IMPORTANCE OF MICROSCOPIC STOOL EXAMINATION IN PATIENTS WITH DIARRHOEA


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Background: Loose motion is a common symptom in patients reporting to our hospital. As it is a small set up where only facility for microscopic stool examination is available, we designed this study to know how much microscopic stool examination can help us in management of patients with diarrhoea.

Methods: This cross-sectional descriptive study was conducted from January 2010 to April 2012, at Thall Scout Hospital, Hangoo, Khyber Pakhtoon Khwa, Pakistan. All the patients presenting with acute diarrhoea were included in the study. Patients older than 12 years of age were labelled as adults and those 12 years or younger as child. Stool specimens were collected using proper procedure and were examined microscopically. Results: Of 494 stool specimens examined, 117 (23.68%) were positive for parasites or their ova, 34 (6.88%) had numerous pus and red blood cells and 343 (69.43%) patients had only stool of loose/soft consistency. Of 117 stool specimens positive for parasites, Giardia lambia was detected in 67 (57.26%) patients, Entamoeba histolytica in 22 (18.80%) patients, H. nana in 10 (8.55%) patients, Tenea saginata in 8 (6.84%) patients, hook worm in 6 (5.13%) patients, ascaris in 2 (1.71%) and Trichuris trichura in 2 (1.71%) patients. Conclusion: Among the parasitic causes of diarrhoea, giardia is the most common cause in our study with entameoba the second most common cause.

Keywords: Parasite, diarrhoea, protozoa, helminthes, Giardia lambia

ORIGINAL ARTICLE

INTRODUCTION

The world health organization (WHO) defines diarrhoea as having three or more loose stools in a single day or having more stools than is normal for that specific individual.1 Infectious diarrhoea is a great health problem mostly in developing nations.2 The statistics show that about 3–5 billion people suffer from diarrhoea annually,3 most of which are children from developing countries.4 It has also been reported that in 2008 alone, about 1.3 million children died of diarrhoea,5 with most of them belonging to world’s poorest nations. Statistical data of 1980 showed that diarrhoea caused death of 4.6 million children in developing world.6 With the widespread availability of oral rehydration solution (ORS) in the year 2008, the mortality from diarrhoea was reduced dramatically.7 Children less than two years of age in developing countries contract six or more episodes of diarrhoea in a year with resultant significant morbidity. Adults get less episode of diarrhoea because of their acquired immunity.8 In developed nations, course of diarrhoea is mild but still a problem though there is a significant reduction in mortality. However, economic loss and absence from school and working place may be significant.

A study in British population reported an annual prevalence of infectious diarrhoea to be about twenty percent.9 Approximately one-third of people travelling from developed world to developing countries get diarrhoea.10 It is very important to know the exact cause of diarrhoea not only for epidemiological purposes for also for the right treatment of diarrhoea. Many studies have been carried out in children to know about the causative agent of diarrhoea11–13 but there are few such studies in adults regarding etiological agent of diarrhoea especially in developed countries.12–14

MATERIAL AND METHODS

This cross-sectional descriptive study was carried out at Thall Scout Hospital, Hangoo, Khyber Pakhtoon Khwa Province of Pakistan. Thall is located at the junction of North Waziristan Agency, Kurrum Agency and Orakzai Agency from January 2010 to April 2012. In this hospital only Frontier Corps soldiers and their families are treated. It is a small set up where only the base line investigations are available. For stool examination, only microscopy is available. So we can only look for parasites, leukocytes and red blood cells in the stool. Stool specimens of patients were collected in the hospital and fresh stool specimen were examined under the microscope using proper techniques.

All the patients with a history of loose motion of less than two weeks were included in the study. Patients with age less than 12 years were included in children group and those with age more than 12 years were included in adults group. Of 494 patients 418 (84.62%) were adult male, 21 (4.25%) were adult female, 25 (5.06%) were female children and 30 (6.07%) were male children.

Based on stool examination the patients were divided into three categories.
Stool positive for parasites or ova: All the patients whose stool was positive for parasites or their ova were included in this group.

Stool positive for pus cells and red blood cells: All the patients whose stool was negative for parasites and ova but had pus cells and red blood cells >10/high power field in their stool were included in this group.

Only of loose consistency: All the patients whose stool was negative for parasites and their ova and also negative for pus cells and red blood cells but was of loose/soft consistency were included in this group.

RESULTS

Of 494, 117 (23.68%) patients stool samples were positive for parasites or their ova, 34 (6.88%) patients had pus cells and red blood cells on stool R/E but no parasites and ova, 343 (69.43%) patients had only stool of loose/soft consistency but had neither parasites and ova nor pus cells and red blood cells on stool R/E.

Of 117 patients whose stool was positive for parasites or their ova, 89 (76.06%) patients had protozoa in their stool and 28 (23.93%) patients stool was positive for helminthes. Of these 117 patients giardia was positive in 67 (57.26%) patients, Entamoeba histolytica (E. Histolytica) was positive in 22 (18.80%) patients, H. nana was positive in 10 (8.55%) patients, Tenea saginata in 8 (6.84%) patients, hookworm in 6 (5.13%) patients, ascaris in 02 (1.71%) patients and Trichuris trichura (T. trichura) in 02 (1.71%) patients.

