Iraqi Journal of Veterinary Sciences

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Some physiological and biochemical criteria in the local buffalo infected with stomach and intestinal worms in the city of Samarra

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Article information

Article history:
Received December 13, 2020
Accepted May 26, 2021
Available online October 24, 2021

Keywords:
Stomach worms
Intestinal worms
Local buffalo
Samarra city

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Abstract

The study included 70 local buffalo animals (between six months and two years), 50 buffalo were confirmed to be infected with gastrointestinal worms and 20 were considering as a control group. The results of the feces tests showed that local buffalo was infected with different types of worms. It was observed that worm incidence was as follows: 85% Nematodes, 10% Cestode and 5% Trematode. The results of the study showed a significant decrease in the total number of red blood cells, hemoglobin concentration, packed cell volume, total number of platelets, and significant increase was observed in the total number of white blood cells and was most likely caused by a significant increase in the rates of eosinophil's. Also the results showed that the effect of worms on some biochemical parameters was significant decrease in total protein concentration, albumin, and globulin. So, it could be concluding that buffalo spread in the city of Samarra suffers from parasitic diseases that affect the health of animals, through change the study criteria, so a therapeutic program must be adopted by cattle breeders to control parasitic diseases and thus improve the health and production of animals.

DOI: 10.33899/ijvs.2021.129140.1629,

Introduction

Buffalo is an important agricultural animal that domesticate by human since ancient times in the areas of the Nile Valley and Mesopotamia between 2000 and 3000 years BC. Today buffaloes exist in many countries of the world such as Southeast Asia, India, China, Pakistan, Iraq, Egypt, Turkey, and in some Latin American countries and Europe, where it is an important source of milk and meat production as well as its use in rice fields in Southeast Asia (1). The buffalo belongs to class: mammalia, order: Ungulata, sup-order: Artiodactyla, sup-class: Ruminant, family: Bovadae, sup-family: Bovina, species: Bos, sup-species: Bubaline belonging to the Carabao Asian (2). The buffalo is infected with many parasitic worms; most important are the worms of the stomach and intestines. The buffalo is exposed to infection with these worms by high ratio due to the nature of its tendency to grazing and swamping in marshes, mud areas and rivers, where the presence of larvae is very common (3), and since the infection of Buffalo by parasitic worms effects on its health and its production, so many researchers around the world and extensively interested in the epidemiology of worms that attack the buffalo and viewed the various factors that play an important role in influencing the validity and distribution of the seasons of the year and the impact of these factors in different phases of cycles Such as eggs and larval stages, as well as environmental factors affecting adult phases and the adaptation of worms to those factors (4). because of the important of Buffalo That infected with stomach and intestine worms and necessity of treatment; Several studies have been carried out on various types of treatments to show their effect on worms in buffalo, including those in Australia, India, where researchers have used many worm repellents and studied their effect on various types of gastrointestinal worms and their resistance

(5). In Iraq, although studies on the infection of gastrointestinal buffalo worms are few, but there are researchers studied these worms in the buffalo, for example in Baghdad, a study was carried out in the epidemiology of some types of worms in the Iraqi buffaloes (6), which three types of the parasites were first recorded in Iraq: *Moniezia benedeni*, *Gastrothylax crumenifier* and, *Carmyerius spatiosus*, while there was a study about pneumonia pathogenicity (bacterial and parasitic) was conducted in the buffalo in southern Iraq (7). There was also a survey of some pathogenic cattle parasites in Basra Governorate, including the Buffalo (8).

This study aims to evaluated the effect of infection of stomach and intestinal worms on some blood and biochemical parameters in the buffalo animals in the city of Samarra.

Materials and methods

The study started from March 2016 and continued until May 2016, during which 70 animals of local buffaloes were tested in different regions of Samarra, ranging from (six months to two years), they included 50 animals infected with stomach and intestinal worms after being confirmed by Clinical markers and laboratory testing and 20 buffalo animals of different ages were clinically matched as control groups. All tests were conducted in the laboratories of the College of Science, University of Baghdad.

Sample collection

Collected samples from 70 local buffalo animals, from different regions of Samarra, Iraq, between March and May 2016. Feces sample were collected directly from rectum of the animals. Blood samples were collected from the jugular vein.

Floating methods

This method was used to detect the eggs of nematode and the tapeworms. 2 g of feces Placed in a 250 mL flask and add 90 ml of saturated sugar solution and after mixing the mixture well, filtered with a strainer and transfer it to 15 ml test tubes Until the surface of the solution was observed above the edges of the tube. The cover of the glass slide was carefully placed and after 30 minutes the cover of the slide was lifted, and placed on a glass slide and examined under a microscope (9).

Sedimentation method

This method was used to detect residual of the worm eggs. 100 ml of water was mixed with 10 g of feces in a 250 mL flask and clear with a strainer. It was transferred to 15 mL test tubes and placed in the centrifuge for 3 minutes. After that the floating was remove and taking part of precipitate and placed on a glass slide with cover slid and examined under a microscope (10).

