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Watery Diarrhea of Cryptosporidium in Paediatrics

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ABSTRACT

The aim of this study is to detect Cryptosporidium infection causing cryptosporidiosis in AL -Qadisiyah province, Iraq. This study includes the test of 115 stool samples were collected from children of both sexes, aged one month to five years, suffering from diarrhea and hospitalized in the children's hospital. An investigative study was conducted on a parasite. The samples were analyzed using Zyl-Nelson staining. The results showed an overall infection rate of 39.13%, of which 26.08% occurred in rural areas and 13.04% in center areas. Most of the infections occurred at 1-12 months of age, higher than other age groups 12.17% early age the most susceptible to infection and there was no significant difference between male and female infections.

1. Introduction

Diarrhea is defined as a pathological condition resulting from digestive system dysfunction, and there is a relationship between diarrhea and malnutrition (Harold & David, 1964). Diarrhea is caused by infection with pathogens, and acute diarrhea is defined as the most common case of digestive secretion in childhood, characterized by the sudden appearance of three or more watery stools, accompanied by vomiting, abdominal pain, and high body temperature. Acute diarrhea occurs mainly in children in the first five years after birth, with the highest incidence of pathological cases and pneumonia recorded, and acute diarrhea is primarily due to dehydration, that is, hypovolemia, and in frequent cases and general malnutrition, the main cause of death - offspring in children up to five years of age.

According to the World Health Organization (WHO) in 2004, one and a half million children die from acute diarrhea worldwide, mainly in countries with low living standards, most of them are from India (380,600), Nigeria (151,700), the Democratic Republic of Congo (899,000), Afghanistan (82,100) and Ethiopia (73,700). Diarrhea is watery and causes loss of water and salts such as sodium and potassium from the body, causes an increase in the acidity of the blood and tissues, and causes muscle cramps, and diarrhea is described as continuous and irregular movements of the intestines (Zerpa & Huicho, 1994). Diarrhea is thought to result from a direct interaction between bacteria and epithelial cells of the small intestine (Kirubakaran, et al., 1981). Microbiology was not studied in depth scientifically until after World War II. One of the most common symptoms in diarrhea is iron malabsorption in the presence of infection, in addition to infection with bacteria and viruses, dysentery histolytica Entamoeba causes sudden malabsorption, damage to the intestinal villi, malabsorption of proteins, carbohydrates, fats, calcium and vitamins in the ileum and jejunum (Morin, et al., 1978).

Children and infants can treat orally rehydration by solution and dependence on starchy foods such as corn, potatoes and rice. The development of medical sciences in

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the 20th century led to the production of antimicrobial drugs and their use to reduce the number of deaths caused by bacterial infections, especially those causing diarrhea, but the use of excessive and inactive PL led to the emergence of many resistant strains of bacteria (Pohlenz, et al., 1978). As for Iraq, there are a lot of research studies, but there is no space to go into some of them, found some researchers the prevalence of intestinal parasites among the residents of Shatrah city when (3425) feces were examined, and the incidence of Giardia lamblia was (27%) versus (14.2%) dysentery, in addition to the presence of six other types of intestinal parasites (Tzipori, et al., 1981). Al-Mamouri conducted an epidemiological study on intestinal parasites in primary school children in Al-Mahawil district, Babil governorate. A total of 2116 fecal samples were collected for pupils between 6-13 years, and the results of the study find that the infection rate of Giardia lamblia was (9.9%) compared to (12%) dysentery amoeba, in addition to the presence of seven other species of intestinal parasites (Tzipori, et al., 1981). An investigation the quality of prevalence of intestinal parasites in Karbala city by examining of 4024 fecal samples of different age groups (DuPont, et al., 1995).

The infection rate of Giardia lamblia was 9.3% compared to 10.4% for dysentery amoebae, in addition to the presence eight other species of the infertile parasites, between al-Kubaisi (DuPont, et al., 1995). Some epidemiological aspects of intestinal parasites among young age groups in Karbala city, when 1050 stool samples were collected for children attending the children's hospital in Karbala city, and the incidence of dysentery amoeba was 9.6% and for Giardia lamblia 7.3%. In addition to pinworms in Nineveh - Bakr, Newman, et al., (1994) conducted an experimental and temporary epidemiological and immunological study on twistworm disease in different positions (children, calves, lambs and goats), in which of 470 fecal samples from children of different ages were examined. Incidence in children (17.1%) Parasitic protozoa infect a wide variety of hosts, including humans, and cause damage to these hosts.

