



Studies on parasites that cause diarrhea in calves

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ABSTRACT

The aim of present study was detection of parasites cause diarrhea in calves, their seasonal prevalence, and comparative studies on efficacy of chemical drugs (Ivermectin) and natural extracts (Artemisia) against those parasites. 208 fecal samples of diarrheic calves 80 suckling calves (41 cow calves + 39 buffalo calves) & 128 weaned calves (88 cow calves + 40 buffalo calves). The samples were taken From (February 2014 to January 2015) from different localities in Munofya Governorate. The results revealed that the incidence of parasitic diarrhea in suckling calves was 60.1% and 58.5% in cow and buffalo respectively. The study indicated that, the weaned diarrhetic cow calves were 68.2% more than that of buffalo 50%. The detected parasites were *Toxocara vitulorum*, *Trichostrongylus spp.*, *Eimeria spp.* and *Cryptosporidium spp.* The seasonal variation of *Toxocara vitulorum* was 45.5% in winter, while the other seasonal variation were 27.3%, 18.2% and 9.09 % in autumn, spring and summer respectively. *Trichostrongylus spp.* was in spring 50 % and 30% in autumn. While it was in winter (20%) and 0% in summer. In case of *Eimeria spp.* it was 13.1 %, 41.3 %, 26 .9 % and 40% in winter, spring, summer and autumn respectively. The study, indicated the seasonal variation of *Cryptosporidium spp.* were 20 % , 30 % ,17.5% and 32% in Winter, Spring, Summer and Autumn, respectively. The results of treatment were, the reduction percentage of eggs per gram (EPG) of nematodes was 100% within first week for Ivermectin, while it was 75% within second week and was still for Artemisia.

Key words: Diarrhea, Calves, Helminthes, protozoa, seasonal variation

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1. Introduction

Calves are taken much and great importance around the world as sources of good quality meat. It is not uncommon to wean calves and then an experience outbreak of respiratory diseases. Likewise sometimes, the weaned calves will break with diarrhea and this can be more difficult to diagnose the cause. Worms and coccidiosis commonly cause diarrheas in recently weaned calves (John, 2009). In gastro-intestinal nematodes (GIN) group of parasites have a remarkable status as the main pathogens causing severe damage to their hosts. Species of nematodes belonging to group of Trichostrongyloids are the major concern because their blood-sucking feeding habits causing anemia that can be so sever resulting in death of the animals (Macedo Barragan et al., (2009). Ivermectin

is one of the widely used ant parasitic agent among cattle (Wjnia et al., 1987). The efficacy of Ivermectin approached 100% in reduction of egg count in fecal samples of goats. *Artemisia* is a well know alternative therapeutic with particular application in the treatment of nematodes infection (Taylor and Francis, 2002) .This plant has purgative effects which play role in controlling intestinal worms (Darwich et al; 2009).

Therefore, the aim of present study was detection of parasites cause diarrhea in calves, their seasonal prevalence, and comparative studies on efficacy of chemical drugs (Ivermectin) and natural extracts (Artemisia) against those parasites.

2. MATERIALS AND METHODS

2.1. Fecal samples:

Fecal samples were collected from 208 calves suffered from diarrhea in different localities in Munofyia Governorate during a period extend from (first February 2014 to the end of January 2015). Fecal samples were collected directly from the rectum of each calf, in plastic sac. The date of collection, age and the name of the owner were recorded. The samples were examined macro and microscopically in the same day of collection, to investigate the internal parasitic cause of diarrhea. The fecal samples were examined according to Soulsby (1988) by the following methods:

Direct fecal smear: A pinhead piece of faces was spread on a microscopic slide and mixed with 1-2 drops of saline solution by the aid of glass stick, then covered by cover slip and examined under light microscope.

Floatation method: About 1ml of sieved mixed sediment fecal specimen with water was diluted by 10-20 ml of saturated salt solution in a test tube and filled to the top. A cover glass was put over the top of the tube so that it was in contact with the liquid. After about 10-20 minutes, the cover glass was gently removed and examined under a low power.

