EFFECT OF INFECTION WITH INTESTINAL PARASITIES ON BLOOD PICTURE [+]

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Abstract

This study was performed from December 2004 to March 2005 to investigate the prevalence rates of intestinal parasites and blood picture of patients who were suffering from different intestinal parasite in hospitals of AL- Hilla city center.

This study included 540 patients from both sexes and different ages. Stool samples examinations were performing for these cases, which include direct smear method and the Scotch Cellulose Tape Technique for examination about Enterobius vermicularis in children. Certain examinations of blood picture were conducted, which included total white blood cells count, Eosinophil count and Hb determination for 273 cases. The results of this study show that the total infection rate with intestinal parasites was 50.5% .This study record the prevalence rate of intestinal parasites as following Entamoeba histolytica 91(16.85%), Giardia lamblia 86(15.92%), A .lumbricoides 25(4.62%), H.nana 10 (1.85%) , E. vermicularis 61(11.2 %).

In relation with blood picture examinations, there was significant increasing of each of total number of W.B.Cs and number of Eosinophils for patients of parasitic infections in comparison with standard normal values. In addition, there was non-significant decreasing of Hb values for the patients' less than normal level of hemoglobin (Hb).

المستخلص

أجريت هذه الدراسة من كانون الأول ٢٠٠٤ ولغاية آذار ٢٠٠٥ للتحري عن انتشار الطفيليات المعوية والصورة الدموية المرافقة لها بعض المرضى الوافدين وبعض المرضى الراقدين في مستشفيات مدينة الحلة مركز محافظة بابل. هذه الدراسة شملت ٥٤٠ مريضاً من كلا الجنسين ومن مختلف الأعمار. لقد أخذت عينات البراز من هؤلاء المرضى وأجريت عليها الفحوصات المختبرية بطريقة المسحة المباشرة. أجريت خلال هذه الدراسة بعض فحوصات الصورة الدموية شملت حساب العدد الكلي لخلايا الدم البيضاء، حساب الخلايا الحامضية وتقدير قيمة الهيموكلوبين لـ ٢٧٣ حالة مرضية.أظهرت نتائج الدراسة الحالية أن نسبة الاصابة الكلية بالطفيليات المعوية كانت ٥٠,٥ %.

بالنسبة لفحوصات الصورة الدموية لوحظ ارتفاع معنوي في العدد الكلي لخلايا الدم البيضاء والخلايا الحامضية للاشخاص المصابين بالطفيليات المعوية مقارنة بالقيم الطبيعية القياسية لكل من خلايا

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الدم البيضاء والخلايا الحامضية. أيضا لوحظ انخفاض غير معنوي في قيم الهيموكلوبين للاشخاص المصابين اقل من المستوى الطبيعي للهيموكلوبين.

Introduction

Intestinal helminthes and protozoa have global prevalence, though they show considerable variation both in place and in time. The distribution of parasites over the surface of the earth is dependant on the presence of suitable hosts, the habits, and environmental conditions [1]. Estimates of the global prevalence of intestinal parasitic diseases are at best extremely rough. Although many studies have been done, and others are still going on, all over the world, to study intestinal infection of parasitic nature, still morbidity reporting is essentially non-existent in many parts of the world, in which these diseases do occur [2].

Materials and Methods

The Patients: This study included 540 patients of both sexes and different ages with clinically confirmed intestinal parasite.

General Information

The information included living conditions or regions (Urban, Rural), locality, sex, age and education. Some information was obtained from the case sheet as a confirmatory diagnosis of intestinal disorders.

Laboratory Examination

1-Stool Examinations

Stool Samples Collection

Clean plastic cups were used for stool samples collection avoiding presence of urine or any other substances that may lead to false examination.

Stool Samples Examinations

1-Macroscopical Examination

It was performed by observing grossly the consistency of stool samples, presence of helminthes, blood, mucus and other substances.

2- Microscopical Examination

1-Direct Method

From each stool samples, smears with normal saline and lugols iodine were examined. Two direct smears were examined from each fecal sample, by preparing two clean dry microscope slides, each with normal saline and lugols iodine solutions. By using clean fine wood stick, the stool specimen was touched in different sites, especially where streaks of blood or pus are noticed, then mixed thoroughly with each drop of normal saline and lugols iodine solutions on the prepared 2 slides, then each half of the slides was covered by cover slip. The

smear was examined thoroughly under the low (x10) power and high (x40) power of the microscope.

