

## CLINICAL PRESENTATION AND TREATMENT OUTCOMES IN PATIENTS OF LIVER ABSCESS IN NORTH INDIAN POPULATION

### Authors:

<sup>1</sup>Mohammad Habib Raza, MS, Phd Surgery (Professor), <sup>2</sup>Md Hasan Iqbal, MS General Surgery (Resident),

<sup>3</sup>Mohammad Sadik Akhter, MS Surgery (Associate professor), <sup>4</sup>Haris Manzoor khan, MD Microbiology (professor), <sup>5</sup>Wasif Mohammad Ali, MS surgery (Associate Professor)

<sup>1,2,3</sup>Department of surgery, JN Medical College, Aligarh Muslim University, Aligarh, UP, INDIA

<sup>4</sup>Department of microbiology, JN Medical College, Aligarh Muslim University, Aligarh, UP, INDIA

<sup>5</sup>Dept. Of Surgery, JN Medical College, AMU, Aligarh

**Corresponding Author:** Prof Mohammad Habib Raza, A-1 Medical colony, AMU, Aligarh UP, INDIA , Pincode-202002

Article Received: 13-August-2023, Revised: 3-September-2023, Accepted: 23-September-2023

**Conflict of interest:** Nil

**Funding:** Self

**Ethical clearance:** By the Institutional ethics committee of Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh (Uttar Pradesh), India.

### **ABSTRACT:**

**BACKGROUND:** Pyogenic and amoebic liver abscesses are rare, potentially lethal conditions. In this study, we aimed to study the clinical presentation of patients with liver abscess. To study the overall outcome (morbidity and mortality).

**METHODS:** Patients with confirmed liver abscesses were divided into three groups: amoebic group (n = 104), pyogenic (n = 41) and mixed group (n=4) which were analyzed for differences in clinical and laboratory findings. **RESULTS:** Amoebic liver abscesses presented most frequently in young adults (21 - 30 years; 33.6%), whereas pyogenic liver abscesses were most commonly observed in adults 41 - 50 years (26%). Pus culture reports of all Amoebic liver abscesses were reported as sterile. Most common organism isolated pyogenic liver abscess was *E coli*. **CONCLUSIONS:** Pyogenic abscesses were commonly observed in older patients, and were associated with features such as markedly deranged liver function test, leukocytosis, high PT/INR levels, longer hospital stay and higher complication and mortality rate compare to Amoebic liver abscess.

**Keywords:** Amoebic liver Abscess, Pyogenic Liver Abscess, *Entamoeba histolytica*

### **INTRODUCTION:**

Liver abscesses are cystic space occupying lesions within liver parenchyma. It is the commonest intra-abdominal visceral abscess (1). If early diagnosis and treatment is not started it is a lethal condition. It has high prevalence in underdeveloped and developing countries. Pyogenic, Amoebic and Fungal are the three major forms of liver abscesses (2). By the advancement of chemo-radiotherapy and more cases of immunocompromised patients and incidence of fungal liver abscess has also increased (3). Pyogenic liver abscess is more common in western world while amoebic liver abscess is more commonly found in third world countries (4), which are underdeveloped, and more people living under lower socio economic conditions. Commonly known etiologies of pyogenic liver abscess are biliary infection, portal vein seeding, direct extension, hepatic artery seeding, penetrating

trauma and cryptogenic cause (5). Amoebic liver abscess is the most common extra intestinal form of invasive amoebiasis (6) *Entamoeba histolytica* and *Entamoeba dispar* are the two species of amoeba that infect humans (7). *E dispar* remains asymptomatic while *E histolytica* is the parasite that is responsible for all forms of invasive disease. Amoebic liver abscess transmits through the feco oral route. Low socioeconomic conditions, unsanitary habits, immune-compromised state and alcohol abuse are significant risk factors for amoebic liver abscess (8). *E histolytica* completes its life cycle in two stages; cysts and trophozoites. The first are acquisition of the infection through contaminated food and water and the second to the invasion of tissues. The cyst cell wall is made up chitin cell wall that provides resistance to environment and gastric juice even after being ingested through the consumption of contaminated food and water, and passes without changes to the

duodenum (9). In the intestinal lumen cyst wall is digested by trypsin to release four trophozoites that multiply in the colon and penetrate the intestinal mucus layer causing colitis, the death of epithelial cells and infiltration of neutrophils and lymphocytes leads to the development superficial ulcerations, hemorrhages, perforations and enterocutaneous fistula. After this invasion, the trophozoites may reach the liver via hepatic portal circulation and colonize the liver parenchyma to form the liver abscess. Both amoebic and pyogenic liver abscess are common surgical conditions in north India. The clinical features and management outcomes vary between different parts of this country. It also varies from other developed nations, where the incidence of amoebic liver abscess is very low. The present study was carried out at Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh, India to study the clinical presentation and treatment outcomes in the north Indian population with the objective of comparison between other studies in developing and developed nation.

#### **MATERIAL AND METHODS:**

Liver abscess patients aged more than 14 years, presenting to the emergency department (ED) or outpatient department (OPD) admitted to the surgical wards were included in the study. For inclusion in the study informed consent was taken patients.

#### **INCLUSION CRITERIA:**

Age >14 years. Patients diagnosed as liver abscess on clinical evaluation. Patients diagnosed as liver abscess on radiological evaluation. Patients giving consent for inclusion in the study.

#### **OVERVIEW:**

The present study is a hospital based prospective cohort study conducted in the departments of Surgery and Microbiology, Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh (Uttar Pradesh), India. The study was conducted between October, 2019 to January, 2022. This study was approved by the Institutional ethics committee of Jawaharlal Nehru Medical College and Hospital, Aligarh Muslim University, Aligarh (Uttar Pradesh), India.

#### **DATA COLLECTION AND METHODS:**

The details of presenting complaints including onset of pain, site, severity, nature and radiation was taken. Associated symptoms like fever with/without chills and rigors, nausea, vomiting, anorexia, yellowish discoloration of eye and skin with pruritus recorded. History of similar complains in past and history of

previous treatment taken. History of any Co-morbidities like diabetes mellitus, hypertension, immunosuppression, steroids supplements. Personal history on dietary habits, smoking, alcoholism, tobacco addiction, socio-economic status etc was taken. Pulse rate, blood pressure, respiratory rate, temperature and saturation were recorded. All patients were thoroughly examined including general and systemic examination. Abdominal examination was done and the following points were noted, tender abdomen, guarding, rigidity, organomegaly and free fluid in the peritoneal cavity. Respiratory and cardiovascular examination was performed to look for pleural effusion, pericardial effusion or any other respiratory or cardiac pathology. Blood samples were taken for laboratory investigations including complete blood counts, liver function test, renal function test, Prothrombin time and International Normalized Ratio (PT/INR), Arterial blood gas analysis was done. A clinical diagnosis of amoebic or pyogenic liver abscess was made on the basis of clinical evaluation. Radiological imaging includes USG abdomen and pelvis, X-ray chest was done to see the chest and cardiac status. CECT and MRI were done when the diagnosis was in doubt. USG findings including heterogeneous hypoechoic to hyperechoic lesions depending on the presence of internal echoes due to thickened septa and debris in the liver were noted. Evaluation of aspirate by macroscopic appearance based on color of the pus aspirated (anchovy sauce appearance) for Amoebic liver abscess and purulent or yellow colored in Pyogenic liver abscess. Pus collected was sent to the department of microbiology for bacteriological isolation and pus culture and sensitivity. All the data were included in the pro forma prepared for the study. After collection of data, a master chart was prepared and entered in a computer. Analysis: Data were retrieved from the computer Excel sheet and Analysis of the data was done at the conclusion of the study.

