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THE STUDY OF IRON DEFICIENCY ANEMIA IN AMOEBIC LIVER ABSCESS PATIENTS

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Abstract

Background: Amoebiasis is parasitic infection occur due to protozoan parasite, *Entamoeba histolytica* in human being. It commonly resides in large intestine but can invade to other organs Amoebic Liver Abscess (ALA) is the most common complication of invasive amoebiasis. **Aim and Objective:** The present study was planned to determine the demographic profile and symptoms of liver abscess with Iron deficiency Anemia.**Materials and Method:** The present study was conducted on 50 confirmed liver abscess cases on the basis of radiological images, which were above 20 years of age were considered for the study. The estimations of the hemoglobin, serum ferritin, serum iron, and total iron-binding capacity (TIBC) by cell counter and ELISA method. **Results**: The study has shown that the value of mean and standard division serum ferritin (11.17 ± 2.57), serum Iron (42.45 ± 3.69), MCV (79.69 ± 21.57), and Hb (12.11 ±1.67) is significantly low as compared to serum TIBC (816 ± 155.19) in liver abscess patient. **Conclusion:** ALA presents itself through various non-specific symptoms and signs. Confirmation of the diagnosis is made possible with the help of radiological and microbiological attributes. Early diagnosis and prompt iron profile treatment may decline the overall mortality/morbidity associated with the disease.

Key Words: Iron Deficiency, Anemia, Amoebic Liver Abscess, *Entamoeba Histolytica*

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Introduction.

The liver abscess is the most common condition that is contributing to about 48% of all visceral abscesses and 13% of all intra-abdominal abscess [1]. Liver abscess are caused by bacterial parasitic or fungal infection. Broadly categories into - amoebic and Pyogenic. Pyogenic Liver Abscess (PLA) is more common in the developed world, while Amoebic Liver Abscess (ALA) is in the developing countries. ALA is the commonest extraintestinal manifestation of amoebiasis which arises due to the spread of *Entamoeba histolytica* from the large bowel to the liver via the portal vein [2]. *Entamoeba histolytica* infects 10% of the world's population, out of which 10% develop invasive amoebiasis and 1-10% of them develop ALA [3]. Amoebic liver abscesses (ALA) are the most common extraintestinal site of infection, and occur in fewer than 1% of E histolytica infections [4]. Most infections occurring in the developing countries of the tropics and subtropics like tropical Asia, Africa, Mexico, Central and South America [5] . It is estimated that 40 million people are infected annually (1). ALA presents itself more commonly with fever and right upper quadrant pain. There may be uncommon manifestations due to rupture of abscess in neighbouring cavities like pleura, pericardium and peritoneum, compression of tubular structures in hepatic hilum and distant embolic dissemination. Ultrasonography is the method of choice for diagnosis of liver abscess [3]. Bacteria are more likely to be isolated from abscess cavity than from blood.[6]
ALA is 3 to 10 times as common in man as women. Most patients are young adults, although all age groups can be affected. With care, a relevant epidemiologic history usually can be elicited. Most patients are emigrants from or residents of endemic areas and poor. Anemia is common in amebic liver abscess, Results of liver tests often are abnormal liver test in focusing attention . Entamoeba histolytica infects many people worldwide and causes high morbidity, mainly due to iron deficiency anemia. Liver abscesses are infectious space-occupying lesions of liver.[5] Alcohol also the causative factor influences the absorption of iron [7]) and the metabolic effects of chronic alcohol consumption include an increase in the liver iron content [8]. The aim of the present study was thus to determine the iron profile in the ALA patients .

Materials and Method

A prospective study was done on the admitted patients in the department of surgery, NCMCH, Panipat. The study was done after Ethical clearances. All the written informed consent was taken from all the cases before carrying out the study.

Subject Selection

50 patients were admitted in the department of surgery diagnosed as a cases of amoebic liver abscess. Above 20 years of age cases were selected for the study . A detailed history was taken from each of these patients and all of them were subjected to a through clinical examination. These patients were then subjected to investigations available within the hospital such as Hb, Tc, RBS, urea, creatinine, liver function tests (SGOT, SGPT, Serum bilirubin, ALP, serum albumin, total proteins, A:G ratio PT). Ultrasonography of abdomen was done in all cases**.** Routine serological testing in addition to abdominal and pelvic ultrasonography are performed. Additional CECT abdominal procedures were conducted. A control group was not included for this non-interventional study. Patients with evidence of alcoholic cirrhosis, hepatitis (B or C), cholangitis ,Pregnancy , Cancer, gall bladder/biliary tract disease or any other significant chronic illness were excluded.

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Sample Collection

Overnight fasting 5 ml of blood was drawn from the antecubital vein of all the study participants.

Sample Analysis

The estimations of the hemoglobin, MCV by cell counter and serum ferritin, serum iron and total iron-binding capacity (TIBC) by ELISA Reader Method.

Statistics Analysis

Mean ± SD were calculated for all the parameters and differentiated by Student's t-test using SPSS 16. P-values considered significant were as follows: – $P < 0.05$– a Significant and $P > 0.001$ –a highly Significant.

Results

Table 1. Demographic profile (Mean ± SD)

Age (years)	Patients	Sex(M/F)	Weight(Kg)
20-30	5	4/1	52
31-40	13	7/6	68
41-50	17	14/3	70
51-60	15	8/7	64
Total	50	33/17	
Percentage (%)	100%	66/34%	Avg- 63

• In the present study, the highest incidence occurred in the age group 41-50 yrs , males were more commonly affected than females, as shown in the table no. 1.

