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Case Report

Clinical management and gross pathological findings of a severe anaplamosis in a dairy cow

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ABSTRACT

Objectives: Bovine anaplasmosis is an arthropod-borne hemolytic disease of cattle which is caused by a rickettsia; *Anaplasma marginale*. Anaplasmosis is also called "Yellow bag" or yellow fever, where the affected animals usually develop a jaundiced appearance. The objective of this study was to investigate the clinical findings, treatment and gross pathology of a severe anaplasmosis in a dairy cow.

Materials and methods: In this report, a rare case of fatal anaplasmosis in a 4 year old Jersey-Friesian cow, weighing about 200 kg was reported. Diagnosis was done based on clinical symptoms, blood examination for the presence of *A. marginale*, and biochemical analyses of blood. Leishman staining was done to check the *A. marginale* at the margin of erythrocytes. Treatment was instituted with blood transfusion and Oxytetracyline dosed at 20 mg/kg body weight and iron supplement containing 20 mL Cobaphos (containing Phosphorus 125mg + Cyanocobalamine 0.05 mg) and 20 mL Fercobsang containing Iron (as ammonium citrate) 1.75 mg, Cyanocobalamine (Vitamin B12) 0.025 mg, Nicotinamide (vitamin PP) 20 mg, Cobalt (as digluconate) 0.0067 mg, Benzyl Alcohol (E1519) 20.8 mg) were given intramuscularly.

Results: The cow did not survive the infection as it eventually died of the disease. Post mortem examination showed gross evidence of splenomegaly, hepatomegaly, distended bile duct and generalized jaundice.

Conclusion: Based on the consequence of this case report, preventive vector control, prompt and appropriate treatment and improved management practices are recommended in order to prevent clinical anaplasmosis cases among cattle.

KEYWORDS

Bovine anaplasmosis, Clinical management, Diary cow, Jaundice, Post mortem

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INTRODUCTION

Anaplasmosis is a tick-borne haemoparasitic, infectious non-contagious disease of ruminants, occurring predominantly in the tropics and subtropics (De-Whittier et al., 2007). It is a vector-borne, infectious blood disease in cattle caused by the rickesttsial parasites *Anaplasma marginale*. Diagnosis is based on clinical signs and the examination of blood under the microscope for evidence of the parasite (De-Whittier et al., 2007). Affected cattle either die or recover within 4 days following the first signs of the disease. The mortality rate increases with the age of the animal (Smith et al., 1989).

A. marginale is the primary causative agent of bovine anaplasmosis, characterized by anaemia, prog-ressive weakness, loss of weight and jaundice (Munz and Dumbell, 1994). It is an obligate intraerythrocytic parasite that replicates within erythrocytes, consequently leading to erythrocyte damage. The economic significance of bovine anaplasmosis include constraints in efficient production with its attendant costs such as the loss of production of infected and recovered animals, abortion and death as the case may be in addition to the cost of tick control (Rymaszewska and Grenda, 2008).

Anaplasmosis has no age or breed preference in cattle, but the severity of the signs vary according to the age and the infective dose of the organism. The disease is most severe in adult cattle and the predominant signs include fever, lethargy and depression, loss of appetite, muscle tremor and weakness. Other signs include dry muzzle, pale gums and labored breathing. The disease has a mortality rate ranging from 20 to 50% in adult cattle. However, young calves of one year old usually manifest mild clinical signs with little or no mortality (Radostits et al., 2000). Anaplasmosis can be divided into four different stages according to the appearance of the parasite in the blood and clinical signs. In severe cases of anaplasmosis, death may ensue within few days. Since Anaplasmosis is not contagious, spread from animal to animal is mainly via insect vectors. The major route of transmission includes tick vectors through intrastadial or transtadial and rarely trans-ovarian transmission. Anaplas-mosis can additionally be transmitted mechanically through blood sucking flies and via the placenta in pregnant cows (Kocan et al., 2010).

Even though the cases of anaplasmosis are common, fatal clinical cases are seldom reported. Knowledge of the case fatality and management of the disease is of high significance from the preventive point of view. Here, we report a rare fatal case of clinical bovine anaplasmosis that did not respond to treatment resulting in death of the infected cow. The gross pathological changes associated with the disease are also reported.

Case history

A 4-year old Jersey-Friesian cow, weighing 200 kgs was presented to the University Veterinary hospital, Universiti Putra Malaysia (UPM), Faculty of Veterinary Medicine, (UPM) with the complains of losing weight, fever, pale mucous membrane and decreased milk production.

Clinical examination

Physical and clinical examination findings showed yellow discoloration of the mucus membrane of the eyes and vulva. There were presence of ticks on the cow's body, while the pre-scapular lymph nodes were swollen. Strenuous breathing and decrease in appetite were also observed. Blood sample was collected via jugular venipuncture; the blood sample was analyzed for complete blood count, blood biochemistry and for Leishman stain.

