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Efficacy of Ivermectin against GastroIntestinal Nematodes in Calves

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Abstract: A study was undertaken on 30 young cattle (age 6-9) months, body weight 60-120 kg (of both sexes) of Bangladesh Agricultural University, Mymensingh affected naturally with various gastrointesitinal Nematodiasis with a view to evaluating. The therapeutic efficacy of ivenmectin two times. The drug was administered at day '0' and 30th. In total 20 cattle were given treatment and 10 left as, control animals. The parameters studied were On the basis of fecal egg reduction, the efficacy was 100%, 100%, 100% and 95.8%, on day '0', 7th, 21st and 30th after first treatment .On 30th post treatment day, the drug was repeated and the efficacy was 100% and 100% on 40th and 60th post treatment day (From Day '0') in the animals of control group the `reduction was 0%. The body weight increased on 30th and 60th day in the treatment was not significant compared with the mean values of control group However there were some increase of body weight in both treatment and control group. The body weight increases were 8.60% and 11.95% in the treatment group and 3.26 and 4.34 in the control group on 30th and 60th day. Therefore the net weight gains in the treatment group were 5.44% (5.44% (8.60-3.26) and 7.91% (11.95-4.34) on those days. The growth or weight gain stimulated by ivermectin treatment although not statistically significant was still encouraging. The Hb increase in the treatment group was significant on ($p < 0.05$) 60th post treatment day. The PCV, total RBC and WBC and differential counts were almost within normal range in both the groups and there were no much detectable changes in the range and mean values of treatment and control group. The relative values of individual types of cells like lymphocyte, neutrophil, monocyte and basophil were also within normal range in both treatment and control groups. However, the percentage of eosinophil was slightly increased in both group in all study days. In parasitic diseases such increase of eosinophil may some time occur (Soulsby, 1989).

Key words: Ivermectin, GastroIntestinal, Nematodes

Introduction

In Bangladesh young cattles are affected with various strogylus. Young animals between 4-9 month of age are often affected but adult not previously exposed to infection frequently show clinical signs. The common signs are watery diarrhoea exposed to infection frequently show clinical stgns. The common signs are watery diarrhoea, some times constipation (as in *Haemonchus and mecistocirus* infestation) anemia and bottle Jaw. Heavy infection may produce rapid death before clinical signs appear. Other signs including progressive weight loss, rough hair coat and in appetance (Blood *et al.,* 1989) may also develop. A number of althelmintics are available in the market of Bangladesh, for treatment of various strongylus. The drugs have been reported to yield varying degrees of efficacy. Recently Ivermectin is introduce in this country but EPG, Hb, PCV body weight of all the animals were recorded before given treatment (Day 0). The animals of treatment group were given treatment with Ivermectin by subcutaneous injection 200μmg /kg body weight at two times at day '0' and 30th post treatment day. The control animals were not given treatment.

Parameter collected:
Total EPG count
Data recorded were at Day '0' 7th, 14th, 21st, 40th and 60
Determination of blood hemoglobin, PCV, Total RBC, WBC and differential counts and
Body weight measurement on Day '0' 30th and 60th post treatment. The research was analyzed

Materials and Methods

The present study was conducted on 30 cattle affected with different gastrointestinal (GI) nematodes belonging to the dairy farm of Bangladesh Agricultural University, (BAU) Mymensingh from July 1999 to October 1999. The animals are identified on the basis of fecal sample examination by direct smear and flotation methods (soulsby 1986).Positive cases were divided randomly into 2 groups. The treatment group consisted of 20 and control group 10 animals. The animals belonged to cross-bred and between 6-9 months of age. The body weigh ranged between 60-120 kg.

EPG, Hb, PCV, body weight of all the animals were recorded before giving treatment (day '0'). The animals of treatment group were give treatment with Ivermectin by subcutaneous injection at 200 μmg/kg body weight at two times ; day '0' and at 30th post treatment day. The control animals were not given treatment.

Result and Discussion

Reduction of fecal egg output (Table 1): In this trial ivermectin was administered at the dose rate of 0.2 mg/kg body weight s/c (Manufacturer's recommendation) and 100% reduction of fecal egg out put was noted on 7th, 14th and 21st day after giving treatment. The findings are in consonance with those reported earlier form this country (Islam 1997 and Zesmin, 1998) and elsewhere (Kennedy and Zobell 1988, Oku *et al.,* 1988, Eagleson and allerton 1992, Chandranathani and Sani 1993, Hong *et al.,*1995, Arantes *et al.,* 1996, Assonville *et al.*, 1996. Eyskerr 1998 and Chompoochan *et al.*, 1998). Results as obtained after 2nd time administration also are in consonance with the finding of Rickard *et al.*, (1991) and Assonivill *et al.*, (1995).