#### **DATA ANALYSIS PROCEDURE:**

The data was coded and entered into Microsoft Excel Spreadsheet. Analysis was done using the SPSS version 20.0 (IBM SPSS Statistics Inc, Chicago, Illinois, USA) Windows software program. Descriptive statistics included computation of percentages, means and standard deviations (SD). Chi-square test was used for qualitative data whenever two or more than two groups were used to compare. Level of significance was set at  $P < 0.05$ .

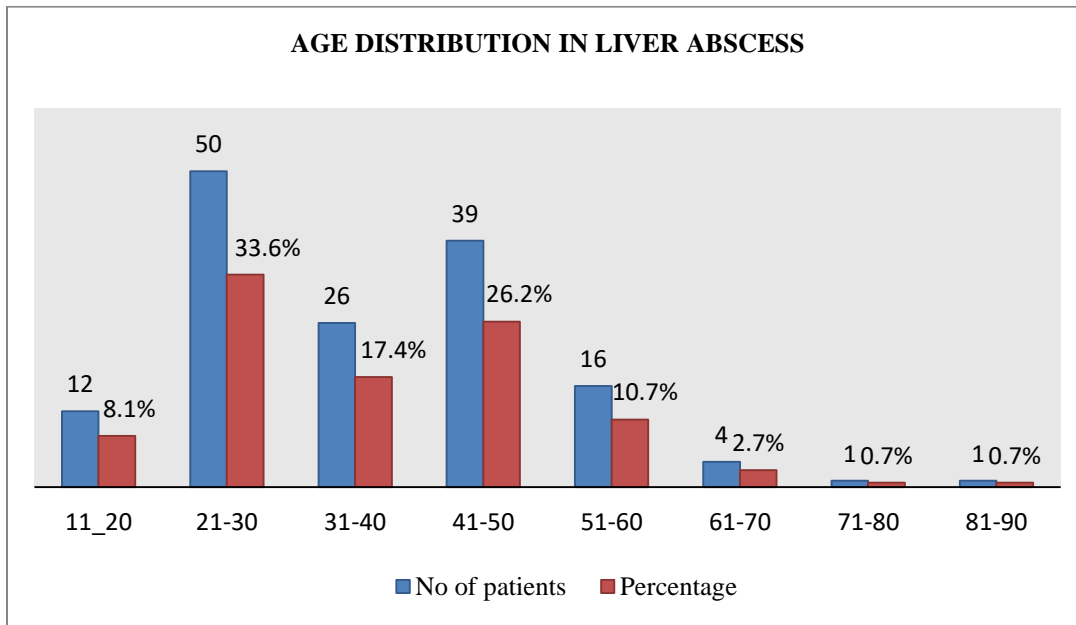
**EXCLUSION CRITERIA:**

Patients not giving consent for inclusion in the study. Patients in which diagnosis of liver abscess are made only on surgical intervention.

**RESULTS:**

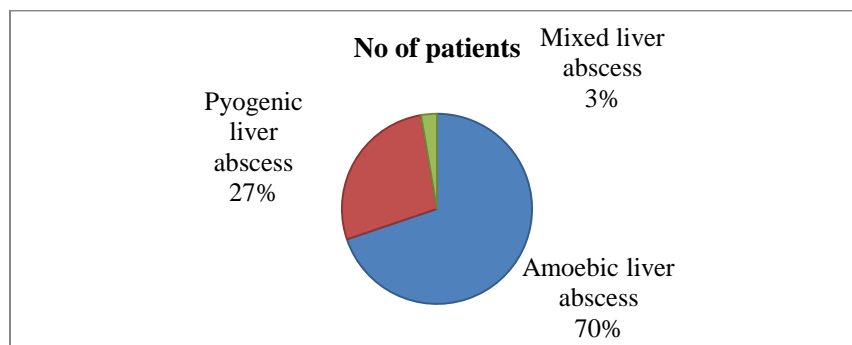
**Age distribution:**

Patients ages ranged from 15 to 82 years and mean age was 37.75±13.25 years. Most commonly affected age group was 21-30(33.6%) and the least affected age group was 81-90years (0.7%).Male to female ratio 6.8:1. 130 (87.2%) were males and 19(12.8%) were females.



**Figure 1**

**Types of liver abscess:**

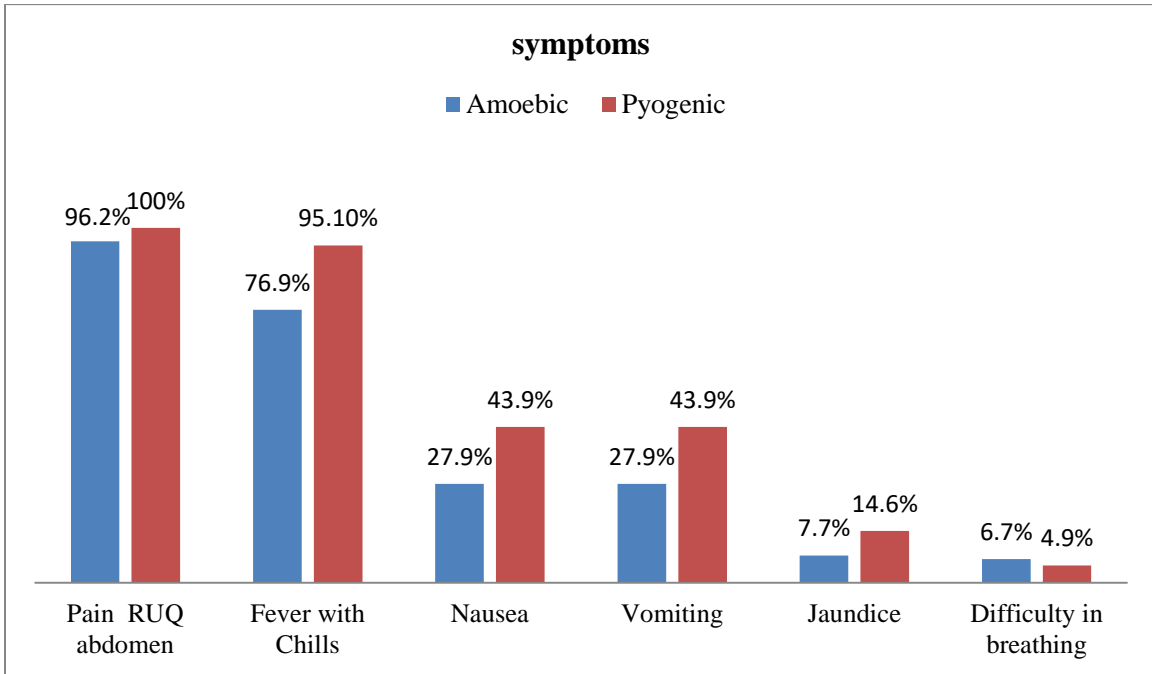


**Figure 2**

**Case Distribution According to Clinical Symptoms:**

Pain in the right upper quadrant of the abdomen and fever were the most common symptom. In patients of pyogenic liver abscess, pain in the right upper quadrant of abdomen was the most common symptom followed by high grade fever and difficulty in breathing. 100(96.2%) and 41(100%) patients had pain in the right

