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The Level of Minerals in Patients Infected with Entamoeba Histolytica

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Abstract—**The study was carried out during the period from the beginning of (November / 2013 - November / 2014) for detection of Entamoeba histolytica in patients with age range from (3-60) year who attended to AL-Yarmouk teaching hospital and AL-Tifil central hospital.The diagnosis done by microscopic examination. A total of 200 suspected patient there was120 infected with the parasitediagnosed by the direct examination method, a blood sample was taken from each one, as well as (60) healthy controls were involved in the study, which included:Lipid profile and minerals measurement by spectrophotometric method.The results indicated: The prevalence of Entamoeba histolytica by using microscopic examination was 145 (72.5%). The level of (Ca++) increased significantly (P<0.05), while the level of Magnesium (Mg++) and Zinc (Zn++) decreased significantly (P<0.05) in patients sera, in comparison with healthy control.**

Index Terms— **Entamoeba histolytica, Ca++ ,Zn++ ,Mg++**

I. INTRODUCTION

Entamoeba histolytica is a protozoan parasite that causes amoebic dysentery and liver abscess. The disease is still one of the major health problems and predominantly affects individuals of lower socioeconomic status who live in developing countries [1, 2, 3]. Infections can be intestinal, extra intestinal, or both. Most cases are intestinal and asymptomatic. Symptoms, when occur, are multiple and varied, ranging from mild abdominal discomfort and diarrhea (often with blood and mucus) alternating with periods of remission or constipation, to severe illness with fever, chills, and significant bloody or mucoid diarrhea (”amoebic dysentery”). Amoebic colitis may be confused with inflammatory bowel disease such as ulcerative colitis [4].

About 99% of total body magnesium is located in bone, muscles and non-muscular soft tissue [5].

Approximately 50–60% of magnesium resides as surface substituents of the hydroxyl appetite mineral component of bone [6]. The magnesium content of bone decreases with age, and magnesium stored in this way is not completely bio available during magnesium deprivation [7]. Nonetheless, bone provides a large exchangeable pool to buffer acute changes in serum magnesium concentration, overall, one third of skeletal magnesium is exchangeable, serving as a reservoir for maintaining physiological extracellular magnesium levels [8]. Calcium is the most abundant mineral in the human body. The average adult body contains in total approximately 1 kg, 99% in the skeleton in the form of calcium phosphate salts. The extracellular fluid (ECF) contains approximately 22.5 mmol, of which about 9 mmol is in the plasma. Approximately 500 mmol of calcium is exchanged between bone and the ECF over a period of twenty-four hours [9]. The concentration of calcium ions inside the cells (in the intracellular fluid) is 10,000 times lower than in the plasma (ie. at < 0.0002 m mole /L, compared with 1.8 m mole/ L in the plasma) [10].

Calcium metabolism refers to all the movements (and how they are regulated) of calcium atoms and ions into and out of various body compartments, such as the gut, the blood plasma, the interstitial fluids which bathe the cells in the body, the intracellular fluids, and bone. An important component, of calcium metabolism is plasma calcium homeostasis, which describes the mechanisms where the concentration of calcium ions in the blood plasma is kept within very narrow limits [10].

Trace elements such as Zinc are essential for normal human development and functioning of the body [11].They has been implicated to play important roles in immune-physiologic functions.Zinc is an integral part of more than 200 enzymes and has significant task in nucleic acid metabolism, cell replication, tissue repair, and growth. Its deprivation leads to profound alteration of thymic function with resultant loss of T-cell- mediated responses and increased susceptibility to infectious diseases [11].

Zinc deficiency places children in many low-income countries at increased risk of illness and death from infectious [12,13,14] and impairedfetal development and reduced immunocompetence in the elderly.

II. MATERIALS & METHODS

A. *Studied groups*

The study carried out during the period from (November 2013- November 2014), the age of patients extended from (3 – 60) years, two studied groups were involved:

- Suspected patients: Blood and stool samples were obtained from a total of 200 patients clinically suspected with amoebic dysentery that had been examined and defined as suspected cases by specialized physician; the samples were collected from (Al-Yarmouk teaching hospital & Al-Tifil central hospital) in Baghdad.
- Healthy Control: Blood and stool samples from a total 60 healthy control group were involved from Al-Yarmouk teaching hospital staff and from different places in Baghdad; they were examined and defined as healthy, with no history of amoebic dysentery.

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B. Samples collection

Stool sample from each patient was collected in a clean, dry tight cover container and examined with a half an hour. The samples were examined for the presence of E. histolytica.