Blood tests

Using the digital blood count device, the total number of red blood cells, hemoglobin concentration, packed cell volume, total number of platelets, and total and differential white blood cells count were measured (11,12).

Biochemical tests

Determination the total protein level using a ready-kit according to the Burit method, which is based on (11). Albumin was evaluated in the serum using the bromocresol Green Method using the ready kit from Biolabo-Maizy Company -France. The concentration of total globulin was determined by subtracting albumin concentration from the total protein concentration (13).

Statistical analysis

The results were statistically analyzed using SPSS program (Microsoft, Ver. 11.5, USA), mean and the standard error, T-test (14).

Results

The results of this study from the emergence of a number of clinical signs that the infected animals suffered from it such as diarrhea and sometimes mixed with mucus or blood, also showed feces tests showed the infection of buffalo animals in Samarra with many different types of worms, which represented the nematode of the genus *Cooperia*, which appeared at the highest rate of 85%. As well as the infected of buffalo with tapeworm's type *Moniezia expansa* in 10% of cases, and the trematodes worms type *Paramphistomum cervei* by 5%.

Table 1 shows the changes in the blood parameters in the infected buffalo. The total number of red blood cells counts, hemoglobin concentration (Hb), packed cell volume (PCV), platelets counts).

Table 2 shows the changes in the total and differential white blood cells counts in the affected buffalo compared with control animals. Table 3 shows the changes in the biochemical parameters (total protein, albumin, and globulin) in the affected buffalo compared with control animals.

Table 1: Effects of infection of stomach and intestinal worms on some blood parameters

Parameters	Mean ±St error (gm/100 ml)	
	Control group	Infected group
Total protein	7.76±0.80 [a]	5.33±0.83 [b]
Albumen	3.21±0.52 [a]	1.65±0.37 [b]
Globulin	4.55±0.93 [a]	3.68±0.73 [b]

Different characters in the same row mean significant difference at a significant level at P≤0.05.

Table 2: Effects of infection of stomach and intestinal worms on differential white blood cells

Parameters	Mean ±St error	
	Control group	Infected group
WBC 10^6ml	8.99±1.45 [b]	11.373±3.733 [a]
Neutrophils %	44.08±7.9 [a]	43.23±7.27 [a]
Lymphocytes %	48.12±8.97 [a]	46.21±4.24 [a]
Eosinophils %	4.32±1.23 [b]	8.27±2.44 [a]
Monocyte %	3.53±1.06 [a]	3.12±1.88 [a]
Basophils %	0.8±0.76 [a]	0.9±0.65 [a]

Different characters in the same row mean significant difference at a significant level at P≤0.05.

Table 3: Effects of infection of stomach and intestinal worms on some biochemical parameters

Parameters	Mean ±St error	
	Control group	Infected group
RBC (µ*10^6)	7.56±0.72 [a]	5.8±1.34 [b]
Hb (100 mm/gram)	12.7±1.41[a]	9.87±1.18 [b]
PCV (%)	34.7±4.32 [a]	29.7±4.76 [b]
Platelets (µ*$10^{3)}$	327.18±41.26[a]	276.4±36.21[b]

Different characters in the same row mean significant difference at a significant level at P≤0.05.

Discussion

The results of this study revealed that the buffalo animals in Samarra were infected with different genus and types of gastrointestinal worms. These results were consistent with Bachal *et al*. (1), who reported that buffalo infection with these different and varied numbers of gastrointestinal worms may be due to their presence in different grazing areas or near rivers as well as bad management and not properly treated it correctly. The study showed buffalo was infected with termatodes, and this is corresponding with what Al-Baz *et al*. (8), reported whom they refer to that buffaloes spend most of their time in the river and that they graze on the river's edges, where water snails are present numerously, which is the mediated host of these worms.

The study showed that the single infection in buffalo was a more common injury than a double infection, and this is consistent with Raza *et al*. (15), it is believed that the reason of this is due to the presence of large pasture, which leads to the dispersion the eggs of the roundworms and exposed to more individual infection. Also Barbosa (16), reported that the damage caused by worms in the intestinal wall from acute or chronic inflammation or necrosis in the intestinal mucosa leads to increased production of fluid and inflammatory products, including protein loss and decreased absorption of fluid and electrolytes from the intestine causing Exudative diarrhea.

Also Mckellar *et al*. (17) reported that some types of gastrointestinal worms, especially the species of *Ostertagia* genus produce secretions have the ability to increase the intensity of intestinal constriction and increase the electrical efficiency of the muscles of the duodenum and thus increase the speed of passage of food intake during the duodenum and then the intestine as well as the impact on the contraction and relaxation the pyloric sphincter in stomach causing the diarrhea.

