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Original Research Article

The Most Detective Protozoal Infections in Correlation with Radiological Findings in Wasit Governorate Hospitals During 2015

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Abstract

Results of current study indicate that parasitic protozoa still a real threat to public health in Iraq. The current study spotlight the diagnosis of infection in hospitalization Wasit governorate by using routine parasitic laboratory testsandradiological examinations. Out of 3350, 1780 (98.18%) and 33 (1.82%) were infected with *Entamoeba histolytica* and *Leishmaina donovani*, with overall prevalence was 65.33% for both pathogenic protozoa. The CT scan and ultrasonography in Amoebiasis revealed hepato-splenomegaly 96.66%, Amebic liver abscess2.35%, pleural effusion and Peri-hepatic fluid collection 0.54% and 0.45% respectively. Whereas in Leshmaniasis included Hepatosplenomegaly 48.5%, Ascites 24.2%, Lymphadenopathy15.2%, multiple nodular lesions in the liver and spleen 6.1% and shrinkage liver3.0%. A high number of cases in a region of present study were closely associated with an unusually distribution of a reservoir for human parasitic disease, in addition attributed to lower socioeconomic status and lack ofhealth education. But a ray of hope in the time as the health education is the key changing the attitude of the public is a particular and important for disabling these. In conclusion, we recommended widely using simultaneously radiological test with other criteria for more accuracy diagnosis.

Key Words: Intestinal protozoa, blood protozoa, CT scan.

الخلاصة

بينت نتائج الدراسة الحالية إن الاوالي الطفيلية (البروتوزوا) لا تزال تشكل تهديدا حقيقيا على الصحة العامة في العراق. اذ سلطت الدراسة الضوء على تشخيص الاصابة الطفيلية في مستشفيات محافظة واسط باستخدام الفحوصات الطفيلية الروتينية فضلا عن الفحوصات الشعاعية. اظهرت نتائج التشخيص ان 1780 اصابة من مجموع 3350حالة مفحوصة بنسبة اصابة بلغت(98.18٪) و33(1.82٪) اصابة بالأميبا الحالة للنسيج والليشمانيا دونوفاني على التوالي، بنسبة اجمالية للانتشار وصلت الى 65.33٪ لكلا نوعي الاوالي. اثبت التشخيص بالاشعة المقطعية والفحص بالموجات فوق الصوتية في داء الأميبات عن تضخم الكبد والطحال بنسبة 96.66٪، خراج الكبد الأميبي2.35 ٪، الانصباب الجنبي وتجمع سائل محيط الكبد بنسبة 0.54٪و 0.45٪ على التوالي. وشملت في داء الليشمانيا تتضخم الكبد و الطحال بنسبة 48.5٪، و 24.2٪ الاستسقاء، اعتلال العقد اللمفية15.2٪، والآفات عقيدية متعددة في الكبد والطحال 6.1٪ وانكماش الكبد بنسبة 3.0٪. اثبت العدد الكبير من الاصابات في منطقة الدراسة وجود علاقة قوية بالانتشار غير المعتاد للمضائف الخازنة للمرض الطفيلي ، كما يعزى إلى انخفاض مستوى الوضع الاجتماعي والاقتصادي وانعدام التثقيف الصحي.ولكن بصيصا من الأمل ينبعث من خلال حملات التوعية والتثقيف الصحي التي هي مفتاح مهم في تغيير موقف ونظرة المجتمع اتجاه المشاكل الصحية للحد منها وحظرها. ختاما توصي الدراسة باستخدام الفحص الشعاعي في الوقت ذاته مع مختلف المعايير تحقيقا للمزيد من الدقة في التشخيص.

الكلمات المفتاحية: بروتوزوا الأمعاء، طفيليات الدم، الاشعة المقطعية.

