Black Quarter in crossbred dairy cattle- A Case Report

Umar Nazir Zahid[1], S. Mathan Kumar [2], Sarnarinder Singh Randhawa[1], Swaran Singh Randhawa[1], Mir. Nadeem Hassan[3]

1. Department of Clinical Veterinary Medicine Ethics and Jurisprudence, Guru Anand Dev Veterinary and Animal Science University, Ludhiana, Punjab, India ; 2. Department of Animal and Veterinary Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos University Al Khoud, Muscat, Sultanate of Oman.; 3. Department of Veterinary Microbiology, GADVASU, Ludhiana, Punjab, India
Corresponding author: S. Mathan Kumar, email:mathan@squ.edu.om
Received: 29-04-2012, Accepted: 11-06-2012, Published Online: 31-10-2012
doi: 10.5455/vetworld.2012.767-770

Abstract

Aim: A sporadic incident of Clostridial disease that affected Holstein Friesian (HF) cross bred cows (n=8) at an organized dairy farm was investigated.

Materials and Methods: Detailed clinical investigations and treatment were carried out on all the affected animals. Complete blood count (CBC) and plasma biochemistry were performed on survived animals (n=6). The needle biopsy samples were subjected to culture and identification of the organism by Gram staining.

Results: Two cows were died before instituting the treatment in this clinical incident. The carcasses were seen with typical bloated appearance immediately after death, laying one side with affected leg stuck out. Post-mortem of the carcasses were not been carried out. Pertinent findings of the CBC were a relative neutrophilia whilst a normal total leucocyte count and lowered Hb. Plasma biochemical parameters revealed significant increase in the mean activity of aspartate aminotransferase while alanine aminotransferase levels were within limits. Gram's staining of the inoculated culture revealed the presence of small gram-positive rods with sub terminal spores. Clinical treatment of the cases was performed with administration of heavy dose of crystalline penicillin and non-steroidal anti-inflammatory drugs (NSAIDS). Clinical recoveries of the cases were good and cessation of spread within the herd confining itself as a sporadic clinical incident.

Conclusion: Sporadic Clostridiosis (BQ) of eight cross bred dairy cows was dealt in the present case study by including the details of its alterations in hematological parameters, Plasma biochemical parameters, observation of characteristic clinical signs of the disease and employment of empirical treatment with Penicillin.

Keywords: Black Quarter, *Clostridium*, *Clostridium chauvoei*, dairy, HF crossbred dairy cattle, sporadic *Clostridiosis*.

To cite this article: Zahid UN, Mathan Kumar S, Randhawa Sarnarinder S, Randhawa Swaran S, Hassan MN (2012) Black Quarter in crossbred dairy cattle- A Case Report, *Vet World*, 5(12): 767-770, doi: 10.5455/vetworld.2012.767-770

Introduction

Clostridium spp are the group of anaerobic bacteria that are of considerable medical and veterinary importance. Clostridiosis commonly referred to a variety of diseases of economic importance caused by the bacteria of this genus [1]. *Clostridium chauvoei*, the causative agent of blackleg and malignant edema in cattle, sheep and other ruminants isa gram positive, spore forming, rod shaped bacterium [2]. The clostridial myositis of skeletal muscles is characterized by the appearance of crepitating sounds with fluctuating swelling causing myonecrosis in of one or more limb quarters, severe toxemia and followed by rapid death [3]. The spores of which survive for several years without losing their pathogenicity. It is a soil borne infection, portal of entry is through alimentary tract after ingestion of contaminated feed, fodder and soil [4]. It is an economically important disease among the marginal dairy farmers of India though preventable by vaccination but occurs sporadically.

Case Description

A sporadic outbreak of Clostridial disease (Black quarter) was investigated in HF cross bred cows (n=8) maintained at an organized dairy farm unit in the Ludhiana district, Punjab. All the affected were of aged 3 years and in their first lactation. The unit herd was having a populationof seventy five cows at the time of this sporadic incident. The farm population has been purchased from the southern states of India as mid to late term pregnant heifers and been transferred to acclimatize prior to calving. All the animals at the time of purchase were immunized against Foot and Mouth disease (FMD), Black

