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Clinical Presentation and Management Protocols in Cases of Liver Abscess in a Peripheral Hospital in North-East India

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ABSTRACT: Objectives: To highlight the clinical profile, aetiology and management approaches in patients with liver abscess. Methods: A prospective observational study was conducted on 60 patients with liver abscess at a peripheral defence hospital in North-East India from January 2017 to October 2020. The clinical presentations, salient investigations and management strategies were recorded. Statistical analysis was done to test association. Results: The mean age of patients was 36.4 years and majority of them were males (94%).Upper abdomen pain was the commonest presenting complaint (98.3%). Alcohol consumption was the commonest risk factor associated (74%). Solitary abscess was seen in 74% and multiple abscess were seen in 26%. Aetiologically 70% were amoebic, 5% were tubercular, 12 % were pyogenic, 3% were fungal and remaining were of mixed aetiology. Abscess in right lobe were predominantly amoebic and those in left were pyogenic. Percutaneous needle aspiration was done in 60%cases, pigtail was placed in 8.3% and conservative management was done in 30% cases. Recurrences were noted in 15% cases in the conservative management group.Conclusion: Amoebic liver abscess involving the right lobe predominantly in young males is the most common presentation. Alcohol consumption followed by poor sanitary conditions and Diabetes were the common predisposing factors. Ultrasonography of the abdomen is a simple, inexpensive and reliable modality for diagnosis. Percutaneous aspiration under ultrasound guidance was the most efficient modality of management in expediting the healing and preventing recurrences.

Key words: Liver abscess, Amoebic aetiology, Ultrasonography, Percutaneous aspiration.

I. INTRODUCTION

Liver abscess (LA) is defined as collection of purulent material in liver parenchyma. It is the commonest infection of the liver which can be due to bacterial, parasitic, fungal, or mixed infection. Though it has a global prevalence it is predominantly seen in developing countries like India where the majority of the population is in the lower socioeconomic strata. LA poses a formidable diagnostic and therapeutic challenge due to its varied presentations. It contributes significantly to morbidity and mortality if left untreated. Amoebic liver abscess is more common in developing countries whereas pyogenic aetiology dominates in the developed world [1].

Amoebiasis is presently the third most common cause of death from parasitic disease [2]. The condition is endemic in tropical countries like India due to poor sanitary condition and overcrowding. Amoebic liver abscess is the most common extraintestinal manifestation of Entamoeba histolytica [3]. Other aetiologies include bacterial, fungal and mixed organisms. The microbiological invasion of the liver is facilitated mainly by the diseases of the biliary tract followed by portal circulation, arterial circulation and rarely by trauma or cryptogenic cause [4]. Among the risk factors poor sanitary conditions, alcohol abuse, overcrowding and immunodeficiency states like Diabetes Mellitus, HIV, malnutrition and steroid abuse were prominent. The common clinical presentation includes right upper quadrant pain abdomen, fever with chills, nausea and vomiting. The most common sign is righthypochondrial tenderness with guarding and hepatomegaly. Ascites, jaundice or pleural effusion were rarely seen.

Ultrasonography is the preferable initial diagnostic test. It is rapid, inexpensive, and is only slightly less sensitive than computed tomography (CT) scanning (75-80% sensitivity vs 88-95% for CT scan). It cannot definitely differentiate between amoebic, pyogenic or malignant lesion. Serology, pus culture and biochemical tests along with clinical and epidemiological correlation help to identify the aetiological agent.

Open surgical drainage was the mainstay for treating LA earlier [1]. However, radiologically

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guided less invasive drainage procedures with intravenous antibiotics cover have evolved as the therapy of choice. These have drastically brought down the duration of hospital stay, reduced morbidity and prevented recurrences compared to conservative approach [5]. The concept behind this study is to determine the epidemiology, clinical profile, aetiopathogenesis and management strategies in cases of LA in a peripheral hospital of North-East India.

II. MATERIALS AND METHODS

It was an observational study conducted by the Department of Internal Medicine at a secondary care Air Force Hospital located in Jorhat, Assam. The study period comprised from January 2017 to September 2020. A total of 60 admitted patients diagnosed as having liver abscess were included in the study after seeking an informed written consent. All the patients with age greater than 18 years with varied presentations of liver abscess confirmed by ultrasonography were included. Patients less than 18 years of age or those with organised abscess were excluded.

