



In Pediatric Gastroenteritis: the Presence of Helicobacter Pylori Prevalence of Entamoeba Histolytica, Giardia Intestinalis And Cryptosporidium Spp

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Abstract

Objective: Parasitic gastroenteritis continues to be an important cause of morbidity and mortality in children worldwide. The purpose of this study is to evaluate the frequency of Entamoeba histolytica, Giardia intestinalis and Cryptosporidium spp species in diarrhea samples taken from children.

Methods: Between August 2018 and January 2019, 400 stool samples of children suffering from gastroenteritis were examined for important intestinal protozoa agents by both direct examination (Native & Lugol iodine) and antigen detection tests.

Results: It was determined that G. intestinalis was the most common pathogen (13%). This was followed by Cryptosporidium spp (7.75), E. histolytica (4.00%), T. hominis (1.00%). The common complaint in children in this study was diarrhea.

Conclusion: E. histolytica, G. intestinalis and Cryptosporidium spp were identified as important pathogens commonly seen in Erzurum. Adequate hygienic measures should be taken to reduce the frequency of enteric pathogens. Immunological and molecular tests should be done for a better interpretation of the results.

Keywords: Gastroenteritis, Entamoeba histolytica, Giardia intestinalis, Cryptosporidium spp., Erzurum, Turkey

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Pediatric Gastroenteritis in Entamoeba histolytica, Giardia intestinalis and Cryptosporidium spp. Prevalence

Öz

Amaç: Tüm dünyada parazitik gastroenterit, çocuklarda önemli bir morbidite ve mortalite nedeni olmaya devam etmektedir. Bu çalışmanın amacı, çocuklardan alınan ishal örneklerinde Entamoeba histolytica, Giardia intestinalis ve Cryptosporidium spp türlerinin sıklığını değerlendirmektir.

Yöntemler: Ağustos 2018'den Ocak 2019 tarihleri arasında , gastroenterit şikayetli olan çocukların 400 dışkı numunesi, hem direkt bakı (Native & Lugol iyot) hem de antijen saptama testleri ile önemli bağırsak protozoa etkenleri açısından incelendi.

Bulgular: Giardia intestinalis'in en sık görülen patojen olduğu (%13) tespit edildi. Bunu Cryptosporidium spp (7.75), E. histolytica(%4,00), T. hominis (%1,00) oranlarında izledi. Bu çalışmada çocuklardaki ortak şikayet ishal tablosuydu.

Tartışma ve Sonuç: Erzurum'da yaygın olarak görülen önemli patojenler E. histolytica, G. intestinalis ve Cryptosporidium spp olarak belirlendi. Enterik patojenlerin sıklığını azaltmak için yeterli hijyenik önlemler alınmalıdır. Sonuçların daha iyi yorumlanması için immünolojik ve moleküler testler yapılmalıdır.

Anahtar kelimeler: Gastroenterit; Entamoeba histolytica; Giardia intestinalis; Cryptosporidium spp; Erzurum.

INTRODUCTION

Giardia intestinalis, Entamoeba histolytica Cryptosporidium spp. are among the common intestinal parasites causing diarrhea in the world¹⁻⁴. They still remain to be the most commonly encountered parasites causing significant morbidity and mortality throughout the world, affecting millions of people each year³⁻⁶. G. intestinalis is a, flagellated protozoan (that causes giardiasis with a wide variety of gastrointestinal complaints. The main symptoms in giardiasis are nausea, vomiting, malaise, flatulence, abdominal pain, diarrhea, steatorrhea, and weight loss^{1,2}. It is spread via cysts by fecal-oral contamination, the prevalence is higher in populations with poor sanitation⁷. The disease is commonly water-borne since cysts are resistant to the chlorine in water⁸. E. histolytica can also spread via cysts by the fecal-oral route by contaminated food and water or oral-anal sex⁹. It causes which is more likely the world's second protozoal disease after malaria in causing death^{7,10}. The pathogenesis in E. histolytica is disruption of the protective mucus overlying the colonic mucosa resulting in colitis, ulcerations, bleeding and rarely intestinal perforation. The main symptoms are

