

Prevalence of *Buxtonella sulcata* in Sheep and Supplied drinking water

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Summary

Buxtonella sulcata multiplication in lumen of the intestinal tract lead to Diarrhea. A total of 120 sheep faecal samples were collected (23 males and 97 females) with ages ranged from less than 1 year to 3 years. Also, 11 sheep drinking (river) water from Al-Suwaira city, Wasit governorate, for the period extended from September 2015 to the end February 2016. Laboratory methods used were direct wet film and iodine and Giemsa staining to detect the cysts and trophozoite of the parasite . Results recorded (30.83%) infection rate of *Buxtonella sulcate* in sheep, while the contamination rate of water (45.45%). Females are infected more than males which reach (35.13%) (13.04%) respectively. The highest infection rate (44.00%) showed in age group 2-3 years, while, the lowest (21.42%) found in age group (> 2). %), with significant difference ($p < 0.05$) between ages and genus. Our conclusion is contamination of water acts as a good source for the spread of infection with *Buxtonella sulcate* .

Keywords: *Buxtonella sulcata*, cyst, trophozoites, sheep.

Introduction

Buxtonella sulcata is a commensal protozoan of the alimentary tract of ruminants (1). It is very similar to *Balantidium coli* that usually infect pig and human (2 and 3) .This parasite belongs to Kingdom: Protozoa, Phylum: Ciliophora, Class: Kinetofragminophorea, Order: Trichostomatorida, Family: Pycnotrichidae, Genus: Buxtonella. The trophozoites are rectangular, with diameters of 107.8-137.2 x 49-102.9, with a median of 121.25 X 94.06 um while the cysts are frequently circular to oval, 68.6-107.8 µm in length, with an average of 74.5 µm) (4) .

Diarrhea in animals is caused by several agents. They mainly include bacterial, viral and intestinal protozoa such as *Cryptosporidium* spp., *Eimeria* spp. and *Giardia* species (5). Every case of diarrhea requires a prompt diagnosis and therapy. To date, *Buxtonella sulcata* has been not fully documented as a causative agent for long-standing diarrhea which is mostly ended by death in neonates (1).

In Iraq, (6) is the first who documented infection of cow with *B. sulcata* in Al-Qadissiyah province. In Baghdad province, Al-Zubaidi and Al-Mayah stated (43.2%) infection rate with *B. sulcata* in neonatal and young calves (7), while Al-Seady *et al.* (8)

recorded infection rate (24.5%) in lambs. Other researchers (9) recorded infection rate (35%) with *Buxtonella sulcata* in buffaloes. This study was undertaken to detect the cysts and trophozoites of *B. sulcata* in both sheep faecal samples and supplied drinking water as a source of infection in Wasit province, Iraq.

Materials and Methods

One hundred twenty sheep faecal samples and 11 river water samples from Al-Suwaira city, Wasit province during the period from 1st of September 2015 to the end February 2016. Sheep were 23 male and 97 female with age ranging from less than 1 year up to 3years. Approximately five grams of fecal sample was taken directly from rectum of each animal, put in clean plastic containers with information age, sex and sampling data. Made direct wet film by Place a drop of sample on the glass slide and cover with a cover slide and Giemsa staining were used After the sample has been prepared with methanol to detect cyst and trophozoite of *B. sulcata* in both faecal and drinking water samples under power magnification (40X and 100X) (10 and 11). Identification of *B. sulcata* cysts and trophozoites was based on specific morphological feature (7). A package of SPSS-16 using Chi square to compare the rate

of infection between gender and age of sheep was conducted. Statistical probability of $p < 0.05$ was considered significant (12).

Results and Discussion

Microscopical identification of Direct smears from fecal and water samples or smears stained with Giemsa and iodine stain revealed *B. sulcata* trophozoites as oval body entirely covered by clear long cilia with a kidney shape macronucleus and a smaller micronucleus. The feature grooves, cytopyge and cytostome placed at the posterior-ventral (Fig. 1 and 2). Cyst of *B. sulcata* observed became spherical in shape, with clear cyst wall (Fig. 3). These findings were coincided with the features of *B. sulcata* described (6 and 13). Microscopical examination of 120 sheep fecal samples and 11 water sample revealed that total infection rate with *B. sulcata* was 30.83 and 45.45%, respectively (Table, 1). This considerable high contamination rate of river drinking water predicts it as the main source of infection for sheep consumed it. Almost similar findings were reported in previous studies (9, 14) carried out on livestock in Mosul (24.16%) and Baghdad (24.5%) and become as high as 43.2% in neonatal and younger calves (7, 9). Globally, *B. sulcata* was recorded in Korea (13), Iraq (14), England (15), Poland (16), Denmark (17), Pakistan (18), Japan (19), Turkey (20), Nepal (21), Thailand (22), North-America (23), Costa Rica (24) and Egypt (25). A very wide variations in the prevalence of infections with *B. sulcata* has been recorded. This variation is mainly attributed to geographical regions, environment and sanitation (4 and 14).

