ORIGINAL RESEARCH PAPER

Volume-7 | Issue-1 | January-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CRYPTOSPORIDIUM: AN EMERGING DIARRHOEAL AGENT IN HEALTHY ADULT POPULATION

Medicine

Dr Gaurav Mahajan* MD Medicine, DNB Medicine, MNAMS *Corresponding Author

Dr Lavan Singh MD Microbiology, Trained in Transplant Immunology

Dr Hardeep Kaur MD Paediatrics, DNB Paediatrics

ABSTRACT

INTRODUCTION: Cryptosporidium is known to cause diarrhoea in humans primarily with immunodeficiency and those with AIDS. However, it has been implicated as a cause of chronic or persistent diarrhoea in some healthy adult individuals as well. We studied the prevalence of Cryptosporidium in stool samples of all diarrhoeal cases having recurrent or persistent symptoms.

METHODOLOGY: This observational study was conducted at a large Zonal level hospital in northern India. These samples were collected from patients having predominant symptom as diarrhoea along with other associated symptoms like abdominal cramps, nausea and vomiting. A total of 2116 stools samples were collected and processed between May 2015 to Nov 2016. Round to oval bodies of oocysts of varying sizes, 4 to 6 µm in diameter that stained pink or red were identified as Cryptosporidia.

RESULTS: The mean age of the patients was 31.2 years (18 - 56 years). Out of the 2116 stool samples, 80% belonged to male patients while the rest (20%) belonged to females. 6.47% samples were positive for causative agents (137/2116) while 91 samples were positive for Cryptosporidium alone (4.30%, 91/2116). Only two of these 91 patients were HIV positive.

CONCLUSION & RECOMMENDATIONS: The prevalence of Cryptosporidium infection varies widely from place to place. It can cause self-limiting to persistent diarrhoea in healthy immunocompetent individuals as well. Most patients respond very well to Nitazoxanide therapy. Stool for Cryptosporidium cysts should be a mandatory investigation for all patents of chronic or persistent diarrhoea regardless of their immune status.

KEYWORDS

Cryptosporidium, Chronic diarrhoea, Persistant diarrhoea, Stool RE

Introduction

Cryptosporidium is a minute parasite and is known to cause enterocolitis in domestic animals including calves, pigs and chicken. This parasite is a recent addition to the list of new organisms causing human diarrheal illness primarily affecting people with immunodeficiency and those with AIDS[1]. Only a handful of cases had been reported prior to 1980. The source of infection has been ingestion of contaminated water, milk and close contact with cows, sheep and pets. Poor hand hygiene is also a contributor to some extent. In immunocompetent individuals, the organism primarily localises in the distal small intestine and proximal colon, while in immunocompromised patients, the entire gut and at times biliary as well as respiratory tracts may get affected. The incubation period is about 7-10 days. The parasite causes watery or mucus diarrhoea, persistent gastroenteritis with varying degree of nausea, vomiting, abdominal cramps, malabsorption syndrome, and low-grade fever. It remains a commensal and a non-pathogenic entity in healthy individuals in most of the cases but in few, it causes self-limiting diarrhoea. However, there have been recent reports that the parasite may be a causative organism of chronic or persistent diarrhoea in some healthy adult individuals as well. It has also been responsible for a few water borne epidemic outbreaks[2,3]. We studied the prevalence of Cryptosporidium in stool samples of all diarrhoeal cases having recurrent or persistent symptoms despite having received routine treatment for diarrhoea.

Material and methods

This study was conducted at a large zonal level hospital in northern India. Ethical clearance of the hospital ethical committee was taken beforehand. Patient consent was also taken before enrollment in the study. A total of 2116 stools samples were collected and processed between May 2015 to Nov 2016. These samples were collected from patients having predominant symptom as diarrhoea along with other associated symptoms e.g. abdominal cramps, nausea and vomiting. The samples were collected from both out patients as well as inpatients admitted for such symptoms.

Inclusion Criteria:

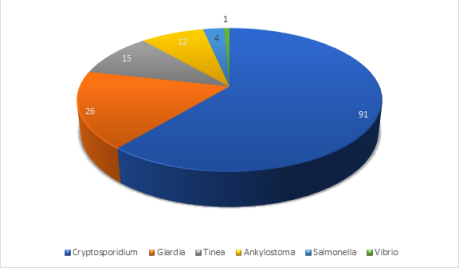
1. All patients presenting to the hospital with diarrhea with or without associated symptoms.
2. Patients more than 18 years of age.

Samples were processed for routine examination including microscopic examination with preparation in saline and lugol's iodine, culture for bacteria and were also preserved in 10% formalin for Cryptosporidium. Formalin ether concentration method was used to increase the sensitivity. Later on samples were processed for Cryptosporidium by modified Ziehl-Neelsen stain using 1% Sulfuric acid. Round to oval bodies of oocysts of varying sizes, 4 to 6 µm in diameter that stained pink or red were identified as Cryptosporidia. Yeast and debris stained green or blue. Many times these Cryptosporidia were also seen arranged in clusters. All Cryptosporidium positive patients were screened for HIV status. Before subjecting these patients to HIV testing, patient consent was taken and pre-test counselling was done. Since the shedding of Cryptosporidium in stool is intermittent, multiple stool samples from the same patient were examined for better sensitivity.