Table 2: Iron studies in patients with ALA

Age group (years)	No. Of Patients	Ferritin mean value (ng/ml)	Iron mean value (µg/dl)	TIBC Mean value (µg/dl)	Haemoglobin levels (g/dl)	MCV
20-30	5	11	38	808	13	78
31-40	13	8	51	837	12	82
41-50	18	15	36	901	12	80
51-60	14	10	45	720	11	78

In the table No. 2 , Laboratory investigations were analyzed. Iron profile were found higher in the age group of 41-50 yrs. Of cases.

Table 4: ALA with Iron profile value in Mean ± SD

Age (years)	Weight (kg)	Ferritin mean value (ng/ml)	Iron mean value (µg/dl)	TIBC Mean value (µg/dl)	Haemoglobin levels (g/dl)	MCV (μM^3)
42.6 ± 9.21	63.46 ± 7.96	11.17 ± 2.57	42.45 ± 3.69	816 ± 155.19	12.11 ±1.67	79.69 ± 21.57

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The table showed that the value of mean and standard division was serum ferritin (11.17 ± 2.57), serum Iron(42.45 ± 3.69), MCV (79.69 ± 21.57) and Hb (12.11 ±1.67) is significantly low and serum TIBC (816 ± 155.19) is significantly higher in liver abscess patient.

Table 3: Symptoms in liver abscesses.

symptoms	No. of patients	Percentage
Pain abdomen	40	80
Fever	25	50
Chills	17	34
Nausea/vomiting	10	20
Anorexia	27	54
Loss of weight	20	40
Diarrhoea	5	10

Table showed that the higher onset of symptom in ALA patients were seen pain in abdomen (80%).

Discussion

From the above data , it is clear that the iron deficiency anemia develops with amoebic abscesses of the liver has all the features of the anemia of infection, and not those of haemolysis or iron deficiency. Liver abscess is a collection of pus in the liver parenchyma. It is usually amoebic or pyogenic, and rarely tubercular or fungal in origin [9]. ALA can be suspected in any person of endemic region who presents with fever, pain abdomen and liver tenderness [2]. Most studies prove that amoebic liver abscess affects commonly middle-aged man and uncommonly seen at extreme of ages [10,11]. Amoebiasis is a parasitic disease caused by the protozoan parasite Entamoeba histolytica (E histolytica) that is commonly transmitted via the fecal-oral route. Amoebiasis may affect mostly in middle age group and has mostly affected males. It is considered the third leading parasitic cause of death worldwide, surpassed only by malaria and Schistosomiasis.

The study revealed that the 41-50 years aged people were suffer in higher percentage and commonly in male compared to female. According to Bhagwan satiani, Eugene, D. Davidson, Serum Iron profile were higher also in age group of 41-50 as compared to elder ages in liver abscess Patients.

The value of mean and standard division was serum ferritin (11.17 ± 2.57), serum Iron(42.45 ± 3.69), MCV (79.69 ± 21.57) and Hb (12.11 ±1.67) is significantly low and serum TIBC (816 ± 155.19) is significantly higher in liver abscess patient. The maximum symptom of liver abscess patients was abdomen pain as shown in table no.3, similar results seen in this study (5). The results have shown very low serum ferritin levels of patients with ALA. Researchers have found Similar findings. [12]. The postulated explanations are that ferritin being an acute phase reactant is expected to be elevated in infection with *Entamoeba histolytica* and different pathogenic processes are discussed as possible reasons for elevated serum ferritin level in inflammation. It is reasonable to assume that though the blood samples were taken on

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discharge, it may take time for the acute phase protein levels to normalize. A follow up measurement of ferritin in these patients would be more informative of their actual iron status.

The amoebic abscesses were found in 60 patients and iron deficiency liver abscesses was 50 patients. The age ranges from 20 years to 60 years for amoebic liver abscess. The mean age around 42 years and the peak incidence is found in the 31-50 years, which is around 17 (36%) cases of total amebic liver abscess patients. Only 17 female patients admitted out of 50 cases so the M: F ratio is 3:1 in iron deficiency liver Abscess patients. These are comparable with other studies.[5,9-14]

In the present study, the most common symptom in Iron deficiency liver abscess was pain abdomen which was around 40 (80%) cases. After that anorexia was mostly present in around 27 (54%) cases and then Fever, weight loss, chills, vomiting, diarrhoea were present in decreasing order. In amebic liver abscess group, pain abdomen presents in 27 (84%) patients. This is in consistence with studies in literature. [15-22]. Anemia is common in ALA, both due to the chronic infection leading to anemia of chronic disease and due to the commonly prevailing iron deficiency in developing countries. Anemia promptly responding to amoebicidal drugs favors anemia of chronic disease rather than iron deficiency. [23] A detailed study including blood picture, bone marrow iron store levels will accurately determine the iron status of these patients.

Conclusion

This study shows a complex iron profile levels compared to the postulated theories in the past. A small number of samples and coexisting anemia may have influenced the results which are not in par with the previously postulated explanations. A further well designed prospective cohort study with a larger number of samples and more precise statistical analysis of the clinical profile, evaluation of anaemia and other confounding causes that could influence the iron studies would be recommended to study the correlation of these two widely attributed risk factors for developing invasive ALA.

Conflict of interest

No existence of conflict of interest among the authors of the study.

Strength and Limitations of the Present Study

There are a few limitations of the study. In the present study, only 20–60 years ages subjects participated in the research. Hence, in the future , we would like to include an increase in a number of participants to reach a concrete conclusion. The present study was given an impact to understand about the Iron deficiency anemia with ALA.