Figure-1, 2 & 3. Swollen and crepitating gluteal and lumbar muscles

Quarter (BQ) and Hemorrhagic Septicemia (HS) with Raksha Triovac[R] vaccine (Indian Immunologicals). This combine vaccine formulation contains BQ component as formaldehyde inactivated Clostridium chauvoei culture. The cows were housed at tie stall barns and are intensively managed. The animals were fed with concentrate mash, chopped green fodder and mixed fodder silage. The unit herd had a history of foot and mouth disease affection a month back. Among the herd, eight cows were observed with sudden onset of lameness and swelling in the gluteal and lumbar muscles. On clinical examination the cows were found depressed, febrile, lame (on one limb) with acute swelling of gluteal muscles (Fig. 1, 2 & 3), anorectic, with complete rumen stasis, high fever (>104°F) and a pulse rate of above 110/min. Palpation of the swollen area emitted crackling/crepitating sounds. All the animals were clinically affected with in a period of two days indicating the sudden onset and loss of two cows on the first day. Herd check and isolation of the affected was performed. The laboratory clinical investigations were performed and intensive clinical therapy was instituted on the survived cows. The unit herd was observed carefully for any other inclusion of herd mates with similar signs over a period of few weeks.

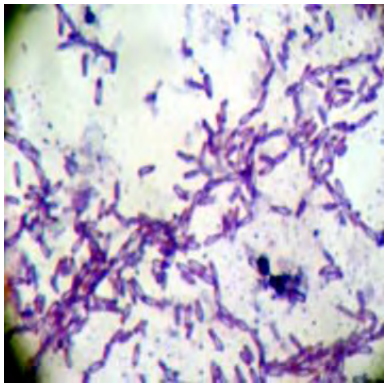
Materials and Methods

From a total of eight affected cows two were died exhibiting clinical signs on the first day of this sporadic incident before even the treatment instituted. Post-mortem of the carcasses were not been carried out with the fear of spread of bacteria. The clinical investigation further continued with collection of blood samples from the six cows. To perform CBC and smears blood samples were collected using disodium salt of ethylene diamine tetraacetic acid (EDTA) as anticoagulant for estimation of hematological parameters [5] and to check for any haemoprotozoan infection. Blood samples were also collected in heparinized vials for estimation of plasma biochemical parameters of clinical importance by utilizing DT60II[R] Dry chemistry analyzer (Johnson and Johnson, USA). Needle biopsy samples were obtained for microbiological identification to identify the suspected cause of organism. Such samples were taken from the swollen muscles of gluteal and lumbar region inoculated into Robertson's cooked meat media. The culture was incubated in the anaerobic chamber for 48 hours. Upon completion of the tenured time,Gram's staining of the culture was performed to identify the microbe involved in this sporadic clinical incident.

Results and Discussion

The acute onset of the clinical signs and loss of two cows on the initial day were predictably suggesting the involvement of any acute/per acute clinical causes/ disease of cattle.

As mentioned above the characteristic clinical signs are consistent with the descriptions by [3,4] for the blackleg disease such as occurrence of sudden lameness, reluctance to move, swelling on the one or more quarters involving major group of muscles, anorectic, with complete rumen stasis, high fever (>104°F), pulse rate of above 110/min and culminating fatally. Added, upon palpation of the swollen muscles emitted crackling/crepitating sounds. A presumptive clinical diagnosis of Clostridiosis (BQ) was made, based on the acute onset and characteristic clinical signs suggesting the etiological involvement of *Clostridium chauvoei* in this sporadic Clostridiosis.The two dead carcasses were observed with the bloated appearance, with the limbs spread apart and pointing upwards, due to the rapid accumulation of gas under the skin/body cavity. Postmortem examination (PM) of the carcasses were not been carried with the fear of bacterial spread and consequent contamination of the environment by formation of spores. It is suggested, performing PM of carcasses is considered optional or should not be performed and the decision weighed on the husbandry/clinical situation in BQ [4]. The portal



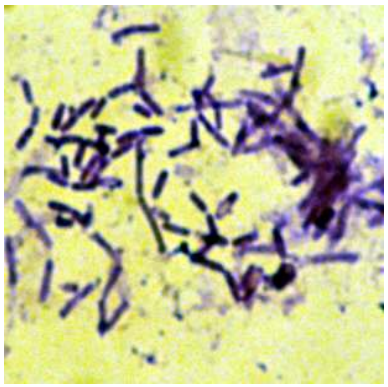


Figure-4 and Figure-5. Gram staining of the culture showing small gram-positive rods with sub terminal spores

of entry of this organism in cattle is through ingestion of bacterial spores originating from contaminated feed or soil. The ingested spores enter the circulation upon essential anaerobic situations these spores germinate and multiply. The bacteria produce toxins, which in turn actively circulates in blood and causes damage such as severe necrotizing myositis locally in the skeletal muscle and systemic toxemia [2,3]. The organism invariably causes lesions other than the skeletal muscles were the base of tongue, heart muscle, diaphragm, psoas muscles, on brisket and udder. Among the other possible conditions that are considered in the list of differentials are as abcess, seroma and hematoma, all are possibly ruled out by the characteristic clinical signs.