Stool sample examination

C. Macroscopic examination

It was performed by observing the consistency of stool, presence of blood, mucous and other substances.

D. Microscopic examination

For each stool sample, wet mount preparation slide was examined by clean, dry slides by obtaining one drop of normal saline and small amount of stool from different places of stool by using clean wooden stick, especially when blood or mucous were noticed, then mixed gently with normal saline and covered with cover slip, the slide was examined under the low (10x) and high power (40x) of microscope. [15].

E. Blood samples

Five mL of Venus blood was obtained from each patient and collected in sterilized screw cap plastic tube, blood samples were left for 30 min. at room temperature, then centrifuge at 3000 rpm for five minute, then the serum for each sample was collected in Eppendorf tubes and stored in deep freeze at -20c° until the time for using. The current study included :

One hundred twenty clinical patients of E.histolytica and (60) healthy control involved in the study. The levels of Ca++was examined by spectrophotometric method according to [16].

The level of Mg++ was examined by spectrophotometric method according to [17]. The level of Zn++ was examined by spectrophotometric method according to [18].

III. STATISTICAL ANALYSIS:

The statistical Analysis (T – test) was used to compare between means in studied groups according to [19].

IV. RESULTS & DISCUSSION

A. Magnesium (Mg++)

The level of Magnesium in the serum of patients with E.histolytica showed significant decreasing ($P<0.05$) in comparison with healthy control. While the results show no significant difference ($P>0.05$) between the gender of both groups Table (1). It was (1.58 ± 0.02), (1.53 ± 0.02) in males and females of patients group respectively against (2.33 ± 0.04), (2.30 ± 0.06) in males and females respectively of healthy control group.

These results are in agree with another study done by [20] who proved that the Mg++ serum level is reduced in blood when there is excessive loss of body fluids such as in diarrhea.

Table 1: The level of magnesium (mg/dL) in patients with *E.histolytica* and healthy control

Groups	Mean ± S.D Gender	
	Males	**Females**
Patients	1.58 ± 0.02	1.53 ± 0.02
Control	2.33 ± 0.04	2.30 ± 0.06
T-test value	0.084 *	0.098 *

*(P<0.05)

B. Calcium (Ca++)

The level of calcium in patients serum of E.histolytica showed significant increasing ($P<0.05$) in comparison with healthy control. While the results show non-significant difference ($P>0.05$) between the gender in both groups Table (2). It was (11.32 ± 0.08), (11.38 ± 0.06) in males and females of patients groups respectively in comparison with (8.79 ± 0.09), (9.10 ± 0.11) in males and females of healthy control groups respectively. These results are in agree with another study done by [21] who proved that hypomagnesaemia results in an increasing in intracellular calcium level. So the concentration of Mg++ is decreased, and then leads to increased Ca++ serum levels; as they act antagonistically.

Table 2: The level of calcium (mg/dL) in patients with *E.histolytica* and healthy control

Groups	Mean ± S.D Gender	
	Males	**Females**
Patients	**11.32 ± 0.08**	**11.38 ± 0.06**
Control	**8.79 ± 0.09**	**9.10 ± 0.11**
T-test value	**0.253 ***	**0.251 ***

* (P<0.05)

C. Zinc (Zn++)

The level of zinc in patients withE.histolytica showed a significant decreasing ($P<0.05$) in comparison with healthy control.While the results showed no-significant difference ($P>0.05$) between the gender in both groups Table (3). The level of zinc was (63.89 ± 0.99), (65.42 ± 0.32) in males and females of patients group respectively in comparison to (93.39 ± 0.73), (91.82 ± 1.21) in males and females of healthy control group respectively.

Also, the results are in agree with [22] who found a significant decrease in concentration of Zn++ during the infection with E.histolytica. The probable expression of the significant decreasing of zinc due to effect of diarrhea which leads to decreased in minerals in the body.

Table 3: The level of zinc (mg/dL) in patients with *E.histolytica* and healthy control

Groups	Mean ± S.D Gender	
	Males	**Females**
Patients	63.89 ± 0.99	65.42 ± 0.32
Control	93.39 ± 0.73	91.82 ± 1.21
T-test value	2.84 *	1.83 *

* (P<0.05)

REFERENCES

[1] Simonetta, G.; Giovanni, S.; Francico, R. and Mariella, A. (2002). Amebic infections due to the Entamoeba histolytica – Entamoeba dispar complex. A study of the incidence in a remote rural area of Ecuador. Am. J. Trop. Med. Hyg. 67: 123-127.