upper quadrant of abdomen in ALA and PLA respectively. 80 (76.9%) and 39(95.1%) patients had fever in ALA and PLA respectively. 29 (27.9%) patients had nausea and vomiting in ALA and 18 (43.9%) in PLA. 08(7.7%) patients had jaundice in ALA and 06(14.6%) in PLA. 07(6.7%) and 02(4.6%) patients had difficulty in breathing in ALA and PLA respectively.

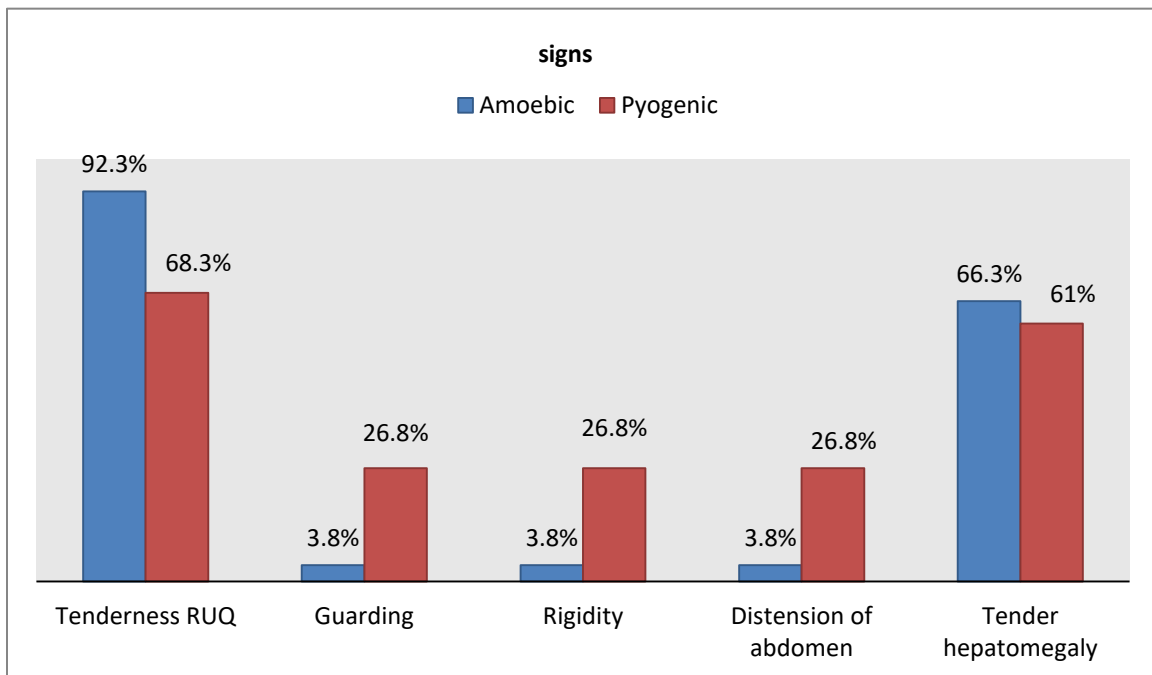


**Figure 3**

**Case Distribution According to Clinical Signs:**

Tenderness in right upper quadrant of abdomen was the most common sign. 96(92.3%) and 28(68.3%) patients had tenderness in right upper quadrant of abdomen in amoebic and pyogenic liver abscess respectively.

69(66.3%) and 25(61.0%) patients had tender hepatomegaly in amoebic and pyogenic liver abscess respectively. 04 (3.8%) and 11 (26.8%) had guarding and rigidity in amoebic and pyogenic liver abscess respectively.