Diagnosis

Microscopic examination of Leishman stained blood smears revealed presence of *A. marginale* organism at the margins of erythrocytes (**Figure 1**). The smear was observed to be negative for *Babesia spp* and *Trypanosoma*. The blood result showed that the cow had severe anemia with PCV of as low as 10%. Based on the presence of the *A. marginale* in the blood of the cow and from the clinical and physical examination findings, the condition was diagnosed as bovine Anaplasmosis.

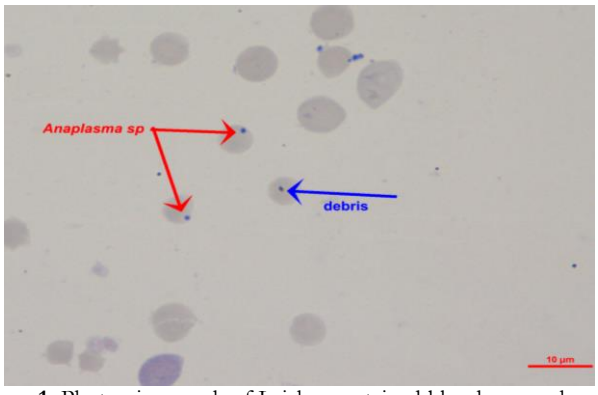

Figure1: Photomicrograph of Leishman stained blood smear showing *A. marginale* located at the margins of infected erythrocytes.

Treatment

The cow was treated with 45 mL of Oxytetracyline (20 mg/kg), 20 mL Cobaphos (containing Phosphorus 125

mg + Cyanocobalamine 0.05 mg) and 20 mL Fercobsang (containing Iron (as ammonium citrate) 1.75 mg, Cyanocobalamine (Vitamin B12) 0.025 mg, Nicotinamide (vitamin PP) 20 mg, Cobalt (as digluconate) 0.0067 mg, Benzyl Alcohol (E1519) 20.8 mg) intramuscularly. The following day, blood transfusion was done with 450 mL blood and the cow was able to stand and move around with a marked increase in appetite. On day 4 post blood transfusion, the cow was treated again with the same drugs and doses as in day one. On day 7, antibiotics were repeated and the cow was bright and standing. Unfortunately, the cow was found dead on the following day (day 8). Systematic necropsy was performed on the animal and gross lesions were recorded.

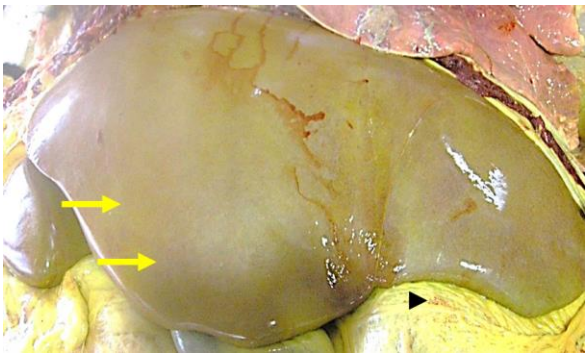

Figure 2: Gross lesion of the liver showing marked enlargement (hepatomegaly), typified by blunt edges (yellow arrow) with yellowish discoloration of the omentum (black arrow head).

Figure 3: Gross lesion of the spleen showing enlargement (splenomegaly).

Gross pathological lesions

Upon post mortem examination, the gross lesions encountered included pale mucous membrane with emaciated carcass; serosal surfaces of the abdominal organs had yellowish discoloration indicating icterus. Splenomegaly with congestion and discoloration of the spleen was visible. Hepatomegaly and paint brush hemorrhages on the endocardium were also seen. The lungs were congested and the gallbladder was distended with dark colored bile (**Figure 2-6**).

Figure 4: Gross lesion of the lung showing severe congestion of the caudal lobes (arrows).

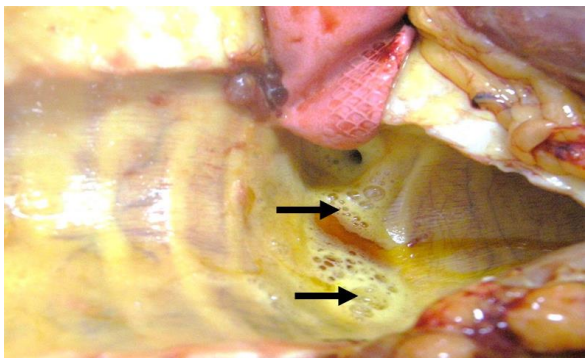

Figure 5: Gross lesion of the trachaea showing frothy exudates within the lumen (arrows).

