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Review Article

A Case Report of Splenomegaly Due to Chronic Salmonellosis in a Three Months Old Holstein Calf

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ABSTRACT

Objective: Salmonellosis is a bacterial disease with a rising prevalence in the cattle industry. It is most common in dairy calves one to ten weeks of age. Salmonellosis has a serious economic impact on the cattle industry worldwide. **Methods:** In May 2013, a three months old male Holstein calf with the history of lateral recumbency was referred to veterinary hospital with severe depression, cachexia, mild yellowish of sclera, bradypnea, moderate dehydration and watery feces with mucous. Blood, CSF and peritoneal fluid samples were taken and referred to laboratory. **Results:** In bacteriologic evaluation, serogroup D of Salmonella were isolated from all samples. Histopathologic examination showed mild fatty change with multiple typhoid nodules, hyperemia and necrosis in liver and severe hyperemia in spleen. According to clinical, post mortem examination and laboratory results, the diagnosis of chronic salmonellosis was confirmed.

1. INTRODUCTION

Calves may be infected with a diverse array of salmonella serotypes within hours of birth (Anderson et al., 2001). The subsequent manifestations of disease are variable, reflecting the balance between host immunity, pathogen dose, and virulence. Neonatal diseases outbreaks are frequently observed in calves between 4 and 28 days of age (Anderson et al., 2001). However, older calves may be affected. Clinical signs include fever, dull mentation, loss of appetite, and scours that often contain increased mucus and may contain blood (Wray and Davies, 2000). Dehydration combined with acid-base and electrolyte derangements, contribute to weakness and depressed mentation in acutely infected calves. Calves surviving the acute phase of the disease often go through a cachectic period during recovery. The severity and duration of clinical disease in calves is related to virulence of the

strain, challenge dose, calf age, efficiency of passive immunity, nutrition, and degree of environmental stress (Mohler et al., 2006; Mohler et al., 2008). Salmonella enteritica serovar Typhimurium is commonly incriminated in outbreaks of enteric disease in calves less than 2 months of age (Tsolis et al., 1999; Wray et al., 1987). In contrast, Senteritica serovar Dublin is associated with disease of similar frequencies in young and adult cattle (Sojka and Field, 1970). Fecal-oral transmission is the primary route of infection. However, other reported routes include the mucosa of the upper respiratory tract and conjunctiva. Following ingestion, salmonellae colonize the intestinal tract and invade through M-cells (which are specialized cells in intestinal lymphoid tissues), enterocytes, and tonsillar lymphoid tissue (Wray and Davies, 2000). Although pathologists associate salmonellosis with enteric lesions, such as diphtheritic membranes, peracute infections often have

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few pathologic findings (Wray and Davies, 2000). Lesions observed with peracute salmonellosis include pulmonary congestion and submucosal and subserosal petechial hemorrhages of multiple organs, including the intestines and heart. Acute salmonellosis is typically characterized by diffuse catarrhal hemorrhagic enteritis with diffuse fibrinonecrotic ileotyphlocolitis. The intestinal contents are watery, malodorous, and may contain mucous or whole blood. Inflammation of the gallbladder is common, and histopathological evidence of fibrinous cholecystitis is considered pathognomonic for acute enteric salmonellosis in calves. Enlargement edema and hemorrhage are commonly observed in the mesenteric lymph nodes (McGavin, 2001). Abomasal mucosal erosions may be observed, particularly with *salmonella dublin* infection. Chronic salmonellosis may result in thickening of the intestinal wall with a yellow-gray necrotic material overlying a red mucosal surface. In some cases the necropsy findings may include splenomegaly and pinpoint white foci in the liver (paratyphoid nodules) (Radostits et al., 2007).

2. CASE DESCRIPTION

In May 2013, a three months old male Holstein calf with the history of lateral recumbency was referred to veterinary hospital with severe depression, cachexia, mild yellowish of sclera, bradypnea, moderate dehydration and watery feces with mucous. Blood, CSF and peritoneal fluid samples were taken and referred to laboratory. For rehydration, fluid therapy was begun with normal saline after about five minutes the calf died due to severity of the disease and the carcass were dissected immediately. Most evident signs in necropsy were excess of peritoneal fluid, enlargement of mesenteric lymph nodes, discoloration of liver into yellowish, gall bladder enlargement with bile clots, hyperemia of kidneys and severe splenomegaly (fig.1,2).



Figures 1. Severe splenomegaly, Ulcerated gall bladder and enlargement with bile clots, hyperemia of kidneys.



Figures 2. Severe splenomegaly, Ulcerated gall bladder and enlargement with bile clots, hyperemia of kidneys.

In bacteriologic evaluation, serogroup D of *Salmonella* were isolated from all samples. Histopathologic examination of tissue samples showed mild fatty change with multiple typhoid nodules, hyperemia and necrosis in liver, hyperemia of kidneys, mild edema of lymph nodes, and severe hyperemia in spleen and diffuse acute interstitial pneumonia. According to clinical, post mortem examination and laboratory results, the diagnosis of chronic salmonellosis was confirmed.

3. DISCUSSION

Salmonellae are endemic on most large intensive farms and salmonellosis is a common cause of neonatal morbidity and mortality. Disease and mortality usually reflect a variety of management events and environmental stressors that contribute to compromised host immunity and increased pathogen exposure. The diversity of *salmonella* serovars present on farms, and the potential for different serovars to possess different virulence factors, requires the implementation of broad prophylactic strategies that are efficacious for all *salmonellae*. Calf immunity is optimized by good colostrums management and provision of adequate nutrition and a comfortable environment. *Salmonella* serotype-specific immunity can also be enhanced through vaccination. Environmental management requires a focus on minimizing the bacterial challenge to neonates via contaminated colostrums, milk, equipment, personnel, and feces. Strategies to promote host immunity and minimize pathogen exposure at the farm level reflect an exercise in risk management. The benefits include a reduction in disease incidence and mortality, reduced drug and labor costs, and improved growth rates (Radostits et al., 2007).

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