

Haematological Variables of Patients with Amoebic Dysentery

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المتغيرات الدموية للمصابين بمرض الزحار الأميبي

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الخلاصة :

من الأمور المهمة سريريا *Entamoeba histolytica* ألتشخيص التفريقي للطفيلي الأبتدائي ووبائيا في حالة الإصابة بالزحار الأميبي. أجريت الدراسة الحالية للفترة من تشرين الأول 2009 ولغاية شباط 2010. ركزت هذه الدراسة على العلاقة بين الإصابة الطفيلية وفقر الدم والصورة السريرية للدم. فحصت 424 عينة براز بواسطة المجهر الضوئي وبأستخدام طريقتي المسحة المباشرة والصبغ بمحلول أليود للتحري عن طفيلي الزحار الأميبي. كذلك جمعت عينات دم وريدية من كل مصاب لقياس كل من (معدل الهيموغلوبين ،حجم خلايا الدم المضغوطة ، وتعداد خلايا الدم البيضاء التفريقي) . بينت نتائج الدراسة بأن نسبة الإصابة بطفيلي الزحار الأميبي كانت 16% (424/68) وان 65% منهم كانوا يعانون من فقر الدم .كما اظهرت النتائج بأن نسبة الإصابة بالطفيلي كانت الأكبر ومعدل الهيموغلوبين كان الأقل في الأعمار دون العشر سنوات وان الذكور الأكثر اصابة. لاتوجد فروقات معنوية في فقر الدم بين الأجناس. أشارت الدراسة الحالية الى ان بعض الأصابات الطفيلية تلعب دورا مهما في الإصابة بفقر الدم في محافظة واسط.

Abstract :

Differential diagnosis of protozoan parasite *Entamoeba histolytica* is of great clinical and epidemiological importance in the case of acute dysentery by microscopy. The present study was carried out from October 2009 to February 2010. This study focused on relationship between some parasitic infestations, anemia and blood picture. A total of 424 fecal samples were collected from patients. The stool specimens were examined by light microscopy (Direct slide smear, Iodine wet mount) to distinguish *E. histolytica*. Also venous blood sample collected from each patient was tested for hemoglobin concentration (Hb%), packed cell volume (PCV) and leukocyte count (WBCs differential). Overall 16% (68/424) of the examined patients had parasitic infestation with *E. histolytica*. For each of *E. histolytica* infestation, $\geq 65\%$ of the infested patients were anemic. The results showed that the higher infection and the lower hemoglobin rate (anemia) in age (under 10 years old). The male was predominant. There was no significant difference in occurrence of anemia between genders ($X^2 = 0.58$, $P > 0.05$). This study has shown that some parasitic infestations, at least, contribute to anemic in Wasit province

Introduction :

A parasite is an organism, such as a single-celled animal (protozoan) or worm, which survives by living inside another, usually much larger than the organism (the host). Parasitic infections are common in rural Africa, Asia, and South America [1]. Intestinal parasitic infection is a major health problem such as anemia that estimated to affect half the school-age children and adolescents in developing countries. The main causes are parasitic infections, malaria, and low iron intake. By increasing standards of health and controlling the carriers or intermediate hosts, most industrialized countries have successfully decreased the rates of infestation [2,3].

In developing countries, however, geographic and socioeconomic factors as well as unpredictable factors such as natural disasters contribute to the problem [4]. These countries are mainly located in warm or hot and relatively humid areas that, combined with poverty, malnutrition, high population density, unavailability of potable water and low health status, provide optimum conditions for the growth and transmission of intestinal parasites [5,6]. Insufficient research into infectious and parasitic diseases, lack of attention in developing countries to the problem and lack of follow-up treatment are also barriers to decreasing the rates of parasitic infestation [7].

The prevalence of parasitic infections varies in different parts of the world. The prevalence of *Entamoeba histolytica*, for example, ranges from 5% to 81% and is estimated to involve around 480 million people worldwide [8]. Geographical conditions and poor nutritional and socioeconomic status contribute to making Iraq a favourable area for parasitic infections. This study of a random sample of Wasit population aimed to determine the demographic factors favouring infestation and to describe the prevalence of anemia related with parasitic infections. The results of this study could then be used by health authorities to improve environmental health throughout the community, thereby preventing the spread of intestinal parasitic infections in this province.

Materials and methods :

In the present study we examined 424 stool specimens from 68 patients, not belonging to a selected population, collected from October 2009 to February 2010 at the Karamah hospital, Wasit Province. Each stool sample was examined macroscopically for the presence of blood, mucus, segments of adult worm and consistency (loose , formed , unformed or watery). A match- stick head of stool was emulsified in 8.5% saline on a slide. A coverslip (22 x 22 mm) was placed on the suspension and examined with the light microscope, first with 10X objective and again with 40X objective. The same matchstick head size of faeces was emulsified in lugols iodine, covered with a coverslip and examined with a light

microscope [4]. The iodine preparation is particularly suitable for the identification of protozoan cysts. Iodine stains the nuclei and makes them quite visible. The 8.5% saline and iodine wet mount allow for the detection and identification of protozoan human gut parasites.