Table 1: Frequencies of different parasites (n=117)

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giardia lamblia</td>
<td>67</td>
<td>57.26%</td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td>22</td>
<td>18.80%</td>
</tr>
<tr>
<td>H. nana</td>
<td>10</td>
<td>8.54%</td>
</tr>
<tr>
<td>Tenea saginata</td>
<td>8</td>
<td>6.83%</td>
</tr>
<tr>
<td>Hook worm</td>
<td>6</td>
<td>5.12%</td>
</tr>
<tr>
<td>Ascaris lumbricoides</td>
<td>2</td>
<td>1.70%</td>
</tr>
<tr>
<td>Trichuris trichura</td>
<td>2</td>
<td>1.70%</td>
</tr>
</tbody>
</table>

Table 2: Age and sex distribution (n=494)

<table>
<thead>
<tr>
<th>Age and Sex</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult male</td>
<td>418</td>
<td>84.62%</td>
</tr>
<tr>
<td>Adult female</td>
<td>21</td>
<td>4.25%</td>
</tr>
<tr>
<td>Child male</td>
<td>30</td>
<td>6.07%</td>
</tr>
<tr>
<td>Child female</td>
<td>25</td>
<td>5.06%</td>
</tr>
</tbody>
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DISCUSSION

Because of new advancements in the recent years, an etiological agent can be isolated in up to seventy percent of cases of diarrhoea. The most common diarrhoea causing pathogen includes rota virus, Giardia lamblia, Enterotoxigenic Echerichia coli (E. coli), Campylobactor jejuni, Shigella, E. histolytica and vibrio cholerae 0:1. The exact identification and isolation of these causative organism need advanced laboratory techniques and sophisticated methods like routine culture, ELIZA, in vivo studies in animals and tissue cultures. However, due to lack of advanced laboratory techniques and economic restriction in developing countries make such studies difficult. Although isolation of exact etiological agent does not affect oral rehydration therapy, yet it is necessary whether a patient with diarrhoea be given antibiotic and other drugs or not stool inspection for visible mucous and blood, PH measurement and microscopy for fats, parasites, red and white blood cells have been performed for years for the assessment of inflammatory diseases of colon and carbohydrates and fat malabsorption. Studies in past have shown importance of microscopic stool examination in detection of faecal white blood cells in patient with diarrhoea especially those suffering from shigellosis.

Koch describes the importance of microscopic stool examination in the evaluation of diarrhoeal patients in the past and recent research work has now established its value in the diagnosis of parasitic diarrhoea and shigellosis. Patient with diarrhoea who have blood in stool and whose microscopy show red blood cells most likely are infected with E. histolytica or shigella. These patients require antibiotic therapy. Studies have shown that patients suffering from shigellosis have numerous white blood cells in stool (more than 50/high power field) on microscopy which differentiates these patients from those infected with E. histolytica. Patients with dysentery have numerous RBCs and WBCs on microscopic stool examination and are more likely to have numerous white blood cells in stool than all patients, which suggests the invasive nature of these agents.

In our study, we divided our patients in three categories on the basis of stool microscopic findings. In which a definite agent was identified and in which specific treatment should be given, in which specific etiological agent was not identified but their stool samples had numerous pus cells and red blood cells and included patients with diarrhoea in which no specific agent was identified and their stool had no pus cells and red blood but the only finding was that their stool was of loose/soft consistency. Now the question is that whether the latter two categories in our study require specific therapy. They also further classified the pathogens as causing watery diarrhoea which included Rotavirus, Enterotoxigenic E. coli and C. jejuni which do not require treatment and other includes Shigella, E. histolytica, Vibrio cholerae and Giardia lamblia which require specific therapy. They further classified the pathogens as causing watery diarrhoea which included Rotavirus, Enterotoxigenic E. coli and Vibrio cholerae, agents causing dysentery which included Shigella and E. histolytica and others which included Giardia lamblia and C. jejuni. They also found out that patients with Shigella and Entamoeba had more feacal erythrocytes (>10/HPF) than patients with other pathogens (48% and 39% respectively versus 12% all patients p<0.01). Now we may say that cat II in
our study can be classified as patients with dysentery most probably due to *Shigella* (as *Entamoeba* can be detected by stool microscopy) which require treatment for bacillary dysentery and cat III in our study can be classified as patients with watery diarrhoea not requiring drug treatment but only oral rehydration required.

In a study by Tinadue O et al. their findings are almost comparable with our study. Out of 300 patients with diarrhoea in their study 70 (23.3%) patients stool was positive for parasites. There were 18 (6%) helminthes and 52(18.6%) protozoa. Whereas in our study parasites were positive in 117 (23.68%) out 494 patients. Helminthes were positive in 28 (5.6%) patients and protozoa in 89 (18.06%).

There is a lot of room for improvement. Advanced investigations can be carried out to find out specific causes and to treat the patients accordingly. The study may be extended to general population and not restricted to a specific population like soldiers and their families which have a specific environment. But working in periphery with limited resources should not be an obstacle in our research. We should classify our working in that particular environment with those limited resources.

**CONCLUSION**

Though microscopic stool examination is a simple test, requiring a few minutes, yet is very effective in dysentery diagnosis and differentiating between *Shigella* and the invasive *E. histolytica*. Microscopic stool examination is of limited value in differentiating between agents causing watery diarrhoea especially enterotoxigenic *E. coli* and vibrio cholera 0:1. However, these agents cause self-limiting watery diarrhoea for which fluid therapy is mandatory and antibiotic used in these patients may only reduce the duration of disease and excretion of pathogen.

**REFERENCES**


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