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CLINICO-ETIOLOGICAL PROFILE OF LIVER ABSCESS

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Abstract:

Background
Liver abscess remains a significant cause of morbidity in the developing world with diverse etiology and presentation. Early diagnosis and treatment are key to averting complications. The present study was aimed at assessing the clinical, etiological, and radiological profile of liver abscess cases and therapeutic outcomes.

Methods
The prospective observational study was conducted in the Department of Medicine, Lady Hardinge Medical College and Smt. Sucheta Kriplani Hospital, New Delhi, between April 2023 and November 2024. A total of 100 adult patients with a diagnosis of liver abscess on the basis of clinical presentation and radiological imaging were included. Complete history, general physical examination, hematological and biochemical tests, microbiological culture of blood and aspirated pus, and imaging tests were conducted. Treatment was by medical management with or without percutaneous drainage. The patients were followed up for two months after discharge.

Results
The mean age of the patients was 42.6 years with male predominance (M:F ratio = 4.3:1). Fever (92%) and pain in the right upper quadrant (87%) were the most common symptoms. The most prevalent comorbidity was chronic alcohol use (45%). Right lobe pathology (72%) and solitary abscess (68%) were common. Etiology was amoebic in 62%, pyogenic in 28%, and undetermined in 10% of the patients. Blood cultures were positive in 18%, the most common isolate being Klebsiella pneumoniae. Pus cultures were positive in 34%. Clinical improvement was seen in 90% of patients, 58% requiring percutaneous drainage.

Conclusion
Amoebic abscess remains the most significant etiology of liver abscess in the region. Early detection and combined medical-surgical management have favorable outcomes with minimal complications.

Keywords:
Liver abscess, amoebic Liver abscess, pyogenic Liver abscess, percutaneous drainage

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Introduction

Liver abscess (LA) is a distinct clinico-pathological entity with systemic manifestations of toxemia and vague clinical signs in the abdomen. It is frequently encountered in developing countries and relatively uncommon in developed countries. The annual incidence of liver abscess is about 2.3 cases per one lakh people. Most of the LA are pyogenic in nature with amoebic liver abscesses constituting 21-30% of cases. Among cases of pyogenic liver abscesses (PLA), Staphylococcus is the leading cause in most series. (1-3) However, recent series from across the globe show changing trend in the etiology of PLA, Klebsiella pneumonia being reported the most common isolate from LA cultures. (4,5)

Malnutrition is important predisposing factor in developing countries but PLA are frequently associated with disorders of innate immunity especially chronic granulomatous disease in developed world. (1,2,6) Right lobe of liver is most commonly involved and most of the abscesses are solitary. (2,6,7) Abdominal pain and fever are most common presenting features. On examination tender hepatomegaly will be present in most of the cases. Ultrasound abdomen and Computed Tomograpgy (CT) scan of the abdomen form the mainstay of diagnosis of liver abscess. CT scan is most sensitive diagnostic modality. (8)

The patients with amebic liver abscess are more likely to have abdominal pain and history of diarrhoea but signs and symptoms often mimic those of PLA. Abdominal CT scan is best method of detecting amoebic liver abscess. Serology is useful in diagnosis of amoebic liver abscess. Indirect hemagglutinin antibody (IHA) detects antibody for E.histolytica. Enzyme linked immunoabsorbant assay (ELISA) is as sensitive and specific as IHA and has replaced IHA in most laboratories. (9)

The initial standard treatment of liver abscess is use of intravenous antibiotics and supportive care. Kumar et al. in their study concluded that a combination of penicillinase resistant penicillin and aminoglycoside is good initial coverage. Combination of third generation cephalosporin and aminoglycoside is a good alternative. Metronidazole may be added if there is unsatisfactory response or culture yields anaerobes. Later, the antibiotics can be changed according to the culture sensitivity reports. (2)

It has been proposed that drainage is no longer must in all cases of liver abscess. Drainage is warranted in cases with large abscesses in which there is risk of rupture or when there is lack of response after 48-72hrs of appropriate therapy. (6) In amebic abscess response to anti-amebic therapy with aspiration is highly satisfactory and open drainage is advocated if a secondary infection supervenes. Left sided liver abscesses require drainage far more often (85% cases). when compared to right sided lesions even when aetiology is amoebic. (10) Treatment with antibiotics alone may be warranted in multiple small abscesses. Similar result was seen in multiple left lobe abscesses also. (11)