Results

The study was performed on 2116 apparantly healthy individuals having diarrhoea as the predominant symptom. Mean age of the patients was 31.2 years (18 - 56 years). 1693 were male (80%) and 423 were females (20%). 6.5% samples were positive for causative agents (137/2116). 91 samples were positive for Cryptosporidium alone (4.30%, 91/2116). Out of these 91 patients, 72 were male and 19 were females. Giardia was the second most common pathogen (1.2%, 26/2116) isolated from stool samples. The detail of isolates is depicted in Figure 1. The duration of diarrhoea varied from 2-30 days prior to treatment. All the patients responded very well to Nitazoxanide treatment. Two patients out of the 91 positive for Cryptosporidium were found to be HIV positive by rapid test.

Figure-1



Causative agents detected in stool samples

Discussion

This observational study was conducted to see the prevalence of cryptosporidiosis in our local apparently healthy adult population. Overall prevalence of 4.30% was found in our study. Males were affected more (79.12%, 72/91) as compared to females (20.08%). Higher prevalence (25%) was observed by Harmesh Manocha et al in their study in southern part of India. They observed 69% positive prevalence in males and 21% in females.[4] This higher prevalence could be explained on the basis that their study was carried out at a tertiary care hospital where more immunocompromised patients are admitted. The prevalence in males and in females was similar to our study. In the past the prevalence in Northern India has been observed to be low and it varied from 1.3% to 4.5% when one moved from north India to eastern part of the country.[5,6] Ajjampur et al found cryptosporidium as one of the leading pathogens causing diarrhoea in children with prevalence of 1.1 - 18.9% in their study[7]. In one study in southern India, cryptosporidium oocysts have been found in stool samples of 3% of healthy children,[8] while other studies have failed to find evidence of asymptomatic cryptsporodiosis.[9,10] Further, recurrent cryptosporidium infection and relapsing diarrhoea associated with it was found to be common in North Eastern Brazil.[11]

Conclusion

We conclude that the prevalence of cryptosporidium infection varies widely from place to place. In our study, the prevalence of cryptosporidiosis could have been slightly higher if any antigen detection kit or PCR based assay was used. Currently available antigen detection kits are having sensitivity ranging from 60 to 100% with excellent specificity. We preferred the modified Ziehl-Neelsen, firstly being cost effective and secondly because we had limited number of sample load per day. Further, false positive results are known with some kits. We observed near 100 percent positivity in stool samples of patients where even slight suspicion of cryptosporodiosis was thought of. In the group where no organism was isolated or seen, reason for diarrhoea could be various species of diarrhogenic E.coli, Rota viruses and Norvo viruses, and similar other organisms which are not routinely tested and are actually a cause of self–limiting diarrhoea. All patients responded very well to Nitazoxanide therapy. Stool for Cryptosporidium cysts should be a mandatory investigation for all patents of chronic or persistent diarrhoea regardless of their immune status. All these Cryptosporidium samples have been preserved in 10% formalin for future species identification by PCR.

Conflicts of interest

The authors have none to declare.

References

1. MMWR Morb MortWkly rep.1982;31:589-592.
2. Current WI, Reese NC, Ernst JV, et al. Human cryptosporidiosis in immunocompetent and immunodeficient persons: studies of an outbreak and experimental transmission. *N Engl J Med* 1983; 3081: 252-57
3. D Antonio RG, Win RE,Taylor JP, et al. A waterborne outbreak of cryptosporidiosis in normal hosts. *Ann Intern Med* 1986;103:886-888.
4. Harmesh Manocha,Seema Dua, Yogesh Chander, Maigha Tailang. Cryptosporiodiosis, whether it is more prevalent in Southern India. *Trop Parasitology*. 2014 Jul-Dec ; 492:125- 127.
5. Sethi S, Sehgal R,Malla N, Mahajan RC. Cryptosporidium in tertiary care hospital. *Natl Med J India*.1999;12:207-9.
6. Das P, Pal S, Dutta D, Bhattacharya MK. Cryptosporidiosis in Bengali children with acute diarrhoea. *Trans R soc trop Med Hyg*. 1987;81:241
7. Ajjampur SS, Sankaran P, Kang G.Cryptosporidium species in HIV –infected individuals in India:An overview. *Natl Med J India*. 2008; 21:178-84.
8. Reinthaler FF, Mascher F, Sixl W Enyat u,Marth E. Cryptosporidiosis in children in Idukki District in southern *India.J Diarrhoeal Dis Res* 1989;7:89-91.
9. Kaur N, Diwan N. Cryptosporidiosis in northern Indian children. *Indian J Med Sci*. 1991;45:143-5.
10. Mahajan M,Mathur M,Talwar V. Cryptosporidiosis in east Delhi children. *J Commun Dis*.1992;24:133-7.
11. Newman RD, Sears CL, Moore SR, Nataro JP, Wuhib T, Agnew DA etal. Longitudinal study of cryptosporidium infection in children in northeastern Brazil. *J infect Dis*.1999;180:167-75.