2-The Scotch Cellulose Tape Technique

2- Blood Examinations

Blood Samples Collection: Blood samples were drawn from the 273 patients with intestinal parasite , by using 2ml disposable syringes, 1.5ml of this blood was put in E.D.T.A. tube for W.B.C.s count, Eosinophil count and Hb hemoglobin determination.

Blood Picture Examinations

These examinations were performed for a certain number of infected patients with intestinal disorders, in other words these patients were infected with intestinal parasites that cause intestinal disorders.

1-Total White Blood Cell Count [W.B.Cs Count] : W.B.Cs. count was performed according to [3, 4]

2- Eosinophil Count: Was performed by differential white blood cells count according to [3, 4].

3-Haemoglobin (Hb) Determination: Haemoglobin determination was performed by using Sahli method according to [3].

Statistical Methods

T-test and Chi-squared were applied to find the significant difference between the data. P value (<0.05) were considered significant [5].

The Results

Prevalence rates of parasitic infections that are associated with intestinal parasites were (٥٠,٥%) associated with different parasitic infections. This study record that the number and percentage of parasite as follows: Entamoeba histolytica 91(16.85%), Giardia lamblia 86(15.92%), A.lumbricoides 25(4.62%), H.nana 10 (1.85%), E. vermicularis 61(11.2 %) (Table 1).

Blood Examinations

The blood picture examinations were performed for different groups of patients who were with intestinal parasites. These examinations included total white blood cells count (T.W.B.Cs count), Eosinophil count and Haemoglobin (Hb) determination.

1- Total White Blood Cells Count (T.W.B.Cs count)

This examination was performed for 45 patients.They were divided into 3 age groups and each group included 15 patients.The mean value ± S.D. of T.W.B.Cs

count for the 1st , 2nd and 3rd groups was 9470 ± 3560, 9375 ± 3540 & 8605 ± 3160 respectively (Table 2).

2- Eosinophil Count

This examination was also performed for 45 cases who were the same three groups of patients, mentioned previously with T.W.B.Cs count. The mean value ± S.D of Eosinophil count is 7.17 ± 3.9, 7.23 ± 4.0 and 4.12 ± 3.52 for the 1st, 2nd and 3rd group respectively (Table 2).

Another group of patients (81 patients) was with range of age (1-15 year). Eosinophil count was performed for this group of patients and the results are summarized in (Table 3).

3- Hemoglobin Determination (Hb)

This examination was performed for the same three groups of (45 patients). The mean value ± S.D of Hb is 11.5 ± 1.6, 12.4 ±1.8, and 12.7 ±1.5 gm/dl for 1st, 2nd and 3rd group respectively (Table 2).

In addition, Hb determination was estimated for 86 patients with a range of age 5-40 year. The mean values ± S.D for the upper cases are (8.92 ± 1.01), (9.21 ± 0.95) and (8.57 ± 1.04) respectively (Table 4).

Table (5) shows that the Hb concentration of infected and non-infected children with Enterobuis vermicularis in different age groups is lower than normal hemoglobin (Hb) concentration.

Discussion

The present study shows relationship between intestinal parasitic infection and hemoglobin (Hb) level which decreases with the increasing of number of types of intestinal parasites and this result is similar to the results of, [6,7,8] who studied the effect of some intestinal parasites on blood picture among pupils of some areas of Ninevah, AL- Najaf and Babylon provinces respectively. The interpretation of the effect of parasite on the Hb level corresponds to the results of many investigators who revealed that, the effect of A.lumbricoides upon Hb level occurs due to the competition of this parasite on the food of its host and this depends on the density and number of this parasite [9]. H.nana comes second degree after A.lumbricoides in their effects on Hb level for the same reason,[10], while E. vermicularis is with little effect in comparison with other worms because it is found in large intestine and does not feed on blood but feed on excreta or products of the host and does not cause any damage in intestinal wall [11].Effect of intestinal protozoa on Hb level is more sever in comparison with the effect of intestinal worms. Intestinal protozoa that have more effect on Hb level were E. histolytica and G.lamblia. In relation with, E.histolytica it leads to necrosis of intestinal mucosa causing damage and degeneration of absorption sites of necessary substances, in addition to occurrence of bleeding associated with this process[10].G.lamblia leads to covering sites of absorption of vitamins and other essential nutritional elements since it makes as a barrier in front the transmission of these substances from lumen of intestine to blood stream, while the effect of other intestinal protozoa in this study is very little because most of them are commonsals [12]. The infection with intestinal parasites has an important effect on values of blood