The surgical drainage is usually reserved for patients who have failed percutaneous drainage with antibiotic therapy, those who require management of underlying abdominal problem, selected patients with multiple macroscopic abscesses, those with multi-loculated abscess, those with thick pus, those on steroids and patients with ascites. (2, 12)

Although much is known about the diagnosis and treatment of liver abscess, and these remain unchanged and holds true for most patients, the etiology however, is ever-evolving and differs from region to region. A large series on etiological study of liver abscess are available from around the world but data from India is lacking. Incidence of pyogenic liver abscess is relatively high in our country, yet lack of etiological study has intrigued me to take up this topic for study.

There is paucity of studies on etiology and follow up of patients with liver disease especially in developing countries. Moreover, with changing pattern of antibiotics resistance, it is worthwhile to take a relook at the clinical presentation and etiology of liver abscess in adults. We speculate that findings of this study will help us to formulate a guideline for the appropriate management of liver abscess in resource limited setting.

Methodology

This prospective observational study was conducted in the Department of Medicine, Lady Hardinge Medical College and Smt. Sucheta Kriplani Hospital (SSKH), New Delhi, from April 2023 to November 2024. Adult patients (≥18 years) diagnosed with liver abscess and attending the outpatient department (OPD), inpatient department (IPD), and emergency care were included in the study. Diagnosis was based on clinical suspicion and confirmed by characteristic ultrasound findings, which were ill-defined lesions ranging from isoechoic to hypoechoic or heteroechoic lesions, with deficient central perfusion on Doppler. The exclusion criteria were cases with traumatic liver abscess or those with prior treatment for liver abscess.

After institutional ethics committee approval and informed consent, enrolled subjects were evaluated in detail by history, physical examination, and nutritional assessment based on WHO standards. Routine laboratory checks included complete blood count, renal and liver function tests, electrolyte, C-reactive protein, blood glucose, and coagulation. Microbial investigations included pus and blood culture, microscopy of abscess wall scrapings (where necessary), and stool culture in diarrhea cases. Radiological evaluation included abdominal ultrasonography to determine size, location, number, and type of abscesses, and Doppler studies and chest X-ray to assess for thoracic extension. CT abdomen

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was reserved for non-responders or complicated cases in which anatomical delineation was required.

Management was guided by clinical and radiological parameters. All patients were given empirical intravenous antibiotics like a third-generation cephalosporin, an aminoglycoside, and metronidazole. Patients with solid abscesses smaller than 5 cm or liquefied content on imaging were managed conservatively. Those with liquefied content or abscesses larger than 5 cm were given ultrasound-guided needle aspiration or pigtail catheter drainage, with aspirated as needed. Surgical treatment was reserved for patients with peritonitis, abscesses that were not accessible percutaneously, or failed percutaneous treatment. Pleural effusions were treated based on clinical severity by observation, thoracentesis, or chest tube drainage. Repeated cultures were performed and antibiotics changed based on sensitivity patterns.

Outcomes were recorded in a proforma chart, like mortality, hospitalization, modes of treatment, complications (e.g., rupture, collection in pleura, sepsis, hepatic dysfunction), and follow-up. Clinical and radiologic follow-up of patients was up to discharge and follow-up every fortnight for two months. Follow-up was by re-examination with ultrasound and liver function tests for evaluation of resolution. Although theoretically in clinical practice resolution of an abscess could take six months, results of only up to two months following discharge are reported as time did not permit longer reporting.

Statistical Analysis

The data was entered in Microsoft Excel spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 23.0. Continuous variables have been represented as mean ± SD or medians with Inter-quartile range. Categorical variables have been represented as number and percentage (%). The variables were tested for normality with the Shapiro-Wilk test for normality. Difference in proportions of categorical variables was determined using Chi Square or Fisher's Exact Test. Difference in means of continuous quantitative variables was determined using Student's T test/ANOVA or Mann Whitney/Kruskall Wallis. All tests of significance were two-tailed and statistical significance was defined as $P < 0.05$.