Introduction

Many genera of the protozoa are human and animal pathogens. The lack of effective vaccines, the paucity of reliable drugs, and other problems, including difficulties of vector control, prompted the World Health Organization to target six diseases for increased research and training . Three of these were protozoan infections—malaria, trypanosomiasis, and leishmaniasis[1]. Leishmaniasis, disease caused by obligatory haemo-flagellates intracellular protozoan belongs to genus *Leishmania*. The infection of human appears with multiple clinical manifestations, including cutaneous Leishmaniasis (CL), mucocutaneous, diffuse and Visceral Leishmaniasis (VL). The pathogenesis of VL is complex, and the clinical presentation ranges from asymptomatic infection to severe and fatal disease [2]. It causes fever, weight loss, anemia, splenomegali and hepatomegali, it can kill, is responsible for several thousands of population may deaths per year, it surpassed only by malaria. *Leishmania* is transmitted by sand fly vectors. Vector obtains their blood meal, like most blood-feeding ecto-parasites. A single sand fly bite can be enough to transmit the disease [3,4]. VL and CL are both endemic in Iraq [5-7]. It is caused primarily by the two related species:*Leishmania donovani* and *L. infantum* (synonym *L. chagasi*). *L.donovani*, is considered endemic in Iraq, particularly in the central area of it.

Another important parasitic disease is Amoebiasis, known as an acute/chronic protozoosis, affecting all species, human, dog, cats, is produced by *Entamoeba histolytica*. The disease can be found world-wide but is more prevalent in persons of lower socioeconomic status who live in developing countries where the prevalence of amebic infection may be as high as fifty percent; however, prevalence is estimated at one percent of the population. All problems related to the sewerage and drinking water systems. High risk groups are refuges, recent immigrants, travelers, developmentally or mentally- impaired people [8]. According to some studies conducted in some African countries from 6% to 75% of the population carry the parasite, these studies using microscopic examination giving general idea on the distribution of the disease in the population [9]. While other study [10] estimated prevalence at 40–50 million people and results in approximately 100,000 deaths annually worldwide. Amoebic dysentery from *Entamoeba histolytica* is the second most common cause of death from parasitic disease worldwide after malaria [11]. However, it suggested that outbreaks due to *E. histolytica* are rarely reported. Cysts may remain viable for three months but may be destroyed by hyperchlorination or iodination [12]. Thus, the epidemiology of amoebiasis around the world is complicated and still remains much based on signs and symptoms. Diagnosis of amoebic intestinal remains based on the predominantly on the microscopic organism detection in fecal specimens. also called an oval and parasite test. This test is used to find parasites that cause diarrhea, loose or watery stools, cramping, flatulence (gas) and other abdominal illness. Magnetic Resonance Imaging (MRI) scan, Computerized Axial Tomography scan (CAT) these tests are used to look for some parasitic diseases that may cause lesions in the internal organs or abnormal scarringorgans [13]. Due to the dearth of comprehensive literature on the comparative between radiology and routine tests, the current study was designed to determine the infection rate of parasitic protozoa among hospitalization in Wasit Governorate / Iraq, in combination with clinical, parasitological examination and radiological findings.

Materials and Methods

Study area: Country Iraq, Governorate, Wasit. Also spelled Kut al-Imara or Kut El Amara; Kurdish: Kût; Turkish: *Kut'ül Ammare* or *Kut*) is a city in eastern Iraq, on the left bank of the Tigris River, about160 kilometers (99 miles) south east

of Baghdad. As of 2003 the estimated population is about374,000 people. It is the capital of the province long known as Al Kut, but since the 1960srenamed Wasit. The old town of Kut is within a sharp "U" bend of the river, almost making it an island but for a narrow connection to the shore. The area around Kut is a fertile cereal grain growing region[14].

