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Case Report

THE FIRST *BUXTONELLA SULCATA* INFECTION IN A HEIFER CALF IN HATAY PROVINCE

(Buxtonellasis in a heifer calf)

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Abstract: Parasitic diseases are one of the major problem in livestock animals, and also protozoan diseases have a great importance in parasitic disease in ruminants. Different intestinal protozoa are responsible for causing diarrhea and even death in neonatal and young bovine calves. *Buxtonella sulcata* (*B. sulcata*) may be probable causative agent of diarrhea which has unknown etiology in cattle. Herewith, presentation of the successfully treatment of diarrhea related with *B. sulcata* in a heifer calf in Hatay province was aimed in this case report.

Keywords: *Buxtonella sulcata*, Calf, Diarrhea, Treatment.

INTRODUCTION

Parasitic diseases are one of the major problem in livestock animals, and are caused by climatic and bad managing conditions, frequently exposure to parasites and lack of knowledge of livestock farmers about the transmission of parasites (Bilal et al., 2009; Roy et al., 2011). It is informed that protozoan diseases have a great importance in parasitic disease in ruminants (Roy et al., 2011).

Different intestinal protozoa (*Cryptosporidium*, *Eimeria*.) are responsible for causing diarrhea and even death in neonatal and young bovine calves (Soulsby, 1982; Urquhart et al., 2003). One of these protozoons is *Buxtonella sulcata (B. sulcata)* which considered as an opportunistic ciliate protozoan inhabiting colon of bovines and it was first reported and named by Jameson (1926) from caecum of the cattle (Levine, 1985; Bhatia, 2000). *Buxtonella sulcata,* morphologically similar to *Balantidium coli,* inhabits in gastrointestinal (GI) tracts of ruminants (Jameson, 1926). According to Lubinsky (1957), *Balantidium* reported in cattle were actually *B. sulcata* (Lubinsky, 1957; Ganai et al., 2015; Kumar et al., 2017). Herewith, it was aimed to present of the successfully treatment of diarrhea related with *B. sulcata* in a heifer calf in Hatay province.

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CASE REPORT

Six-month-old 100 kg body weight heifer calf which had previously been tried to treat by local veterinarian with some medications for 20 days (Fig. 1), was presented to clinic with mucoid stool (Fig. 2), loss of appetite, fever (40.2 °C), and no clinical healing. In the physical examination, mild dehydration, pale mucous membranes were detected. Although these abnormalities were determined in the physical examination, any abnormalities were not detected in the haematological analysis. Faecal pH was detected as 6-7 by using the quick commercial pH strip. Also, for parasitological analysis, some stool samples were collected directly from rectum into the sterile plastic container with personal safety precautions against the risk of contamination and was immediately brought for coprological examination to laboratory of parasitology department. In per gram of feces, a total of 150 *Buxtonella* trophozoites were identified on native faecal examination by using glass slide covered with cover, and were seen with low power magnification (10x and 40x) of microscope (Olympus CX21) (Fig. 3-4). Besides, cysts of *Buxtonella* were also detected in stool samples kept for a few minutes. Any parasitic agents were not detected except *Buxtonella* in feces samples. Identification of *B. sulcata* was performed according to Lubinsky (1957). Treatment protocol (Hasheminasab et al., 2015) was created for heifer calf after all of examinations accomplished (Table 1). Ten days later, all examinations were performed at the end of treatment in breeder's barn. In the physical examination, it was detected that the calf was clearly recovered. In post-treatment faecal examination, a total of 8 *Buxtonella* trophozoites were detected. For the exact treatment, it was recommended to continue the treatment to the breeder for a few days.

Table 1. Treatment protocol of heifer calf for *B. sulcata*

Oxytetracycline, 40 mg kg^{-1} BW per day	(Geosol %20® Vetaş®, Istanbul) 20gr, po, sid for 10 days
Flunixine meglumine, 2 mg kg^{-1} BW	(Fulimed®Alke®, Istanbul) 4ml, im, sid for 3 days
Commercial ruminal stimulant	(Vetarumex® Vetaş®, Istanbul) 62gr, po, sid for 3 days
Ascorbic acid, 6 mg kg^{-1} BW	(Ascorvet® Vetaş®, Istanbul) 3ml, im, sid for 10 days
Vitamin B1 and B6, 5.5 mg kg^{-1} BW	(Nervit Kompoze®, Vetaş®, Istanbul) 5ml, im, sid, for 10 days

Figure 1. A Six-month-old heifer calf infected by *B. sulcata.*
B: Before the treatment; **A:** After the treatment