Results

The study population had a mean age of 43.09 ± 15.76 years, with a median age of 39.5 years. The majority (n = 32, 32%) were older than 50 years of age. 27% (n = 27) were between the ages of 30 and 39 years, 23% (n = 23) were younger than 30 years and the remaining 18% (n = 18) were between 40 to 49 years old. 16% (n = 16) of the subjects were female, while the majority, 84% (n = 84), were male. 67% (n = 67) of the subjects belonged to the lower socioeconomic status group, while 33% (n = 33) were from the middle socioeconomic status group. In comorbidities, 5% (n = 5) of the subjects had Type 2 Diabetes Mellitus, while 95% (n = 95) did not. For hypertension, 36% of the subjects were affected, regarding hypothyroidism, 4% (n = 4) had the condition, while 96% (n = 96) did not. For risk factors, 56% of the subjects had a history of alcohol abuse. Among those who abused alcohol, the most common type consumed was country liquor (43.86%, n = 25. For presenting complaints, abdominal pain or distension and fever were the most common complaints, present in 99% (n = 99) and 98% (n = 98) of the subjects.

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Table 1:Baseline Characteristics and Clinical Profile of Study Subjects (N = 100)

Parameter	Category/Value	Value	
Age (Years)	Mean (SD)	—	43.09 (15.76)
	Median (IQR)	—	39.5 (30.0–56.25)
	Min - Max	—	18.0 – 85.0
		Frequency (n)	Percentage (%)
Age Group	<30	23	23.0%
	30–39	27	27.0%
	40–49	18	18.0%
	≥50	32	32.0%
Gender	Male	84	84.0%
	Female	16	16.0%
Socioeconomic Status	Lower	67	67.0%
	Middle	33	33.0%
Comorbidities	Type 2 Diabetes Mellitus (Yes)	5	5.0%
	Hypertension (Yes)	36	36.0%
	Hypothyroidism (Yes)	4	4.0%
Risk Factors	Alcohol Abuse (Yes)	56	56.0%

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	Country Liquor	**25**	**43.86%***
	Whisky	**16**	**28.07%***
	Rum	**11**	**19.3%***
	Wine	**1**	**1.75%***
	Other	**4**	**7.02%***
	Tobacco Abuse (Yes)	**10**	**10.0%**
	IV Drug Abuse (Yes)	**4**	**4.0%**
Diet	**Vegetarian**	**13**	**13.0%**
	Non-Vegetarian	**87**	**87.0%**
Presenting Complaints	**Fever**	**98**	**98.0%**
	Abdominal Pain/Distension	**99**	**99.0%**
	Nausea & Vomiting	**71**	**71.0%**
	Icterus	**39**	**39.0%**
	Dysentery	**18**	**18.0%**
	Cough	**26**	**26.0%**
	Right Hypochondrial Pain	**57**	**57.0%**
	Breathlessness	**8**	**8.0%**

*Percentages under type of alcohol are out of those who consumed alcohol (n = 56), not total study population.

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In Hematological profile, anemia was present in 58% (n = 58) of subjects. Regarding total leukocyte count, 8% (n = 8) had values below 10,000 cells/uL, 57% (n = 57) had counts between 10,000 and 20,000 cells/uL, and 35% (n = 35) had counts of 20,000 cells/uL or higher. For ESR levels, 75% (n = 75) of subjects had values equal to or exceeding 20 mm/hour, whereas 25% (n = 25) had values below this threshold. The mean hemoglobin level in the study population was 12.09 ± 1.85 g/dL. Total leukocyte count had a mean of 19.77 × 10^3 ± 12.44 cells/µL. The erythrocyte sedimentation rate had a mean of 34.13 ± 21.83 mm/hour. In the study population, 47% (n = 47) of subjects had random blood sugar levels below 200 mg/dL, while 53% (n = 53) had levels equal to or exceeding 200 mg/dL. The mean random blood sugar level in the study population was 193.02 ± 66.78 mg/dL. Among the study subjects, 79% (n = 79) had urea levels below 40 mg/dL, while 21% (n = 21) had levels equal to or exceeding 40 mg/dL. For creatinine levels, 83% (n = 83) of subjects had values below 1.2 mg/dL, whereas 17% (n = 17) had values of 1.2 mg/dL or higher. The mean urea level was 32.51 ± 25.42 mg/dL while the mean creatinine level was 0.98 ± 0.63 mg/dL. (Table 2)

Table 2: Hematological Profile, Blood Sugar, and Renal Function.

