

Article

Therapeutic intervention against gastro-intestinal helminth parasites of buffaloes

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Abstract: The study was carried out to evaluate the effectiveness of different commercially available anthelmintic against gastrointestinal helminth parasites of buffaloes in Dinajpur district over a period of one year from July 2009 to June 2010. A total of 232 samples were randomly collected from buffaloes of which 199 (85.78%) were found to be positive with the help of “Modified Stoll’s Dilution Technique. Out of positive samples 40 *Fasciola* infected buffaloes were selected for anthelmintic trial and 10 cases were selected for control. The anthelmintic efficacy of Triclabendazole and Nitroxynil were determined on the basis of faecal egg counts. The trial demonstrated excellent efficacy of Nitroxynil (Nitronex®, Renata Ltd.)@ 1.5 ml/ 50kg body weight against fascioliasis significantly ($p<0.01$ & $p< 0.05$) reduce the EPG on day 7 , 14 and 21 post – treatment as 54.04%, 70.68% 100% respectively and Triclabendazole (Fasinex®, Novartis Ltd.)@ 12 mg/kg body weight also significantly ($p<0.01$ & $p< 0.05$) reduce the epg on day 7 , 14 , 21 and 28 post –treatment as 53.94%, 60.04%, 83.36% and 100% respectively. Out of positive samples, 40 cases were selected randomly for anthelmintic trial against nematodiasis. The anthelmintic efficacy of Thiophanate and Levamisole on faecal egg counts of nematodiasis affected buffalo were determined. The trial demonstrated the efficacy of Thiophanate (Nemafax® Rampart power Ltd.) @ 1 gm/ 14 kg body weight against nematodiasis was significantly ($p<0.01$) reduces the EPG of faeces on day 7 , 14 , 21 and 28 post –treatment 52.61%, 59.28%, 72.80% and 100%respectively. The efficacy of Levamisole (Ralnex®, Novartis Ltd.) @ 7.5 mg/ kg body weight against nematodiasis was significantly ($p<0.01$) reduces the EPG of faeces on day 7, 14, and 21 post –treatment day 60.02%, 83.39% and 100% respectively.

Keywords: anthelmintic; helminth parasites; therapy; buffaloes

1. Introduction

Buffalo (*Bubalus bubalis*) is one of the important species of domestic livestock and buffalo population of Bangladesh is about 13, 04,000 (DLS, 2009). The world population of domestic buffaloes has been estimated at over 172 million head, more than 97% (167.6 million) of which are in Asia and the pacific region, mainly 97.7 million heads of buffalo in India alone (FAO, 2004). Buffaloes are the main producers of milk and preferred species as indicated by the increasing ratio of she- buffaloes to buffalo cows in many parts of the world. Trematode species specially includes *Fasciola gigantica*, *Paramphistome* species play vital roles in livestock. Infection of domestic ruminants with *Fasciola hepatica* and *Fasciola gigantica* causes significant loses to the agriculture sector worldwide with over 600 million animals affected. *Toxocara vitulorum*, *Dictyocaulus* species

and filarial nematodes have the worldwide distribution and the prevalence is higher in buffalo and cattle (Karki, 2005). The agro-ecological and geo-climatic conditions are favourable for high prevalence of helminthiasis are very much common in Bangladesh. From the literature it is reveal that research on different species of helminth infections in cattle have been carried in many district and regions of Bangladesh (Bhuiyan, 1970; Rahman and Razzak, 1973; Amin and Samad, 1988; Motalib and Alam, 1989). The selected area of research areas have some special geographical location, climatic condition and ecological factors which are quiet different from the other areas of Bangladesh. Since helminthiasis is the most common among the parasitic diseases in these areas, the farmers as well as the veterinarians need to use specific anthelmintic for the treatment and control of parasitic diseases. Against the same parasitic disease anthelmintic preparations manufactured by different pharmaceutical companies are available in the country. But very little attempt has yet been made to study the comparative efficacy of these anthelmintic product on buffalo. In view of the above considering facts the research work was undertaken with the objective to study the comparative therapeutic efficacy of different commercially available anthelmintic against trematode and nematode infestation in buffalo.

