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RELATIONSHIP BETWEEN ENTAMMOEBA HISTOLYTICA AND BLOOD PARAMETERS

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Abstract

Background

Entamoeba histolytica is the responsible parasite of amoebiasis and remains one of the top three parasite causes of mortality worldwide. With increased travel and emigration to developed countries, infection is becoming more common in nonendemic areas. Although most individuals infected with E. histolytica remain asymptomatic, some present with amoebic colitis and disseminated disease.

Objective

aim of the present study was to evaluate the relationship between the infection with E. histolytica and some blood parameters.

Patients and methods: -

a total of 60 male and female presented with infected diarrhea to baqubah teaching hospital and albatool teaching hospital were examined during period (October to December)2022. The age of patents range. From 8-45years. Thirty healthy parasite-free individuals used as a control group Stool samples were collected from patents for direct microscopic examination, then the blood parameters evaluated were (RBCs, HB, PCV, MCV, MCH, MCHC, PLT, TLC, Neutrophile, Lymphocyte and mixed cells) in the patient's blood. using Sysmex instrument

Results:

In this study 60 patents confirm to be positive for E. histolytica. The results showed a significant decrease ($P<0.05$) in RBCs count, level of Hb, PCV, MCV and MCHC in E. histolytica infected patents in comparison to healthy control group. In additon, the total leucocyte count and differential type of neutrophil, lymphocyte and mixed cells (monocyte, eosinophile, basiophile) increased significantly ($P < 0.05$) in patents infected with E. histolytica in compared to healthy control.

Conclusion.

Relationship between the infection with E. histolytic and changes in haematological parameters indices that lead to anemia. The infection has effect on hemoglobin packed RBC and immune system.

Keyword: blood parameters, Entamoeba histolytic, parasitic infection.

Introduction

Entamoeba histolytica is a protozoan that causes intestinal amebiasis as well as extraintestinal manifestations amoebic dysentery, is a term used to describe an infection caused by the protozoan Entamoeba histolytica Most infections are asymptomatic, but invasive intestinal disease may occur manifesting with several weeks of cramping, abdominal pain, watery or bloody diarrhea, and weight loss Disseminated, extra intestinal disease such as liver abscess, pneumonia, purulent , pericarditis, and even cerebral amoebiasis has been described that up to 50 million people are infected by E. histolytica , primarily in developing ,countries .

and it is responsible for over 100,000 deaths a year Transmission generally occurs by the ingestion of infected water or food due to fecal excretion of cysts, and even fecal-oral transmission within household and during male homosexual actvitinvasion of the colon and liver by E. histolytica elicits an ant-inflammatory immune response and may successfully suppress immune reaction to the.

Clinical manifestations.

Approximately ninety percent of Entamoeba infections are asymptomatic]. Risk factors that are associated with increased disease severity and mortality include young age, pregnancy, malignancy, malnutrition, alcoholism, and corticosteroid. Amoebic colitis generally has a subacute onset, with symptoms that can range from mild diarrhea to severe dysentery, with abdominal pain and watery or bloody diarrhea]. Symptoms tend to be nonspecific, and the differential diagnosis is broad. Infectious causes that need to be excluded include shigella, salmonella, campylobacter, and enteroinvasive and enterohemorrhagic Escherichia coli. Noninfectious causes include inflammatory bowel disease, intestinal. tuberculosis, diverticulitis, and ischemic colitis

Unusual but serious complications such as fulminant necrotizing colitis, toxic megacolon, and fistulizing perianal ulcerations can occur, especially when diagnosis and treatment is not timely. Patents that develop necrotizing colitis have a mortality rate of 40% and those with concomitant liver abscess mortality increase to 89%]. These patents appear toxic, with fever, bloody diarrhea, and signs of peritoneal irritation The development of toxic megacolon has been linked to corticosteroid use and is unresponsive to antiamoebic therapy, requiring immediate surgical intervention. Exclusion of inflammatory bowel disease is exceptionally important, given that misdiagnosis and treatment with. corticosteroids can lead to these serious complications.

The formation of an ameboma is another uncommon manifestation that may occur in amebic colitis. It tends to present with pain and swelling in the right iliac fossa, or with symptoms of bowel obstruction. Macroscopically, amebomas resemble a mass (or multiple masses) typically localized in the cecum or ascending colon and consist of localized hyperplastic granulation tissue. Ameboma formation has been generally associated with untreated or partially. treated amoebic colitis. Given that its appearance can resemble lymphoma, neoplasm, tuberculosis, abscess, or inflammatory bowel disease, colonoscopy and histopathological examination of the biopsied material are warranted to exclude another sinister lesion.