Fecal egg reduction is not a reliable criteria to study the efficacy of an anthelmintic because the egg laying ability of the parasites may be suppressed by the action of the drug or may be due to development of immunity. The most effective method of assessing anthelmintic

activity is by slaughtering the animal and counting the worms (Aiello and Mays, 1998). Chompoochan *et al*., (1998) conducted a trial by slaughtering a limited number of animals and found 100% reduction worm burden 14 days after Ivermectin treatment. In this study due to lack of facilities such study could not be conducted. Future worker may conduct research in this discipline.

Effects of Ivermectin treatment on body weight:

The finding are summarized in Table 2: Since body weight gain is a slow process, so the recording was taken on 30th and 60th post treatment day. The increase in treatment group was 8.60% and in control group 3.26% and 4.34% on 30th and 60th post treatment day respectively. The mean values of both the groups did not differ significant ($p<0.05$). The present findings differ from those of Taylor (1993), Smith (1994) and Gogolewski *et al*. (1995) who found significant increase of body weight at 28-30th post treatment day. Islam (1997) reported 6.205% and Zesmin (1998) 6.498% body weight gain on 28th day which are very close to the present finding of 8.60% weight gain.

Body weight gain of an animal does not only depend on parasitic infection. It is related with many other factors like supply of quantity of quality food, management and other stressors which could not be controlled here. Had this been possible the real effect of ivermectin could have been possible to assess. Still in this uncontrolled study (uncontrolled factors related with weight gain) some body weight gain was achieved. In the control animals there was also some body weight gain. From these it appears that controlled studies are required to assess near accurately the effect of ivermctin on body weight gain.

Table 1: Efficacy of ivermectin on EPG.

Treated group (20 animals) Day	Range of EPG	Average	% reduction
Day '0'	600-1400	700	
Day 7th	Nil	Nil	100%
Day 14th	Nil	Nil	100%
Day 21th	Nil	Nil	100%s
Day 30th	000-200	200	95.8%
Day 40th	Nil	Nil	100%
Day 60th	Nil	Nil	100%
B. Control group (10 animals)			
Day '0'	600-1300	650	Not reduced
Day 7th	600-1200	640	do
Day 14th	600-1100	640	do
Day 21th	700-1200	800	do
Day 30th	700-1100	750	do
Day 40th	700-1200	750	do
Day 60th	600-1100	650	do

Table 2: Efficacy of imvermectin on body weight, RBC, PCV and Hb.

		Day 0		Day 30		Day 60		
Factor		Range	Mean	Range	Mean	Range	Mean	Comment
Body weight in kg	Control group 10 animals	60-118	92±10.60	62-120	95±12.40	66-128	96±16.30	Increase body weight 3.26% And 4.34% No net weight gain respectively day 30 and day 60
	Treatment group 20 animals	60-120	90±16.30	70-130	100±4.20	73-138	103±15.3	Body weight increase 4.60% and 11.95% and net gain 5.44% and 7.91 respectively day 30 and day 60
PCV	Control group 10 animals	28-40	35.20	32.40	35.00	33.38	34.20	-
	Treatment group 20 animals	34-44	38.90	24-35	31.50	30-38	32.20	
Hb Gm%	Control group 10 animals	8.40-10.80	9.40±1.24 SD	7.00-11.00	9.25±1.30 SD	7.20-10.82	8.90±1.22 SD	-
RBC Million /Cu mm	Control group 10 animals	6.0-7.00	6.25	6.00-7.20	6.70	6.80-7.00	6.90	-
	Treatment group 20 animals	6.19-7.32	7.12	5.00-7.00	6.32	5.00-6.50	6.50	-

Effects of Ivermectin on hematology (Table 2) : Chages in blood parameters also are a slow process, so the recording for Hb, PCV, total RBC, total WBC and differential counts were taken after 30th and 60th post treatments days after initial recording (Day'0).

The PCV (Table 2) and total RBC count (Table 2) also did not vary significantly between treatment and control groups. Again it may be maintained here that these blood indices are dependent on the supply of some nutrients like iron, copper, cobalt and folic acid (Aiello andMays1998 and cannot be increased (Schalm, 1965). From the assessment of Hb and PCV it appeared that all the animals had some degrees of anemia. The gastrointestinal parasites suck blood and nutrition producing anemia (Smith, 1994). Probably for these effects of parasites, the anemia developed in all these animals.

The total WBC and DLC of both treatment and control groups were within the normal range (Schalm, 1965) which indicate that gastrointestinal parasites exert little dyscrasiatic effects on these parameters.

Conclusion

In this trial high efficacy of ivermectin against gastrointestinal nematodiasis was recorded, based on reduction of fecal egg out put. Satisfactory body weight gain and significant increase ($P < 0.05$ of Hb after 60days of treatment to recover from anemia were also noted. From these drug may be recommended for field use. The reduction of EPG as observed in this study was whether due to death of the worms or due to suppression of egg laying capacity or development of immunity could not be elucidated in this study. Further research works may be carried our in these aspects.

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