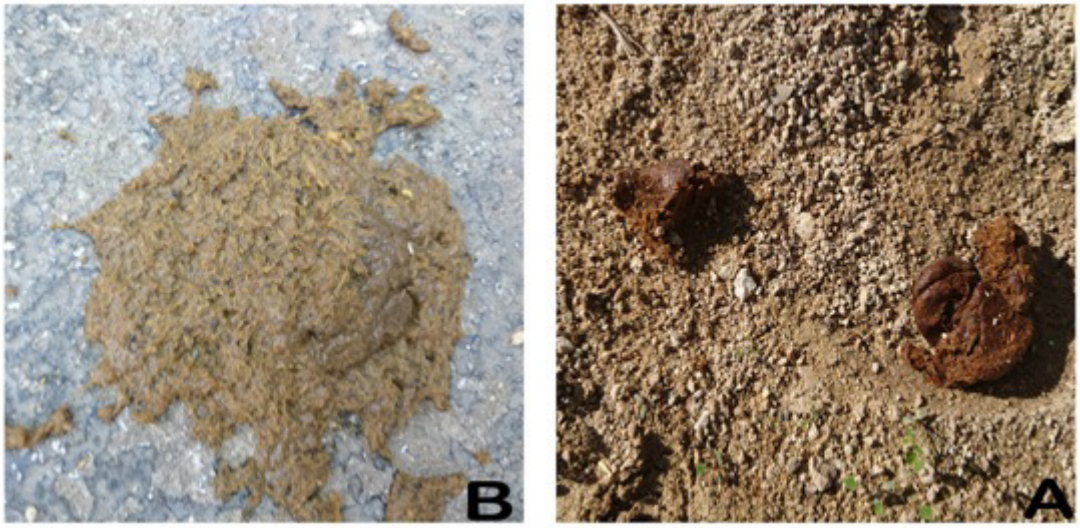

Figure 2. Clinical appearance of stool.
B: Before the treatment; **A:** After the treatment

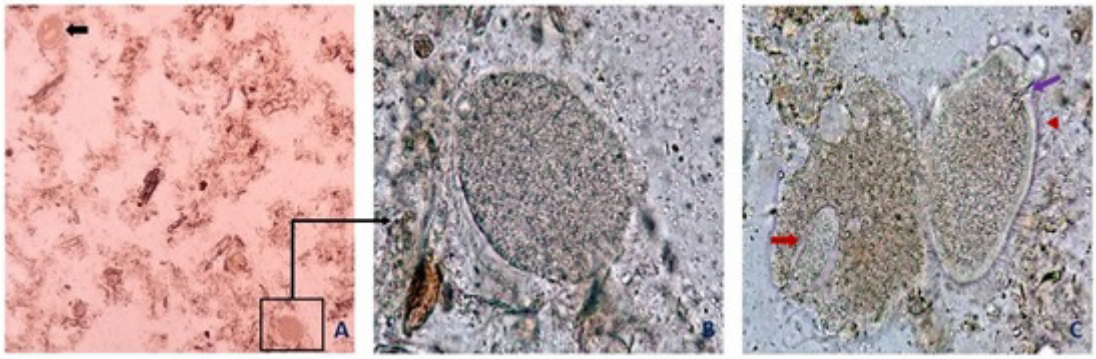

Figure 3. Microscopic appearances of *B. sulcata* trophozoites.
A: 10x magnification of microscope, **arrow:** *B. sulcata* trophozoite; **B, C:** 40x magnification of microscope, **red arrow:** macronucleus shaped as kidney, **purple arrow:** cilia-lined peristome, **red arrow head:** prominent cilia.

Figure 4. Differential diagnosis (Pomajbíková et al., 2013) of *B. sulcata* trophozoites typical sulcus by 10x magnification of microscope
Black lined red arrow: Typical sulcus

DISCUSSION

It is known that some ciliates host in the alimentary tract of ruminants, but their acts has not been exactly explained (Tomczuk et al., 2005; Tung et al., 2012). There is a common idea that the protozoans in the gastrointestinal tract are participated in the process of digestion of plant feeds as a commensal organism (Tomczuk et al., 2005). But, high ratio of infection in ruminants with *B. sulcata* and changes that it causes, indicates that in some cases this ciliate may be accountable for the incidence and condensation of diarrhea symptoms (Tomczuk et al., 2005; Omeragić and Crnkić, 2015; Maharana et al., 2016). In the previously conducted studies in cattle related in diarrhea, although *B. sulcata* was commonly identified in faecal samples, infections caused by *B. sulcata* is not commonly occurred in the neonatal and young calves contrary to adult cattle (Maharana et al., 2016). But, the clinical significance of buxtonellosis in cattle is uncertain and, therefore, controversial opinions related to its pathogenicity still have. Previously studies performed in different part of world such as India, Taiwan, Poland and Iraq showed a wide differences in the infection percentage and ranged

