Bovine Fasciolosis in Ginnir District: Prevalence and Susceptibility to Commonly used Anthelmintics

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The study was conducted to determine the prevalence of bovine fasciolosis and to assess the effectiveness of commonly used anthelmintics in Ginner district south-eastern, Ethiopia from September to December 2011. For the determination of the prevalence, 384 fecal samples were collected and examined by sedimentation technique. The result revealed that 121 (31.51%) animals were positive for Fasciola eggs. The infection rate was 30.81 and 32.16% in animals less than four years and greater or equal to 4 years of age, respectively while it was 29.70 and 33.51% in male and female animals, respectively. However, the differences either in age or sex groups were not statistically significant. Anthelmintics efficacy trial was conducted on 45 naturally infected animals. The animals were randomly allocated into five groups. The first group was treated with Tetracloza 3400mg, the second with Albenda QK 2500mg, the third with Albentong 2500mg, the fourth with Ashialben 2500mg, the last group was left untreated (control). Faecal samples were examined before and after treatment (7 days). The percent effectiveness for tetracloza 3400mg, albenda QK 2500mg, albentong 2500mg and ashialben 2500mg were 100, 90.91, 57.14 and 62.50%, respectively. In conclusion, fasciolosis is still the most prevalent parasitic disease in the district and anthelmintics commonly used in the district have different efficacy. Strategic control methods have to be designed and implemented. Further wide scale studies using standard products of anthelmintics, are needed to determine the presence of anthelmintic resistance.

Keywords: Anthelmintic, bovine, fasciolosis, ginner, prevalence, sedimentation
BOVINE FASCIOLOSIS IN GINNIR DISTRICT: PREVALENCE AND...

Introduction

Fasciolosis, caused by *Fasciola hepatica* and *F. gigantica*, is one of the most prevalent helminthes infections of ruminants in different parts of the world inducing significant morbidity and mortality (WHO, 1995; Okewole et al., 2000). The infection of domestic ruminants with *Fasciola* causes economic loss estimated over US$ 200 million per annum to the agricultural sector worldwide, with over 600 million animals infected (Ramajo et al., 2001). In tropical regions, fasciolosis is considered as the single most important helminthes infection of cattle with prevalence rates of 30-90% in Africa, 25-100% in India and 25-90% in Indonesia (Spithill and Dalton, 1998).

The economic significance of fasciolosis in Ethiopia has been reported by several authors (Yadeta, 1994; Mezgebu; 1995). The two primary requirements for the establishment of the parasite are snail (intermediate host) and environment that suits the development and multiplication. Fasciolosis is considered as an important limiting factor for bovine production in the county (Michael, 2004).

There are different strategies for the control of fasciolosis, based largely on drug (fasciocide) use but allied to epidemiological data (Boray, 1997). Chemotherapy with drug remains the most cost effective way of treating parasitic disease and it is usually at the heart of any controlling campaign. Compared to environmental engineering, drug treatment is very cheap. Less frequent strategic treatment with a possible yearly rotation of an anthelmintic or anthelmintic combination that are effective against both immature and adult fluke have been reported to provide the best method of successful control of fasciolosis (Parr and Gray, 2000). The treatments of fasciolosis and their action also either on adult stage of *Fasciola* or on both adult and juvenile stages. Resistance to Triclabendazole was first appeared in farm animals in Australia in mid 1990s and since then has been reported in a number of European countries (Fairweather and Boray, 1999).

*Fasciola* is a common clinical case in Ginner district veterinary clinics. However, the prevalence was not determined yet. Different anthelmintics are prescribed and used to treat the parasite for a long time. Even livestock owner buy and use these drugs. Most of them are imported without proper test and registration. These all things may have an effect on their efficacy. Therefore, this study was designed to determine the prevalence of bovine fasciolosis in Ginner district and to assess the effectiveness of commonly used anthelmintic for the treatment of fasciolosis in the area.

Materials and Methods

Study Area

The study was carried in Ginner district, Bale zone, Oromia Regional State, situated at 550km from Addis Ababa to the south-eastern, Ethiopia. The area has an altitude of 2000 meter above sea level, receives annual rainfall of 1300 mm. The climate in the area is rainy summer and wet autumn and dry winter. The district has marshy areas which are suitable for *Lymnaea truncatula*, the intermediate host of *Fasciola hepatica*.

Study Animals

The overall cattle population in the study area is 28,000. A total of 384 animals were selected randomly for faecal sample collection to determine the prevalence. Among animals harbouring the parasite 45 animals with similar age and sex (male) were selected for efficacy trial. All these animals were privately owned by smallholder farmers and managed under traditional extensive system and depend mostly on communal grazing and receive a minimum or no supplementary feed and health care.

Faecal Sample Collection and Examination

Faecal samples were collected directly from the rectum into universal laboratory-sampling bottles and immediately transported to Ginner district veterinary laboratory for coproscopical examination using sedimentation technique. During sampling, information on sex and age of sampled animals were recorded.

Efficacy Trial

The animals harbouring the parasite were randomly divided into five groups. The first group was treated with Tetracloza 3400mg , the second with Albenda QK 2500mg , the third with
Albentong 2500mg, the fourth with Ashialben 2500mg, the last group was left untreated (control). Faecal samples were examined before and after treatment (7 days) (Ibarra-Velarde et al., 2001). The dose and route of administration was based on manufacturer’s recommendation (Table 1).