Among the most common is Cryptosporidium parvum has been shown to frequently prefer the ileal region, but may also infect other parts of the small intestine (Shiota, et al., 1994). However, infection sometimes occurs outside the digestive tract, for example, in the epithelium of the extra glands and in certain parts of the respiratory tract, urinary tract, and genital tract (Chermette & Boufassa-Ouzrout, 1988; Nouri & Toroghi, 1991). The developmental stages of the parasite are located in the brush border of the host epithelial cells and it grows in the parasite-bearing vacuole (Parasitophorus vacuole). This hypothesis states that the glycocalyx is homologous in both the parasite-bearing vacuole and the microvilli, as is the continuity of the vacuole with the host plasma membrane (González, 1991; Tanyüksel, et al., 1995; Baxby, et al., 1984). There is no successful and effective treatment against this parasite, but in patients with natural immunity, the disease occurs in the form of simple diarrhea that lasts for a limited period of time and ends on its own.

However, in cases at which the disease occurs in the form of acute or chronic diarrhea (Millard, et al., 1994; Schuster, et al., 1991) as well as the researcher Smith and his group (Ludin, et al., 1991) notice the transmission of cysts parasite eggs were transmitted to humans through contaminated water (Millard, et al., 1994). Diarrhea caused by the parasite can be treated with spiramycin given at a dose of 3 g per day, divided into several doses, over a period of two to four weeks, and dehydration is treated by intravenous nutrient solutions to replace the lost fluid (Schuster, et al., 1991). Eflornithine has also been used to treat the parasite in people suffering from AIDS, and it was found that by using this treatment, some patients were cured of diarrhea and their stools were free of parasite egg sacs (Pohlenz, et al., 1978). It is preferable to sterilize the animal stalls with formalin to prevent the transmission of parasite egg sacs in the feces of these animals to the people working in the management of these stalls (Kwaga, et al., 1988). The aim of this study is to reveal the infection of Cryptosporidium in which cause cryptosporidiosis in Al-Qadisiyah province.

2. Materials and Method

The equipment, tools and chemicals used in this study were summarized in Table 1.

Table 1
Equipment, tools and chemicals used in this study

Company	Objectives name	Instruments name
BDH England	Formalin	Plastic container
BDH England	Drupe	Refrigerator
BDH England	Zylole	Slides and cover slipes
Sybero (syria)	Methylene Blue dye	Stike
BDH England	Phenol	Cloves
Sybero (Syria)	Carbolic Fuxin dye	

Prohibition of Solutions

10% formalin fixative: This solution was prepared by mixing 10 ml l of 40% formalin with 90% of saline solution and this solution was used to preserve and stabilize samples (Chermette & Boufassa-Ouzrout, 1988)

Prohibition of Dyes

Modified Ziel-Neelsen: According to the method (Ludin, et al., 1991) Carpel fuchsin basal dye 4ml

Ethanol 20ml

phenol ml 8

Distilled water 100 ml ml

Preparation

The preparation is carried out in two steps:

Preparation of solution A: dissolve 4 g of basic fuchsin dye in 20 mL of 95% ethyl alcohol. Preparation of solution B: Dissolve 8 g of phenol in 100 milliliters of distilled water with constant stirring until it is completely dissolved. Then solution B is added to solution A to provide the dye 2 Methylene blue. The dye was prepared by dissolving 1 g of the dye in 100 ml of distilled water and using the previously used method (Baxby, et al., 1984).

Samples Collection

Stool samples were collected from patients at the Women's and Children's Hospital and in the suburbs. An investigational study of a parasite was performed. In this study, 115 stool samples were collected from children of

both sexes, age (one month to five years), suffering from diarrhea and being treated at the Children's Hospital. The samples were examined using Zyl-Nelson staining. Specific information was written on the 50-ml plastic bottles, such as name, age, gender, weight, and the symptoms the patient was suffering from, such as diarrhea, loss and inflammation of the stomach and intestines, loss of appetite, weight, high fever, and each sample was numbered and forwarded to a laboratory for laboratory testing - Fecal examination: a gross examination of the stool samples was performed to determine their physiological characteristics such as color, odor and texture. Microscopic examination: to look for cysts of the parasite, each sample was examined with smears stained with modified Zeil-Neelsen stain.

The method of stool smears stained with modified Zyl-Nelsen stain. A matchstick-sized portion of the stool was wiped onto a clean glass slide and mixed with a drop of distilled water, then spread over the entire surface of the slide and left in air for 5 minutes, taking into account the numbering of the slide with the same sample number. At room temperature, according to the method used (Schuster, et al., 1991). Concentrated carbol fuchsin red dye was added to the fixed swab and left in air for 3-5 minutes.