between 11 - 42.85% in calves (Tomczuk et al., 2005; Al-Saffar et al., 2013; Huang et al., 2014; Maharana et al., 2016). But Omeragić and Crnkić (2015) was found higher percentage rate as 57.1% in calves infected with *B. sulcata* contrary to adults. Like presented case report, in rainy season, *B. sulcata* infection can be more seen rather than other seasons (Hasheminasab et al., 2015; Maharana et al., 2016), and sheltering of cattle in muddy floor tends to infection (Hasheminasab et al., 2015). Similar to presented case report, it is reported that diarrhea is fewer seen in calves if the number of cysts less than 500 cysts in 1 g (CPG) of feces (Kočiš et al., 2014; Omeragić and Crnkić, 2015). According to previously studies (Al-Saffar et al., 2010; Al-Saffar et al., 2013; Sultan et al., 2013; Huang et al., 2014; Kočiš et al., 2014; Maharana et al., 2016), this diversity in the percentage of infection with *B. sulcata* might be related in many factors including management, environmental and immunological factors of the infected animals. And, that *B. sulcata* appears to be an almost cosmopolitan ciliate was concluded.

It is expressed that the changing of pH values in favour of acidity in large intestines supports the increasing of the parasites as well as the increment in cytotoxic actions on the tissues of the host (Tomczuk et al., 2005). Similar to Tomczuk et al (2005), faecal pH was found between 6-7 in this case, and it was considered that diarrhea might be caused due to multiplying of *B. sulcata* trophozoites, and cytotoxic effects of acidity on colon.

Buxtonella sulcata is very similar to *Balantidium coli* settled in pigs and humans alimentary tract (Levine, 1985; Tomczuk et al., 2005). Some medical treatment modalities were successfully applied for *B. sulcata* and *B. coli* infections in cattle, previously (Bilal et al., 2009; Hasheminasab et al., 2015; Jamil et al., 2015). About the treatment of diarrhea related to *B. sulcata*, it is emphasized that parenteral treatment with electrolytes and dextrose solutions, vitamin C and vitamin B administrations, and a balanced dietary supplement were be effective (Tomczuk et al., 2005; Omeragić and Crnkić, 2015). Besides it is also informed that oxytetracycline administration against to *B. sulcata* infection is efficient (Hasheminasab et al., 2015). In this case, treatment protocol (Table 1) was created in the light of previous studies (Bilal et al., 2009; Hasheminasab et al., 2015; Jamil et al., 2015). Although nitroimidazoles were detected as effective treatment choice for ciliates (Bilal et al., 2009; Jamil et al., 2015), oxytetracycline (40 mg kg-1 BW, day) was found more effective in Buxtonellosis (Hasheminasab et al., 2015), and was selected for the treatment of this case due to legal restrictions in Turkey. A little of *B. sulcata* trophozoites were determined on post-

treatment stool examination. Hence, it is considered that the heifer calf was treated, successfully.

In conclusion, in the calves with diarrhea, even if potential causative infectious agents may be bacterial or viral, *B. sulcata* may be also considered to be a factor for persistent diarrhea, and oxytetracycline can be chosen for antibacterial and antiprotozoal agent under the legal restrictions. In addition, ration arrangement should be planned against to acidity increment in the gastrointestinal tract of cattle.

REFERENCES

[1] Al-Saffar, TM, Al-Taee, AF, Hadi, E and Suleiman, E **(2013)**. Diagnostic study of *Buxtonella sulcata* in buffaloes in Mosul, Iraq. *Assiut Vet Med J*. **59(136)**: 5-10.

[2] Al-Saffar, TM, Suliman, EG and Al-Bakri, HS **(2010)**. Prevalence of intestinal ciliate *Buxtonella sulcata* in cattle in Mosul. *Iraqi J Vet Sci*. **24(1)**: 27-30.

[3] Bhatia, BB **(2000)**. Textbook of veterinary protozoology. **1st ed**. Indian Council of Agricultural Research, Pusa. PP 336–337.

[4] Bilal, CQ, Khan MS, Avais M, Ijaz M and Khan JA **(2009)**. Prevalence and chemotherapy of *Balantidium coli* in cattle in the River Ravi region, Lahore (Pakistan). *Vet Parasitol.* **163**: 15-17.