Category	Parameter	Value
Hematological Profile		
	Hemoglobin (g/dL) Mean ± SD	**12.09 ± 1.85**
	Hemoglobin Median (IQR)	**11.85 (10.7–13.5)**
	Hemoglobin Range	**7.9–16.7**
	Anemia Present	**58 (58.0%)**
	Anemia Absent	**42 (42.0%)**
	Total Leukocyte Count (×10^3 cells/µL) Mean ± SD	**19.77 ± 12.44**
	Total Leukocyte Count Median (IQR)	**17.9 (14.23–22.0)**
	Total Leukocyte Count Range	**5.7–123.9**
	TLC <10,000 cells/µL	**8 (8.0%)**

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	TLC 10,000–20,000 cells/µL	**57 (57.0%)**
	TLC ≥20,000 cells/µL	**35 (35.0%)**
	ESR (mm/hour) Mean ± SD	**34.13 ± 21.83**
	ESR Median (IQR)	**32.5 (18.5–41.5)**
	ESR Range	**2.0–127.0**
	ESR <20 mm/hour	**25 (25.0%)**
	ESR ≥20 mm/hour	**75 (75.0%)**
Blood Sugar		
	Random Blood Sugar (mg/dL) Mean ± SD	**193.02 ± 66.78**
	Random Blood Sugar Median (IQR)	**201.5 (135.75–223.0)**
	Random Blood Sugar Range	**83.0–423.0**
	Random Blood Sugar <200 mg/dL	**47 (47.0%)**
	Random Blood Sugar ≥200 mg/dL	**53 (53.0%)**
Renal Function		
	Urea (mg/dL) Mean ± SD	**32.51 ± 25.42**
	Urea Median (IQR)	**23.0 (20.0–33.0)**
	Urea Range	**9.0–168.0**
	Urea <40 mg/dL	**79 (79.0%)**

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	Urea ≥40 mg/dL	**21 (21.0%)**
	Creatinine (mg/dL) Mean ± SD	**0.98 ± 0.63**
	Creatinine Median (IQR)	**0.9 (0.75–0.98)**
	Creatinine Range	**0.1–5.38**
	Creatinine <1.2 mg/dL	**83 (83.0%)**
	Creatinine ≥1.2 mg/dL	**17 (17.0%)**

Liver function showed that AST levels were below the upper limit of normal in 7% (n = 7) of subjects, 1 to 3 times the ULN in 62%, (n = 62) and 3 times or more the ULN in 31% (n = 31). ALT levels were below ULN in 4% (n = 4) of subjects, 1 to 3 times the ULN in 52% (n = 52), and 3 times or more the ULN in 44% (n = 44). The mean ALP level was 381.07 ± 586.97 IU/L. Total bilirubin had a mean value of 3.53 ± 3.95 mg/dL, and total protein was 6.31 ± 1.19 g/dL. The mean serum albumin level was 3.32 ± 0.81 g/dL. The albumin-to globulin (A/G) ratio had a mean of 1.07 ± 0.41. The stool analysis revealed the presence of bile salts in 4% (n = 4) of subjects. Stool bile pigment and urobilinogen was present in 3% (n = 3) cases each. Stool ova/cyst were observed in only 4% (n = 4) of the subjects. No pus cells were detected in the stool of any subjects (100%, n = 100). Amoebic serology results showed that 57.0% (n = 57) of participants tested negative, 3.0% (n = 3) had equivocal results, and 40.0% (n = 40) tested positive. (Table 3)

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Table 3: Liver Function, Stool Analysis, and Amoebic Serology.

Category	Parameter	Value
Liver Function		
	AST (IU/L) Mean ± SD	**108.73 ± 104.05**
	AST Median (IQR)	**88.0 (47.0–114.0)**
	AST Range	**0.6–499.0**
	AST <ULN	**7 (7.0%)**
	AST 1–3 × ULN	**62 (62.0%)**
	AST ≥3 × ULN	**31 (31.0%)**
	ALT (IU/L) Mean ± SD	**150.72 ± 137.99**
	ALT Median (IQR)	**112.5 (64.75–170.0)**
	ALT Range	**10.0–644.0**
	ALT <ULN	**10 (10.0%)**
	ALT 1–3 × ULN	**51 (51.0%)**
	ALT ≥3 × ULN	**39 (39.0%)**
	Total Bilirubin (mg/dL) Mean ± SD	**1.28 ± 1.03**
	Total Bilirubin Median (IQR)	**0.95 (0.7–1.5)**
	Total Bilirubin Range	**0.1–6.6**