Study design: Present study design to investigate the Protozoal infections only among3550 patients (1758 males and 1792 were female) at age of one month up to 45years ,were visited two hospitalsAl-Zahra and Suwira during 2015 from the period between January until the September, in both rural and urban area.After examination by the physician, general stool examinations by microscopy were the parasite isolated from patients stool for motile trophozoites. The number of patients 3550 who have been referred to the laboratory after an initial diagnosis of the doctor, referring to the likelihood of parasitic illnesses. Specimens collected in suitable clean containers, avoiding contamination with urine, water. Normally passed stools are preferable, through samples obtained after purgative or high saline. Examinations of fresh specimens are needed to observe of motile protozoan. Feces should be examined for its consistency, colour, odour, and presence of blood or mucus. The microscope is often essential to differentiation between cysts of the pathogenic *Entamoeba histolytica* and the non-pathogenic is based entirely on their sizes [15]. The radiographic examination of the patients have been using Scanner-CT scan; (Toshiba 64 slice/ Japan)and(Phillips16 slice/ Holland) and sonar device. (Siemens portable ultrasound machine equipped with 3.5 MHz convex probe was used for abdominal ultrasound scanning). Standard abdominal CT examination is performed with Toshiba (64 slice) and Philips (16 slice) CT systems in axial plane with caudal angulation to reduce the effect of the radiation with 5 mm. slice thickness and 0.8-1 mm. gap in between . CT scanning protocol for abdomen consist of a combination of non-enhanced and contrast enhanced CT with all precaution to avoid allergic reaction to the contrast agents especially in patient with previous history of allergic reaction. Single detector and multidetector spiral CT allows rapid image acquisition through the entire abdomen after administration of single bolus of intravenous contrast material [16].

Results and Discussion

Results of this study showed *E. histolytica* infection is rampant in areas of the present study, with significantly P> 0.05 in rural area than urban, 50.40% and 51.91% respectively, **Table -1.***E. histolytica* prevalence was found to be 4.2% among children living in the urban slums of Dhaka [17]. Most studies had indicated that socio-economic and personal hygiene factors determined infection with *E. histolytica*, rather than exposure to human and animal excreta in agricultural activities [18].The overall infection rate after diagnosis were 1813 (51.07%) out of 3550 cases.

Only two types of parasites that have been diagnosed;1780 (98.18%)the number of cases certainly positive for amoebic diarrhea(amoebic dysentery), their diagnosis easily done by microscopic examination of stool. 33(1.82%) confirmed cases of visceralleishmaniasis (black fever) *Leishmania donovani* were found in this study**,** but have not shown significant differences P> 0.05. 962 (34.66%) cases suffered from diarrhea due to other reasons, as in Table -2. These results exhibit the complain the study areas from the spread of rodents and stray dogs as reservoirs and mechanical transmission via vectors, particularly mosquitoes and fly which it constitutes potential risks for parasitic zoonoses disease of human. It is worth mentioning that there are many cases are not recordedinany hospital in this governorate, either because of inattention parents to treat their children in hospital

or private clinics, or due to other reasons. *Entamoeba histolytica* was the common intestinal parasite, in different studies in Iraq done by [18] in Alexandria district, [19] in Nasiriyah, [20] in Al-Anbar Province, [21, 22]Baghdad and in Diwaniya [23].

Table 1: protozoa hospitalization according to study area

Study area	Total samples examined	No. positive samples	%
Urban	1564	812	51.91
Rural	1986	1001	50.40
Total	3550	1813	51.07

Table 2: Protozoa hospitalization according to type of parasitic infection

Total Samples	Total No. of positive samples	%	Positive pathogenic protozoa	%	positive blood protozoa	%	Positive intestinal protozoa	%	Diarrhea due to none parasitic reasons	%
3550	2775	78.17	1813	51.07	33	1.82	1780	98.18	962	34.66

