PREVALENCE OF FASCIOLA INFECTION AMONG SCHOOL CHILDREN IN SHARKIA GOVERNORATE, EGYPT

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ABSTRACT

This study was performed on 1350 school children from 9 different villages in Sharkia Governorate to investigate the real situation of endemicity of fascioliasis in the area. Stool examination using modified Kato thick smear method was performed to detect Fasciola infection and other parasites. Those with negative stool samples were examined serologically by ELISA test to detect anti-Fasciola IgG. All cases with positive anti-Fasciola IgG were further examined by circum-oval precipitin test (COPT) against viable S.mansoni eggs to exclude the crossly reacted Schistosoma infections. Sixty nine cases were found to pass Fasciola eggs in their stool samples (5.1%). Anti-Fasciola IgG was detected in the sera of 231 children (17.1%) using ELISA test. Eighty four out of the 231 children were found positive by COPT and were considered as schistosomal cases. The remaining 147 who gave negative COPT were considered as Fasciola infections. All of the 69 Fasciola positive stool cases were found positive by ELISA test and negative by COPT test. The sensitivity of stool analysis was 47% versus 100% sensitivity of ELISA, whereas the specificity of ELISA was 63%. The total number of Fasciola positive cases by ELISA and stool analysis were 147.
serologically by ELISA test to detect anti-Fasciola IgG. Moreover, all cases with positive anti-Fasciola IgG were also examined by circum-oval precipitin test (COPT) against viable S.mansoni eggs to exclude Schistosoma infections which may give false positive fascioliasis.

Partially purified Fasciola antigen was used in an ELISA assay according to Hassan et al. (1989) to detect anti-Fasciola IgG. Fasciola gigantica adult worms, obtained from condemned bovine livers from slaughterhouse, were partially purified using Sephadex G-200 column according to the method of Mansour et al. (1983). The gel filtration gave 4 peaks. The highest results were obtained with peak II and III. The two peaks were pooled and used as an antigen in the present study. Viable S.mansoni eggs, derived by centrifugation on different density gradients of percoll (Pharmacia) were used as an antigen (El-Gamal and Moustafa, 1991) in a circum-oval precipitin test according to the method described by Oliver-Gonzalez (1954).

RESULTS

A total number of 1350 school children from 9 different villages were parasitologically examined for fascioliasis. Sixty-nine cases were found to pass Fasciola eggs in their stool samples (5.1%). Anti-Fasciola IgG was detected in the sera of 231 children (17.1%) using ELISA test against partially purified adult Fasciola antigen as shown in Table (1).

Out of 231 ELISA positive cases, 84 cases were found positive by COPT and were considered as schistosomal cases (Table 2). The remaining 147 who gave negative COPT were considered as Fasciola infections.

All Fasciola positive cases by stool analysis (69) were found to be positive by ELISA test and negative by COPT test. ELISA test could detect 78 Fasciola positive cases more than stool analysis. So, the sensitivity of stool analysis was 47% versus 100% sensitivity of ELISA, while the specificity of ELISA was 63% as shown in Table (3).

The total number of Fasciola positive cases by ELISA and stool analysis were 147 cases among 1350 children. So, the prevalence rate was 10.9%.
cases among 1350 children indicating a prevalence of 10.9% among school children in Sharkia Governorate. This results highlighting the importance of health education and snail control in decreasing the high prevalence.

INTRODUCTION

Human fascioliasis is a world wide problem, it is mainly caused by *Fasciola hepatica* and to a lesser extent by *F.gigantica* (Hardman et al., 1970). Human fascioliasis is becoming a public health problem among Egyptians (Osman, 1991). Many workers studied the prevalence of fascioliasis in Egypt. Ali et al. (1974) found that human fascioliasis became a health problem in Dakahlia Governorate. Moreover, Makled et al. (1988) reported that the prevalence of fascioliasis in Sharkia Governorate reached up to 8.7%. Also its prevalence in Alexandria (4.6%) was studied by Abou-Basha et al. (1990). Diagnosis of human fascioliasis by finding eggs in faeces lacks sensitivity since eggs may not appear during acute and chronic fascioliasis (De Weil et al., 1984). In addition, false positive results are accounted in stool samples following ingestion of infected livers. So, the reference to serological tests are of value in many cases (Hillyer and Santigo, 1981). Keeping in mind that the cross reactions with other helminthic infections and false positivity with normal human sera, appeared with serological tests, constitute a major problem for specific detection of fascioliasis (Hillyer and Capron, 1976). One has to consider and try to eliminate reactivity specially with sera from patients with schistosomiasis (Hassan et al. 1989 and Khalil et al., 1990) to consider the obtained results.