- The swab was clipped with methyl alcohol for 30 seconds, then washed with tap water and dried in air. Then the swab was stained with blue methylene dye for two minutes.
- Wash off with a water jet and allow drying.
- The stained specimens were examined under a light microscope with a 100x magnification objective to identify the cysts of the parasite

3. Results and Discussion

The study recorded a total infection rate of the parasite (Cryptosporidium) that amounted to 39.13% in the test samples. Figure 1 shows the Cryptosporidium cyst.

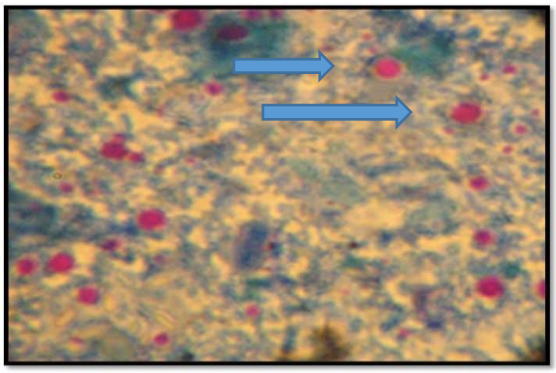

Fig. 1. Cryptosporidium cyst

Tables 1, 2 and 3 show the numbers and rates of infection with the parasite Cryptosporidium in the city center and its suburbs, the percentages of Cryptosporidium infection for age groups and the relationship between the numbers and rates of infection in both sexes in the city center and suburbs, respectively.

Table 2
The numbers and rates of infection with the parasite Cryptosporidium in the city center and its suburbs

Living	Examined no.	Patient no.	%
Center	51	15	13.04
Suburbs	64	30	26.08
Sum.	115	45	39.13

Table 3
Percentages of Cryptosporidium infection for age groups

Class Ages in month	01-12		13-24		25-36		37-48		49-60	
sex	*male*	*female*	*male*	*female*	*Male*	*female*	*male*	*female*	*Male*	*Female*
Cryptosporidium	8	6	7	4	5	4	4	2	3	2
Sum.	14		11		9		6		5	
Percentage %	12.17		9.56		7.82		5.21		4.34	

Table 4
The relationship between the numbers and rates of infection in both sexes in the city center and suburbs

	City center			Suburb			P Value
sex	*Examined no.*	*Patient no.*	*Percentage %*	*Examined no.*	*Patient no.*	*%*	
Male	21	7	6,8	30	13	11,3	P<0.001
female	30	8	6,95	34	17	14,78	P<0.001
Sum.	51	15	13,4	64	30	26,08	
P Values	P>0.05			P<0.05			

It is higher than the values obtained by (Kwaga, et al., 1988) in Mosul and (Ludin, et al., 1991) in Diyala. The reason can be attributed to the different geographical location and environmental conditions of the studied areas, and the infection rate in the suburbs was (80.26%) higher than in the city center (40.13%), which is consistent with

what I mentioned (Millard, et al., 1994), and the reason can be attributed to the way of life in the countryside, which depends on raising animals in or near homes that are a source of infection, in addition to the lack of attention to hygiene and health awareness and the proliferation of rodents, and it is different from what I mentioned (Ludin, et al., 1991).

The high incidence of infections in the age group of 1-12 months (12.17%) compared with the other age groups (Table 3). It was observ that as age increases, the incidence of infection decreases, there is an inverse relationship between the rate of injury and age, which is consistent with what I mentioned (Kwaga, et al., 1988). This is due to the susceptibility of children to infection and the possibility of the formation of acquired immunity in old age, and it is not consistent with what was mentioned (Schuster, et al., 1991) in Nigeria, where it was found that the incidence of infection is lower than in adults and the reason can be attributed to the spread of acquired immunodeficiency disease (AIDS). Table 4 shows the numbers Cryptosporidium was infected with a parasite in both sexes, where no significant differences in infection rates between males and females ($P < 0.05$), which were observed with what was mentioned (Millard, et al., 1994), and this can be attributed to the chances of infection available to both sexes.

4. Conclusion

The highest infection of watery diarrhea was in the suburbs and rural areas 26.08%, less than in the center, because of presence of the carrier factor. Addition to the life cycle 20% of oocyst still inside the human body, there is no specific treatment for the injury, but only the self-healing of the infection.

Competing Interests

The authors had no competing interests.

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