Gunathilaka *et al*. (18) reports that *Bunostomum* worms cause severe hemorrhage in the intestinal wall leading to the formation of feces mixed with blood, While other animals showed signs of constipation and colic with abdominal pain and this agree with Gunathilaka *et al*. & Radostits (18,19), reported that worms cause damage to the intestinal mucosa, causing inflammation that results in the appearance of pain signs of the visceral called (vesseral pain), and Robert (20) report that the presence of large numbers of large worms, especially *Toxocara vitulorum*, cause pressure on the walls of the intestine leading to the stimulation of nerve endings, resulting in spasmodic contractions and colic events. Other animals showed decreased appetite, varying degrees of severity and stage of infection.

These results were consistent with Mckellar (21), who confirmed that the difference in appetite of the gastrointestinal worms sometimes may be due to the high level of gastrin hormone, which affects smooth muscle contractions, which inhibition Retina and the rumen so food stays longer and leads to reduce the food intake.

The results showed that the total number of red blood cells, hemoglobin concentration, and packed cell volume were reduced, causing the incidence of normocytic normochromic anemia. Robert (22) indicated that *Mecistocirus digitatus and Haemonchus* genus causes hemorrhagic anemia, Bens (23) reported that adult worms are connected to the stomach mucus to induce little impudence and alienation by means of the teeth in their oral cavity and then inject a substance that acts as an anticoagulant to facilitate the flow of blood causing bleeding for a while to the sites after leaving them. Said " that the worm type *Bunostomum* stick with mucus of intestine causing small wounds and severely bleeding leading to anemia. While the worms type *Oesophagostomum* when their larvae found in the mucus begins to move back to the cavity of the intestine caused hemorrhage in the wall of the cecum and colon (24,25).

The results of the study also indicated an increase in the total number of white blood cells counts and eosinophil's. These results were agreed with Ngole *et al*. (26) and Akhter *et al*. (27), who attributed the cause to increased sensitivity to the parasite protein, which is strange to the body, especially when the larvae penetrate the body tissues during migration and cause decrease in the differential count of lymphocytes and increased in basophils when buffalo infection with *Toxocara vitulorum* worms. The study also

showed the effect of worms on biochemical parameters, where infected animals suffered a decrease in both total protein concentration and albumin. These results were agreed with Alsaad and Muwafag (28), it thought that The reason for this is the worms compete with the host on the protein sources as well as the intestinal dysfunction caused by the worms and their larvae, which leads to low absorption of the protein (29) adds that parasitic worms cause the lack of proteins in different ways, including changing the effectiveness of digestion enzymes and intestinal tract, which effects o41n the absorption of nutrients.

Reported that this type of dysproteinemia is common and occurs either because of albumin loss or failure to manufacture it. In addition, the loss of albumin inhibits its manufacture within the body as its process is very sensitive to the amount of protein absorbed from the intestine (30).

Conclusion

From the obtained results, it could be concluded that buffalo spread in the city of Samarra suffers from parasitic diseases that affect the health of animals.

Acknowledgments

The authors are grateful to the College of Science, University of Baghdad for all helping submitted to achieve this work.

Conflict of interest

The authors declare that, there is no conflict of interest regarding the publication of this paper.

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بعض المعايير الفسيولوجية والكيميوحيوية للجاموس المحلي المصاب بديدان المعدة والأمعاء في مدينة سامراء

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الخلاصة

شملت هذه الدراسة فحص ٧٠ حيواناً من الجاموس المحلي تراوحت أعمارها بين (ستة أشهر إلى سنتين) منها ٥٠ حيواناً تم التأكد بانها مصابة إصابة فعلية بديدان المعدة والأمعاء و ٢٠ حيواناً من الجاموس المحلي السوي سريرياً عدا كمجموعة سيطرة. أوضحت نتائج فحوصات البراز المختلفة إصابة الجاموس المحلي بأنواع مختلفة من الديدان إذ لوحظ أن نسب الإصابة بالديدان كانت كالاتي: الديدان الإسطوانية بنسبة ٨٥% والديدان الشريطية بنسبة ١٠% والديدان المثقبة بنسبة ٥%. كما أظهرت نتائج الدراسة انخفاضاً معنوياً في معدلات العدد الكلي لكريات الدم الحمر وتركيز خضاب الدم وحجم خلايا الدم المرصوصة والعدد الكلي للصفيحات الدموية، مقارنةً بمجموعة حيوانات السيطرة، وكان فقر الدم من النوع ذي الكريات سوية الحجم والصباغ، في حين لوحظت زيادة معنوية في العدد الكلي لخلايا الدم البيض وكان سببها على الأغلب الزيادة المعنوية في معدلات الحمضات. كذلك بينت الدراسة تأثير الديدان على بعض المعايير الكيموحيوية حيث لوحظ انخفاض معنوي في معدلات تركيز البروتين الكلي، والألبومين، والكلوبيولين. لذا، يمكن نستنتج أن الجاموس المنتشر في مدينة سامراء يعاني من أصابته بالأمراض الطفيلية التي تؤثر على صحة الحيوانات لذا يجب اعتماد برنامج علاجي من قبل المربين كي يتم السيطرة على الأمراض الطفيلية ومن ثم تحسين صحة وإنتاج الحيوانات.

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