Amebic liver abscess (ALA) is the most common extra intestinal manifestation of amoebiasis. 50-80% of individuals with ALA will present with symptoms within 2 to 4 weeks, with fever and constant, aching right upper quadrant pain. In up to 50% of

cases, patients present more chronically with protracted diarrhea, weight loss, and abdominal pain. Cough, right-sided pleural pain, and subsequent pleural effusion may occur when the diaphragmatic surface of the liver is involved]. Dysentery is the most common associated symptom, present in nearly 40% of affected patents. Leukocytosis, transaminitis, and elevated alkaline phosphatase on laboratory evaluation are present and imaging reveals an abscess, typically on the right hepatc lobe. Amoebic abscesses tend to be solitary, but multiple abscesses can occur and have been described in previous literature []. Anemia and hypoalbuminemia. [are very common in ALA in comparison to pyogenic abscesses. The lungs are the second most common extra intestinal organ affected.

Pulmonary amoebiasis generally occurs by direct extension of an ALA but can also occur by direct hematogenous spread from intestinal lesions or by lymphatic spread]. The right lower or middle lobe of the lung is most affected. Patents present with fever, hemoptysis, right upper quadrant pain, and referred pain to the right shoulder or intrascapular region. Pulmonary abscesses, broncho hepatic fistula, and empyema can occur when a liver abscess ruptures into the pleural space]. Patents characteristically present with “anchovy sauce-like” like pus or sputum. The presence of bile in these secretions indicates liver. (origin)
Rupture of the liver abscess into the pericardium is also a rare complication with high mortality]. It can present acutely with cardiac tamponade resulting from purulent pericarditis, or with a slowly accumulating pericardial effusion. Symptoms include severe chest pain, shortness of breath, and edema from congestive heart failure or constrictive pericarditis. Inferior vena cava (IVC) thrombosis is another extremely rare complication of ALA]. Mechanical compression of the IVC by a large hepatic abscess or by erosion from a posterior liver abscess can lead to embolism of the IVC and thromboembolic disease of the lungs.

Treatment

Specific diagnosis and treatment is warranted in all infections caused by E. histolytica, even in asymptomatic carriers, not only because of the potential of developing invasive disease, but also to diminish the spread of disease]. Noninvasive colitis may be treated with only a luminal agent such as paromycin, to eliminate intraluminal cysts]. For invasive amoebiasis and extra intestinal disease, nitroimidazoles (e.g., metronidazole) are the mainstay therapy but are only active against the trophozoite stage]. Nitroimidazoles with longer half-lives, such as tinidazole and ornidazole, allow for shorter treatment periods and tend to be beer tolerated but are not available in the United States. after a 10-day course of a nitroimidazole, paromycin should be given to assure that the luminal parasites are cleared to prevent relapse [26]. It has been shown that 40-60% of patients have persistent intestinal parasites after treatment with only nitroimidazole. Second line luminal agents include diiodohydroxyquin and diloxanide furoate.

If fulminant amoebic colitis develops, broad-spectrum antibiotics should be added to the treatment due to risk of bacterial translocation [26]. Surgical intervention is rarely necessary and reserved for those patients with signs of acute abdomen or those with toxic megacolon.

In certain instances, aspiration of ALA is required, particularly when there is no clinical response five to seven days of antiamoebic therapy. Patients with high risk of abscess rupture (cavity diameter of ≥ 5 cm and lobe abscesses or large amoebic pleural effusions should also be considered for drainage. Imaging-guided percutaneous needle aspiration or catheter drainage is the procedure of choice [6]

Education regarding the importance of hand washing and hygiene is the single most important measure in preventing the spread of amoebiasis, as well as other infectious diseases. It is estimated that washing hands with soap and water could.

reduce diarrheal disease-associated mortality by up to 50%, particularly after using the toilet, changing diapers, and before handling or preparing food However, practicing personal hygiene may be difficult in many areas of the world due to lack of resources such as clean water and soap.

Material and methods

Patient and Methods.

Total Of 60 Male and Female patients With Diarrhea Visited Baquba Teaching Hospital and Al Batool Teaching Hospital Were Selected from Period October-November-December 2022.The patient age range from 8-45 years old and ti0 healthy people. Age and sex matched parasite free to consider as control group.

Stool examinations

Stool sample collection

Stool samples from each patent were collected in a clean, dry, tight fit cover containers and examined within half an hour in parasitology lab. The samples were examined for the presence of E. histolytica.

stool samples examination.

Macroscopic examination.

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

Microscopical examination.