[2] ElBakri, A.; Samie, A.; Ezzedine, S. and Abu Odeh, R. (2013). Differential detection of Entamoeba histolytica, Entamoeba dispar and Entamoeba moshkovskii in fecal samples by nested PCR in the United Arab Emirates (UAE).J. Sprig. Intern. Pub.58(2):185-190.

[3] Zahida, T.; Mushtaq, H.; Lashari, A. and Fariha, A. (2013). Institute of Pure and Applied Biology, Bahauddin Zakariya University, Multan. J. Cell Anim. Biol.7 (6):73-76.

[4] Guide to Surveillance, Reporting and control (2006). Amoebiasis. Massachusetts Department of public Health, Bureau of Communicable disease Control. Pp 29-35.

[5] Elin, R. J.(2010). Assessment of magnesium status for diagnosis and therapy. Magnes Res. 23:194-198.

[6] Rude, R. (1996).Magnesium disorders. In. Kokko. J. Tannen. R. (eds). Fluids and electrolytes. Philadelphia, PA: W.B. Saunders Company, pp. 421–445.

[7] Maguire, M. E. and Cowan, J. A. (2002). Magnesium chemistry and biochemistry. Biometals; 15:203-210.

[8] Alfrey, A. C.; Miller, N. L. (1973). Bone magnesium pools in uremia. J. Clin. Invest. 52:3019-3027.

[9] Marshall, W. J. (1995). Clinical Chemistry (3rd ed.). London. Mosby. ISBN 0-7234-2190-0.

[10] Brini, M.; Ottolini, D.; Calì, T. and Carafoli, E. (2013). Chapter 4. Calcium in Health and Disease. In Astrid Sigel, Helmut Sigel and Roland K. O. Sigel. Interrelations between Essential Metal Ions and Human Diseases. Metal Ions in Life Sciences 13. Springer. pp. 81–137.

[11] Isidoros I.; Ioannis D. and StylianosM. (2011). Copper and Its Complexes inMedicine: A Biochemical Approach SAGE-Hindawi Access to Research. Molecular Biology InternationalVolume, 13 pages.

[12] Zeynep K.; Nurten D.; Mehmet T. and Nuriye M. (2011). Serum zinc and copper levels in southeastern Turkish children with giardiasis or amebiasis. Biological Trace Element ResearchVolume 84, Issue 1, pp 11-18.

[13] Osendarp, S.; van Raaij, J. M.; Darmstadt, G. L.; Baqui, A. H.; Hautvast, J. G. and Fuchs, G. J. (2001). Zinc supplementation during pregnancy and effects on growth and morbidity in low birthweight infants: a randomized placebo controlled trial.Lancet . 357:1080–5.

[14] Mocchegiani, E.; Muzzioli, M. and Giacconi, R. (2000). Zinc and immunoresistance to infection in aging: new biological tools. Trends Pharmacol Sci .21 :205–8.

[15] Frances, F. and Marshall B. D. (2009). A Manual of Laboratory and Diagnostic Tests. Lippincott William & Wilkins.8th ed. 286-290.

[16] Ray, S. B. and Chauhan, U. P. (1967). Anal Biochem. Calcium (Colorimetric Method Manual RX monza 20:155.

[17] Lindstrom, F. and Diehl. A. C. (1960). Magnecium MR Calmagte Colorimetric method End point.32:1123.

[18] Pasquinelli, F. (1984). Diagnostica e Tecniche di laboratorio, Colorimetric determination of Zinc in serum. Page 1103-1104.(Abstract).

[19] SAS. ,(2012). Statistical Analysis System, User's Guide. Statistical. Ver. 9.1 th ed. SAS. Inst. Inc. Cary. N.C.USA.

[20] Frances, F. and Marshall B. D. (2015). A Manual of Laboratory and Diagnostic Tests. Lippincott William & Wilkins.9th ed. P.407-450.

[21] López-López A.; Castellote-Bargalló A.; Campoy-Folgoso C.; Rivero-Urgël M.; Tormo-Carnicé R.; Infante-Pina D. and López-Sabater M. (2001). "The influence of dietary palmitic acid triacylglyceride position on the fatty acid, calcium and magnesium contents of at term newborn faeces". Early Human Development. 65 Suppl.: S83–94.

[22] Claudia E. L.; Andrea S.; Leovegildo A.; Björn B.; Nora e. and Medrano Y. G. (2015).Nutritional Status of Children with Intestinal Parasites from a Tropical Area of Bolivia, Emphasis on Zinc and Iron Status. Food and Nutrition Sciences Inc. Vol.06 No.04p. 399-411.