Cryptosporidiosis in a tertiary care hospital

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ABSTRACT

Background. Cryptosporidium, an important cause of diarrhea, has been reported worldwide both in immunocompetent and immunocompromised individuals and has emerged as a serious public health problem. This study was undertaken to assess the present status of cryptosporidiosis in children and adults with diarrhoea who attended the Nehru Hospital, Chandigarh which is a tertiary care hospital.

Methods. Routine stool examination was done using saline and iodine stained preparations for various parasites. Modified Ziehl–Neelsen and rapid safranin–methylene blue techniques were used to detect Cryptosporidium in 2000 stool samples (1645 adults, 355 children) from March to November 1998.

Results. Of the 2000 samples, 205 (10.2%) were positive for various parasites. Five (1.4%) children were positive for Cryptosporidium and one child was positive for human immunodeficiency virus. In adults, Cryptosporidium was found in only one patient (0.06%). Giardia lamblia was the commonest parasite detected both in adults (4%) and children (15.2%).

Conclusion. The present study highlights the importance of Cryptosporidium as a cause of diarrhoea, especially in children. Thus, there is a need for specific staining techniques to detect Cryptosporidium in routine diagnostic laboratories.
INTRODUCTION
The coccidian parasite Cryptosporidium parvum can be transmitted to humans through several different sources, including drinking water, contact with infected humans and animals, as well as consumption of contaminated food. The disease appears to be assuming serious consequences for public health due to the large number of reports of severe intestinal and extra-intestinal cryptosporidiosis. It occurs more often in immunocompromised individuals, especially those who are HIV-positive. In India, it has been recognized as the third most common microbial infection in AIDS patients. The disease has also been widely reported in immunocompetent humans but it causes short-term self-limiting acute gastroenteritis in such patients in contrast to the chronic, severe diarrhoea seen in some immunocompromised patients. It is a major cause of water-borne epidemics in developed nations.

The largest epidemic involving 403,000 persons occurred in Milwaukee, Wisconsin, USA. In developing countries, prevalence rates vary from 1.3% to 15% in immunocompetent individuals. In India, it has been found to be the causative agent of diarrhoea in 1.3%–13.1% of children.

The present study was undertaken to assess the current status of cryptosporidiosis in patients of all age groups suffering from diarrhoea and referred to the Nehru Hospital, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh which is a tertiary care hospital and serves as a referral centre for the population of Chandigarh and the neighbouring states of Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir and some adjoining areas of western Uttar Pradesh and Rajasthan.

PATIENTS AND METHODS
Two thousand stool samples were collected from patients suffering from diarrhoea/gastroenteritis attending the various outpatient departments and indoor wards of the Nehru Hospital attached to PGIMER, Chandigarh between March and November 1998. The population was divided into two groups: children (<13 years) and adults (>13 years).

Stool examination
Routine stool examination was carried out using saline and iodine stained preparation techniques on all samples. Negative samples were examined again by the formol ether concentration method. Both modified Ziehl–Neelsen and rapid safranin–methylene blue techniques were used to detect Cryptosporidium oocysts in stool specimens after methanol fixation. All negative samples were concentrated using Sheather’s sugar flotation technique and stained dark pink against a green background with acid-fast staining and orange with the safranin–methylene blue technique. The most common parasite in children was Giardia lamblia (15.2%; Table I).

In adults, out of 1645 stool samples examined, 131 (7.9%) were positive for various parasites and Cryptosporidium was found in one patient only. The most common parasite was Giardia lamblia (4%). Both modified Ziehl–Neelsen and safranin–methylene blue techniques demonstrated Cryptosporidium in all the cases. The clinical data of the six patients with cryptosporidiosis are summarized in Table II. Cryptosporidium was detected as the sole parasite in six patients in whom no other bacterial or viral pathogen was detected. The diarrhoea persisted for 8 to 15 days in all children except in cases 1 and 5, in whom it persisted for about one month. Case 1 had significant weight loss and chronic malabsorption. A biopsy performed in this patient revealed inflammatory infiltrate in the lamina propria with lymphocytes and eosinophils. Case 5 was positive for HIV antibody by ELISA and Western blot and may have acquired the infection from his mother and father who were known to be HIV positive. This child (12 months old) from Ludhiana, Punjab had chronic diarrhoea (30–35 motions/day), was severely dehydrated, had significant weight loss and was suffering from pneumonia. All the children were bottle-fed except one who was breast-fed.

DISCUSSION
Human infection with Cryptosporidium has been reported from
all parts of the world, both in developed and developing countries and has been implicated as an important cause of diarrhoea, especially in children. In India, there are only a few reports on the prevalence of this infection. A study carried out in south India indicated an incidence of 13.1% in children with diarrhoea and 9.8% in age-matched controls while from north India, an incidence of 1.3% and 1.4% in children with diarrhoea has been reported. A report from West Bengal has also shown a much lower incidence than that in south India. Studies from Bangalore and Mumbai indicate an incidence of 4% and 5.6%, respectively.

Studies from Liberia have shown the incidence to be 8.4%, 5.9% and 8.6% in children with diarrhoea, asymptomatic children and contacts of positive children, respectively. From neighbouring Bangladesh, an incidence of 6.5% among animal handlers has been reported.

The present study reveals an incidence of 1.4% in children, which is similar to reports from western countries. The low incidence may be because Chandigarh town has an excellent water supply system which appears to limit the infection. Cryptosporidium was the sole pathogen detected in these six patients. All the children except case 4 were bottle-fed/weaned. An increased incidence has been reported in bottle-fed children, possibly due to the use of contaminated food and bottles. This is in contrast to the data from south India, where no statistically significant difference was found in the frequency of Cryptosporidium in infants who were exclusively breast-fed, infants on weaning foods in whom breast milk was supplemented by milk and in infants who were only bottle-fed. Further, the findings in our study appear to be similar to those observed almost 12 years ago from this area.

Case 1 was malnourished and diarrhoea in this case persisted for 1 month. This was not unexpected as malnourishment is associated with chronicity of diarrhoea in children. Moreover, a biopsy performed in this case revealed inflammatory infiltrate in the lamina propria and Cryptosporidium is known to produce mild inflammatory changes. However, in the present study in adult patients, Cryptosporidium could be detected in only one patient. This low prevalence may be due to the fact that most of the patients were immunocompetent individuals.

The prevalence in children is similar to the earlier report from this geographical area more than a decade ago. As in the previous study, all children were less than two years of age and the majority were bottle-fed. However, in the present study, one child positive for Cryptosporidium was HIV-positive, presented with severe chronic diarrhoea and pneumonia. It appears that as the AIDS epidemic progresses in India, we may come across a larger number of such patients. In India, the reported incidence of Cryptosporidium in AIDS patients is 27.48%. In the USA, it has been reported in about 3%–4% of patients with AIDS while in Haiti and Africa 50% of patients with AIDS have this infection.

Since Cryptosporidium was the sole pathogen detected in all six patients, it is likely that Cryptosporidium was the cause of diarrhoea in these patients. The present study thus highlights the importance of Cryptosporidium as a cause of diarrhoea, especially in children. Therefore, we suggest that stool specimens should be routinely examined for this particular parasite since the disease is self-limiting in immunocompetent individuals and unnecessary use of antibiotics can be avoided. However, the present data are hospital-based and do not reflect the true prevalence, as there may be a greater number of persons harbouring this parasite who do not report to health clinics. Field studies are needed to assess the true prevalence. The predominance of the infection in men remains unexplained and further studies are warranted to understand the epidemiology of the disease in this region.

REFERENCES