2. Materials and Methods

The faecal samples of individual animal were collected in polythene bag. About 10-15 gm of faecal sample was collected from each animal and was brought to the laboratory in preservatives for examination. Total eggs per gm (EPG) of faeces of all animals were counted. The worms were identified on the basis of the morphology of the egg. Modified Stoll's Dilution Method (Soulsby, 1982) was used to detect parasite eggs. The animals were given treatment against trematode and nematode infestations. The grouping system and treatment schedule were, Group A: 20 animals with Trematode infestation and treated with Nitroxynil (Nitronex® Renata, Bangladesh Ltd.) administered subcutaneously @ 1.5 ml/50 kg body weight. Group B: 20 animals and treated with Triclabendazole (Fasinex® Novartis, Bangladesh Ltd.) @ 12 mg/kg body weight orally. Group C: 10 infected animals kept as untreated control. Anthelmintic trials against Nematode infestation was Group D: 20 animals and treated with Levamisole (Ralnex® Novartis, Bangladesh Ltd.) @ 7.5 mg / kg body weight) orally Group E: 20 animals treated with Thiophanate (Nemafax® Rampart power, Bangladesh Ltd.) @ 1 gm/14kg body weight orally. Group F: 10 infected animals kept as untreated control. Faecal egg count was carried out on day 0 and levels of infestation were determined on day 7, 14, 21 & 28 following treatment.

3. Results

Out of 232 faecal samples 199 (85.78%) samples were found to be positive with the help of "Modified Stoll's Dilution Technique and 100 positive cases were taken for anthelmintic trial.

3.1. Anthelmintic trial on fascioliasis

Among total positive sample 40 *fasciola* infested buffaloes were selected for anthelmintic trial against fascioliasis and 10 cases were selected for control. The anthelmintic efficacy of Triclabendazole (Fasinex®, Novartis Ltd.) and Nitroxynil (Nitronex®, Renata Ltd.) were determined on the basis of faecal egg counts are shown in Table 1. The trials demonstrated excellent efficacy of Nitroxynil @ 1.5 ml/ 50kg body weight against fascioliasis that significantly ($p < 0.01$ & $p < 0.05$) reduce the EPG on day 7, 14 and 21 post-treatment as 54.04%, 70.68% 100% respectively. The efficacy of Triclabendazole @ 12 mg/kg body weight against fascioliasis also significantly ($p < 0.01$ & $p < 0.05$) reduce the egg on day 7, 14, 21 and 28 post-treatment as 53.94%, 60.04%, 83.36% and 100% respectively. In case of Nitroxynil trial reduction of EPG to zero on 21st day after treatment and in case of Triclabendazole trial reduction of EPG to zero on 28th day after treatment. So, Nitroxynil (Nitronex®) appeared to be more effective than Triclabendazole (Fasinex®). Nitronex® caused 100% reduction of EPG on 21st day of treatment and Fasinex® caused 100% reduction of EPG on 28th day. In the control groups the EPG was seen increasing on day 7, 14, 21 and 28.

Table 1. Comparative efficacy of Nitroxynil (Nitronex®) and Triclabendazole (Fasinex®) against fascioliasis.

Group of animals	Drugs used	No. of animals	Mean Egg per Gram (EPG) of faeces				
			Pre-treatment (day-0)	Post-treatment (days)			
				7	14	21	28
Group A	Nitronex®	20	172.55	79.30 (54.04%)	23.25 (70.68%)	00.00 (100%)	00.00 (100%)
Group B	Fasinex®	20	153.95	69.95 (53.94%)	27.95 (60.04%)	4.65 (83.36%)	00.00 (100%)
Group C	Control	10	149.30	168.00	196.10	205.50	224.20
P-value			0.711	0.017	0.0002	0.0001	0.0041
Level of significance			NS	*	**	**	**

** P value <0.01* P value <0.05

3.2. Anthelmintic trial on nematodiasis

Out of total positive sample 40 nematode infested buffaloes were selected randomly for anthelmintic. The anthelmintic efficacy of Thiophanate (Nemafax® Rampart power Ltd.) and Levamisole (Ralnex®, Novartis Ltd.) on faecal egg counts of nematodiasis affected buffalo are shown in Table 2. The trial demonstrated the efficacy of Thiophanate @ 1 gm/ 14 kg body weight against nematodiasis was significantly ($p < 0.01$) reduces the EPG of faeces on day 7, 14, 21 and 28 post –treatment 52.61%, 59.28%, 72.80% and 100% respectively. The efficacy of Levamisole @ 7.5 mg/ kg body weight against nematodiasis was significantly ($p < 0.01$) reduces the EPG of faeces on day 7, 14, and 21 post –treatment day 60.02%, 83.39% and 100% respectively. In case of Levamisole (Ralnex®) trial reduction of EPG to zero on 21st day after treatment and in case of Nemafax® trial reduction of EPG to zero on 28th day after treatment. So, Ralnex® appeared to be more effective than Nemafax®. Ralnex® caused 100% reduction of EPG on 21st day of treatment and Nemafax® caused 100% reduction of EPG on 28th day. In the control groups the EPG did not decrease rather increasing trends was seen on study period day 7, 14, 21 and 28.

Table 2. Comparative efficacy of Levamisole (Ralnex®) and Thiophanate (Nemafax®) against nematodiasis.