**Figure 4**

**Case Distribution According to Site of Abscess:**

USG abdomen shows involvement

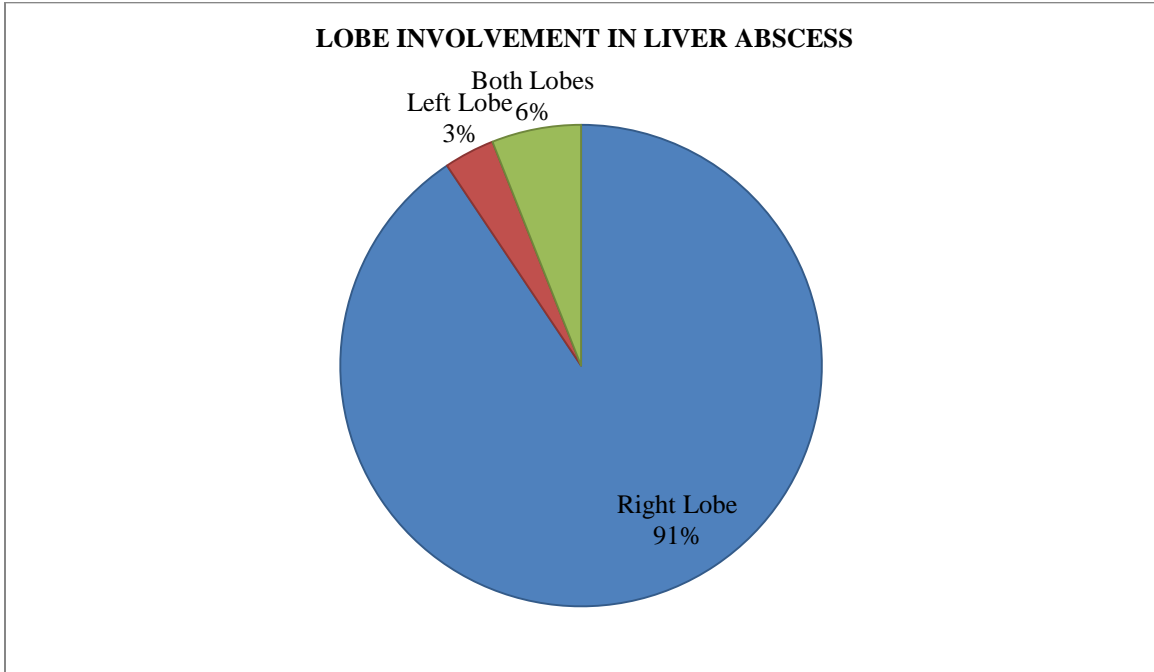


Figure 5

**Case Distribution According to Size of Abscess:**

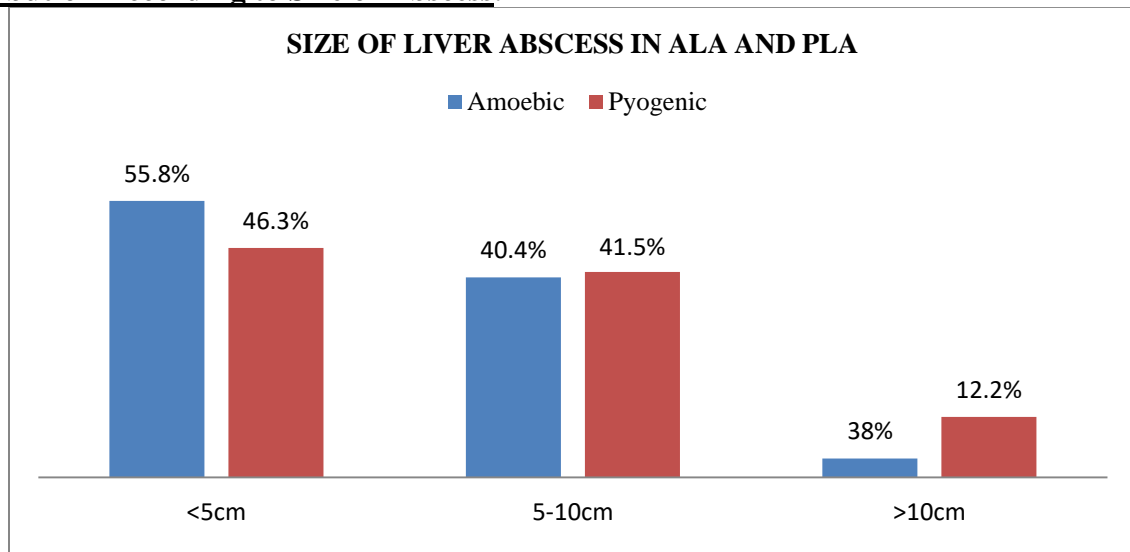


Figure 6

**Case Distribution According to Level of Hb and TLC:**

In patients with Amoebic and Pyogenic liver abscess, 74(71.2%) and 35(85.4%) were anemic respectively. 68(65.4%) patients of ALA and 38(92.7%) patients of PLA had leukocytosis (TLC>11000/mm<sup>3</sup>).

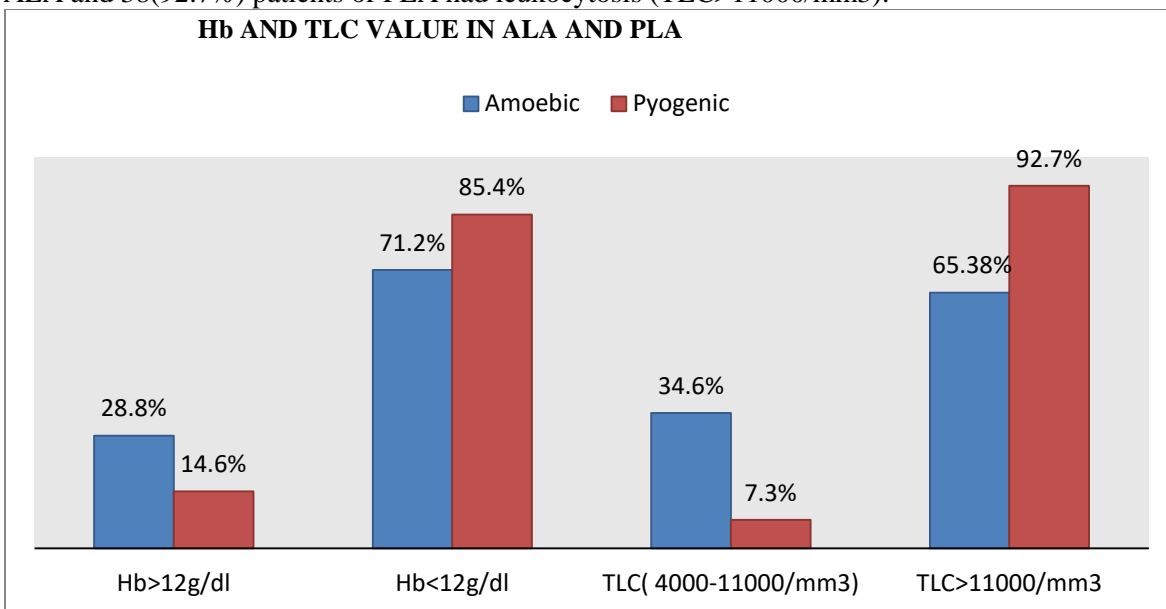


Figure 7

**Case Distribution According to Total Bilirubin:**

In Amoebic and Pyogenic liver abscess, 8(7.7%) and 05(12.2%) had raised total bilirubin levels (TB > 2mg/dl).