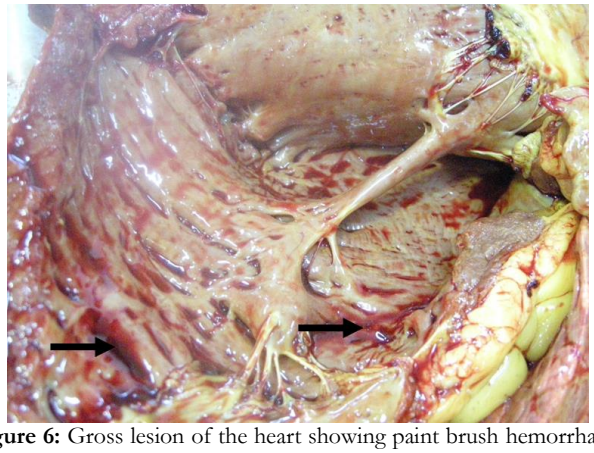

Figure 6: Gross lesion of the heart showing paint brush hemorrhages (extravasations) on the surface of the endocardium (arrows).

DISCUSSION

Although anaplasmosis is not a common disease, there could be great variation in both morbidity and mortality in infected animal herds. Anaplasmosis usually presents with sporadic death, affecting only one or a few animals in a herd. But occasionally, it can affect a large number of animals. This may depend on the herd's prior exposure to the parasite. Recovered or latently infected animals are

believed to be fairly resistant to the clinical disease (Eriks et al., 1993).

Oxytetracycline and Chlortetracycline are effective drugs against bovine anaplasmosis, provided they are given early in the course of the infection, before the onset of severe anemia (Campbell and Rew, 2013). In this case, we instituted oxytetracycline treatment to the cow and the treatment was not effective as the condition persisted, promting the institution of blood transfusion and the condition was diagnosed at a later stage. The other treatment options such as diminazene aceturate (dosed at 3 to 5 mg/kg, IM), amicarbalide (dosed at 5 to 10 mg/kg, IM), and imidocarb (dosed at 1 to 3 mg/kg, IM) are most often used (Campbell and Rew, 2013).

The primary effect of the infection is the induction of extravascular hemolytic anemia, and the anemia is presumed to be the cause of death. The clinical signs and lesions of anaplasmosis can be subtle, but if affected animals are examined closely, they will be found to be anemic and may have mild Icterus. In this case report, the cow presented with a PCV of 10% and even though blood transfusion was able to stabilize the PCV for a few days, the cow eventually died. Blood transfusion is the most effective remedy for regenerative non-hemolytic anemia. In hemolytic anemia, blood transfusion temporarily alleviates the anemia, but as it was in this case, the parasites invaded the normal red blood cells, resulting to more hemolysis and reversion to anemia and hypovolemic shock. In the acute phase of infection, animals may be febrile, while aggression and excitability are often reported in affected animals. The cause of this aggression is not known, but it is presumed to be due to the effects of hypoxia in the brain (De-Whittier et al., 2007).

Postmortem lesions in the dead animal are often mild. The most useful postmortem lesions are marked splenic enlargement and congestion (Kieser et al., 1990) and this is consistent with the lesions we observed in this report. The jaundice and anemia reported in this case is due to the destruction of red blood cells and their contents being released into the blood stream. Similarly, splenomegaly with congestion and discoloration of the spleen reported in our case is in agreement with the results of (Devos et al., 2006), who reported that the spleen of infected cows was enlarged following anaplasmosis. This is associated with excessive destruction of defective erythrocytes by macrophages within the spleen (Devos et al., 2006). Pulmonary congestion, hepatomegaly, and distended gall bladder with dark colored bile were observed in this case as reported previously (Egbe-Nwiyi et al., 1997). Anaplasmosis is an infectious disease of cattle that causes anemia, abortions, and death. Adult cattle have the most severe symptoms of the disease.

CONCLUSION

Here we report a case of anaplasmosis in a cow presented with a severe anemia. Chemotherapy and blood transfusion failed to remedy the condition because of the onset of severe anemia. Gross pathological lesions showed evidence of jaundice and organ damage. Farmers are advised to work closely with their veterinarians in order to promptly report cases of weakness and the prevalence of anaplasmosis in and around their herd. Tick control through regular tick baths and injections is also paramount in the control of anaplasmosis. Since ticks were found in the cow, they could be the likely source of transmission of the Anaplasma. Unless infected cattle are detected during the early stages of the disease, treatment is usually not effective. If anaplasmosis has not been a problem in a farm, management programs and monitoring will help the farmer against anaplasmosis outbreaks.

CONFLICT OF INTEREST

Nothing to declare.

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