Egg count with the McMaster technique according to Soulsby (1988): Three grams of positive fecal sample were mixed with 45 ml saturated salt solution shacked and strained. Then a sample was withdrawn by specific pipette and quickly transferred into the counting chambers McMaster slide. The eggs within each ruled area were counted as: The number of eggs/gm (E.P.G)= no of eggs in 2 chamber/2×100.

Detection of Cryptosporidium oocysts: Fine fecal smears was done, dried in air- fixed with methanol-stained with modified Ziehl-Neelson stain- examined with light microscope under oil immersion lens x 1000 according to Henriksen and Pohlenz., (1981)

2.2. Treatment

The objectives of this experiment were to investigate the effectiveness of chemical

drugs as Ivermectin against nematodes, which cause diarrhea in calves in comp-
ration with the natural extracts such as Artemisia. Fifteen calves suffered from parasitic diarrhea were selected according to parasites and divided into 3 equal groups. The first group (5 calves was suffered from parasitic diarrhea due to nematodal causes) was treated with ivermectin, one dose 1ml/50kg b. w. Second group (5 calves was suffered parasitic from diarrhea due to *Toxocara vitolorum*) treated with Artemisia 300mg/kg of b.w. twice daily for 5day. Five calves were used a control group (untreated). The fecal samples were collected in all groups from zero day of treatment until 21 days post treatment.

3. RESULTS

3.1. Incidence of internal parasites in diarrheic suckling calves

Fecal examination results indicated that the infection among suckling calves was about 60%. The rate of infection in cow calves was 60.1% while it was 58.5% in suckling buffalo calves (Table1). The most common helminthic cause was *Toxocara vitolorum* while *Cryptosporidium* sp. and *Eimeria* sp. were the protozoal agents (Table 2). In buffalo suckling calves, *T. vitolorum* infection was highest 17.4% (4 from 23 number of infection). The results were somewhat decreased in suckling cow calves where the ration of infection was 12% (3from 24 number of infection). *Eimeria* Sp. infection was nearly similar rate in both calves spices 32% and 30.4% in cow and buffalo suckling calves respectively .On the other hand *Cryptosporidium* sp. infection was 56 % in cow suckling calves (14from 41 infected) while it was 52.2% in buffalo suckling calves. From above other results and table (5) the rate of infection in diarrhetic suckling calves was 27.5% and 32.5% by helminthes& *Eimeria* sp. and *Cryptosporidium* sp. respectively.

3.2. Incidence of internal parasites in diarrheic weaned Calves:

The detected parasites species were *T. vitulorum*, *Trichostrongylus spp.* as nematode causes while *Eimeria* and *Cryptosporidium spp.* were the protozoan agents. Each infected calf had at least one parasitic species. Weaned cow calves were suffered more (60 from 88) by (68.2%) while that of buffalo (20 from 40) by (50%) (Table 3)

3.3. Seasonal prevalence of parasites, which cause diarrhea in calves.

As in table (4) seasonal prevalence of internal parasites among diarrheic calves in comparative manner related to numbers of all examined every season. *Toxocara vitulorum*: the ratio was in winter (8.3%),

spring (4.3%), summer (1.9%) and autumn (6%). *Trichostrongylus spp.*: the ratio was in winter (3.3%), spring (10.9%), summer (0%) and autumn (6%). *Eimeria spp.*: the ratio was in winter (13.3%), spring (41.3%), summer (26.9%) and autumn (40%). *Cryptosporidium spp.*: the ratio was in winter (13.3%), spring (26.09%), summer (13.5%) and autumn (30%).

3.4. Antiparasitic activity of (Ivermectin-Artemisia) against nematodes

The reduction percent for egg/gram (EPG) of nematodes was 100% at 1 week for Ivermectin, while it was 75% at 2 week and egg was still destined (Table 5).