Group of animals	Drugs used	No. of animals	Mean Egg per Gram (EPG) of faeces				
			Pre-treatment (day-0)	Post-treatment (days)			
				7	14	21	28
Group D	Ralnex®	20	280.20	112.00 (60.02%)	18.60 (83.39%)	00.00 (100%)	00.00 (100%)
Group E	Nemafax®	20	265.90	126.00 (52.61%)	51.30 (59.28%)	13.95 (72.80%)	00.00 (100%)
Group F	Control	10	205.40	224.10	242.90	317.60	336.30
P-value			0.711	0.0080	0.0001	0.0021	0.0005
Level of significance			NS	**	**	**	**

**P value <0.01

NS = not significant ($P > 0.05$)

4. Discussion

4.1. Treatment with Nitroxynil (Nitronex®)

In this research, the total reduction of faecal egg counts on 21st day after treatment with Nitronex® was 100%. The 100% efficacy of Nitroxynil against fascioliasis on 21st day of post-treatment in buffalo is confirmed the previous observations of Roy and Reddy (1969) who also detected 100% reduction of faecal egg counts on 21st post-treatment day with single injection of Trodx. Similar observation had also been reported by Ahmed *et al.* (1983) who found 93% reduction of faecal eggs on 21st days of post-treatment. In this research on 14th day 69.30% reduction of faecal egg counts was observed. Panday *et al.* (2002) observed completely reduction of faecal eggs in buffaloes after treatment with nitroxynil at the dose rate of 3ml/100kg body weight. Qian *et al.*, (1991) observed 100% effectiveness against *Fasciola hepatica* in dairy goat after treatment with nitroxynil @

15 mg/kg body weight. Amin and Samad (1988) studied the percentage of efficacy of nitroxylin injection against fascioliasis in cattle and the result was 86.23%.

4.2. Treatment with Triclabendazole (Fasinex®)

In this research, the total reduction of faecal egg counts on 28th day after treatment with Fasinex® was 100%. Qadir (1984) reported 88.5% overall efficacy rate of Fasinex® against *Fasciola* sp. infection in Bangladesh. Turner *et al.* (1984) and Boray *et al.* (1983) studied the percentage of efficacy of Fasinex® against fascioliasis in cattle and 93.94% reduction of fecal egg count was recorded with Fasinex® @ 10 mg/kg body weight against *Fasciola gigantica* in Bangladesh. Gupta *et al.* (1989) examined the 100% efficacy of Fasinex® in sheep. In this research, the efficacy of Nitronex® was found comparatively higher than that of Fasinex®. However the findings could not be compared due to lack of similar available report in the literature. But never the less both the drugs showed good efficacy (above 75.56%) against naturally occurring *Fasciola* infection in buffalo and may be recommended for clinical use.

4.3. Treatment with Levamisole (Ralnex®)

This study recorded, 100% efficacy of Levamisole (Ralnex®) @ 7.5 mg /kg body weight orally against the gastro-intestinal nematodiasis on 21st day of treatment. More or less similar effectiveness of Ralnex® has been reported against gastro-intestinal nematode in calf by Kumar *et al.* (1999) who observed 100% efficacy of Levamisole. Ashraf *et al.* (2002) served 100% efficacy of Levamisole against ascarids in buffalo. Crig *et al.* (1980) evaluated the anthelmintic efficacy of levamisole against all worms and the efficacy appeared low in goats given 3.96 mg of levamisole/kg, but was high against adult *Haemonchus contortus* (99%).

4.4. Treatment with Thiophanate (Nemafax®)

In this research, the efficacy of Nemafax® was 100% on 28th days of post-treatment. More or less similar effectiveness of Nemafax® reported earlier against gastro-intestinal nematode in cattle by Afazuddin (1985) observed 100% efficacy of Nemafax® against gastro-intestinal nematodes. Chandrasekharan *et al.* (1978) reported 95-100% efficacy of thiophanate against gastro-intestinal nematode infection. Mostofa *et al.* (1983) reported 99.3-100% and 92.96% efficacy with thiophanate therapy respectively. In this research, 61 % of efficacy was found on 14th days of post-treatment. The efficacy study of Ralnex® was found comparatively better than that of Nemafax®. However, this finding could not be compared due to lack of similar available report in the literature. But never the less both the drugs showed good efficacy (above 75.50%) against naturally infected nematodes infection in buffalo and any one of them may be used for clinical nematodiasis.

5. Conclusions

On the basis of findings conclusion may be inferred, Treatment with Nitroxylin (Nitronex®) against fascioliasis are more effective than Triclabendazole (Fasinex®) and treatment with Levamisole (Ralnex®) against gastro-intestinal nematodiasis are more effective than Thiophanate (Nemafax®) after the same days of treatment.

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Conflict of interest

None to declare.

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