components (W.B.Cs, Eosinophils and Hb). The decreasing of Hb level that is associated with increasing of Eosinophils and total W.B.Cs numbers is found in agreement with results of other researchers,[6,7,8]. The intestinal protozoa affecting blood constituents are G.lamblia and E. histolytica, this results from high density of these protozoa that leads to decrease in absorption of necessary nutrients for the formation of blood components [9], also E. histolytica take its food or R.B.Cs by damage or perforation mucosa of intestine leading to intestinal ulceration [13].This study reveals that the mean total W.B.Cs count is ($t = 2.704$, $d.f = 40$, $P< 0.005$), and this does not agree with result of [8].The mean value of Hb is not significantly lower than normal value in patients ($t = 1.63$, $d.f = 40$, $P> 0.05$) and this is attributed to the causative parasites, which have effect on the blood or blood forming tissues, and this interpretation is nearly similar to that of some researchers, [6,14,15,16,17,18].In relation with Eosinophils count the results are statistically significant ($t = 2.432$, $d.f = 40$, $P< 0.005$) . The present results are similar to or agree with that of some other researchers [6, 7.8].

Table (1): Prevalence rates of isolated intestinal parasites

Isolated intestinal parasites			
	NO.	**% of total examined**	**% of positive**
1- Entamoeba histolytica	91	16.85	33.3
2-Giardia lamblia	86	15.92	31.5
3-Ascare lumbricoides	25	4.62	9.15
5- Hymenolopis nana	10	1.85	3.66
6- Enterobius vermicularis	61	11.2	22.3
Total	273	50.5	(100%)

Table (2): The blood picture examinations for intestinal parasites

Subject	No	Age rang	T.W.B.Cs count		P. value	Eosinophil count		P. value	Haemoglobin Hb determination g/dl		P. value
			Mean ±S.D	Rang		Mean ±S.D	Rang		Mean ±S.D	Rang	
1st group	15	5-15	9470±3560	3700-14500	P<0.005	7.17±3.9	1-13	P<0.005	11.5±1.6	8.3-14.7	P>0.05
2nd group	15	16-30	9375±3540	3000-15500	P<0.005	7.23±4.0	1-14	P<0.005	12.4±1.8	9.6-15.5	P>0.05
3rd group	15	31-50	8605±3160	2500-14500	P<0.005	4.12±3.52	1-12	P<0.005	12.7±1.5	9.6-15.3	P>0.05

Table (3): The occurrence of eosinophilia as a result of parasitic infections

Age groups	Infected No.	Helminths	Protozoa	Mean No. of Eosinophils per/mm^3
1-4	11	2	9	506
5-9	15	4	11	402
10-14	20	11	9	313
15+ and more	35	18	17	257
Total No.	81	35	46	338*

Mean number of Eosinophils /mm^3

Table (4): Level of Hb for some patients with certain intestinal parasites

Infected No.	(Hb level ± S.D) gm/100ml	(Hb values±S.D) for non infected persons
27	8.92 ± 1.01	10.21 ± 0.52
41	9.21 ± 0.95	11.10 ± 0.89
18	8.57 ± 1.04	11.95 ± 0.62

Table (5): Hb concentration of children infected with Enterobuis vermicularis in different age groups

Age groups (years)	Examined No. of children	Mean of Hb for infected children	Mean of Hb for non infected children	Normal* Hb
1- < 2	5	9.16	10.2	13.5
2 - < 3	11	9.31	9.86	13.0
3 - <4	10	9.17	9.5	12.5
4 - < 5	15	9.37	9.8	12.5
5 - < 6	20	9.4	10.20	12.0
Total No.	61	9.27	9.91	12.7

$X^2 = 2.85$, d.f = 1 , $P > 0.05$

* Normal Hb haemoglobin (physifax 14) Hb = gm/100ml

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