Prevalence and evaluation of anthelmintics against nematodes in lions (Panthera leo) of Nandankanan Zoo

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Abstract

Twenty four lions of Nandankanan Zoo were studied for prevalence of nematode eggs by faecal sample analysis and the prevalence rate was found to be 70%. For evaluation of anthelmintics, 20 lions were considered and were divided into four groups according to the drug administered and each group consisted of five animals. The lions were administered pyrantel pamoate at the rate of 20 mg/kg body weight, Levamisole at the rate of 4.4 mg/kg body weight and Ivermectin at the rate of 0.3 mg/kg body weight. Evaluation of anthelmintic activity against nematodes of lions revealed that Ivermectin at a dose rate of 0.3 mg/kg body weight reduced the faecal egg count of Toxascaris leonina and Ancylostoma Spp to 100% on 3rd day post treatment while in others it was lesser. The reappearance of Toxascaris leonina infection in lions occurred 24, 45 and 52 days of post treatment while the reappearance of Ancylostoma infection in lions occurred 24, 31 and 45 days of post treatment in groups that were administered with Pyrantel pamoate, Levamisole and Ivermectin respectively.

Key words: Lions, Toxascaris, Ancylostoma, Ivermectin, anthelmintics

Introduction

The spectrum of parasitic diseases in wild animals is of great importance for both human and veterinary medicine. Under captivity, the health status of zoo animal varies with different factors like management, feeding, environment and seasonal variation (Chauhan et al., 1973). Regular disease surveillance and monitoring prompt diagnosis, effective treatment and control measures are key to successful management of zoological parks. The present investigation has been planned to study the prevalence of gastro intestinal nematodes in lions and to evaluate the efficacy of various anthelmintics administered to control the gastro intestinal nematodes in lions.

Materials and Methods

For prevalence studies, all the lions (24) were taken into consideration. Approximately 2 grams of faeces were collected from individual enclosures avoiding all possible external contamination in a clean, dry and airtight plastic container and brought to the laboratory for macroscopic and microscopic examination. In case of animals that were kept in groups, a pooled sample was collected. Regular faecal sample analysis was done for a period of four months using standard qualitative (sedimentation and floatation) tests (Soulsby, 1982). The prevalence of nematodes infection was found by the following formula.

\[
\text{Prevalence} \% = \frac{\text{Number of positive samples} \times 100}{\text{Samples examined}}
\]

The presence of eggs was identified through their morphological characteristics (Bowman, 1999). Few nematode worms were recovered on post mortem examination as well as from faecal samples. For evaluation of anthelmintics, 20 lions of either sex with age ranging 8-18 years and body weight ranging from 120-180 kg were selected. The animals were divided into four groups (Group I, Group II, Group III and Group IV) according to the drug administered and each group consisted of five animals. The lions comprising of Group I were administered pyrantel pamoate (Nemocid®, 200 mg, IPCA Lab) at the rate of 20 mg/kg body weight. The lions in Group II were administered Levamisole (Dicaris®, 150mg, Ithmor) at the rate of 4.4 mg/kg body weight and Ivermectin (Ivermectol®, 12 mg, Ochoalab) at the rate of 0.3 mg/kg body weight were administered to Group III.
Group IV was taken as control where no drugs were administered. These drugs were given along with meat to lions. For determining the comparative efficacy of anthelmintics against parasitic infection, the eggs per gram (EPG) of faeces were undertaken using McMaster Technique. The EPG was carried out during pre treatment and on days 3rd, 7th and 10th days post treatment.