SUBJECTS AND METHODS

This study was performed on 1350 school children (1101 males and 249 females), aged 6-12 years (mean ±SD: 10.18±2.43) from 9 different villages in Sharkia Governorate. For every child, stool examination using modified Kato thick smear method (Martin and Beaver, 1968) was performed to detect *Fasciola* infection and other parasites. Ten ml. urine sample was examined using nuclepore filtration technique (Peters et al., 1976) for *S.haematobium* egg counting. Those with negative stool samples were examined
Table (1): Stool examination and ELISA for detection of *Fasciola* infection.

<table>
<thead>
<tr>
<th>Test</th>
<th>Total number</th>
<th>No. of +ve cases</th>
<th>% positivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool</td>
<td>1350</td>
<td>69</td>
<td>5.1</td>
</tr>
<tr>
<td>ELISA</td>
<td>1350</td>
<td>231</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Table (2): COPT among cases with ELISA positive anti-*Fasciola* IgG.

<table>
<thead>
<tr>
<th>Test</th>
<th>Total number</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPT +ve</td>
<td>231</td>
<td>84</td>
<td>36.4</td>
</tr>
<tr>
<td>COPT -ve</td>
<td>231</td>
<td>147</td>
<td>63.6</td>
</tr>
</tbody>
</table>

Table (3): Sensitivity and specificity of the ELISA test.

<table>
<thead>
<tr>
<th>Positive by test</th>
<th>False +ve</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool examination</td>
<td>69</td>
<td>0</td>
<td>47%</td>
</tr>
<tr>
<td>ELISA</td>
<td>231</td>
<td>84</td>
<td>100%</td>
</tr>
</tbody>
</table>

DISCUSSION

In Egypt, human fascioliasis have been reported by Ali et al. (1974) and El-Shazly et al. (1991) in Dakahlia Governorate, Farag et al. (1979), Abou-Basha et al. (1990) and Farag et al. (1995) in Alexandria Governorate, Ismail et al. (1988) and Makled et al. (1988) in Sharkia Governorate and Abdel-Rahman et al. (1995) in Menoufia Governorate. In the present work, 69 out of 1350 children (5.1%) had *Fasciola* eggs by stool examination with a sensitivity of 47%. De Weil et al. (1984) attributed the low sensitivity of stool examination of difficulty in finding *Fasciola* eggs during acute and chronic fascioliasis. Moreover, false fascioliasis due to ingestion of infected liver was reported by Cheesbrough (1987) as another cause of low sensitivity. So, the sole dependence on stool examination will miss many cases as mentioned by Makled et al. (1988). The reference to serological tests is of
accurate value in many cases (Hillyer and Santigo, 1981). Using ELISA test in the present work, 231 cases out of 1350 school children were found positive. COPT was carried out to exclude those with schistosomiasis from the recorded ELISA positive cases as cross reactions between schistosomiasis and fascioliasis were reported by many workers (Khalil et al., 1990 and Osman & Helmy, 1994). COPT revealed that 36.4% of ELISA positive cases had anti-Schistosoma antibodies in their sera, which is in agreement with the results previously obtained by Hassan et al. (1989) who reported that 25% of sera of schistosomiasis gave false positive reactions with Fasciola antigen.

In the present work, 147 Fasciola cases proved by positive ELISA were negative by COPT. Moreover, all positive stool cases had detectable anti-Fasciola antibodies by ELISA revealing that the sensitivity of ELISA was 100%. These results are in agreement with those of Shaker et al. (1990) and Habeeb et al. (1992) who recorded sensitivities around 66%. As a partially purified Fasciola antigen was used, the specificity of ELISA was 63%, which is lower than that obtained by Shaker et al. (1994) who used a highly purified Fasciola antigen.

Mourad (1995) reported that fascioliasis became endemic in Sharkia Governorate. The prevalence of human fascioliasis among rural school children was 10.9% in the present work. This was slightly higher than that recorded by Makled et al. (1988) who reported a prevalence of 8.7% in other localities in Sharkia. The increasing prevalence might be due to inefficient snail control in the governorate. Farag et al. (1995) highlighted the importance of wing snail control as they reported a decrease in prevalence of fascioliasis in Alexandria Governorate from 5.2% in 1990 to less than 2% in 1994 after the B.alexandrina snail control and without administration of any fasciolicidal drug.

REFERENCES


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