids or small capillaries which resulted into dark red colour urine in onion poisoning [11].

In the present case report animal showed hemolytic anemia as reported by many workers in onion poisoning [12]. The hemolytic anemia may also seen in other diseases such as babesiosis, post parturient hemoglobinuria etc. [13, 14]. In the present case, the attempts were made to rule out other disease which shows similar signs and hemolytic anemia, on the basis of history, signs, clinical and laboratory examination.

As there is no any specific antidote for treatment of onion poisoning hence, the treatment is directed to stop the feeding of onion immediately and symptomatic and supportive therapeutic management of the case. In severe anemic cases blood transfusion is necessary to promote early clinical recovery [15]. In the present case blood transfusion could not be arranged due to lockdown period imposed because of COVID-19 pandemic. However large quantity of Parenteral administration of plasma volume expander along with hematinics, vitamins and other supportive therapy given which showed improvement in clinical signs on second day of treatment and showed complete recovery within two week period.

Onion poisoning can be prevented by unrestricted ingestion of onions by ruminants [16]. It is also suggested to feed protein rich diet with onion as dietary proteins plays important role for the synthesis of enzymes and for the availability of cofactors required for anti-oxidative reactions [15]. In conclusion the case of onion poisoning in bullock was successfully treated by administering plasma expander, haematinics and multivitamin preparation along with other supportive therapy.

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