A detailed history, clinical findings and laboratory profile of patients were documented on a predesigned proforma. Special emphasis was laid on the details of alcohol consumption in terms of duration, frequency and quantity. All patients were subjected to complete hemogram, coagulation profile, liver function tests and renal function tests. Serology for HIV, Hepatitis B and C viruses and for Entamoeba histolytica was done. Blood and urine cultures were sent. All patients were subjected to chest radiograph. Patients with cough and constitutional features were subjected to Mantoux, sputum for AFB and TB-PCR test to rule out tuberculosis. Computed Tomography was reserved for doubtful diagnosis or in cases of complications of liver abscess. Once the diagnosis was established on ultrasound all the cases of liver abscess were subjected to broad spectrum injectable antibiotics in the form of second generation cephalosporins and metronidazole. Abscess less than 5 cm size were managed conservatively. Patients whose symptoms failed to respond to conservative management even after 48 hours or those with abscess size greater than 5 cm were subjected to invasive drainage procedure after seeking a written informed consent and stabilizing coagulation derangement if any. Invasive procedures under ultrasound guidance were carried out either by percutaneous needle aspiration or by 8F pigtail catheter in the radiology department. Pigtail catheters were placed for large sized abscess (> 10 cm) without septations or in cases of recurrence despiteneedle aspirations. The catheters were removed after a 24-hour period with no aspirate through them. The aspirate was collected in sterile containers and sent to microbiology department for analysing the likely pathogen. The sample was subjected to Gram's stain, ZN stain for AFB and wet mount microscopy to identify trophozoites of Entamoeba histolytica. The aspirate was plated on aerobic, anaerobic and fungal culture media. Treatment was modified once the definitive pathogen was isolated.Open surgical procedure was reserved for patients presenting with burst liver abscessor those with associated surgical abdominal pathology. Patients were closely monitored and ultrasound was repeated every 14-21 days till the abscess resolved or the size was less than 2 cm. Management protocol followed by us has been elucidated in Figure 1.

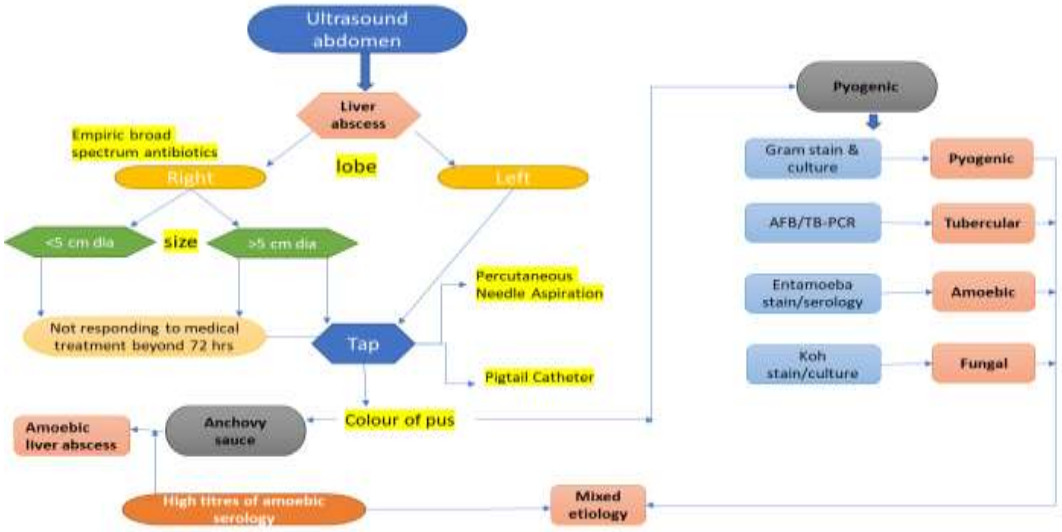

Figure. 1 Management Algorithm

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III. RESULTS

A total of 60 patients of liver abscess were analysed. The mean age of the patients was 36.4 years (range 19.5 – 76Years). Male to female ratio was 11:1.Pain in upper abdomen (98.3%) followed by fever(90%) were the most common symptoms. Anorexia, weight loss, nausea and vomiting, diarrhea and cough were the other symptoms. Right hypochondrial tenderness (100%) followed by raised temperature (93.3%) and hepatomegaly (50%) were the common signs noted. Right sided pleural effusion was seen in 5 % of the patients and one patient presented in a state of septic shock (Table 1). Among the risk factors associated Alcohol (74%) was most common followed by Diabetes Mellitus (16%). Laboratory parameters pertaining to liver functions and inflammatory markers were deranged in most of the patients as elucidated in Table 2.