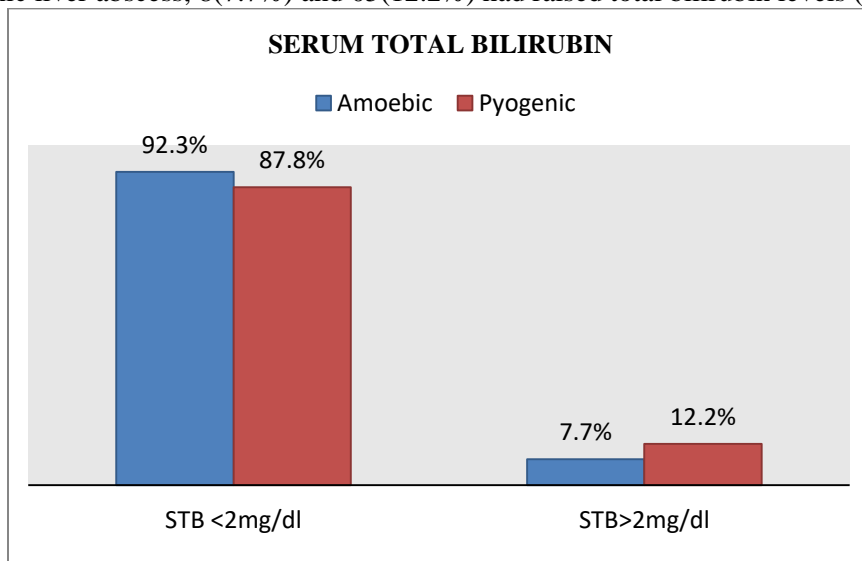
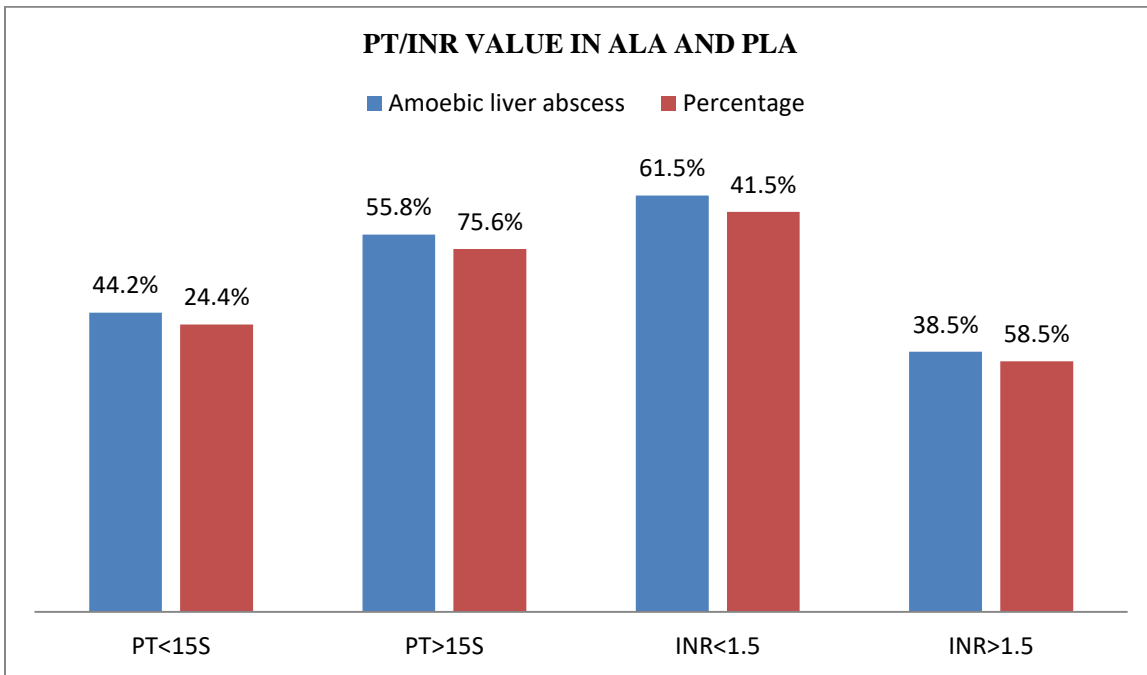


Figure 8

**Case Distribution According to PT/INR:**

In Amoebic and Pyogenic liver abscess, 58(55.8%) and 31(75.6%) patients had high levels of prothrombin time (>15s). 40(38.5%) patients in ALA and 24(58.5%) patients in PLA had high INR levels (>1.5).

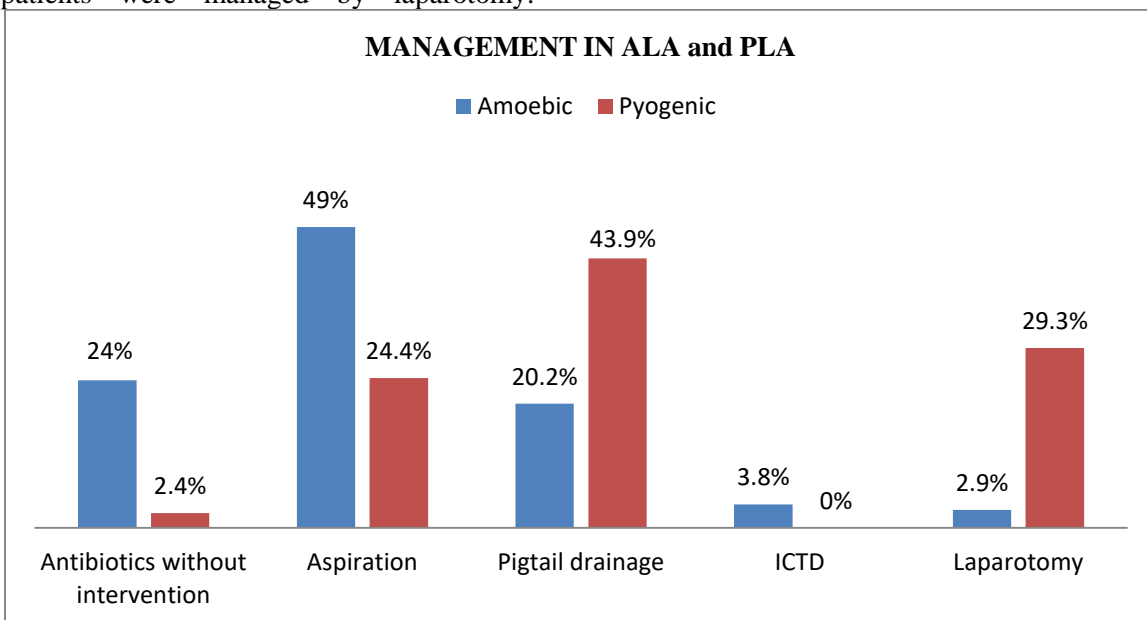


**Figure 9**

**Case Distribution According to Treatment:**

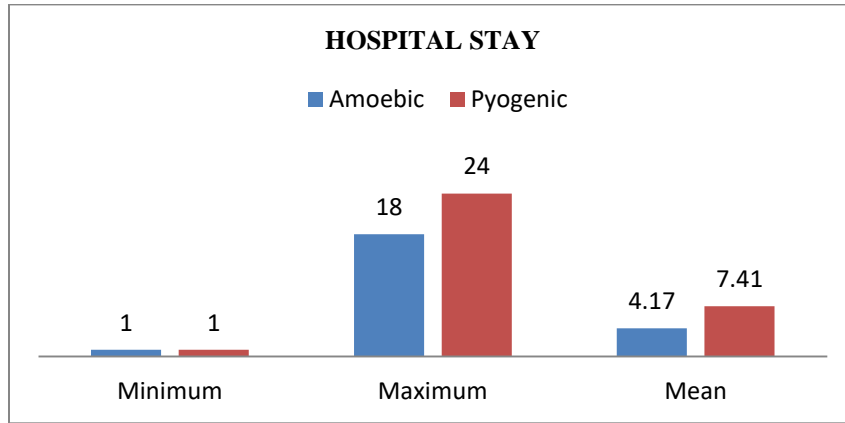
Amoebic liver abscess was mainly managed by aspiration followed by antibiotics. 51(49%) patients were managed by aspiration, 25(24%) were managed by antibiotics only, 21 (20.2%) were managed by pigtail drainage, 04(3.8%) were managed by ICTD and 03(2.9%) patients were managed by laparotomy.

Pyogenic liver abscess was mainly managed by pigtail drainage, followed by laparotomy. 18(43.9%) patients were managed by pigtail drainage, 12(29.3%) were managed by laparotomy, 10(24.4%) were managed by aspiration and 01(2.4%) was managed by antibiotics only.