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, one with normal saline and the other with lugol's iodine solutions. By using clean wood stick, the stool specimen was touched in different sites, especially where streaks of blood or pus were noticed, then mixed thoroughly with each drop of normal saline and lugol's iodine solutions on the prepared slides, then each slide was covered with a cover slip. The smear was examined thoroughly. under the low (x10) and high (x40) powers of the microscope.

Blood Samples Collection

Blood samples were drawn from the 60 patents that infected with E. histolytica and healthy parasite free as control, by using disposable syringes 2ml. one ml of the collected blood was put in EDTA tube for blood parameters and WBCs count and differential by using Sysmex instrument, Japan.

Procedure

Ten µl of blood sample was placed in the aspirator of the instrument and the blood sample was aspirated.

Statical analysis.

Statical Analysis System- (SAS, 2010) was used to evaluate the effect of different parameters in this study.

Results

In this study sixty patient were confirmed to be positive for E. histolytica. thirty healthy matched free parasites used as control group.

Table1: Comparison between patient infected with Entamoeba histolytica and healthy control regarding blood parameter.

Parameter	Patients N = 60	Control Healthy N = 30
RBCs ($X10^6/mm^3$)	*3.473± 0.012	4.002± 0.079
PCV (%)	*32.245 ± 0.765	37.983±0.652
Hb g/dl	*8.512 ± 0.181	12.913±0.732
MCV (mm^3)	*74.054 ± 0.689	84.112±0.719
MCHC (g/dl of RBCs)	*24.082 ± 0.312	28.327±5.233

Significant difference ($P<0.05$) between patients and control group Blood parameters shown decrease ($P<0.05$) in red blood cell and hemoglobin concentration –packed cell volume- mean corpuscular volume and significant increase $P<0.05$ in mean corpuscular volume

Parameter	Patients N = 60	Control Healthy N = 30
WBCs (X $10^3/mm^3$)	*8.123 ± 0.213	9.891±0.568
Neutrophile	*59.589 ± 0.789	48.448±0.231
Lymphocyte	*25.232 ± 0.215	22.587±0.055
Mixed Cells (Monocyte & Eosinophile)	*8.245 ± 0.097	6.789±0.022

Mixed cells(Monocyte)*9.852 ± 0.085 , 6.555±0.052(Eosinophile, Basophile)

* Significant difference ($P<0.05$) between patients and control group.

The results of total leucocyte count and differential type of neutrophil, lymphocyte and mixed cell like monocyte eosinophil basophile show significant increase $P<0.05$ in patient with E.histolytica.

Discussion

Amoebiasis continues to be a large health issue in developing countries, particularly in children. With increased travel and emigration to developed countries from endemic areas, the incidence and prevalence of amoebiasis continue to increase. Since most parents are asymptomatic, diagnosis and treatment can be challenging for clinicians, potentially leading to continuous spread of the disease. E. histolytica should be considered as a differential diagnosis of colitis and with certain extra intestinal manifestations, particularly when certain. demographics (i.e., gender, race, travel history) are present.

The present results have revealed a significant decrease in RBCs count, concentration of Hb and PCV in patients with E. histolytica infection compared to healthy control group. This result may be because this parasite causes digestive disturbance, also release the trophozoite motile feeding stage which adheres to villi of intestine and suck the chime from villi) and secretes proteolytic enzymes that dissolve host tissues and host cells and engulfs RBCs.

The results have shown a decrease in MCV and MCHC in patients infected with E. histolytica when compared to healthy control group. A decrease in MCV may be due to a decrease in Hb inside RBCs caused by E. histolytica infection; decrease in MCHC is caused by iron deficiency anemia that lead to decrease in formation of Hb in RBCs.

There are significant differences for serum iron between people with and without some intestinal parasites. E. histolytica needs great levels of iron to stay alive. This parasitic protozoan has the ability to gain iron from the host proteins, thus, heavy infection with E.hostolytica may cause a decline in iron level in the host

The data of this study showed a significant increase in WBCs, and this may be explained by the increase in the number of neutrophil, lymphocyte and mixed cells (monocyte, eosinophil, basophile). Because the infection with the pathogenic E. histolytica produces a marked immune response which results in the development of protective immunity

E.histolytica interacts to the mucous layer of the small intestine, resulting in villous atrophy in different levels, beside triggering inflammatory infiltrate and crypt hypertrophy. These processes disrupt the enterocytes and change bile acid metabolism that affects the absorption of most nutrients which are essential for body function, such as vitamins, iron, zinc, and folic acid.

Conclusions

relationship between the infection with E. histolytica and changes in haematological parameters indices that lead to anemia.

The infection has effect on hemoglobin packed RBC and immune system invasion of the colon and liver by E. histolytica elicits an anti-inflammatory immune response and may successfully suppress immune reaction to the amebae.

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