malaise, weight loss, abdominal cramps, bloody diarrhea, and fever⁷. Cryptosporidium is a coccidian protozoa that causes gastrointestinal and respiratory diseases in humans. It can be transmitted via oocysts by contact with human and animal feces and by oral-anal sex¹¹. The main clinical features are watery diarrhea, abdominal pain, dehydration, nausea, vomiting, fever and weight loss. The symptoms are more severe in immunocompromised patients in whom cryptosporidiosis may be life-threatening¹². Like Giardia oocysts of Cryptosporidium are also resistant to chlorine^{13,14}. All these protozoa are shed in feces, so diagnosis is made by detection of these parasites or their antigens in feces. Although direct microscopy is the most commonly used method in diagnosis, misconceptions or false positivities or negativities have led to the development of more reliable methods. For this purpose, different staining techniques, ELISA, multiplex PCR are currently used. The infection with these protozoa varies according to the level of development in any region worldwide. To prevent the spread of these infections and keep

them under control, for this reason, we aimed to study them by direct microscopy and immunochromatographic methods.

METHODS

Between August 2018 and January 2019, stool samples from 400 children between the ages of 0-5 years with gastroenteritis were included in the study. Of these, 214 cases were from male (53.5% and 186 cases from females (46.5%). Investigation for the presence of parasites or their antigens were made using native-Lugol preparation Unicellular parasitic factors were investigated with antiglare detection kits for the presence of antigens and direct parasite.

Bacterial agents such as Salmonella and Shigella were cultured and tried to be determined. The presence of protozoa antigens in stool samples was investigated with a commercial Chromatographic kit (Xlamon Boson Blotoch Co., Ltd 90-94 Tianfeng Road, Jimei North Industrial Park, Xiamen, Fujian, 361021, P.R. China). Ethics committee approval were taken on 26.06.2020, with the decision no.21. Statistical analysis: The data was analyzed by SPSS 20.0.

RESULTS

During the study period, 400 children between the ages of 0-5 years with symptoms of gastroenteritis were The three common enteric protozoon results are shown in Table 1.

Table 1: The frequency of different protozoons examined by both direct microscopy (Native-Lugol preparation) and antigen detection tests

| | Positive No (%) | Negative No (%) | Total No |
|---|--------------------|--------------------|-------------|
| <i>E.histolytica</i> antigen | 16(4.00) | 384 (96.00) | 400 |
| <i>E.histolytica</i> Direct microscopy (Trophozoite & kist)) | 15 (3.75) | 385 (96.25) | 400 |
| <i>G. intestinalis</i> antigen | 36 (9.00) | 364 (91.00) | 400 |
| <i>G.intestinalis</i> Direct microscopy (Trophozoite & kist)) | 52 (13.00) | 348 (87.00) | 400 |
| <i>T.hominis</i> Direct microscopy | 4 (1.00) | 396 (99.00) | 400 |
| <i>Cryptosporidium</i> antigen | 3 (0.75) | 397 (99.25) | 400 |
| <i>Cryptosporidium</i> Direct microscopy | 0 (0.00) | 400 (0.00) | 400 |
| Total | 75 (18.75) | 325 (81.25) | 400 |

In this study, When we compared the two tests within themselves, no statistical difference was found.