[5] Ganai, A, Parveen, S, Kaur, D, Katoch, R, Yadav, A, Godara, R and Ahamed, I **(2015)**. Incidence of *Buxtonella sulcata* in bovines in RS Pura, Jammu. *J Parasit Dis*. **39(3)**: 446-447.

[6] Hasheminasab, SS, Darbandi, MS, Talvar, HM, Maghsood, H and Khalili, S **(2015)**. Chemotherapy of *Buxtonella sulcata* in cattle in Sanandj, Iran. *Int. J. Med.* **3**: 118-119.

[7] Huang, CC, Wang, LC, Pan, CH, Yang, CH and Lai, CH **(2014)**. Investigation of gastrointestinal parasites of dairy cattle around Taiwan. *J Microbiol Immunol Infect*. **47(1)**: 70-74.

[8] Jameson, PA **(1926)**. A ciliate, *Buxtonella sulcata*, n.g., n.sp., from the caecum of the cattle. *Parasitol*. **18(2)**: 182-186.

[9] Jamil, M, Ijaz, M and Mudassır Ali, M **(2015)**. Prevalence, hematology and treatment of *Balantidium coli* among small ruminants in and around Lahore, Pakistan. *Kafkas Univ Vet Fak Derg*. **21(1)**: 123-126.

[10] Kočiš, J, Ilić, T, Becskei, Z, Radisavljević, K and Dimitrijević, S **(2014)**. Buxtonellosis and coccidiosis of cattles in Northern Serbia. *Acta Parasitol*. **60(1)**: 158-163.

[11] Kumar, B, Maharana, BR, Prashad, A, Joseph, JP and Patel, BR **(2017)**. Incidence of *Buxtonella sulcata* in Jaffrabadi buffaloes of south-western Gujarat, India. *Buffalo Bull*. **36(4)**: 623-628.

[12] Levine, ND **(1985)**. Veterinary Protozoology. Lowa State University, Ames, IA. PP 414.

[13] Lubinsky, G **(1957)**. *Buxtonella sulcata* (Ciliata: Holotricha), a parasite of *Bos indicus* and *Bubalus bubalus* in the Western Punjab. *Can J Zool*. **35(4)**: 545-548.

[14] Maharana, BR, Kumar, B, Sudhakar, NR, Behera, SK and Patbandha, TK **(2016)**. Prevalence of gastrointestinal parasites in bovines in and around Junagadh (Gujarat). *J Parasit Dis*. **40(4)**: 1174-1178.

[15] Omeragić, J and Crnkić, Ć **(2015)**. Diarrhoea in cattle caused by *Buxtonella sulcata* in Sarajevo area. *Veterinaria*. **64(2)**: 50-54.

[16] Pomajbíková, K, Oborník, M, Horák, A, Petrželková, KJ, Grim, JN, Levecke, B and Modrý, D **(2013)**. Novel insights into the genetic diversity of Balantidium and Balantidium-like cyst-forming ciliates. *PLoS Negl Trop Dis*. **7(3)**: e2140.

[17] Roy, BC, Mondal, MMH, Talukder, MH and Majumder, S **(2011)**. Prevalence of *Balantidium coli* in buffaloes at different areas of Mymensingh. *J Bangladesh Agril Univ*, **9(1)**: 67–72.

[18] Soulsby, EJL **(1982)**. Helminths, arthropods and protozoa of domesticated animals, **7th ed**. ELBS and Bailliere Tindal, London.

[19] Sultan, K, Khalafalla, RE and Elseify, MA **(2013)**. Preliminary investigation on *Buxtonella sulcata* (Jameson, 1926) (Ciliphora: Trichostomatidae) in Egyptian Ruminants. *BS Vet Med J*. **22**: 91-94.

[20] Tomczuk, K, Kurek, L, Stec, A, Studzinska, M and Mochol, J **(2005)**. Incidence and clinical aspects of colon ciliate *Buxtonella sulcata* infection in cattle. *Bull Vet Inst Pulawy*. **49(1)**: 29-33.

[21] Tung, KC, Huang, CC, Pan, CH, Yang, CH and Lai, CH **(2012)**. Prevalence of gastrointestinal parasites in yellow cattle between Taiwan and its Offshore Islands. *Thai J Vet Med*. **42(2)**: 220.

[22] Urquhart, GM, Armour, J, Duncan, JL, Dunn, AM and Jennings FW **(2003)** Veterinary Parasitology. **2nd ed**. Blackwell Science LTD, Osney Mead 276. PP 209-250.