

First report of cryptosporidiosis among Iraqi children

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أول تقرير عن داء خفيات الأبواغ بين أطفال العراق

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خلاصة من بين ٢٤٠ طفلاً عراقياً دون الخامسة من العمر ممن شخصت حالاتهم مبدئياً على أنها التهاب المعدة والأمعاء المصحوب بالتجفاف ، وجد أن ٢٢ طفلاً كانوا يفرغون في برازهم بويضات خفيات الأبواغ . وكانت تلك هي المرة الأولى التي يبلغ فيها عن حدوث داء خفيات الأبواغ بين أطفال المدارس في العراق . لقد أخذت عينات من المرضى وتم فحصها بطريقة تسيل نيسلن المعدلة في ما بين آذار/ مارس وتشرين الثاني/ نوفمبر ١٩٩٤ . وبلغ التوزع التكراري لخفيات الأبواغ بين ١١٤ حالة إيجابية مصابة بالطفيليات المعوية ١٨,٣ % . أما نسبة الذكور إلى الإناث بين الأطفال الإيجابيين لخفيات الأبواغ فكانت ١ : ٢ . وكان معظم المرضى يشكون من مغص في البطن وإسهال مائي ولو حظ عليهم التجفاف بالفحص السريري . أما الأعراض المصاحبة لهذه الحالات فكانت الحمى والقيء . وكان واضحاً وجود ترافق بين خفيات الأبواغ والجيارديات .

ABSTRACT Of 240 Iraqi children under five years old with a primary diagnosis of gastroenteritis and dehydration, 22 were excreting *Cryptosporidium* oocysts in their stools. This is the first reported occurrence of cryptosporidiosis among Iraqi schoolchildren. Samples were collected and examined by the modified Ziehl-Neelsen method between March and November 1994. The frequency distribution of *Cryptosporidium* among 114 positive cases with intestinal parasites was 18.3%. The boy-to-girl ratio was 1:2 among the *Cryptosporidium*-positive children. Most patients complained of abdominal colic and watery diarrhoea and were clinically dehydrated. The associated symptoms were fever and vomiting. *Cryptosporidium* and *Giardia* appeared to be associated.

La cryptosporidiose signalée pour la première fois chez des enfants irakiens

RESUME Sur les 240 enfants irakiens âgés de moins de cinq ans chez lesquels on avait diagnostiqué une gastro-entérite accompagnée de déshydratation, 22 avaient dans leurs selles des oocystes du parasite intestinal *Cryptosporidium*. C'est la première fois que l'on signale la survenue de cas de cryptosporidiose chez des écoliers irakiens. Des prélèvements ont été recueillis et examinés en utilisant la méthode de Ziehl-Neelsen modifiée entre mars et novembre 1994. La répartition de la fréquence de *Cryptosporidium* chez 114 cas positifs ayant des parasites intestinaux était de 18,3%. Le rapport garçon-fille était de 1:2 chez les enfants qui se sont révélés positifs pour le *Cryptosporidium*. La plupart des patients se plaignaient de coliques abdominales et de diarrhée aqueuse et présentaient un état clinique de déshydratation. Fièvre et vomissements étaient des symptômes associés. Il est apparu que *Cryptosporidium* et *Giardia* étaient associés.

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Introduction

Cryptosporidium is a coccidian protozoan parasite of the intestinal tract that causes severe, intractable diarrhoea in immunocompromised patients and self-limiting diarrhoeal illness in immunocompetent individuals [1]. Cryptosporidiosis is zoonotic [2-4].

Cryptosporidiosis has recently gained attention because of its occurrence in patients with acquired immunodeficiency syndrome (AIDS) [1]. Approximately one third of the reported cases have occurred in immunocompetent hosts [2,5].