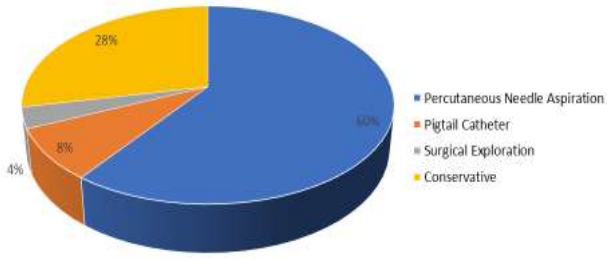
Table 1: Clinical PresentationTable 2: Salient Laboratory Parameters

Symptoms	Percentage (n)	Signs	Percentage
Pain abdomen	98.3 % (59)	Tenderness	100.% (60)
Fever	90.0 % (54)	Temp>38.4C	93.3 % (56)
Anorexia	88.3 % (53)	Hepatomegaly	50.0 % (30)
Nausea/vomiting	56.6 % (34)	Icterus	23.3% (14)
Weight loss	35.0 % (21)	Pallor	40.0% (24)
Diarrhoea	16.6 % (10)	Pleural Effusion	05.0% (3)
Cough	05.0 % (3)	Shock	01.6% (1)

Parameters	Mean values	Patients % (n)
ESR >20 mm Ist hr	52± 28 mm 1st hr	80 % (48)
Bil > 1.2 mg/dL	2.4±1.5 mg/dL	13.3%(8)
SGOT > 50 IU/L	127±76 IU/L	71.1%(43)
SGPT > 50 IU/L	86±32 IU/L	63.3%(38)
Alkaline Phosphatase>150 IU/L	210±75 IU/L	73.3%(44)
Albumin < 3.5 g/dL	3.0±0.64 g/dL	81.4%(49)
INR > 1.0	1.47±0.35	20%(12)
Hb% < 12.0 g/dL	11.2±1.5 g/dL	31.1%(19)
TLC > 11000/µl	17500±830 /µl	75.0%(45)

LA were more commonly seen in the right lobe (76%) and solitary abscess (68%) were seen predominantly on the same side. The average size of the abscesses was 6.8cm. The most common segments involved were segments VI and VII as depicted by ultrasonography. Based on the size and location of the abscess 60% patients were subjected to percutaneous needle aspiration, 8.3% had pigtail drainage, 3.4% had an open surgical exploration and the remaining 28.3% received conservative therapy (Fig. 2)

Fig.2 Modality of Management



Aetiologically 70% were of Amoebic origin, 5% Tubercular, 12% Pyogenic, 3% Fungal and rest were of mixed organisms (Fig.3). Amoebic serology was positive for IgM antibodies with raised titres in 65% patients and most of them were subjected to luminal amoebicidal therapy. Solitary abscesses were mostly of amoebic origin whereas multiple abscesses were predominantly pyogenic. Amoebic and pyogenic abscess predominantly involved the right lobe of the liver whereas tubercular abscess was seen to involve the left lobe more. Pus culture was positive in 21.2% cases and gram-negative flora was mostly isolated (E coli-8.3%, Klebsiella-5%, Actinobacter-3.3%, Pseudomonas-3.3%). The average duration of hospital stay was 21±6 days. 15 % of the cases managed conservatively had recurrence while on follow up. Mortality was 3.3% out of which one case had presented in septic shock with burst liver abscess.

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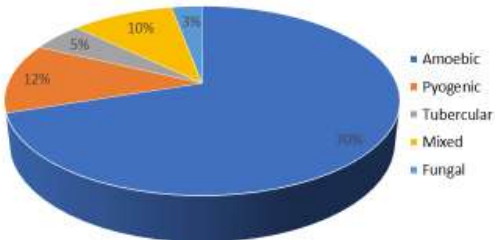
Fig. 3 Aetiological Diagnosis



