The changes in blood count among patients with different intestinal parasitic infections at Erbil city

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Abstract

This study was performed from first of May to last of July 2015

investigate the prevalence rates of intestinal parasites and blood picture of patients who were suffering from different intestinal parasite in health center of Erbil city.

This study included 80 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 and Hb determination for 80 cases. The results of this study show that the total infection rate with intestinal parasites was 45% This study record the prevalence rate of intestinal parasites as following Entamoeba histolytica 8 (22.22%), Giardia lamblia 11 (30.55%), A .lumbricoides 2 (5.55%), H.nana 4 (11.11%) , E. vermicularis 11 (30.55 %). In relation with blood picture examinations, there was significant change 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 Hb values for the patients' less than normal level of hemoglobin (Hb).

Introduction

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

In developing countries, it is impossible to ignore the burden of parasitic infections usually categorized as diseases of poverty[3].The presence of individuals infected with intestinal parasites in situations of poverty, with deficient sanitary infrastructure, lack of latrines or poor use of them, overcrowding, and soil characteristics favorable for the proliferation of parasites provide conditions for the maintenance and transmission of such infections [4]. According to WHO estimates, at least 2 billion people in the world suffer from helminthiasis, and, of those, approximately 300 million suffer

associated severe morbidity [5].These infections represent more than 40% of the disease burden due to all tropical diseases, excluding malaria [5]. In many Latin American countries, endemic intestinal parasitosis is persistent and prevalent in people of all ages, especially the soil-transmitted helminths and the protozoa Cryp-tosporidiumparvum, Giardia lamblia, and Entamoeba histolytica, with rates of infection from 10 to 50% or higher [6]. Prevalence data from intestinal parasite surveys in Honduras are scarce, but statistics from hospitals and health clinics show a regional distribution of common intestinal parasites with varying rates for different age groups that range from 45-70% at the North coast, to 5-8% in the South [7].

Materials and Methods

The present study done on patients attending the health center of Erbil city from first of May to last of July 2015. Study Design : cross sectional study done on patients who attending the health center of Erbil city. The Patients: This study included 80 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 substance.
  2- Microscobical examination:
  A- 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 logul's 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 logul's 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.
  B- The Scotch Cellulose Tape Technique.
2- Blood Examinations
Blood Samples Collection: Blood samples were drawn from the 80 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 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 [8, 9]

2- Eosinophil Count: Was performed by differential white blood cells count according to [8, 9].

3-Haemoglobin (Hb) Determination: Hemoglobin determination was performed by using Sahli method according to [8].

Statistical Methods:

T-test and Chi-squared were applied to find the significant difference between the data. P value (<0.05) were considered significant [10].

Results

This study included 80 patients from both sexes and different ages:

Table (1) percent of infected patients with intestinal parasitic infection, This table shows the percent of infected patients intestinal parasitic infection where was 45% from 80 suspected patients.

Table (2) reveal the distribution of case according to residence ,and shows the rural areas 69.50% followed by 30.55% for urban areas.

Table (3) reveal the distribution of case according to age gruops ,and shows the highest percent with age group of ≤20 years 58.33% and lowest percent with age group (15-20)years 2.77% .

Table (4) record that the number and percentage of parasite as follows: Entamoebahistolytica 8(22.22%), Giardia lambtia 11 (30.55%), A .lumbricoides 2 (5.55%), H.nana 4

(11.11%) , E. vermicularis 11 (30.55 %).

Table (5) reveal the HB vales in relation to type of parasite species in males and females and shows non-significant changes of HB values in both males and females

Table (6) shows the relation of type of parasites infection with no. of W.B.C ,there are significant increasing in eosinophils in worms infection (h. nana. Ascaris, Enterobius) more than protozoa infection (E.histolytica , G.lamblia)

Discussion

Enteroparasitoses are a serious problem in public health, especially in the third world countries [1] and they provoke frequent malnutrition and diarrhea, as well as physical and mental problems in children [2]. Among the parasitic pathogens more frequently found in human beings, there are the helminths Ascaris lumbricoides, Enterobius vermicularis, Ancylostoma duodenale, Strongyloides stercoralis and Trichuris trichura,as well as the intestinal protozoa, such as Giardia lamblia[3]. Transmitting these parasites to another host depend on complex epidemiological cycles, on a great variety of beings and on the lack of basic sanitation, making it difficult to control such diseases[3].