**Figure 10**

**Case Distribution According to Duration of Hospital Stay:**

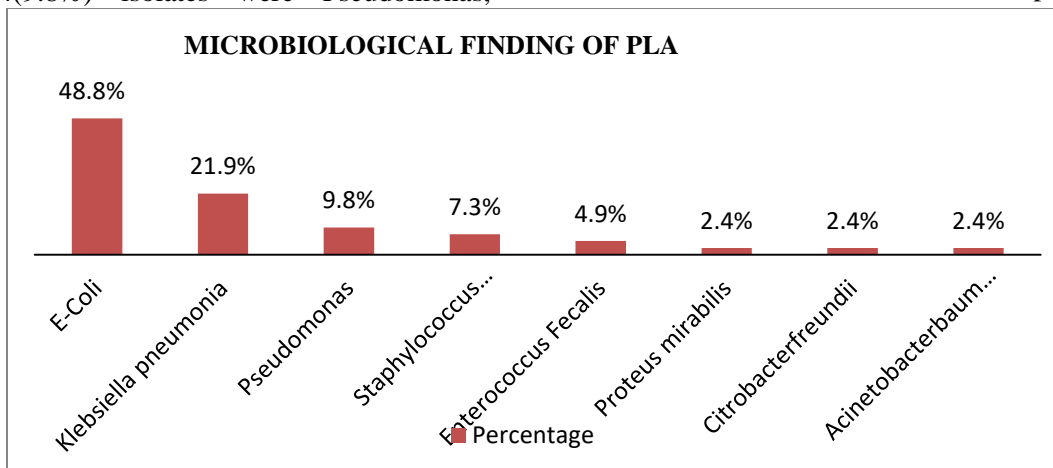


**Figure 11**

**Case Distribution According to Organism Isolated:**

Most common organism isolated was E coli. 20(48.8%) isolates were E coli, 9(21.9%) isolates were Klebsiella pneumoniae, 4(9.8%) isolates were Pseudomonas,

3(7.3%) isolates were Staphylococcus aureus, 2(4.9%) isolates were Enterococcus faecalis and Proteus mirabilis, Citrobacter freundii and Acinetobacter baumannii were 1(2.4%) each. Pus culture reports of all Amoebic liver abscesses were reported as sterile.

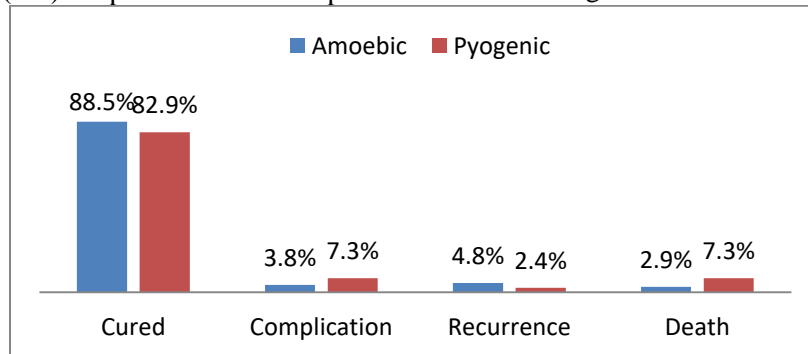


**Figure 12**

**Overall Outcomes:**

In all liver abscesses, 128(85.9%) patients were cured and discharged. 09(6%) patients developed

complications and 06(4%) developed recurrence of liver abscess after discharge from hospital. 06(4%) patients died during the course of treatment.