After the 1991 Gulf War, endemicfoci is formed which led to wide migration of population associated with; poverty, privation, poor nutrition, unsuitable housing and deterioration of the health status of immigrants, also stop the use of pesticides sprayed for being a threat to public health, especially in children. These are risk factors for increased sand fly and a rise occurrence of *Leishmania* disease [24]. The incidence went down after 2004, but the disease had been slow elimination, so again rapidly increasing. The incidence of VL increased from 2.5 (2007) to 3.5/100,000 population in 2008 and 2009 [25]. According to the WHO, there is also a growing concern about the global urbanization of VL as infected people migrate from rural areas into cities [26].In urban areas high people keep and rearing dog more than rural areas. For this reason they are affected with different zoonotic diseases and cause public health hazard. Mahmud *et al*[27] were noticed in their study that the dogs are reservoirs for zoonotic protozoan disease and should considered important to public health as Giardiasis, Amoebiasis, and Leishmaniasis. So, preventive measures against intermediate host should be taken to prevent the transmission of protozoan diseases including vaccination program, sanitation measures and public awareness. This should be combined with more government intervention on regulations and policies in the area in order to limit the risk of contaminating the vegetation, and thus decreases both human infection and the animal reservoir. Additionally, [28] report that domestic animals, particularly goats, play an important role in the spread of VL.In Iraq: Leishmaniasis continues to spread in southern province [3] founded 63 out at least 275 cases of VL in Qadissiyah province.One hundred and seventy two out of 365 have been infected by VL as in Middle area of Iraq(Baghdad, Wasit, Diyala, Najaf, Karbala, Babil, Qadisiya), Southern (Basrah, Misan, Thiqar, Muthana),Western (Al-Anbar) and Northern(Salah-Din, Ninewa, Kirkuk) [7]. The prevalence of infection varies between 1% in industrialized countries to between 50% and 80% in tropical countries, where transmission of *E. histolytica* cysts by untreated drinking water is common rout for transmission by flies. National notification data suggested that 1377 cases of intestinal amoebiasis occur between 1998 and 1999, but outbreaks are rarely reported [8,12].

The total numbers of cases with amebiasis in Kut province are about cases per year, depending on the statistical records of the hospital. Amoebic dysentery has been found wherever sanitation is poor in all climatic zones, from Alaska (61^{o} N) to the Straits of Magellan (52^{o} S) [18].

However, if water shortages where the consumption of contaminated water infection became more prevalent [8]. Zahida *et al*[29] reported the overall prevalence of *E. histolytica* was 8.61%. A different study shows that prevalence of amoebiasis is variable; this may be explained that the prevalence depends on many ecological, physiological, behavioral and nutritional factors [30].

Over the past decade, there has been an increasingly reported risk of ameobiasis in East Asian countries particularly among men who have sex with men (MSM) probably due to oro-anal sexual contact [17,31], in addition it often occur in institutions of mentally retarded individuals [32].

Significant differences P> 0.05 were observed according to age group, the high prevalence was found in 5-14 year46.45%, followed by 15- 44years39.39% and the lower 6.06% in the age groups 45 and more in case of *L. donovani*. No significant for *Entamoeba histolytica,* whereas highest rate 33.54% in the ages 15-44 years, and 25.28% and 24.27% at age 5-14 and 1-4 years respectively, Table -3.

Table 3: Infection rate of protozoa of children according to age group

Age group/year	Positive *L. donovani*	%.	Positive *E. histolytica*	%
1-4	3	9.09	432	24.27
5-14	15	46.45	450	25.28
15-44	13	39.39	597	33.54
45 and more	2	6.06	301	16.91
Total	33	100	1780	100