Cryptosporidiosis has been recorded as a cause of diarrhoea in veterinarians and animal handlers [2,6], in marrow transplant recipients [7], household contacts of infected patients [3,8], homosexual men [9], travellers [10] and children in day care centres [8,11,12]. However, reports of its occurrence are sparse from Arab countries [13,15] and until now absent from the Persian Gulf region [16-19], including Iraq [20].

This paper reports the first cases of cryptosporidiosis among Iraqi children under five years of age with a primary diagnosis of gastroenteritis.

Patients and methods

Stool samples were collected from 240 children (aged less than five years) with a primary diagnosis of gastroenteritis from March to November 1994. They were attending the outpatient clinic of Basra Hospital. Air dried faecal smears were stained by the modified Ziehl-Neelsen method [21]. All samples were also examined microscopically by the direct smear method for the presence of parasitic ova, cysts and trophozoites.

Results

In the 240 examined samples *Cryptosporidium* oocysts were found to be excreted in 21 (8.8%) children (Table 1). The frequency distribution of *Cryptosporidium* among 114 positive children testing for intestinal parasites was 18.3%. The boy-to-girl ratio was 1:2. Most patients complained of abdominal colic and watery diarrhoea and were clinically dehydrated. The associated symptoms were fever and vomiting (Table 1). *Giardia lamblia* seemed more common among *Cryptosporidium*-positive children.

Trophozoites, cysts and ova of other parasites identified were illustrated in relation to sex (Table 2) and age (Table 3). The boy-to-girl ratio was 1.2:1. Intestinal parasites were found more often among five-year old children (15.4%).

Discussion

Although only 8.8% of the patients in our study were shown to be excreting *Cryptosporidium* oocysts, it is a significant percentage from a public health point of view. The absence of reports of cryptosporidiosis in the area may be because a specific diagnostic method is not being used routinely during stool examination. Therefore, it seems reasonable to test apparently healthy people with undiagnosed chronic diarrhoea who are animal handlers, travellers to endemic areas, hospital workers, household contacts of infected patients and children in day care centres [1].

Cyst excretion is often intermittent and occurs in small quantities [22]. Thus, prevalence would be undoubtedly higher if more than one stool sample from each child were examined. Children with cryptosporidiosis are indistinguishable from non-*Cryptosporidium* gastroenteritis children with respect

Table 1 Details of the children testing positive for cryptosporidiosis among the 240 patients

Case No.	Age		Sex	Residence	Clinical presentation				Dehydration	Associated parasite
	Y	M			Diarrhoea	Fever	Vomiting	Abdominal colic		
1	1	6	F	U	+	-	-	+	Mild	<i>Giardia lamblia</i>
2	3	-	M	U	+	-	-	+	Mild	-
3	-	2	M	R	+	+	-	+	Moderate	-
4	5	-	F	U	+	-	-	-	Mild	-
5	4	-	F	R	+	+	+	+	Moderate	-
6	4	6	F	U	+	-	-	-	Mild	-
7	5	-	F	U	+	-	+	+	Mild	-
8	5	-	F	U	Semi-formed	-	-	-	Mild	<i>Enterobius, Giardia lamblia</i>
9	3	-	F	U	+	-	-	+	Mild	-
10	5	-	M	U	+	-	-	+	Mild	-
11	1	-	F	U	+	-	-	+	Mild	-
12	3	-	M	U	+	-	-	+	Mild	<i>Blastocystis hominis, Giardia lamblia</i>
13	1	2	F	U	+	+	+	+	Moderate	-
14	1	6	F	U	+	-	-	+	Mild	<i>Blastocystis hominis</i>
15	5	-	F	U	Soft	-	-	+	Mild	-
16	1	-	M	U	+	-	+	-	Mild	<i>Giardia lamblia</i>
17	5	-	F	U	Mucus, blood	+	+	+	Severe	<i>Entamoeba histolytica</i>
18	5	-	M	U	+	-	-	+	Mild	<i>Giardia lamblia</i>
19	-	8	F	U	+	+	+	-	Moderate	-
20	1	-	M	R	+	+	-	-	Moderate	-
21	-	10	F	R	+	-	+	-	Mild	<i>Blastocystis hominis</i>

F = girl; M = boy; U = urban; R = rural; Y = years; M = months

to their age, nutritional status, severity of diarrhoea or metabolic disturbance [23].