**Figure 13**

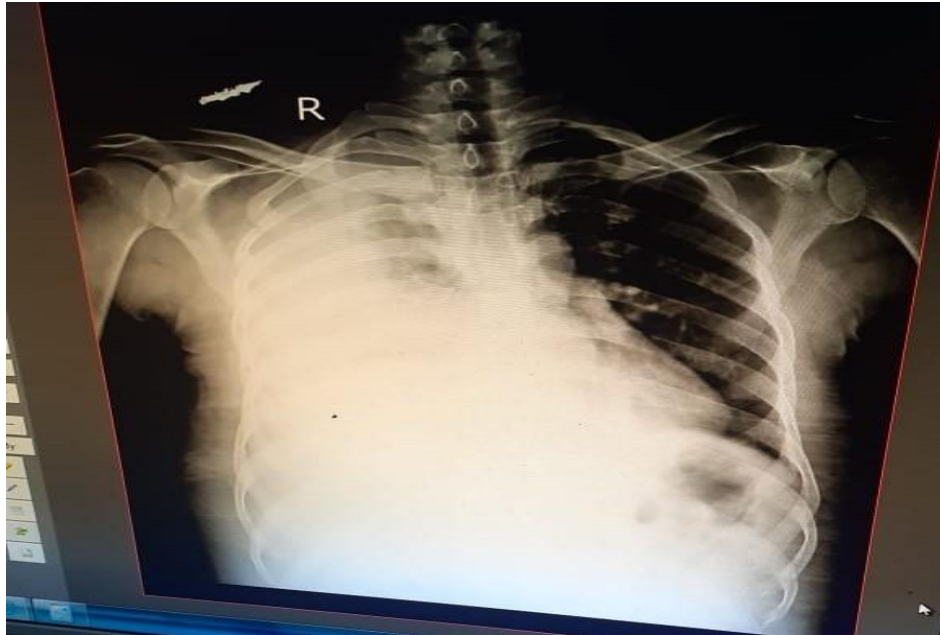


## **Cause of Death in Amoebic and Pyogenic Liver Abscess:**

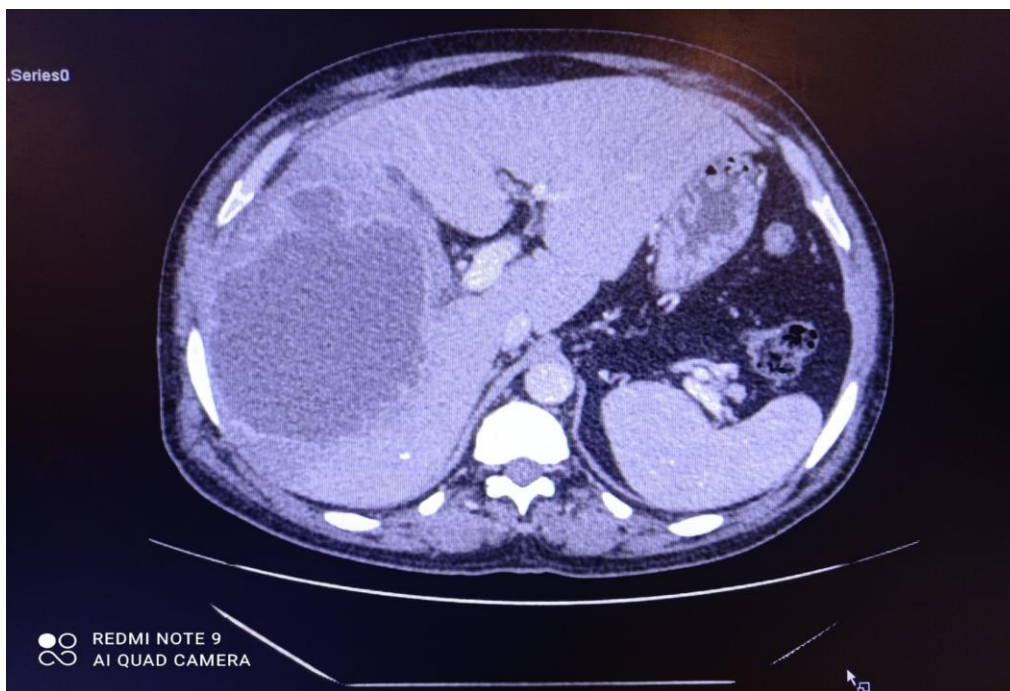
### **Abscess:**

6 patients died during the course of treatment. 3(2.9%) patients were from ALA and 3 (7.3%) were from PLA. All the patients had ruptured liver abscess. Two patients

in ALA had dengue fever with hemorrhagic shock. One patient had covid 19 infections with ARDS with septicemia and MODS. In PLA all patients had ruptured liver abscess with caecal perforation, diffuse peritonitis with septicemia and MODS.



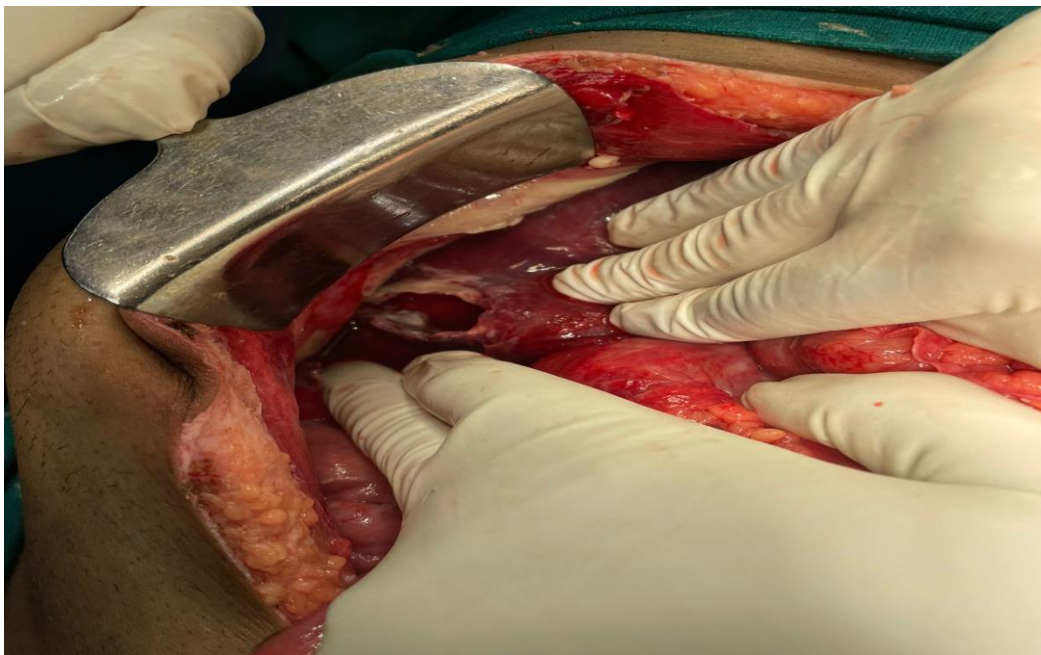
**Figure 14:- Chest X-ray showing massive pleural effusion due to rupture of liver abscess in pleural cavity**



**Figure 15:-Contrast-enhanced computed tomography scan of the abdomen showing large liver abscess with hepatomegaly**



**Figure 16:-Shows perforated caecum in a patient of ruptured liver abscess**



**Figure 17:- Shows ruptured abscess cavity in the right lobe of liver**

### **DISCUSSION:**

Liver abscesses have been recognized for centuries, and in 1883, amoebae were first described as a cause of liver abscesses. In 1938, the largest series of pyogenic and amoebic liver abscesses in the literature for the time was published, and despite a refinement in diagnostic and therapeutic modalities since then, liver abscess remains a serious condition with a high morbidity and mortality

rate. Worldwide, approximately 40 - 50 million people are infected annually with amoebic abscesses, with the majority of infections occurring in developing countries. In endemic areas, the prevalence of infection is higher than 5% - 10%, and has been reported to be as high as 55% in certain areas. These areas include, but are not limited to, rural areas of Central and South America, India, and the tropical areas of Asia and Africa (2).

Conversely, the incidence of pyogenic liver abscess has remained more or less unchanged since the 1950's. In the United States, the incidence of pyogenic liver abscess is estimated to be 8 - 15 cases per 100,000, but this figure is considerably higher in countries where healthcare is not readily available (2). In north Indian population also the incidence of liver abscess is high. We carried out this study to know the clinical presentation and treatment outcomes in patients presenting to this tertiary medical center. Our hospital caters to a large population in north India. In Amoebic liver abscess, 100(96.2%) patients had pain in the right upper quadrant of abdomen, 80 (76.9%) had fever, 29 (27.9%) had nausea and vomiting, 08(7.7%) had jaundice and 07(6.7%) had difficulty in breathing. Similar results were observed by Bhatti et al and Jaiswal AK et al. Ali et al found that the most common symptom was fever 74%, followed by abdominal pain 47% and jaundice 19%. 96(92.3%) patients had tenderness in the right upper quadrant of the abdomen, 69(66.3%) had tender hepatomegaly, 04(3.8%) had guarding, rigidity and abdominal distension in patients of amoebic liver abscess. Similar results reported by Bhatti et al, who found tenderness in the RUQ of the abdomen and hepatomegaly 100% and 85.7% cases respectively whereas Jaiswal AK et al observed tenderness in RUQ abdomen in 100% and tender hepatomegaly in 81% cases. No patient with signs of ruptured liver abscesses was reported by Bhatti et al and Jaiswal AK et al. In Pyogenic liver abscess, 41(100%) had pain in the right upper quadrant of abdomen, 39(95.1%) had fever with chills, 18(43.9%) had nausea and vomiting, 06(14.6%) had jaundice and 02(4.6%) had difficulty in breathing. Similar results observed by Bhatti et al and Jaiswal AK et al. Ali et al found that the most common symptoms was fever 74%, followed by abdominal pain 47% and jaundice 19% and signs were, tenderness in the right upper quadrant of the abdomen was in 28(68.3%) patients. 25(61%) had tender hepatomegaly, 11(26.8%) had guarding, rigidity, and abdominal distension. Similar results were reported by Bhatti et al, who found tenderness RUQ abdomen and hepatomegaly in 100% patients. Jaiswal AK et al observed tenderness RUQ abdomen in 100% and tender hepatomegaly in 61.6% cases. No patients with signs of ruptured liver abscesses were reported by Bhatti et al and Jaiswal AK et al. In amoebic liver abscess, 51(49%) patients were managed by aspiration, 25(24%) were managed by antibiotics. Only 21 (20.2%) were managed by pigtail drainage, 04(3.8%) were managed by ICTD and 03(2.9%) patients were managed by laparotomy. Bhatti et al managed all (100%) patients by aspiration and antibiotics. Jaiswal AK et al managed 75% by pigtail drainage, 22.2% by