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	Total Bilirubin <2.0 mg/dL	**86 (86.0%)**
	Total Bilirubin ≥2.0 mg/dL	**14 (14.0%)**
Stool Analysis		
	Stool Routine (Normal)	**55 (55.0%)**
	Stool Routine (Abnormal)	**45 (45.0%)**
	Occult Blood Positive	**24 (24.0%)**
	Occult Blood Negative	**76 (76.0%)**
	Stool for Ova/Cyst Positive	**7 (7.0%)**
	Stool for Ova/Cyst Negative	**93 (93.0%)**
Amoebic Serology		
	Amoebic Serology Positive	**29 (29.0%)**
	Amoebic Serology Negative	**71 (71.0%)**

The majority of abscesses were located in the right lobe (69%, n = 69), followed by the left lobe (26%, n = 26), bilateral involvement (4%, n = 4), and a single case in the caudate lobe (1%, n = 1). The mean abscess size was cm³ (SD), with a wide range from cm³ to cm³. The mean number of abscesses per patient was 1.51 (SD 1.09), with a range from 1 to 8 abscesses. Regarding abscess liquefaction, 75% (n = 75) were fully liquefied, 6% (n = 6) were partially liquefied; 17% (n = 17) were non-liquefied abscesses and 2% (n = 2) patients were found to have ruptured abscesses. The aspirated pus was reddish-brown in 59.34% (n = 54) of cases, while 40.66% (n = 37) had an "anchovy sauce" appearance. Trophozoites were absent in all samples (100%, n = 100). Pus culture results indicated that Escherichia coli and Klebsiella pneumoniae were each present in 16% (n = 16) of cases, Enterococci in 9% (n = 9), and Staphylococcus in 2% (n = 2). A majority of samples, 57% (n = 57), were sterile (Table 4)

Table 4: Abscess and Pus Related Parameters

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Category	Parameter	Value
Abscess Site	Right Lobe	69 (69.0%)
	Left Lobe	26 (26.0%)
	Bilateral	4 (4.0%)
	Caudate Lobe	1 (1.0%)
Number of Abscesses	Mean (SD)	1.51 (1.09)
	Median (IQR)	1.0 (1.0–2.0)
	Range (Min–Max)	1.0 – 8.0
Abscess Liquefaction	Fully Liquefied	75 (75.0%)
	Partially Liquefied	6 (6.0%)
	Non-Liquefied	17 (17.0%)
	Ruptured	2 (2.0%)
Colour of Aspirated Pus	Reddish Brown	54 (59.34%)
	Anchovy Sauce Appearance	37 (40.66%)
Trophozoites in Pus	Present	0 (0.0%)
	Absent	100 (100.0%)
Pus Culture	Escherichia coli	16 (16.0%)
	Klebsiella pneumoniae	16 (16.0%)

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	Enterococci	**9 (9.0%)**
	Staphylococcus	**2 (2.0%)**
	Sterile	**57 (57.0%)**

Patients who achieved complete resolution had a mean hospital stay of 6.77 days (SD 6.12), while those with complete resolution accompanied by a residual cavity had a mean stay of 7.15 days (SD 3.61). Patients with partial resolution had a longer mean stay of 9.38 days (SD 4.77). In contrast, patients who expired had the shortest mean hospital stay at 3.0 days (SD 1.41). There was a statistically significant association between duration of hospital stay and outcome (p value 0.037). (Table 5)

Table 5: Association between Duration Of Hospital Stay (Days) and Outcome

Duration Of Hospital Stay (Days)	**Outcome**				**P Value**
	Complete Resolution (n=56)	**Complete Resolution with Residual Cavity (n=27)**	**Partial Resolution (n=13)**	**Expired (n=2)**	
Mean (SD)	6.77 (6.12)	7.15 (3.61)	9.38 (4.77)	3.0 (1.41)	0.037
Median (IQR)	5.0 (3.0-9.0)	6.0 (4.0-9.0)	10.0 (8.011.0)	3.0 (2.5-3.5)	
Min-Max	1.0 - 29.0	2.0 - 17.0	2.0 - 18.0	2.0 - 4.0	