The results of the complete blood count of the six cows as follows, Hemoglobin (Hb) 7.40 ± 0.20 gm. % and Total leucocyte content (TLC) 8783±1356 cells/ mm^3. Results of the differential count of the WBC's were noted asNeutrophil count (N) 56.67 ± 3.25%, Lymphocytes (L) 42.33±3.7%, and Eosinophil (E) 1.00 ± 0.68%. The results indicate presence of a relative neutrophilia whilst with normal range of TLC, anemia and an absence of any haemoprotozoan disease among the survived cows. Plasma biochemical concentrations of aspartate aminotransferase (AST) was 238 ± 25 U/L and alanine aminotransferase (ALT) levels were found to be 8 ± 3 U/L. The present study results are in agreement with the hematological changes that are been observed with two to three days post infection experimentally on the hill bulls of two to three year olds except the lowered Hb in this study [6]. The present case study results recorded a moderate anemia among the survived and those are in the treatment could be attributed due to the fact, that the cows were also suffered with an incident of FMD a month back whilst the unit herd which was duly immunized against both of these diseases at the time of purchase. The reasons behind this occurrence of both the diseases could possibly be due to the failure of vaccine that arise out of poor handling and administration of the vaccine by field staff. Microbial identification out of the gram staining of the inoculated culture revealed the presence of small gram-positive rods with sub terminal spores (Fig.4 and Fig.5). This finding had clearly supported the empirical decision to employ heavy doses (44,000 U/kg body weight IM) of crystalline penicillin (Crys 40^R Sarbahai Zydus, India) twice daily for seven days. The agent was also injected locally in to the affected muscles for enhanced efficacy, added the cows were given NSAIDs to aid in pain relief from the lameness and febrile. Occurrence of BQ is predominant in warmer months [4]. Usually the disease culminates fatally without the possible chances to employ treatment and see the recovery of the affected.

This sporadic Clostridiosis occurred in the winter month such as December equating to an atypical BQ where in the temperature of the location of the unite herd are around 10^oC and within the herd of seventy five it affected only eight cows among which two were died. It is important to know that the unit herd operates under intensive system with zero grazing and predictably the level of spore's contamination in to their feed/ fodder.

Conclusion

Clostridiosis in dairy cattle can cause considerable losses in terms of loss of herd and loss of production. Sporadic Clostridiosis (BQ) of eight cross bred dairy cows was dealt in the present case study by including the details of its alterations in hematological parameters, plasma biochemical parameters, observation of characteristic clinical signs of the disease and employment of empirical treatment with Penicillin. Microbial identification should be among the top tool

of clinical investigations of any clinical disease situation to a herd. The present case study emphasizes the need of proper vaccine handling and administration to the herd by the veterinary team in the field against such important diseases.

References

1. Divers, T.J and Peek, S.F. (2008). *Rebhun's Diseases of Dairy Cattle*.2nd Edition, W.B.Saunders Co. Ltd., Philadelphia, USA.
2. Sultana, M., Ahad, A., Biswas, P.K., Rahman, M.A., Barua,H., (2008). Black Quarter (BQ) Disease in Cattle and Diagnosis of BQ Septicemia Based on Gross Lesions and Microscopic Examination. *Bangladesh J Microbiol*.25 (1): 13-16.
3. Radostits, O.M., Gay C. C., Blood, D.C. and Hinchcliff, K.W. (2000).*Veterinary Medicine*. 9th Edition W.B. Saunders Co. Ltd., Philadelphia, USA.
4. Robson S.,(2012). Blackleg in cattle. Available at: http://www.thedairysite.com/articles/843/blackleg-in-cattle. Accessed on: 24 Apr 2012.
5. Coles, E.H.,(1980*). Veterinary Clinical Pathology* 3rd Edition, W.B. Saunders Co.Ltd., London.
6. Singh, K. P., Parihar, N. S., Charan, K and Tripathi, B. N. (1993). Hematological and biochemical alterations in Hill bulls infected with *Clostridium Chauvoei*.*Acta Vet.* 62: 89-94.

* * * * * * * *