The results showed that total infection with intestinal parasites (45%) is high in rural areas because there are many people in rural areas who suffering from parasitic infection due to poor sanitation poor public health practices , increasing of vectors & malnutrition states in addition to using of river water directly for drinking & washing [11].

There are 5 types of intestinal parasites (table 4) first Infection with Entamoeba histolytica regard as critical infection & worldwide distribution . Their cysts transmitted through contaminated food and water hand to mouth contamination . Flies cockroaches serve as vector for E. histolytica infection [12].

Giardia lamblia infection mainly responsible for diarrhea especially in children rather than adults [12,13].

The infection with Ascaris lumbricoides very common in the world ,it is increased in poor sanitation regions , particularly when human face is used as a fertilizer and when children defecate directly on the ground [12].

E. coli non pathogenic parasites in human . It is worldwide distribution & their cysts contaminate food & drinking water then infect human . detection of these non pathogenic parasites in human would suggest ingestion of contaminated water or food & may indicate possible exposure to pathogenic organisms [14,15].

Infection with Ancylostoma duodenal is wild world distribution particularly in the inhabitant practice , poor sanitation practices , especially with regard to proper fecal treatment & disposal . It infect persons who work barefoot in feces contaminated soil [16].

E. vermicularis one of the famous children worms infection especially in crowded area such as schools & orphans . It distributed all over the world [17].

Infection with H. nana occurs by presence of rodent or beetles (Tribolium) in houses .These worms have different life cycle , it can infect human with or without intermediate host [14].

The results of hematologic study show decrease(non seginficant change) in Hb because the intestinal parasite cause digestive disturbance &vitaminosis & also release the trophozoite motile feeding stage and adhere to villi of intestine &suck the chime from villi another parasite suck nearly (50 ml) of blood per day (Stephenson , 1993 ;Cheng , 1974).

Other 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, [1] who studied the effect of some intestinal parasites on blood picture among pupils of some areas of Baghdad 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 [18]. H.nana comes second degree after A.lumbricoides in their effects on Hb level for the same reason,[19], 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 [20].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[18].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 commensals [20].

In table 6 the result show significant change in W.B.C. this finding goes with other study like study done by Lika' Adday[21]. The College Of Dentistry Babylon University they shows increasing in W.B.C. especially in eosinophils due to ability of eosinophils to destroy the parasites by attachment of parasite wall & secretion of granules act in external parasite wall destructing.

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 [20].their

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, [6,22,23]. The present results are similar to or agree with that of some other researchers [1].In relation with Eosinophils count the results are statistically significant .

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Table (1) percent of infected patients with intestinal parasitic infection

Patients	No.	%
Infected	36	45
Non - infected	56	55
Total	80	100

Table (2) Distribution of cases according to Residence

	No. of infected patients	%
Urban	11	30.55
Rural	25	69.50
total	36	100

Table (3) Distribution of cases according to age.

Age group (years)	No. of infected patients	%
5-10	12	33.33
10-15	2	5.55
15-20	1	2.77
≤ 20	21	58.33
Total	36	100%

Table (4) Distribution of cases according parasite species .

	E. histolytica	G.lamblia	H.nana	Ascaris	Enterobius	Total
No.	8	11	4	2	11	36
%	22.22	30.55	11.11	5.55	30.55	100%

Table (5) relation between the type of parasitic species and Hb values mean±SD.

	control	E.histolytica	G.lamblia	H.nana	Ascaris	Enterobius	P. value
Hb determination g/dl(males)	12.5±2.6	11.5±1.6	12.5±1.2	12.3±1.1	11.7±0.6	11.3±1.5	P>0.0
Hb Determination g/dl(females)	11.5±2.6	11.4±1.6	11.2±1.6	10.5±1.6	11.1±1.2	10.5±1.5	P>0.0

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Table (6) relation of no. of W.B.Cs with parasite species Croft, New York, 1965. mean±SD.

W.B.Cs Type	Control	E.histolytica	G.lamblia	h. nana	Ascaris	Enterobius	P. Value
Nertophil(%)	60.5±2.1	75.5±3.1	72.5±2.1	77.5±1.1	65.5±3.4	65.5±1.5	
lymphocte(%)	37.5±2.7	21.5±3.6	33.5±3.1	23.5±2.6	29.5±0.6	27.5±2.6	
Eosinophil(%)	0.6±0.4	0.6±0.3	0.6±0.2	0.7±0.3	0.7±0.3	0.8±0.1	
basophils(%)	0.8±0.5	0.5±0.3	0.5±0.3	0.6±0.3	0.6±0.4	0.4±0.2	