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Management of Liver Abscess Patients in a Tertiary Care Teaching Hospital

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ABSTRACT

The advent of advancements in imaging modalities such as Computed Tomography (CT) scans or Ultrasonography (USG) has significantly influenced the management of liver abscesses, resulting in a notable reduction in morbidity and mortality. Liver abscesses are more prevalent in developing nations, including India. This study aims to assess various treatment approaches, enabling the selection of an appropriate modality based on clinicomicrobiological findings. This prospective study encompassed 78 confirmed cases of liver abscesses, both amoebic and pyogenic, treated at a tertiary care centre. A predefined protocol guided the management of all diagnosed patients, considering parameters such as age, gender, associated conditions and clinical features. Prognosis assessment involved laboratory investigations and radiological findings, facilitating the selection of an appropriate treatment modality. Amoebic liver abscesses were more prevalent than pyogenic ones. Males exhibited a higher incidence of liver abscesses compared to females. The aetiology of liver abscesses showed a strong association with a history of alcohol consumption. Abdominal pain emerged as the predominant symptom in these cases. Conservative management proves effective for minor abscesses. However, for larger abscesses and those situated in the left lobe a combined approach involving medical management and intervention, particularly catheter drainage, yields notably high cure rates. Surgical intervention is reserved for cases presenting complications such as peritonitis. Laparotomy, entamoeba histolytica, percutaneous catheter drainage, percutaneous needle aspiration.

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Key Words
Laparotomy, entamoeba histolytica, percutaneous catheter drainage, percutaneous needle aspiration

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INTRODUCTION

The accumulation of purulent material within the hepatic soft tissue, resulting from microbial, fungal or mixed infections, is referred to as a liver abscess. Despite considerable progress in modern medical practices, untimely intervention for liver abscesses can lead to fatal outcomes, particularly in tropical regions like India. Two primary types of liver abscesses exist amoebic liver abscess caused by Entamoeba histolytica and pyogenic liver abscess, often characterized by polymicrobial infections. While developed countries typically experience a higher incidence of pyogenic liver abscesses, developing and underdeveloped nations like India and Bangladesh are more susceptible to amoebic liver abscesses. Predisposing factors include escalated alcohol consumption, malnutrition, poor personal hygiene, inadequate sanitation and prevalent overcrowding, particularly prevalent in these regions[1-4].

Diagnostic tools such as ultrasound (USG) or computed tomography (CT) play a crucial role in identifying liver abscesses. Irregular margins and a hypoechoic lesion on USG distinguish pyogenic abscesses, with the presence of gas within the abscess cavity and microbubbles or diffusely hyperechoic spots. Treatment for pyogenic liver abscess involves a combination of antibiotic therapies, including metronidazole and cephalosporins, alongside adequate drainage. Surgical approaches, such as laparoscopic, percutaneous or open methods are employed for drainage. Conservative management is suitable for patients with favourable clinical conditions and those with a single lesion or microabscesses of less than 2 cm in diameter. Antibiotics are typically administered for 4-6 weeks. The primary treatment modality involves drainage through percutaneous needle aspiration or percutaneous catheter drainage, emphasizing the importance of “source control” in surgical interventions for pyogenic liver abscesses[4-7].

Rural areas, characterized by limited access to basic amenities like electricity, running water and sewage facilities, prompted this study to analyse the occurrence of liver abscesses based on patient demographics. The study’s objectives include identifying the most effective treatment modalities.

MATERIALS AND METHODS

This prospective clinical investigation was conducted at a tertiary care centre in India. A total of 78 patients were enrolled. The diagnosis of liver abscess relied on a comprehensive assessment encompassing medical history, clinical manifestations and laboratory investigations such as Liver Function Tests (LFT) and International Normalised Ratio (INR). Additionally, imaging studies including chest X-ray, abdominal USG, with or without CT scan of the abdomen, were employed. Serological assessments involved blood samples for the antibody ELISA kit and stool samples for routine microscopy to detect trophozoites and cysts of Entamoeba histolytica, along with culture from the abscess aspirate[8,9].

Patients received medical treatment, with or without one of the following interventions percutaneous needle aspiration, percutaneous catheter drainage or open surgical drainage. Inclusion criteria encompassed patients aged over 18 years with USG or CT findings consistent with liver abscess, while exclusion criteria included individuals with malignant hepatobiliary diseases, liver conditions such as alcoholic hepatitis and viral hepatitis, pregnant women and those with a history of liver transplantation. All patients with liver abscesses received parenteral intravenous (IV) antibiotics before any procedure. Intravenous metronidazole (400-800 mg) every eight hours provided antiamoebic coverage and intravenous ceftriaxone (1 gm) every 12 hrs was administered for five days or alternatively, piperacillin-tazobactam (4.5 gm) every eight hrs. Patients on intravenous metronidazole were transitioned to the oral route (tablet metronidazole 400 mg every eight hrs) upon discharge and continued for a total of 21 days.