VL Were found at the mean age 2.53±1.8 years [3]. Also previous studies done by [8, 20,32,33] showed that children are particularly more susceptible to infection than adults, because of lack of portability sensitization immune to infection, A lack of breast feeding may contribute. Ninety percent of VL cases occur in children under 5 years old, suffered from deterioration of the health status, because of malnutrition [3]. Atia [18] recorded the prevalence rate of infection in children from 1-4 years was 52.43%, in Alexandria nahia, *and* showed that *Entamoeba histolytica* was found in 33.79%. In developing countries, those under 15 years of age were the most frequently affected group, with a notable increase in children aged 5-9 years [34]. Rates by age group were very low, showing no major differences by age group: 0 per 100,000 in age group newborn to 14 years; 0.07 in older and adult 15 to 64; 0.19 in the elderly 65 years and over [8]. Kreidi *et al*., [12] were reported one hundred and seventy cases of amoebiasis during about four months, including 71 cases of intestinal amoebiasis and 106 probable cases of liver abscess. The highest prevalence (16.67%) in age group of 33 to 48 years and minimum (3.45%) in age group of 49 to 63 years [29], they suggested that lower immunity play a role in susceptible to parasitic infections. The highest values were noticed in subjects between 15-64 years old, of 72.4%. The spreading incidence of the disease among65 year old people, had minimal values (P-33.17%) [35].

Most cases are amebic intestinal with a significant differences P> 0.05 according to sex, but significantly for *L. donovani* in males than females. The overall infection rates for both protozoa were 98.18% and 1.82% respectively, Table - 4.

Table 4: Infection rate of protozoa of children according to according to sex

Protozoa	No. of positive samples					
	Total	**%**	**Males**	**%**	**Female**	**%**
L. Donovan	33	1.82	24	72.72	9	27.27
E. histolytica	1780	8.18	1447	81.29	333	18.71
Total	1813	100	1471	81.14	342	18.86

Males show higher infection than female's agreement with [8,21]; while [20] reported the frequency of the parasitic infestations was slightly higher among females (20.7%) than males (19.1%). Additionally, there was no significant association between prevalence and gender and no significant association between prevalence and age. Logistic regression analysis was used to assess the significance of association between water sources and prevalence. A significant association was found between the use of dry riverbed wells and high prevalence and the use of earth dam water and high prevalence as was stated by [36].The overall rate of amoebiasis hospitalization was 0.14 for males and 0.06 for females. But, based on trend lines, male hospitalization rates for amoebiasis are decreasing and rates for females remain at a steady rate, increasing at a rate of 0.0021 per 100,000 populations[8]. Cases of intestinal amoebiasis were nearly equally distributed between the sexes and their mean age was 41 years (range 3-79) [12]. The prevalence of *E. histolytica* in males was 8.15% and in females was 9.46% [Zahida *et al*]. Usually, females are more immune to parasitic infection but the immunity could be broken down under certain conditions, this could be due to hormonal fluctuation in females during various stages of reproductive cycle that may affect their immunity and help opportunistic parasites to establish [37], also house hold practices are additional risk factors for the higher prevalence in female care takers [38].

Hospitalization rates have a seasonal component with significant differences P> 0.05 for *L. donovani*, but no significantly for *E. histolytica*, in incidence of both protozoa according to months of study and type of parasites, the highest infection rate *L. Donovani* just observed in February and January 27.28% and 21.21%, respectively. On the other hand, Amoebiasis were recorded 15.85% in Jun and 13.26% in September Table – 5.

Table 5: Infection rate of protozoa during period of study

Months	**VL**	**%**	**Amoebiasis**	**%**
January	7	21.21	164	9.21
February	9	27.28	183	10.28
March	5	15.15	169	9.49
April	6	18.18	222	12.47
May	2	6.06	162	9.10
Jun	2	6.06	282	15.85
July	1	3.03	196	11.01
August	1	3.03	166	9.33
September	-	-	236	13.26
Total	33	0	1780	100

The percentage record in this study was close with[8] which reported 32% in January and 28%in February. Such finding was confirmed in another study, that peak transmission of leishmaniasis usually starts in May [3]. Also Variations in temperatures were very wide between winter and summer, also from day to night. These extreme variations of temperature select the biota of the area. As well as health conditions mentioned above have a significant role in the spread of parasites in area of present study. The results of [23] showed that July (31.1%) and August (28%) were the highest incidence of intestinal parasites from the rest of months. The protozoa are driven much more by basic sanitation and other environmental factors. Thus, incidences fluctuate wildly depending on season, weather, sanitation, nutrition and other factors [39]. Accurate detection of parasitic diseases is best to use a set of tests and different methods of concentration to increase the sensitivity of microscopic examination.