**Table 1:** Commonly used Anthelmintic drugs against bovine Fasciola in the study area and utilized for efficacy trial

<table>
<thead>
<tr>
<th>Name of Anthelmintic drugs</th>
<th>Generic name</th>
<th>Composition</th>
<th>Dose for bovine fasciolosis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albenda Qk 2500</td>
<td>Albendazole</td>
<td>Albendazole 2500mg</td>
<td>10mg/kg</td>
</tr>
<tr>
<td>Tetracloza cattle 3400</td>
<td>Oxyclozanide and Tetramisole</td>
<td>Oxyclozanide 1400mg and Tetramisole 2000mg</td>
<td>22mg/kg</td>
</tr>
<tr>
<td>Ashialben 2500</td>
<td>Albendazole</td>
<td>Albendazole 2500mg</td>
<td>15mg/kg</td>
</tr>
<tr>
<td>Albentong 2500</td>
<td>Albendazole</td>
<td>Albendazole 2500mg</td>
<td>10mg/kg</td>
</tr>
</tbody>
</table>

*Recommended by the manufacturer

**Statistical Analysis**

All raw data generated from the study were entered into Microsoft excel database system. Chi-square was used to compare the prevalence in age and sex groups. All statistical tests were analysed using SPSS software. The test result was considered significant when the calculated *P*-value is less than 0.05.

**Results and Discussion**

**Prevalence**

Faecal sample of 384 cattle were examined of which 31.51% were positive for bovine fasciolosis. The infection rate of bovine fasciolosis in animals less than four years and greater or equal to four year were 30.81 and 32.16%, respectively whereas it was 29.70% in male and 33.51% in female animals. However, the prevalence of bovine fasciolosis in age and sex groups was not statistically significant (*p* > 0.05) (Table 2).

**Table 2:** Prevalence of bovine fasciolosis depending on age and sex categories

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Categories</th>
<th>No examined</th>
<th>No positive</th>
<th>Prevalence (%)</th>
<th>Chi square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt;4 year</td>
<td>185</td>
<td>57</td>
<td>30.81</td>
<td>0.81</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>≥4 year</td>
<td>199</td>
<td>64</td>
<td>32.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>202</td>
<td>60</td>
<td>29.70</td>
<td>0.53</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>182</td>
<td>61</td>
<td>33.51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Effectiveness of anthelmintic treatments**

The trial revealed that percent of effectiveness for tetracloza 3400mg, albenda QK 2500mg, albentong 2500mg and ashialben 2500mg were 100, 90.91, 57.14 and 62.50%, respectively (Table 3).

**Table 3:** The efficacy of commonly used anthelmintics

<table>
<thead>
<tr>
<th>Anthelmintic drugs</th>
<th>No animals treated</th>
<th>No animal positive before treatment</th>
<th>No animal positive After treatment</th>
<th>Effectiveness percentage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracloza 3400mg</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>100.00</td>
</tr>
<tr>
<td>Albenda QK 2500mg</td>
<td>11</td>
<td>11</td>
<td>1</td>
<td>90.91</td>
</tr>
<tr>
<td>Albentong 2500mg</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>57.14</td>
</tr>
<tr>
<td>Ashialben 2500mg</td>
<td>8</td>
<td>8</td>
<td>3</td>
<td>62.50</td>
</tr>
<tr>
<td>control</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

*Effectiveness percentage = Number of animals negative after treatment divided by number of animals treated by the specific drug and multiplied by 100

The overall prevalence of bovine fasciolosis in the study area was 31.51% which agrees with the reports of Abduljebbar (1994), (34% in Bale). However, it disagrees with other previous reports.
Ahmed et al. (2007) reported a prevalence rate of 13.2% in Awash River basin. Michael (2004) reported the prevalence of 56.3% in Debre Zeit. The difference in the prevalence of fasciolosis in different region of the country may be due to the difference in altitude, rainfall, temperature and humidity. Since the prevalence of fasciolosis is highly related to the favourable ecological factors for snail intermediate host (Urquhart et al., 1996). Graber and Dayness (1974) reported that F. hepatica and F. gigantica infection occurs in areas above 1800 and below 1200 meter above sea level, respectively. Michael (2004) suggests that the climatic factors in highland areas are more favourable for the propagation and activities of snail intermediate host and progression of the parasite.

In this study, significant differences were not observed between age and sex groups. Prevalence of fasciolosis was not associated with sex or age indicating that being maleness or femaleness or adult or young have no effect on the prevalence of the disease. Solomon (2005) suggested that Fasciola equally affect both sex and age groups. This may be due to the fact that both age and sex groups are grazed on a similar pasture land and hence have equal chance to acquire the parasite.

Anthelmintic trial revealed that tetracloza 3400mg which is a combination of two drugs (Oxyclonizanide and Tetramisole) showed 100% effectivity. All animals treated with this drug were free from Fasciola egg after treatment. Oxyclonizanide is one of the fasciolicides used commonly today which reaches its peak concentration in the blood after treatment (Fairweather and Boray, 1999). Mooney et al. (2009) also reported more than 98% efficacy. It has also been reported that oxyclonizanide is effective against triclabendazole-resistant fluke (Coles and Stafford, 2001).

Albendazole group of anthelmintics didn’t cure animal effectively. This may be related with the fact that Albendazole act only on adult parasite (McKellar and Scott, 1990). So there may be maturation between treatment and sampling so that egg production may continue. In this study, it was also observed the difference in different brands of Albendazole. Ashialben 2500mg showed the lowest efficacy. This may be related to the quality of the product. Wide scale trail using standard products and quantitative tests must be conducted to detect anthelmintic resistance.

Bovine fasciolosis is the most prevalent internal parasite infestation in Ginner district. Reasonably the parasite has economic impact in small holder farmers rearing bovine. So, awareness has to be created on owner of the animal (farmers).

References


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