Treatment was determined based on the size of the abscess on USG. Abscess cavity <5 cm or volume <100 cc, conservative treatment[10]. Abscess cavity >5 cm but <10 cm or volume >100-300 cc, percutaneous needle aspiration[11]. Abscess cavity >10 cm or volume >300 cc, percutaneous pigtail catheter drainage[11]. Ruptured liver abscess with peritonitis, laparotomy, evacuation, drainage and peritoneal lavage[10].

Conservative management involved administering intravenous metronidazole and intravenous ceftriaxone or intravenous piperacillin-tazobactam if the initial treatment was ineffective. For patients with abscess sizes between 5-10 cm or volumes greater than 100 cc but less than 300 cc, USG-guided percutaneous needle aspiration was performed. In cases with abscess sizes exceeding 10 cm or volumes greater than 300 cc, USG-guided percutaneous catheter drainage was carried out with the placement of a pigtail catheter. Surgical intervention, through midline laparotomy, was undertaken for patients showing signs of ruptured liver abscess and peritonitis, involving exploration, evacuation, thorough peritoneal lavage and drainage of the abscess cavity[10].

Cultures and sensitivity examinations were promptly conducted on specimens obtained during procedures involving pus aspiration or catheter drainage. Serial assessments of Complete Blood Count (CBC) and LFT were performed in case of altered initial reports, continuing until normalization. Serial USG examinations were conducted on days 3-7 and 15, with repeat interventions carried out for persistently

symptomatic patients with increasing abscess size. Discharge occurred upon symptomatic relief and stable hemodynamic conditions. Regardless of the discharge day, patients were recalled for USG reassessment on days 7-15 and 30 from the last intervention.

RESULTS

This study encompassed a cohort of 78 participants, all of whom hailed from the lower middle or lower socio-economic strata, characterized by compromised hygienic conditions. The age spectrum within the study cohort spanned from 18-90 years, with a predominance of individuals falling within the 41-50 age group. The gender distribution indicated a male-to-female ratio of 3.88:1 (refer to Table 1).

Among patients diagnosed with liver abscess a notable 60.26% had a history of alcoholism, whereas 12.82% presented with diabetes mellitus type II and an additional 12.82% were afflicted by tuberculosis. Jaundice manifested in 5.13% of the study participants, with some exhibiting multiple co-morbidities. This study identified pain in the abdomen, particularly in the right upper quadrant, as the predominant symptom, followed by fever and vomiting. Clinical assessment highlighted tenderness, notably in the right hypochondriac region, as a prominent sign, while pyrexia ranked as the second most prevalent observation. Rigidity, indicative of peritonitis secondary to complicated or ruptured liver abscess, emerged as a less frequent manifestation (see Table 2). The definitive indication of amoebic liver abscess was the presence of trophozoites of Entamoeba histolytica in stool specimens. Notably, serum antilectin antibodies were detected in 21.79% of patients diagnosed with liver abscess (refer to Table 3).

In instances of ruptured liver abscess, two fatalities occurred among eleven cases. Treatment duration varied, with subjects harboring abscesses up to 10 cm undergoing a seven-day therapeutic regimen, while those with abscesses exceeding 10 cm opted for percutaneous catheter drainage treatment lasting 15 days (see Table 4). Fatal outcomes were reported solely in subjects with amoebic liver abscess, accounting for two cases. The duration for symptom resolution was comparable between subjects with amoebic and pyogenic liver abscesses ($p>0.05$) (refer to Table 5).

Table 1: Age and Gender distribution of the study participants

Age groups	No	Percentage
18-30 years	12	15.38
31-40 years	13	16.67
41-50 years	30	38.46
51-60 years	3	3.85
≥60 years	20	25.64
Age in years (Mean±SD)	49.67±17.92	
Male	62	79.49
Female	16	20.51

Table 2: Signs and symptoms in study participants

Symptoms	No	Percentage
Pain abdomen	73	93.59
Fever	62	79.49
Nausea	8	10.26
Vomiting	43	55.13
Diarrhea	20	25.64
Anorexia	16	20.51
Weight loss	4	5.13
Breathlessness	8	10.26
Coughing	12	15.38
Signs		
Increased temperature	56	71.79
Local tenderness	57	73.08
Guarding	48	61.54
Rigidity	12	15.38
Hepatomegaly	49	62.82
Pallor	35	44.87
Icterus	20	25.64