antibiotics only and 2.8% by aspirations. In our study the number of patients with ruptured liver abscess was high compared to other studies, in these patients we had to proceed with laparotomy to save the life of the patients (53). In pyogenic liver abscess, 18(43.9%) patients were managed by pigtail drainage, 11(26%) were managed by aspiration, 12 (29.3%) patients were managed by laparotomy. Bhatti et al managed 100% patients through aspiration and Jaiswal Ak et al managed 46.1% through pigtail, 46.1% by antibiotics and 7.8% by aspiration. The above mentioned authors did not encounter any case of ruptured liver abscess or caecal perforation hence they managed the cases only by non-operative methods. Around 6-9% cases has been reported to have rupture into intra peritoneal cavity . Bowel perforation from amoebiasis is very rare and to have both simultaneously is very rare[11]. Our patients had more serious conditions mainly due to ruptured of the liver abscess and caecal perforation. Since our hospital caters to a large population and is a tertiary medical center. Usually the patients report later to our hospital. This delay in treatment results in rupture of the liver abscess with its complications. caecal perforation is another serious clinical condition which is a consequence of virulent organisms and delayed treatment. If both the condition, ruptured of liver abscess and caecal perforation, it leads to septicemia, MODS, and death. Primary acute cecal pathologies are associated with high mortality rates ( $\approx 42\%$ ). Delay in diagnosis seems to be the most important factor contributing to high mortality as these conditions are commonly misdiagnosed as appendicular pathology. Most of our patients were managed by conservative colonic resection with proximal diversion. This seems to be a more plausible option in current practice in an emergency setting (mortality rate  $\approx 36\%$ ) as hemicolectomy is associated with proportionately higher mortality rates (67%) [12,13]. In our study over all outcome was 128(85.9%) patients were cured and discharged. 09(6%) patients developed complications and 06(4%) developed recurrence of liver abscess after being discharged from hospital. 06 (4%) patients expired during the course of the treatment. Bhatti et al and Jaiswal AK et al, observed no mortality in their study. The reason for no mortality in the study of Bhatti et al and Jaiswal AK et al appears to be that the patients were not very sick and reported early. Most of them were treated by Antibiotics and Aspiration only.

### **CONCLUSION:**

Liver abscess patients diagnosed on clinical and radiological assessments aged more than 14 years old, presenting in the emergency department (ED) or

outpatient department (OPD), admitted to the surgical wards were included in the study. A total of 149 patients were included in our study, 104(69.8%) patients were of Amoebic liver abscess, 41(27.5%) were Pyogenic liver abscess and 04(2.7%) cases mixed types of liver abscess. In our study the mean age was  $37.75 \pm 13.25$  (SD) most commonly affected age group was 21-30 years(33.6%) followed by 41-50 years age group (26.2%). 130(87.2%) patients were males. Male to Female ratio was 6.8:1. Most common organism isolated was *E coli* 20(48.8%) from all cultured positive patients. Cure rate was 88.5% in amoebic liver abscess and 82.9% in pyogenic liver abscess. Recurrence rate was 4.8% in Amoebic liver abscess and 2.4% in pyogenic liver abscess. Mortality rate was 7.3% in pyogenic liver abscess and 2.9% in amoebic liver abscess. Mean duration of hospital stay was  $4.17 \pm 3.69$  days in amoebic liver abscess and  $7.41 \pm 5.97$  days in pyogenic liver abscess. Over all the patients of amoebic liver abscess fared better than pyogenic liver abscess. They had lower complication rate (3.8%), less hospital stay ( $4.17 \pm 3.69$ ) and lower mortality (2.9% versus 7.3%).

#### **REFERENCES:**

1. Jaiswal AK, Jain RK, Sarin R. Prospective study of etiology of liver abscess and comparison of different ways of its management. *Int Surg J.* 2020 Jul 23;7(8):2532–8.
2. Bhatti AB, Ali F, Satti SA, Satti TM. Clinical and pathological comparison of pyogenic and amoebic liver abscesses. *Advances in Infectious Diseases.* 2014 Jul 8;2014.
3. Ali WM, Ali I, Rizvi SAA, Rab AZ, Ahmed M. Recent trends in the epidemiology of liver abscess in western region of Uttar Pradesh: a retrospective study. *J Surg Anesth.* 2018;2(117):1–4.
4. Ghosh S, Sharma S, Gadpayle AK, Gupta HK, Mahajan RK, Sahoo R, Kumar N. Clinical, laboratory, and management profile in patients of liver abscess from northern India. *Journal of tropical medicine.* 2014 Oct;2014.
5. Longworth S, Han J. Pyogenic liver abscess. *Clin Liver Dis.* 2015 Aug 24;6(2):51–4.
6. Sharma M, Dasarathy S. Amoebic liver abscess. *Trop Gastroenterol Off J Dig Dis Found.* 1993 Jan 1;14:3–9.
7. Jackson TFHG. *Entamoeba histolytica* and *Entamoeba dispar* are distinct species; clinical, epidemiological and serological evidence. *Int J Parasitol.* 1998 Jan 1;28(1):181–6.
8. Oli KB. Prevalence of Intestinal Parasites in Tharu Community of Pawannagar Vdcs of Dang District in Relation to their SocioEconomic Status. Central Department of Zoology Institute of Science and Technology Tribhuvan University Kirtipur, Kathmandu; 2016. Bibliography 67
9. Wesel J, Shuman J, Bastuzel I, Dickerson J, Ingram-Smith C. Encystation of *Entamoeba histolytica* in Axenic Culture. *Microorganisms.* 2021 Apr;9(4):873.
10. Butler TJ, McCarthy CF. Pyogenic liver abscess. *Gut.* 1969 May;10(5):389-99. doi: 10.1136/gut.10.5.389. PMID: 5771671; PMCID: PMC1552853.
11. Sharma R, Minhas A. A rare case of amoebic liver abscess with caecal perforation. *International Journal of Surgery.* 2022;6(3):01-3.
12. Kaushal-Deep SM, Anees A, Khan S, Khan MA, Lodhi M. Primary cecal pathologies presenting as acute abdomen and critical appraisal of their current management strategies in emergency settings with review of literature. *International Journal of Critical Illness and Injury Science.* 2018 Apr;8(2):90.
13. Kopperundeve V, Vimala G, Kannan R. A rare presentation of ruptured amoebic liver abscess with caecal perforation-a case series. *International Surgery Journal.* 2022 Jan 29;9(2):454-8.