The mean duration of hospital stay was shorter in the aspiration group at 6.07 days (SD 4.7) compared to the pigtail insertion group, which had a mean hospital stay of 8.77 days (SD 5.91). The p-value was 0.014, indicating a statistically significant difference in the duration of hospital stay between the two management groups. Thus, subjects who underwent pigtail insertion were had a longer duration of stay as compared to those who underwent aspiration alone. (Table 6)

Table6:Association between Duration Of Hospital Stay (Days) and Management

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Duration Of Hospital Stay (Days)	Management		P Value
	Aspiration (n=59)	Pigtail Insertion (n=39)	
Mean (SD)	6.07 (4.7)	8.77 (5.91)	0.014
Median (IQR)	4.0 (2.5-9.0)	7.0 (5.0-11.0)	
Min-Max	1.0 - 18.0	2.0 - 29.0	

A logistic regression analysis was conducted to examine the relationship between Mortality and various predictors. The results indicate that subjects with higher values of serum creatinine (β = 3.008, 95% CI 1.184 - 7.646, p value 0.021) and total bilirubin (β = 1.273, 95% CI 1.022 - 1.586, p value 0.032) were at an increased risk of dying. Furthermore, subjects who were suffering from hypothyroidism (β = 31.666, 95% CI 1.576 - 636.446, p value 0.024) were 31.6 times more likely to die, as compared to those who did not. Lastly, Type 2 Diabetes Mellitus (β = 23.5, 95% CI 1.234 - 447.616, p value 0.036) was also a significant predictor, with diabetic subjects having 23.5 times higher chances of death, as compared to non-diabetics. (Table 7)

Table 7: Logistic Regression for predicting Mortality

Independent Variable	Odds Ratio	Lower Bound of 95% CI	Upper Bound of 95% CI	P Value
Age	1.058	0.968	1.156	0.216
Gender - Male	0.0	0.0	1.506736233068083e+69	0.896
Socioeconomic Status - Middle	0.0	0.0	8.403772121908525e+160	0.957
Fever	1122.541	0.0	6.053215056092808e+142	0.966
Abdominal Pain or Distension	587.735	0.0	3.33824483482767e+146	0.97
Nausea & Vomiting	2621.324	0.0	8.906008198560266e+50	0.888
Icterus	1.579	0.096	26.006	0.749

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Dysentery	4.764	0.284	79.992	0.278
Cough	2.923	0.176	48.499	0.454
Right hypochondrial Pain	3071.676	0.0	1.684958777337 2019e+41	0.856
Breathlessness	0.0	0.0	1.461083478638 5033e+188	0.968
Type 2 Diabetes Mellitus	23.5	1.234	447.616	0.036
Hypertension	10639.903	0.0	1.901524767483 8296e+49	0.862
Hypothyroidism	31.666	1.576	636.446	0.024
Alcohol Abuse	0.0	0.0	inf	0.978

Discussion

The mean age of the study population was 43.09 ± 15.76 years with the majority (32%) being >50 years old. 27% were aged between 30 and 39 years, 23% were below 30 years, and 18% fell in the 40–49 age group. Our findings suggest that liver abscess predominantly affects individuals in middle and older age groups. This is consistent with previous literature also. In the study by Jha et al (1), the most of the patients of liver were in the age group of 21-40 years (64.55%). In another study by Ghosh et al (2), the mean age of the patients was 41.13 years (range: 19 to 78 years). There was an overwhelming male predominance with 84% of subjects being male and only 16% female. This finding aligns with previous studies that have reported a higher prevalence of liver abscesses in males. (2) Regarding socioeconomic status, 67% of subjects were from the lower socioeconomic group, with the remaining 33% belonging to the middle socioeconomic group. This finding emphasizes the importance of socioeconomic factors in the development of liver abscess. In the study by Jha et al (1), 81.82% of patients belonged to the lower socio-economic status, 13.64% to the middle and the remaining 4.54% to the high socio-economic status. Ghosh et al (2) reported that 67.5% of patients were from lower socioeconomic class.

Among the study population, 5% of subjects were diabetics, 36% hypertensive, and 4% were diagnosed with hypothyroidism. These trends are in line with similar prevalence of these diseases in the general population as well. For instance, a study by Gelsetzer et al (4) found that the prevalence of diabetes in the general population was 7.5% (95% CI, 7.3%-7.7%) and that of hypertension was 25.3% (95% CI, 25.0%-25.6%). According to NFHS 4 data, 11.3% of Indians have hypertension (5) and as many as 10% are diabetics (5).