Blood samples were collected by finger prick. Hemoglobin concentration was determined by the Sahli's system (Spain) and Hematocrit was measured using heparinized micro-hematocrit tubes and a micro-hematocrit centrifuge(Germany). Thin blood films were fixed and stained for White Blood Cells count (WBC's differential). Anemia was defined as a hemoglobin of less than 110 g/l for children under 6 years old, less than 120g/l for male and female children between 6-14 years of age and females over 15 year of age, and less than 130 g/l in boys over 15 years of age according to the WHO definition of anemia[5].

Results :

Among the 424 patients whose stool samples were examined in the laboratory during five months (10,11,12,1,2), 68 intestinal parasitic infections (16 %) were diagnosed, 38 in males and 30 in females.As we summarized in (table 1), 68 infections were caused by only one agent. The most common protozoa detected was *E.histolytica* (68).

Table 1. Patients with intestinal parasitosis caused by *E.histolytica*

Age / Year	Male +Ve	%	Female +Ve	%	Total	%
Group 1 (0-10)	13	0.19	8	0.12	21	0.31
Group 2 (11-20)	7	0.10	6	0.09	13	0.19
Group 3 (21-30)	8	0.12	4	0.06	12	0.18
Group 4 (31-40)	5	0.07	6	0.09	11	0.16
Group 5 (41-50)	5	0.07	6	0.09	11	0.16
Total	38	0.56	30	0.44	68	100.0

Table 2 shows the range of hemoglobin (Hb) in five age groups. The lowest hemoglobin appears in group 1(0-10)year whose had anemic case,while the largest hemoglobin rate appeared in group 4 (12-14.6). There was no significant difference in occurrence of anemia between genders ($X^2 = 0.58, P > 0.05$).

Table 2. Prevalence of anemia by age

Age / Year	Hemoglobin(Hb%)	Packed Cell Volume (PCV)
Group 1 (0-10)	9.6-12	30-40
Group 2 (11-20)	9.6-14.6	30-45
Group 3 (21-30)	9.6-14	23-42
Group 4 (31-40)	12-14.6	40-45
Group 5 (41-50)	9.6-14	32-42

The relationship between age and total count of leukocytes appears in table 3. The large number of WBCs was shown in group 2 and 3, while the low number was in group 5.

Table 3. Relationship between age and WBCs differential

Age / Year	White Blood Cells (WBCs differential)
Group 1 (0-10)	4-10
Group 2 (11-20)	6-12
Group 3 (21-30)	4-12
Group 4 (31-40)	8- 9
Group 5 (41-50)	5-7

The monthly prevalence of *E.histolytica* observed in each of the five months(10,11, and 12 / 2009 and 1 and 2 / 2010) (table 4). The months of December 2009 and January 2010 showed a higher infection rate while October, November 2009 and February 2010 showed a lower infection rate. The infection rate for December, and January was 27, 15 (40 %, 22 %) respectively. October, November and February 7, 9, 10 (10%, 13%, 15%) respectively. By statistical analysis (ANOVA), there was no difference in the infection rate in the five months of study (P>0.05).

Table 4. Monthly distribution of *E.histolytica* infection

Months	Case +Ve	%
10	7	0.10
11	9	0.13
12	27	0.40
1	15	0.22
2	10	0.15

Discussion :

Food and water pollution are major factors in the transmission of the infection in a community. Transmission occurs through poor sanitary habits of indiscriminate defecation. Infections usually occur through ingestion of infective cysts from contaminated hands, food or drinks.

The present work describes the changes observed in the frequency of intestinal parasites in a single geographic area over 5 months. The observed 16 % overall prevalence of *E.histolytica* is consistent with those reported from different regions of Iraq and other neighboring countries [9,10,11,12].The ubiquitous nature of *E. histolytica* apparent in this study may be attributed to a high incidence of this parasite in certain locations of Wasit Strip,especially the ones deprived of clean drinking water, which is the major potential source of infection[13]. Additionally, this study revealed that *E. histolytica* has shown persistent annual increase (Table 1). This alarming rise of the parasite could be due to emergence of resistance to the currently employed antiprotozoal drug, metronidazole. Metronidazole resistance is a well-documented phenomenon for various protozoan species [14]. Also the improvement of sanitation , the use of community treatment (especially infected children) and improvement of personal hygiene by health education are advocated as effective and affordable short-term measures for combating parasitic infections [15].Comparison of results from the present study with those from other developing countries in the region, such as Yemen [16], Kuwait [17] and Lebanon [18] shows that considerable differences can be found both in the incidence of individual parasites and in the overall prevalence of parasites. These differences can be explained by the influence of environmental factors and habits of the different nations on the endemicity and transmission of intestinal parasites.

The widespread occurrence of anaemic among the examined patients is worrisome but agrees with the earlier observation that about 30% of the world population is anemic [19]. Anemia is commonly caused by deficiency of iron in diet [19,20].It is common knowledge that due to combined forces of ignorance and poverty the diets of many individuals and households in developing countries often lack many essential blood-building ingredients, including iron.These factors might have contributed to the high occurrence of anemia in the studied area.

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