The CT scan and ultrasonography in 1107 cases of Amoebiasis revealed hepato-splenomegaly, Amebic liver abscess, pleural effusion andPeri-hepatic fluid collection,**Table -6, a**. Radiological findings in Leshmanias is included Hepatosplenomegaly, Ascites, Lymphadenopathy**,** multiple nodular lesions in the liver and spleen and shrinkage liverTable -6,b, Fig.1, Fig.2, Fig.3, Fig.4, Fig.5, Fig.6, Fig.7, Fig.8, and Fig.9.

Table 6 a: Radiological findings in Amoebiasis

Rad. Instrument	Rad. Find.	Male	%	Female	%	Total	%
CT scan	Amebic liver abscess (also seen on Ultrasound)	21	2.36	5	2.42	26	2.35
	pleural effusion	5	0.55	1	0.48	6	0.54
	Peri-hepatic fluid collection	4	0.44	1	0.48	5	0.45
Ultrasonography	Hepatosplenomegaly (also seen on CT)	870	96.66	200	96.62	1070	96.66
Total		900	100	207	100	1107	100

Table 6 b: Radiological findings in Leshmaniasis

Rad. Instrument	Rad.Find.	Male	%	Female	%	Total	%.
CT scan	multiple nodular lesions in the liver and spleen	2	8.33	0	-	2	6.1
Ultrasonography	Hepatosplenomegaly	11	45.83	5	55.56	16	48.5
	Ascites (also seen on CT)	5	20.83	3	33.33	8	24.2
	Lymphadenopathy (also seen on CT)	4	16.67	1	11.11	5	15.2
	Dilated portal vein	1	4.17	0	-	1	3.0
	shrinkage liver	1	4.17	0	-	1	3.0
Total		24	100	9		33	100

Studies indicate that VL can be an opportunistic disease, so, in case of suffering from immune resulting from malnutrition device are more likely to development of symptoms of the disease [24]. It important to keep in mind, that asymptomatic infection could present a major challenge for control programs if its infectiousness is confirmed [2]. Numerous studies demonstrated that intestinal parasites were frequently associated with episodes of sever and often fatal diarrhea in both industrialized and poor countries [40] . The disease in the colon is the most common with acute diarrhea and dysentery accounting for 90% of the clinical amoebiasis cases. After an incubation period of 1-4 weeks, the parasite invade the colonic mucosa, producing characteristic ulcerative lesions and a profuse bloody diarrhea (dysentery) [15]. About 10% of infected cases have clinical symptoms. Most 80% to 98% present with amoebic colitis, diarrhea and abdominal pain [12]. The bacteria flora of the intestine also plays an important role in its virulence and is major cause of amebic colitis, liver abscess and significant morbidity and mortality worldwide Amoebic liver abscess is the most frequent extra intestinal presentation of the disease [41]. One estimate by Pawlowski [42] proposes that sanitation would take 15–25 years to achieve control levels of parasites in an ecosystem, while the addition of drugs and health education would reduce this to a more manageable 5–10 years.