IV. DISCUSSION

Liver abscesses are the most common type of visceral abscess; in a report of 540 cases of intraabdominal abscesses, pyogenic liver abscesses accounted for 48 percent of visceral abscesses and 13 percent of intraabdominal abscesses [6]. Amoebic liver abscess is the most frequent extraintestinal manifestation of Entamoeba histolytica infection.The annual incidence of liver abscess has been estimated at 2.3 cases per 100,000 population and is higher among men than women (3.3 versus 0.5 per 100,000) [7-9] as reflected in our study. It is observed most frequently in the third to fifth decades of life [10]. The reasons for these observations are not fully understood; suggested mechanisms include hormonal effects and a potential role of alcoholic hepatocellular damage in creating a nidus for portal seeding [11]. Risk factors include chronic alcohol consumption, diabetes, underlying hepatobiliary or pancreatic disease, immunocompromised state and liver transplant [7,8,12,13]. A considerable proportion of pyogenic liver abscesses follow one or more episodes of portal vein pyaemia, usually related to bowel leakage and peritonitis. Another important route is direct spread from biliary infection. Underlying biliary tract disease such as gallstones or malignant obstruction are present in majority of such cases. Occasionally, abscesses arise from surgical or penetrating wounds [12,13].Liver abscesses may also result from hematogenous seeding from the systemic circulation.

Patients with liver abscess usually present with one to two weeks of right upper quadrant pain and fever (38.5 to 39.5ºC). Pain may be referred to the epigastrium, the right chest, or the right shoulder. The pain is usually dull but may be pleuritic or aching. Other symptoms may include cough, sweating, malaise, weight loss, anorexia, and hiccough. Concurrent diarrhoea is present in less than one-third of patients, although some patients report history of dysentery within the previous few months. Jaundice occurs in less than 10 percent of patients [9]. Physical examination reveals hepatomegaly and point tenderness over the liver in approximately 75 percent of cases.

Rupture of liver abscess can occur into any adjoining space or organ; extension into the chest occurs almost four times as often as extension into the peritoneal cavity. In up to 7 percent of cases the abscess ruptures into the peritoneum, causing peritonitis [14]. Hepatic vein and inferior vena cava thrombosis secondary to amoebic liver abscess have also been described [15].

Patients with amoebic liver abscess often have a leucocytosis (>10,000/mm3) without eosinophilia. Liver function testing demonstrates an elevated alkaline phosphatase (80 percent of cases), and hepatic transaminases may also be elevated [16]. Other common nonspecific findings include an abnormal chest radiograph and proteinuria.

Liver abscess, once suspected in the setting of fever and right upper quadrant pain; the diagnosis is generally established by radiographic imaging of the liver. In the setting of suggestive findings on imaging studies, confirmatory microscopy, serologic or antigenic testing should be pursued. Radiographic imaging of the liver can be pursued with ultrasound, computed tomography (CT), or magnetic resonance imaging (MRI). Amoebic liver abscesses are most commonly found in the right lobe; 70 to 80 percent are solitary subcapsular lesions, although multiple lesions can be present [17,18]. The predilection of LA in right lobe is because of streaming effect in portal circulation [19,20].

Ultrasonography is the preferable initial diagnostic test. It is rapid, inexpensive, and is only slightly less sensitive than computed tomography (CT) scanning (75-80% sensitivity vs 88-95% for CT scan).On ultrasound, the abscess appears as a round, well-defined hypoechoic mass [21,22,23]. The mean size of the abscess in our study was 6.8cm (range1.8-15.2cm) and segments VI & VII in the right lobe were commonly involved. On CT scan, it appears as a low-density mass with a peripheral enhancing rim (Fig.4). On MRI, the abscess appears as low signal intensity on T1-weighted images and high signal intensity on T2 weighted images. After healing, the periphery of

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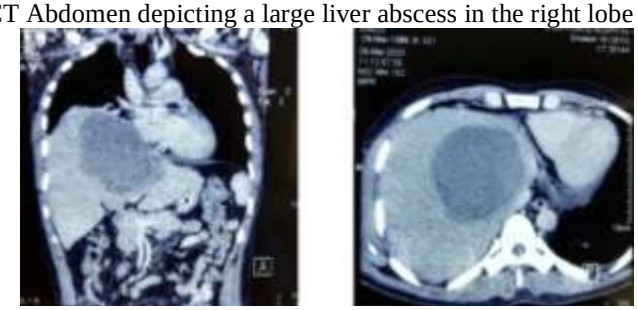
the abscess may calcify as a thin round ring [21,22,23].