Table (1). Incidence of diarrhea due to parasites among suckling calves (aged 1 week-1 month).

Calves species	No of examined	No of infected	%
Cow calves	41	25	60.89
Buffalo calves	39	23	58.97
Total	80	48	60

Table (2). Incidence of internal parasites recovered in diarrheic suckling Calves.

Parasite Animal	<i>Toxocara vitulorum</i>	<i>Eimearia spp.</i>	<i>Trichostrongylus spp.</i>	<i>Cryptosporidium spp.</i>
No. of infected cow calves	3	8	0	14
%	12	32	0	56
No. of infected buffalo calves	4	7	0	12
%	17	30.4	0	52.2

Table (3). Incidence of parasitic diarrhea among weaned calves aged >3 months

Spices of calves	No. of examined	No. of infected	%
Cow calves	88	60	68.2
Buffalo calves	40	20	50
Total	128	80	62.5

Table (4). Seasonal prevalence of internal parasites among diarrheic calves.

parasites	Season & no. of examined	Cow calves		Buffalo calves		Total	%	
		No. of infected		No. of infected				
		suckling	weaned	suckling	weaned			
<i>Toxocara vitulorum</i>	winter	60	2	0	2	1	5	8.3
	spring	46	0	1	1	0	2	4.3
	summer	52	0	1	0	0	1	1.9
	autumn	50	1	0	1	1	3	6
<i>Trichostrongylus spp</i>	winter	60	0	1	0	1	2	3.3
	spring	46	0	3	0	2	5	10.9
	summer	52	0	0	0	0	0	0
	autumn	50	0	2	0	1	3	6
<i>Eimeria spp</i>	winter	60	2	3	0	3	8	13.3
	spring	46	2	14	2	1	19	41.3
	summer	52	1	7	3	3	14	26.9
	autumn	50	3	12	2	3	20	40
<i>Cryptosporidium spp</i>	winter	60	2	2	3	1	8	13.3
	spring	46	4	3	4	1	12	26.09
	summer	52	3	2	2	0	7	13.5
	autumn	50	5	3	3	4	15	30

Table (5). Egg count reduction % (Ivermectin – Artemisia) comparatively.

Drug	Week	Reduction %	Reduction %	Reduction %
		1 week	2weeks	3weeks
	Ivermectin	100	100	100
Artemisia	55	75	75	
control	0	0	0	

Reduction % of egg per gram for (a week) = mean reduced number of that week/total no. without treatment×100

4. DISCUSSION

The present study revealed, that the incidence of parasitic diarrhea, among suckling calves was 60.1% and 58.5% in cow and buffalo, suckling respectively. These results were nearly similar to that reported by Sharma, and Busang (2013) who reported that parasitic infection rate in dairy calves was 63.8%, where the rates of infection were (30.9%, 22.20% ,10.7%) due to(*Cryptosporidium spp.*, *Eimeria spp.*, and helminthes respectively). Our study revealed that the detected parasites were: *Toxocara vitulorum* was highest in suckling buffalo calves (17.4%) While the latter rate was 12% in cow suckling calves. In this

respect Reberio, et al., (2000) reported that *Toxocara vitulorum* and *Eimeria spp.* Were the most pathogen in diarrheic calves.

In the present work, *Cryptosporidium spp.* was detected in 56% of suckling cow calves, while it was 52.2% in buffalo. In this respect, Singla et al., (2012) found that prevalence of *Cryptosporidium spp.* in dairy calves aged 0-30 days was 65.7%, while Sharma, and Busang (2013) found that the prevalence rate in calves less than 3 months was 30.9± 5.6%. This difference may be due to external contamination of udder and contamination of milk utensils in suckling calves (water borne disease). *Eimeria spp.* in our study, were isolated from both species of suckling calves (cow & buffalo)

where the incidence rate was 32% and 30.4% respectively. These results were nearly similar to that recorded by Sharma, and Busang (2013) who found that in dairy calves with liquid feces showed $34.8 \pm 4\%$ incidence rate of combined helminthes and *Eimeria* spp. On the other hand Arslan and Sari (2010) reported that the rate was (60-90 %) in dairy calves in Turkey.