The ultrasound considered as effective tool in the diagnosis of visceral leishmaniasis consequences because of its ability to detect these complications in various abdominal organs such as liver, spleen and pancreas, which in turn help to prevent and treat related deterioration in the patient's health status. Role of radiology in amebiasis: Colonoscopy or sigmoidoscopy may be used for the diagnosis of amebic colitis. Colonoscopy is preferable because the infection may be focal and localized in the cecum or ascending colon and therefore may go undetected by sigmoidoscopy. Due to these procedure not available in Al- Kut the patients go to Baghdad province to complete their examinations in there hospitals. Amebic Liver Abscess: pyogenic liver abscess, cystic hepatoma and hydatid cyst are the main differential diagnosis of amebic liver abscess. Although ultrasound, CT and MRI are useful for the diagnosis of amebic abscess, using of these procedures is still limited in areas of endemic amebias is like our country, in addition they cannot differentiating amebic from pyogenic abscesses. Liver abscesses typically appear as homogeneous, round or oval lesions, but they may also appear as low-attenuated, hypoechoic and hypodense lesions with septations or debris or fluids [43].

Amoebiasis serology is of no value in the diagnosis of acute amoebic dysentery or luminal amoebiasis .But in invasive amoebiasis, particularly in liver abscess, serology is very useful. But in Leishmaniasis are usually positive in kala-azar [15]. While chest radiology is of important in the diagnosis of the syndrome of hepatic amoebiosis, But radiological abnormalities should be assessed concurrently with the other criteria in the diagnosis of those syndrome, because it is not peculiar to this syndrome alone [44]. The role of imaging techniques as diagnostic tools remains to be established in VL [45]. Public investment in treatment and control would decrease the leishmaniasis disease burden and help to alleviate poverty. In conclusion, there is dearth of comprehensive literature on the comparative between radiology and routine test**.** Current study is one of series studies, which covered most areas of Iraq, mainly of them confirmed that the prevalence of parasitic disease is still a true threat to public health and present when suitable conditions are present, so scientific research should be responsible for give attention to develop effective strategies for control parasitic diseases, and not merely deal with parasite itself, but also its interactions with its hosts and vectors, then go into the roots of the real disease, after that dreams of eradication become a reality.

Results indicate that parasitic disease is still a real threat to public health in Iraq, their circulation complete due to high density of population of reservoir hosts. But a ray of hope in the time as the health education is the key changing the attitude of the public is a particular and important for disabling these. It well known that research about parasitic diseases, did not stop, there are much that we still need to know so the current study was designed to detect parasitic infection patients of different ages in Wasit governorate.

Figure1: CT scan of abdomen shows amebic Liver abscess

Figure 2: ultrasound of abdomen shows amebic Liver abscess

Figure 3: ultrasound of abdomen shows abscesslymphoadenopathy

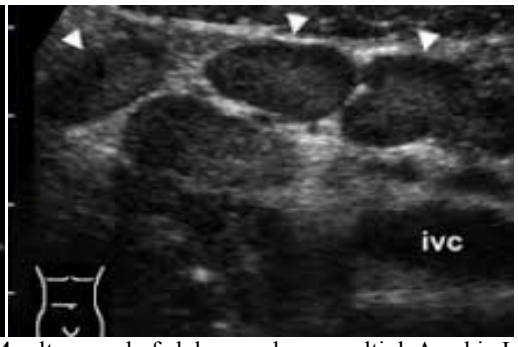

Figure 4: ultrasound of abdomen shows multipleAmebic Liver

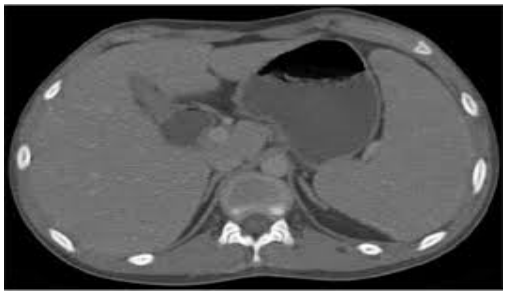

Figure 5: CT scan of abdomen hepatosplenomegaly

Figure 6: ultrasound of abdomen shows hepatomegaly

Figure 7: ultrasound of abdomen shows Splenomegaly

Figure 8: CT scan of chest shows Rt. Pleural effusion

Figure 9: ultrasound of abdomen shows shrinkage of liver

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