The infection rate showed significant difference ($P < 0.05$) between male (13.04%) and female (35.13%) (Table, 2). Also (7 and 14) confirmed that no tremendous difference between genders. Additionally, (10) stated that there was no big distinction in infection rate between sex as these ratios had been ranging between 23.47% and 25.88%. This matter is very likely to be obtained because animals are grazing and exposed together to same environmental conditions. On contrary, (21)

reported higher significant incidence in male (5.52%) than female (3.23%) cattle. In contrast, our exaggerated significance in females might be attributed to the larger sample size of the females.

Sheep older than 2 years showed significant ($P < 0.05$) infection rate (44.00%) with *B. sulcata* than in sheep under 2 year (21.42%) (Table, 3). This result is in accordance with (14) who recorded infection rate (35.29%) at 2-7 years old higher than at 3-8 months lambs (11.36%). Similarly, (7) referred to significantly ($P < 0.05$) higher infection rate in older ages. The reason for lower infection rate in younger lambs is mainly attributed to the presence of maternal antibodies with colostrums they suckled in their early days after birth (26). In conclusion the contamination of river water is incriminated in *B. sulcata* in lambs. Females are more prone to infection more susceptible age is 2-3 years.

Table, 1: Total rate of infection with *B. sulcata* in sheep and drinking water.

Sample	No. of Samples	No. Positive	%
Sheep	120	37	30.83
Drinking water sheep	11	5	45.45

Table, 2: Infection rate with *B. sulcata* according to sex in sheep.

Sex	No. of Samples	No. Positive	%
Male	23	3	13.04 ^a
Female	97	34	35.13 ^b
Total	120	37	30.83

Different superscripts within same column refer to significant difference at $P < 0.05$.

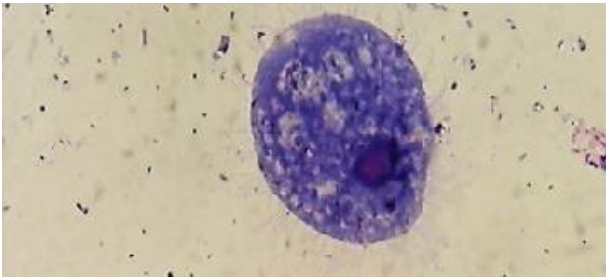
Table, 3: Prevalence of *B. sulcata* according to the age groups in sheep.

Age group (year)	No. of Samples	No. Positive	%
>2	70	15	21.42 ^a
2-3	50	22	44.00 ^b
Total	120	37	30.83

Different superscripts within same column refer to significant difference at $P < 0.05$.



Figure,1: Trophozoite of *B. sulcata* in sheep drinking water in direct wet film (100x).



Figure, 2: Trophozoite of *B. sulcata* in sheep faecal sample stained with Giemsa (100x).



Figure, 3: Cyst of *B. sulcata* in sheep fecal sample in direct wet film (100x).

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انتشار طفيلي *Buxtonella sulcata* في الاغنام ومياه الشرب المجهزة

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الخلاصة

يؤدي تضاعف *Buxtonella sulcata* في التجويف الأمعاء إلى الإسهال. تم جمع 120 عينة من براز الأغنام (23 ذكور و 97 إناث) تتراوح أعمارهم بين أقل من سنة إلى 3 سنوات. كذلك ، 11 عينة من مياه شرب الاغنام (النهر) من مدينة الصويرة ، محافظة واسط ، للفترة الممتدة من شهر ايلول 2015 إلى نهاية شباط 2016. استخدمت الطرق المختبرية كالطريقة المباشرة الرطبة وصبغة اليود والكمزا للكشف عن الاكياس والطور الخضري للطفيلي. سجلت النتائج (30.83%) معدل الإصابة *Buxtonella sulcata* في الأغنام ، في حين أن معدل تلوث المياه (45.45%). أظهرت الإناث أعلى نسبة إصابة من الذكور والتي تصل إلى (35.13%) (13.04%) على التوالي. وأظهرت أعلى نسبة إصابة (44.00%) في الفئة العمرية 2-3 سنوات ، في حين أن أدنى معدل (21.42%) وجدت في الفئة العمرية (>2%) ، مع اختلاف كبير (P < 0.05) بين الأعمار والجنس. استنتج ان تلوث المياه يعد مصدر جيد لانتشار الاصابة بطفيلي *Buxtonella sulcata*.

الكلمات المفتاحية: طفيلي *Buxtonella sulcata* ، الكيس، الطور الخضري، الاغنام .