On gallium citrate and technetium-labelled sulphur colloid radionuclide liver scans, amoebic abscesses are "cold" (with a bright rim in some cases), whereas pyogenic abscesses are "hot". Radiographic findings must be interpreted in the appropriate clinical context with consideration of the differential diagnoses, including cystic lesions and malignancy.Plain chest or abdominal films may show elevation and limitation of motion of the right diaphragm, basilar atelectasis, and right pleural effusion or gas within the abscess cavity.

Fig.4 CT Abdomen depicting a large liver abscess in the right lobe of liver



All our patients were subjected to empiric broad spectrum antibiotics in the form of third generation cephalosporins with metronidazole. The treatment was later modified based on the culture sensitivity of the aspirate. This non-invasive approach was found to be beneficial if the abscess size was less than 5 cm (28% of our patients).

Consistent with the latest approach of radiologically guided percutaneous needle aspiration with systemic antibiotic coverage being the best modality of therapy[24], 60% of the patients in our study benefitted from this approach. For single abscesses with a diameter ≤5 cm, either percutaneous catheter drainage or needle aspiration is acceptable [25-27]. Drainage catheters should remain in place until drainage is minimal (usually up to seven days). Repeat needle aspiration may be required in up to half of cases if a catheter is not left in situ [25-27].For percutaneous management of single abscesses with diameter >5 cm, catheter drainage is preferred over needle aspiration (Fig.5) [25-27].

Fig 5. Pig-tail catheter drainageFig.6.Anchovy sauce paste from amoebic liver abscess

Only two patients who had presented with burst abscess with peritonitis required surgical exploration. The other indications for surgical drainage are multiple abscesses, loculated abscesses, abscesses with viscous contents obstructing the drainage catheter, underlying disease requiring primary surgical management and inadequate response to percutaneous drainage within seven days.

Liver abscesses are generally polymicrobial in origin.Amoebic liver abscesses contain acellular, proteinaceous debris, and a brown fluid likened to "anchovy paste," consisting predominantly of necrotic hepatocytes (Fig.6). Aspirate cultures are more likely to be positive than blood cultures in pyogenic liver abscess. 70% had anchovy sauce appearance with no growth on culture (Amoebic origin). Pus culture was positive in 21.2% cases and gram-negative flora was mostly isolated with E coli-(8.3%) andKlebsiella-(5%) being the predominant micro-organisms isolated. 5% of the cases were detected to have Acid Fast

Bacilli and were positive for Tuberculosis by RT-PCR. 3% of the cases with immunocompromised status (on chemotherapy) had Fungal aetiology.Amoebic serology was positive for IgM antibodies with raised titres in 65% patients. Other rare modalities of diagnosis are rapid enzyme immunoassay and antigen detection assays.

The average duration of antibiotics course was from 04 to 06 weeks. Liver abscess with positive amoebic serology for IgM antibodies were treated with a course of luminal amebicides(paromomycin 25 to 30 mg/kg per day orally in three divided doses for seven days or diloxanide furoate 500 mg orally three times daily for 10 days) following the therapy for invasive amebiasis to prevent recurrences.

Recurrence of liver abscess was seen in 15% of the cases which were on medical management.Complications like intraperitoneal rupture and peritonitis were seen in two cases which required surgical exploration.

Two cases had died out of which one had a ruptured abscess and was in a state of septic shock. Uncomplicated amoebic liver abscess has a mortality rate of <1 percent if diagnosed and treated early. In one study of 135 patients with amoebic liver abscess in India with overall mortality rate of 17 percent, independent risk factors for increased mortality included bilirubin level >3.5 mg/dL, serum albumin <2.0 g/dL, large volume of the abscess cavity, multiple abscesses, and encephalopathy [28].

V. CONCLUSION

Liver abscess is the most common type of visceral abscess. It is the most common infection of the liver. LA poses a formidable diagnostic and therapeutic challenge due to its varied presentations. Early diagnosis on a background of astute clinical suspicion will have a significant impact on the morbidity and mortality due to this disease. Ultrasonography remains a simple, inexpensive, accurate and rapid non-invasive diagnostic tool. It aids in confirming the location, size and number of the abscess and also provides guidance to the site for percutaneous invasive therapeutic approach. Right lobe of the liver was most commonly involved.LA is polymicrobial in origin and amoebiasis remains the most common aetiology. Alcohol addiction and diabetes mellitus were the most common predisposing risk factors. Percutaneous aspiration under the cover of empiric antibiotics is the best modality of treatment. It significantly reduced the duration of therapy, had a more favourable outcome with minimal complications and also prevented recurrences.

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