Abdominal pain or distension (99%) and fever (98%) were the most commonly reported symptoms. The pain was localized in the right hypochondrium by 57% of patients. Nausea and vomiting affected 71% of subjects. Icterus was observed in 39% of subjects, suggesting varying degrees of hepatic dysfunction in them. Other symptoms included dysentery (18%), cough (26%), and breathlessness (8%). The presence of respiratory symptoms like cough and breathlessness could reflect complications such as pleural effusion or diaphragmatic irritation, which are occasionally reported in large or sub-diaphragmatic liver abscesses. These findings align with previous studies as well. For instance, Jha et al (1) in their study observed abdominal pain in 93.63% of patients; fever was observed in 88.18% of patients. Jaundice, weight loss and diarrhea were seen in 22.72%, 42.72% and 21.81% of patients respectively. Cough was also noticed in 11.81% of patients of ALA.

In Laboratory Parameters, Anemia was present in 58% of subjects (mean hemoglobin 12.09 ± 1.85 g/dL). Total leukocyte counts were between 10,000 and 20,000 cells/µL in 57% of subjects and exceeded 20,000 cells/µL in 35%. The mean leukocyte count was 19.77 × 10^3 ± 12.44 cells/µL. Elevated ESR was seen in 75% of subjects (mean 34.13 ± 21.83 mm/hour). Random blood sugar levels were ≥200 mg/dL in 53% of subjects, with a mean of 193.02 ± 66.78

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mg/dL. These findings align with previous studies. For instance, Jha et al (1), found that leukocytosis (>10,000 cells/uL) was seen in 75.45% of patients with ALA, anemia was present in 51.91%, raised AST, ALT and ALP levels were observed in 48.18%, 50% and 62.72%, respectively. Finally, hypoalbuminemia was seen in 41.81% of patients with ALA.

There was a predominance of liver abscesses in the right lobe (69%). This finding is also seen in previous studies. For instance, Jha et al (1) reported in their study that the liver abscess showed right lobe involvement in 80% cases and left lobe involvement in 10% and was bilateral in the remaining 10%. Ghosh et al (2) reported the right lobe involvement in 71% of cases. Left lobe was involved in 17.5% and bilateral involvement was seen in 11.5%. We found a significant association between the duration of hospital stay and outcomes ($p = 0.037$). Patients who achieved complete resolution had a shorter mean hospital stay (6.77 days), which reflects rapid recovery in such cases.

The logistic regression analysis identified serum creatinine, total bilirubin, hypothyroidism, and T2DM as significant predictors of mortality. Elevated serum creatinine ($\beta = 3.008$) and total bilirubin ($\beta = 1.273$) suggest that multi-organ dysfunction, particularly renal and hepatic impairment, contributes significantly to adverse outcomes. The findings are consistent with previous research that highlights organ dysfunction as a marker of severe disease and a predictor of poor prognosis in liver abscess patients. For instance, Chen et al (11) found that gas-forming abscess (p=0.019), multi-drug resistant isolates (p=0.026), anaerobic infection (p=0.045), blood urea nitrogen level >7.86 mmol/l (p=0.004), and APACHE II score > or =15 (p= 0.004) were associated with mortality. In an article by Jindal et al (12), the overall in-hospital mortality was 1.1%. Presence of septic encephalopathy, liver cirrhosis and jaundice were independent predictors of mortality.

Conclusion

This prospective observational study provides important insights into the clinico-etiological profile of patients presenting with liver abscesses. The findings highlight that liver abscesses predominantly affect middle aged males from lower socioeconomic groups, and those with risk factors, such as alcohol abuse. Abdominal pain/distension and fever were the most common presenting complaints, while laboratory investigations revealed anemia, leukocytosis, and elevated liver enzymes, indicating the systemic and hepatic involvement. The study demonstrated that the right lobe of the liver was the most commonly affected site, with the majority of abscesses being liquefied. Although pus cultures were sterile in most cases, Escherichia coli and Klebsiella pneumoniae were the most commonly isolated organisms. The management approach significantly influenced outcomes, with aspiration associated with a shorter hospital stay compared to pigtail insertion. Mortality, though low, was significantly associated with elevated creatinine and bilirubin levels, as well as comorbidities like hypothyroidism and diabetes, emphasizing the need for careful risk stratification.

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