Further to assess the efficacy of the drugs used in the study, the EPG was conducted on one week intervals up to two months and the reappearance of eggs was recorded for all drugs. The percentage of efficacy of each drugs were determined by the following formula.

\[
\text{Efficacy} \% = \frac{\text{Pre-treatment EPG} - \text{Post-treatment EPG}}{\text{Pre-treatment EPG}} \times 100
\]

**Results and Discussion**

Out of 40 samples examined in lions, 28 samples were found positive for parasitic ova while 12 samples were negative. Single infection with *Toxascaris leonina* was observed in 6 samples where as 6 samples was found positive for *Ancylostoma* species. A mixed infection of *Toxascaris leonina* and *Ancylostoma Spp* were found in 16 samples. The prevalence of single infection of *Toxascaris leonina* in lions reported by Nashiruddullah and Chakraborty (2001) in Assam State Zoo and Kashid et al. (2003) at different locations in India confirmed our findings of *Toxascaris leonina* in Nandankanan Zoo. Prevalence of mixed infection of *Toxascaris leonina* and *Ancylostoma Spp* was reported by Maske et al. (1990) and Dhoot et al. (2000) in Maharaj Bag Zoo in Nagpur and Kistwara et al. (1998) and Jitendran (2002) in Zoos of Himachal Pradesh, confirm of the presence of mixed infection in lions and are in consonance with the observations recorded during our study in Nandankanan Zoo. The higher prevalence rate of *Toxascaris leonina* in lions might be due to the direct life cycle of *Toxascaris leonina*, development of infective stages within a week and housing patterns of lions in groups in safari. Evaluation of anthelmintic activity against nematodes of lions revealed that Ivermectin at a dose rate of 0.3-mg/kg body weight, the reduction of *Toxascaris leonina* ova to zero after 3rd day of post treatment where as in Pyrantel pamoate and Levamisole, the efficacy were 70.31% and 94.36% respectively on 3rd day post treatment (Table 1). The efficacy of Ivermectin recorded in our studies confirms the report of (Meredith et al., 1991; Suresh et al., 2002; Singla et al., 2003; Singh et al., 2006). The efficacy of Ivermectin against *Ancylostoma Spp* infection in lions was 100% on 3rd day post treatment. The reduction of faecal egg count by Pyrantel pamoate and Levamisole against *Ancylostoma Spp* infection was 95.15% and 88.89% respectively on 3rd day post treatment (Table 2). The reappearance of *Toxascaris leonina* infection in lions occurred 24, 45 and 52 days post treatment while the reappearance of *Ancylostoma* infection-

Table 1: Comparatives efficacy of different drugs against *Toxascaris leonina* in lions

<table>
<thead>
<tr>
<th>Groups</th>
<th>Drugs used</th>
<th>Pre-treatment EPG</th>
<th>Post-treatment EPG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EGG Per Gram</td>
<td>3rd day</td>
</tr>
<tr>
<td>I</td>
<td>Nemocid</td>
<td>256</td>
<td>76 (70.31)</td>
</tr>
<tr>
<td>II</td>
<td>Dicaris</td>
<td>195</td>
<td>11 (94.36)</td>
</tr>
<tr>
<td>III</td>
<td>Ivermectol</td>
<td>221</td>
<td>0 (100.00)</td>
</tr>
<tr>
<td>IV</td>
<td>Control</td>
<td>281</td>
<td>290</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate efficacy percentage.

Table 2: Comparatives efficacy of different drugs against *Ancylostoma Spp* in lions

<table>
<thead>
<tr>
<th>Groups</th>
<th>Drugs Used</th>
<th>Pre-treatment EPG</th>
<th>Egg Per Gram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3rd day</td>
</tr>
<tr>
<td>I</td>
<td>Nemocid</td>
<td>103</td>
<td>5 (95.15)</td>
</tr>
<tr>
<td>II</td>
<td>Dicaris</td>
<td>117</td>
<td>13 (88.89)</td>
</tr>
<tr>
<td>III</td>
<td>Ivermectol</td>
<td>168</td>
<td>0 (100.00)</td>
</tr>
<tr>
<td>IV</td>
<td>Control</td>
<td>111</td>
<td>137</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate efficacy percentage.
in lions occurred 24, 31 and 45 days post treatment in groups that were administered with Pyrantel pamoate, Levamisole and Ivermectin respectively, but with a low egg per gram count.

**Conclusion**

On the basis of result obtained in the present studies Ivermectin at a dose rate of 0.3mg/kg body weight orally may be recommended for the treatment of *Toxascaris leonina* and *Ancylostoma Spp* infection in lions.

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**References**