The present study, indicated that the seasonal prevalence of *Cryptosporidium* spp. were 20 % , 30 % ,17.5% and 32% in Winter ,Spring , Summer and Autumn, respectively. The highest ratio in autumn (32%) then spring (30%). While lowers was (20%) in winter and (17.5%) in summer. This may be attributed to bad condition (cold or hot and dry). Our results were equal to that obtained by other workers, as Taylor et al., (2007). Who found the peaks infection of *Cryptosporidium* spp. was recorded in autumn and spring Paul et al., (2008) observed that highest prevalence of *Cryptosporidium* spp. was in worm and humid months among bovine calves. Where the rate of infection was 37.3 %, 25.6% and 19.6 % in autumn, summer and winter respectively. The seasonal prevalence of *Eimeria* spp. in present study was recorded, the ratio was 13.1 %, 41.3 %, 26 .9 % and 40% in winter, spring, summer and autumn respectively. In this respect, results of other workers was run parallel to our results as Wahid and Soad (2007) who studied the effect of feeding season on the prevalence of *Eimeria* spp. in growing buffalo calves in Egypt. They found the ratio of infection was highest in green season (Autumn & Spring) 94.40 %, than dry season (Summer & Winter) 87.90%. Rahmatullah et al., (2007) reported that prevalence of *Eimeria* spp. in fecal samples of calves aged 3 – 4 months was highest in autumn and spring, while it was lower in winter. The ratio was moderate in summer. Also other results in calves less than 2 months in Azerbaijan province reported by Yousef Davoudi et al., (2011). They found that the seasonal prevalence of *Eimeria* spp. in calves less than 2 months was 13.6%, 16%, 28 %

and 14.4 % in Winter, Autumn, Summer and Spring respectively. Concerning, the seasonal prevalence of *Toxocara vitulorum* reached its peak in Winter,(45.5%) may be due to large number of parturition and /or the presence of third larval stage in colostrums and milk . While the other rates of prevalence were 27.3%, 18.2% and 9.09 % in autumn, spring and summer respectively. Our results were run parallel to that obtained by Wickramasinghel et al (2009). The latter mentioned that *Toxocara vitulorum* mainly transmitted through colostrum and milk causing disease (severe anemia, diarrhea, weight loss and anorexia) particularly in buffalo calves between 1-3 months. Concerning, the use Ivermectin and Artemisia in treatment. The results indicated that Ivermectin was the best drug for treatment of intestinal nematodes, and then *Artemisia* .The reduction percent of fecal egg count per gram (EPG) was 100% at 4th day post treat by Ivermectin, while it was 55% at 7th day post treat by Artemisia. our results was agreed with other obtained by Njanja et al., (1987) who reported that the efficacy of Ivermectin approached to 100% in reduction of egg count in fecal samples of goats. With respect to *Artemisia*, the present work indicated that the maximum effect was at 7th day post treatment. The reduction rate was 75% but eggs were still disseminated in feces. These results of our work agreed with that obtained by Zafar et al., (2004). Who reported Artemisia whole plant process anti thelmintic activity against nematodes.

5. CONCLUSIONS

From the results of this study, we conclude that suckling and weaned calves of both cow & buffalo were infected by internal parasites: *Toxocara vitulorum* (was highest in suckling calves), *Trichostrongylus* spp. (were appeared only in weaned calves, but not appeared in suckling one), *Cryptosporidium* spp. (were highest infection ratio in suckling calves but were declined in weaned), *Eimeria* spp. (were

highest in weaned calves, but they were decreased in suckling calves). Ivermectin was suitable drugs against internal nematodes.

5. ACKNOWLEDGMENT

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