All patients presented with some or most of the recognized symptoms and signs [1,24], but in none of them was cryptosporidiosis a differential diagnosis. The clinical

findings and the course of illness do not help in indicating the source of patients' infection. *Cryptosporidium* lacks host specificity [2,3,5,25] and thus is a potential zoonosis [2,5,6,26]. The role of *Cryptosporidium* in causing disease in infected patients is un

Table 2 Prevalence of parasitic infections other than cryptosporidiosis among the 240 patients by sex

Parasite	No. and percentage		
	Boys	Girls	Total
Protozoa			
<i>Entamoeba histolytica</i>	29(12.1)	20(8.3)	49(20.4)
<i>Blastocystis hominis</i>	17(7.1)	23(9.6)	40(16.7)
<i>Giardia lamblia</i>	19(7-9)	12(5.6)	31(12.9)
Helminths			
<i>Enterobius vermicularis</i>	2(0.8)	1(0.4)	3(1.3)
<i>Hymenolepis nana</i>	1(0.4)	1(0.4)	2(0.8)
<i>Ascaris lumbricoides</i>	0(0.0)	1(0.4)	1(0.4)
Total	68(28.3)	58(24.2)	126(52.5)

Table 3 Prevalence (no. and %) of parasitic infections other than cryptosporidiosis among the 240 patients, by age group

Parasite	Age (years)					
	< 1	1	2	3	4	5
Protozoa						
<i>Entamoeba histolytica</i>	10 (4.2)	3 (1.3)	8 (3.3)	6 (2.5)	6(2.5)	16(6.7)
<i>Blastocystis hominis</i>	4 (1.7)	5 (2.1)	4 (1.7)	10 (4.2)	7 (2.0)	10 (4.2)
<i>Giardia Lamblia</i>		13 (5.4)	3 (1.3)	6 (2.5)	—	9 (3.8)
Helminths						
<i>Enterobius vermicularis</i>	—	—	—	1 (0.4)	—	2 (0.8)
<i>Hymenolepis nana</i>	—	—	—	1 (0.4)	1 (0.4)	—
<i>Ascaris lumbricoides</i>	—	—	—	—	1 (0.4)	—
Total	14 (5.8)	21 (8.8)	15 (6.3)	24 (10.0)	15 (6.3)	37 (15.4)

clear, but diarrhoea has been experimentally induced in lambs [27,28], pigs [29] and calves [29].

The most important risk factor for cryptosporidiosis in children is contact with a person suffering from diarrhoea [2,6,26]. Other possible methods of transmission are association with dogs and cats, consumption of untreated milk, water supply, dummies and other fomites [30]. Thus, the major routes of transmission associated with this parasitosis should be assessed further investigation.

Many Iraqi children with gastroenteritis are malnourished and many suffer from associated infections including bronchopneumonia, septicaemia, salmonellosis and viral and parasitic infections. Protein malnutrition is associated with immune deficiency [31]. Thus, many of our gastroenteritic children are potentially immunocompromised.

The mechanism responsible for the mixed cryptosporidial and giardial infections that were observed is not known. It is possible that the high prevalence of protozoan parasites in children was independently

associated with poor hygiene, contaminated water supply, overcrowding and probably other food and/or waterborne infections [32,33]. The high prevalence rate of intestinal parasites observed among boys can be attributed to the fact that boys are more ac-

tive, mobile and integrated into the environment.

These first observations in Iraq suggested that cryptosporidiosis should be considered in the differential diagnosis of overwhelming diarrhoea in order to arrive at the proper treatment.

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