

Enterotoxemia in a Cow due to *Clostridium perfringens* Type A

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Abstract: Enterotoxemia was diagnosed in a 3-year-old cow that died suddenly. Lesions of hemorrhagic enteritis were seen in the small intestine during necropsy. Lethal alpha toxin of *Clostridium perfringens* was detected in the intestinal contents by toxin neutralization test. *C. perfringens* type A was isolated from the intestinal contents and typed by multiplex PCR. Enterotoxemia should be considered as a cause of sudden death in cattle in Turkey.

Key Words: Enterotoxemia, *Clostridium perfringens* type A, cattle, enteritis

Bir İnekte *Clostridium perfringens* Tip A'dan Kaynaklanan Enterotoksemi Olgusu

Özet: Bu çalışmada 3 yaşında aniden ölen bir inekte enterotoksemi teşhis edildi. Nekropside ince bağırsaklarda hemorajik enteritis tablosu görüldü. İnce bağırsak içeriğinde *Clostridium perfringens*'in öldürücü alfa toksini saptandı. Etken multiplex PCR ile *C. perfringens* type A olarak tiplendirildi. Türkiye'de sığırlarda görülen ani ölüm olgularında enterotoksemi hastalığı göz önünde bulundurulmalıdır.

Anahtar Sözcükler: Enterotoksemi, *Clostridium perfringens* tip A, sığır, enteritis

Introduction

Clostridium perfringens is a Gram-positive, sporulated, anaerobic bacterium that is one of the most important causes of clostridial enteric disease in domestic animals. *C. perfringens* is classified into 5 types (types A, B, C, D, and E) on the basis of the production of 4 major lethal toxins: alpha (α), beta (β), epsilon (ϵ), and iota (ι) (1). *C. perfringens* type A, C, and D cause enterotoxemia in cattle (1-3). Enterotoxemia in cattle is characterized by a high fatality rate, sudden death, and lesions of hemorrhagic enteritis of the small intestine (2,4). Jejunal hemorrhage syndrome caused by *C. perfringens* type A has been reported in cattle in other countries (5,6). Enterotoxemia is a common disease in small ruminants in Turkey (7,8); however, there is little information about bovine enterotoxemia. To the best of the authors' knowledge, enterotoxemia has not been recently reported in adult cattle in Turkey.

Case History

A 3-year-old dairy cow died suddenly and her internal organs (small intestine, liver, lungs, heart, spleen, and kidneys) were submitted to the Department of Microbiology, Elazığ Veterinary Control and Research Institute for further diagnostic investigation within 2 h. Information about vaccination, treatment, and clinical findings was not available. During necropsy, the most striking finding was hemorrhagic enteritis with intraluminal hemorrhage and ulceration. Intestinal contents were centrifuged and the supernatant was injected intraperitoneally into mice along with the antisera of *C. perfringens* toxins. A total of 10 mice were used to detect α , β , ϵ , and ι toxins. The type of toxin was identified by the protection of mice from death by the specific antisera.

Intestinal contents were cultured on a Perfringens agar base (TSC Agar; Oxoid) containing egg yolk emulsion (SR47; Oxoid) and selective supplement (R88; Oxoid).

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The agar plates were incubated in an anaerobic chamber at 37 °C for 24 h. In addition, tissue samples from organs were cultured onto blood agar plates, which were incubated under aerobic and anaerobic conditions. The suspected colonies were identified by characteristic colony morphology, Gram staining and biochemical tests. The isolate was cultured on blood agar. DNA samples extracted from colonies grown on blood agar were amplified by multiplex PCR using primers of α , β , ϵ , and ι toxin genes (9,10).

Results and Discussion

C. perfringens type A and its lethal α toxin were isolated from the cow's intestinal contents. *C. perfringens* type A is commonly recovered from the intestinal tracts of animals, while other types, B, C, D, and E, are less common in the intestinal tracts of animals (1). The organism reproduces at a high rate and produces toxins, especially when there is a sudden change in diet. It is always possible to isolate *C. perfringens* type A from

intestinal contents and therefore the detection of lethal toxins in intestinal contents is important for the diagnosis of enterotoxemia. *C. perfringens* type A produces α toxin, which is hemolytic, necrotizing, and potentially lethal (1). β_2 toxin produced by *C. perfringens* was described in 2002 (2). *C. perfringens* type A also produces β_2 toxin, which has a synergistic role with α toxin in the development of hemorrhagic lesions in the small intestine in cases of bovine enterotoxemia (2). In the present case, the presence of β_2 was not investigated. More studies are warranted to understand the role of β_2 toxin in enterotoxemia cases caused by *C. perfringens* type A.

C. perfringens type A has been suggested as a cause of jejunal hemorrhage syndrome in beef and dairy cattle in Canada (5,6). *C. perfringens* type A was isolated from calves with enterotoxemia in Belgium and from calves with tympani, abomasitis, and abomasal ulceration in the western United States (1,2).

This case report provides evidence that *C. perfringens* type A infection can cause the sudden death of cattle in Turkey.

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