DISCUSSION

Gastroenteritis generally remains a major cause of morbidity and mortality in the pediatric population worldwide especially in those younger than 5 years age¹⁵. *E. histolytica*, *G.intestinalis*, and *Cryptosporidium spp.* are common intestinal parasites seen in people of all ages with higher rates in children compared to adults^{2,7,10-12}. They cause gastroenteritis by drinking contaminated water or by fecal-oral transmission which continues as an important challenge for public health especially in underdeveloped and developing countries due to poor sanitation^{1,6-9}. Considering the results of our study, enteric protozoa's rate of detection was 18.75%. The highest rate of *G. intestinalis* (13%) and *E. histolytica* (4.00%), *T. hominis* (1.00%), and *Cryptosporidium spp.* (7.75%) were detected in the protozoa. When these results are assessed, it will be observed that there is a significant difference in the results of the direct microscopy versus antigen search method. *E. histolytica* direct view 3.75%, antigen search 4.00%, *G.intestinalis*; direct inspection 13.00%, antigen scanning 9.00% *Cryptosporidium*; direct view 0.0%, antigen search 0.75% Although direct microscopy is the most commonly used method in the diagnosis of intestinal parasites, misdiagnosis caused by non-pathogenic *Entamoeba* species have led to the search for more reliable methods^{16,17}. In various studies conducted in different regions of our country, the prevalence of *E. histolytica* / *E. dispar* and *G. intestinalis* has been reported at rates ranging from 0.05% and *G. intestinalis* in 1.4%, in Istanbul³ In Eskisehir, a study by Tüzmen and Doğan in 2014, examination of 354 stool specimens, 84 (23.7%) were found to be positive for *E.histolytica*/*E.dispar* positive by direct microscopy, 31 (8.7%) by ELISA and 9 (2.5%) by PCR. In Ankara study by Tuvan ZK et al. 96 stool samples were examined by ELISA technique, *G. intestinalis* was seen in 13 (13.8%) and *E.histolytica* in 2 (2.1%) samples

Cryptosporidium antigen was not detected at all 18 In a study by Gunduz et al 2011, *Giardia intestinalis* was the most common pathoneg in 50 (4%) diarrheic stools in Manisa 19 A recent study in a van. Yunus Emre Beyhan YE and Yılmaz H have reported that *Cryptosporidium spp.* antigen positivity by ELISA assay 2.8% of 723 patients while *Cryptosporidium spp.* was not detected in any patient with Nativ-Lugol method 20 They showed that The highest rate of *Cryptosporidium spp* positivity was found in the 0-6 age group (4.5%) the lowest positivity was found in the 15-24 age group with 1.1%. In a study by Tanyuksel et al. on immunosuppressed patients, the frequency of *Cryptosporidium spp.* had reported being 16.9% of 106 neoplastic patients²¹. Sarı et al. at rate of 6.4% in 47 patients with chronic kidney failure²². In studies conducted in different countries, different results were obtained in different patient groups regarding the frequency of *E. histolytica*, *G. intestinalis*, and *Cryptosporidium spp.* For example, In Australia, traditional microscopy examination of 472 clinical fecal samples detected only 14 cases of *G. İntestinalis*, 10 cases, 23 cases of *E. histolytica* infection, and 5 cases of *Cryptosporidium spp.* while by PCR method 28 cases of *G. intestinalis*, 11 cases of *E. histolytica* infection, and 9 cases of *Cryptosporidium sp.* Were reported²³. In Libya, by microscopy technique, the detection rates of *E. histolytica*/*dispar*, *G. İntestinalis*, and *Cryptosporidium spp.* were 19.9%, 4.6%, 3.4% in diarrheic stool samples²⁴. In Bangladesh, 423 fecal samples were analyzed *E. histolytica* were detected in 74 samples (17.5%), *G. İntestinalis* in 214 samples (50.6%) and *Cryptosporidium spp.* in 9 samples (9.2%) by both microscopy and PCR²⁵ The variation in detection rates in ours and other different studies can be attributed to the sensitivity and specificity of methods applied in this study^{16,23}. Other factors may be hygiene in pediatrics, socio-economic status, sanitation of water, and immune status of studied children. The combination of these

factors should be taken into consideration when and laboratory results were given and assessed, The studies should be done at most once every two or three years to prevent the spread of these parasites and keep them under control at least rates. However, these parasitic infections could be eradicated by applying adequate sanitation worldwide, but this is unlikely to happen soon especially in underdeveloped countries. Further research should be performed with other immunological and molecular assays in a larger population.

Ethics Committee Approval: Ethics committee approval were taken on 26.06.2020, with the decision no.21. Statistical analysis: The data was analyzed by SPSS 20.0.

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