Table 3: Laboratory findings in in study population

Parameter	No	Percentage
Anaemia (Haemoglobin <10 g L)	25	32.05
Leucocytosis	57	73.08
Total Serum Bilrubin >1.2 mg dL	17	21.79
Serum Alkaline Phosphatase >140 IU L	62	79.49
INR >1.5	14	17.95
Trophozoites in stool microscopy	23	29.49
ELISA positive	17	21.79

DISCUSSIONS

Liver abscess stands as a prevalent condition frequently encountered in both the Surgery OPD and emergency settings on the outskirts of India. The associated mortality rate for liver abscess is notably high, reaching up to 20%. Importantly, in developing nations, amoebic liver abscess takes precedence. In this study, we observed amoebic liver abscess in 52 cases (66.67%) with the remaining cases being pyogenic and predominantly affecting the right lobe of the liver. In line with the findings of Jha *et al*., out of 125 patients screened, 110 (88%) presented with amoebic liver abscess, and 15 (12%) had pyogenic liver abscess[12]. These results align with prior reports by Sharma *et al*. and Mukhopadhyay *et al*. on amoebic liver abscess[13,14].

Within the present study the majority of subjects fell within the age group of 41-50 years, consistent with the observations of Verma and Arora who noted a peak in the age group of 40-49 years[15]. Male predominance, a global phenomenon, was also evident in this study[2-15]. A noteworthy finding was the history of alcohol intake among 60% of the subjects. Alcohol emerged as a significant predisposing factor in amoebic liver abscess pathogenesis, corroborating the results of Siroliya *et al*., where approximately 68% of subjects with liver abscess had a history of alcoholism[7]. Similar associations were reported by Ramani *et al*. and other researchers. Jha *et al*. Reported that 33.64% of amoebic liver abscess and 60% of pyogenic liver abscess patients were diabetic[12]. In this study, 14.28% of amoebic liver abscess and 11.11% of pyogenic liver abscess cases had diabetes

Table 4: Treatment outcome of different management protocols

	Conservative		Percutaneous needle aspiration		Percutaneous pigtail catheter		Laparotomy drainage		
Post treatment day	n	%	n	%	n	%	n	%	p-value
3	5	6.41	7	8.97	0	0.00	0	0.00	0.025
7	7	8.97	16	20.51	0	0.00	0	0.00	
15	12	15.38	4	5.13	9	11.54	8	10.26	
30	4	5.13	2	2.56	3	3.85	1	1.28	
Mortality	0	0.00	0	0.00	0	0.00	2	2.56	

Table 5: Correlation of resolution of symptoms and type of liver abscess

	Amoebic liver abscess		Pyogenic liver abscess		
Resolution of symptoms post treatment	n	%	n	%	p-value
3 days	9	11.54	2	2.56	0.31
7 days	12	15.38	11	14.10	
15 days	26	33.33	9	11.54	
30 days	5	6.41	4	5.13	
Mortality	3	3.85	0	0.00	

mellitus type II. Among nine ruptured liver abscess cases, death was reported in 2 cases (22.22%). Treatment duration varied based on the size of the liver abscess, with subjects having abscesses ≤10 cm treated for seven days, while those with abscesses >10 cm underwent a 15-day regimen. Statistically significant differences ($p<0.05$) were noted in treatment outcomes based on abscess size, with death exclusively occurring in subjects with ruptured amoebic liver abscesses. The time taken for symptom resolution was comparable between subjects with amoebic and pyogenic liver abscesses ($p>0.05$). Mortality rates reported by Siroliya *et al*. were 8%, with a higher rate in pyogenic liver abscess (15%) compared to amoebic liver abscess (5%)[7]. However, in the present study, no deaths were recorded in pyogenic liver abscess cases. Jha *et al*.[12] reported successful treatment in 103 patients with amoebic liver abscess (93.63%) and mortality in 6.36%. Notably, all patients with pyogenic liver abscess were successfully treated, consistent with the findings of the present study.

Traditionally, open procedures such as laparotomy were the primary approach for liver abscess treatment. However, with advancements in imaging, microbiological investigations and antibiotic therapies, there has been a shift toward conservative and minimally invasive procedures. Ultrasonography (USG)-guided aspiration or pigtail catheter drainage has become the preferred method, resulting in reduced hospital stays compared to Percutaneous Catheter Drainage (PCD) and laparotomy, which should be reserved for cases developing peritonitis.

CONCLUSION

Liver abscess represents a prevalent concern, particularly among individuals in the middle-age demographic, with a higher incidence observed in men. For minor abscesses, conservative management is deemed appropriate. However, for larger abscesses exceeding 300 cc and those situated in the left lobe, a combined approach involving medical management and intervention, particularly catheter drainage (as opposed to needle aspiration) yields notably high cure rates. Surgical intervention is reserved for cases presenting complications such as peritonitis. This nuanced therapeutic strategy aligns with the optimal management of diverse presentations of liver abscess.

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