CLINICOPATHOLOGICAL STUDY AND MANAGEMENT STRATEGIES OF LIVER ABSCESS IN A TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND

India being a tropical country, liver abscess is a major problem, often with lethal consequences and diagnostic/therapeutic challenges. We have described the clinical profile, microbiological aetiologies, and management outcomes in patients with liver abscess.

MATERIALS AND METHODS

During the period of the month from 01/07/2015 to 30/06/2016, a prospective study was performed involving 50 patients admitted to the in-patient ward of the Department of General Surgery of Gauhati Medical College and Hospital, their diagnosis was made on the basis of clinical features, laboratory investigations and radiological evidence of liver abscess.

RESULTS

Pyogenic liver abscess (PLA) was the most common (64%) type of liver abscess among the study group. The most common aetiology of pyogenic liver abscess was *Escherichia coli*. Ultrasonography (USG) of the abdomen was accurate and cost effective in diagnosis of liver abscesses. Percutaneous catheter drainage (PCD) was the most effective method of treatment. Right lobe was predominantly involved in amoebic and pyogenic abscesses.

CONCLUSION

In developing countries like India, the clinical presentation of liver abscess has not varied over time. At present, rapid diagnosis and image-guided percutaneous drainage offer a better prognosis for liver abscess. Appropriate use of minimally invasive drainage techniques reduces mortality. We suggest early recognition of clinical features and prompt abdominal USG as cost-effective means for treatment initiation and reducing complications.

KEYWORDS

Liver Abscess.

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BACKGROUND

Liver abscess (LA) is defined as collection of purulent material in liver parenchyma which can be due to bacterial, parasitic, fungal, or mixed infection. Liver abscess is a common condition in India. India has 2nd highest incidence of liver abscess in the world.¹ In tropical country like India, both amoebic and pyogenic liver abscess (PLA) continue to be an important cause of morbidity and mortality.¹

Out of total incidence of LA, approximately two-thirds of cases in developing countries are of amoebic (ALA) aetiology and three-fourths of cases in developed countries are pyogenic.¹

PLA result from ascending biliary tract infection, haematogenous spread through portal venous system, septicaemia with involvement of liver by way of hepatic arterial circulation and secondary spread from

intra-peritoneal infection. *Escherichia coli*, *Klebsiella*, and *Streptococcus* are the most common aetiology of PLA.

Although no distinct clinical criteria exist for distinguishing ALA and PLA, the differential diagnosis can be made based on the following criteria- younger age, resident, or recent travel to areas of endemic amoebiasis, diarrhoea, and marked abdominal pain raise clinical suspicion of ALA. The diagnosis is confirmed by ultrasonography (USG), serological tests such as indirect haemagglutination test or ELISA (Enzyme linked immunosorbent assay), reddish brown (Anchovy paste like material) aspirate from the abscess, negative Gram stain, rapid resolution after Metronidazole treatment. The diagnosis of PLA is based on picket fence configuration of temperature chart, nausea, vomiting, anorexia, haematological analysis of leukocytosis, anaemia, and positive blood or aspirate culture for bacterial aetiology. The treatment of liver abscesses has evolved remarkably with minimal invasive drainage taking the centre stage. Radiological imaging has improved diagnostic competence and has altered therapeutic strategy by allowing the possibility of percutaneous approach using needle aspiration or catheter drainage while open surgery should be reserved for management of complicated cases.

In view of these recent developments, a prospective clinical study was undertaken at the Gauhati Medical College and Hospital, Guwahati, under Srimanta Sankaradeva

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University of Health Sciences to analyse in-depth, regarding the different clinical behaviour of liver abscess in relation to age, sex, aetiologies, locations and diagnostic and management strategies of liver abscess.

Aims and Objectives

The objective is to study a minimum of 50 cases of Liver Abscesses and to determine

- Demographic profile (Age, Sex).
- Aetiology.
- Spectrum of Clinical Presentations.
- Evaluate laboratory investigation profile.
- The efficacy of Ultrasonography and other radiological studies in determining the aetiology of liver abscess and in differentiating it from other hepatobiliary conditions which mandate change in the treatment.
- To study the bacteriological characteristics including its antibiotic sensitivity.
- Amoebic Serology Tests Using ELISA.
- To evaluate efficacy, complications, morbidity & mortality, duration of hospital stay associated with Management Strategies followed-
 1. Conservative Therapy (Antibiotics, metronidazole etc.).
 2. Sonographic-guided percutaneous drainage (Percutaneous Aspiration or Percutaneous Pigtail Catheter Drainage) + Antibiotics Coverage.
 3. Open surgical drainage.

MATERIALS AND METHODS

The present study was conducted at Gauhati Medical College and Hospital during the period from 01-07-2015 to 30-06-2016.

Institutional approval of the study protocol was obtained and the patients included in the study were informed about the proposed study and informed consent was obtained from each patient.

Inclusion Criteria

1. All cases of liver abscess diagnosed clinically and ultrasonographically.
2. All cases of bacterial and parasitic liver abscess.
3. All cases in evolving, liquefied & ruptured stage with or without peritonitis.
4. All cases of clinical liver abscess with elevated total leucocyte count (TLC), LFT, and serologically amoebic antigen positive.

Exclusion Criteria

1. Traumatic Liver Abscess.
2. Past history of liver abscess.
3. Associated with malignancy.

The diagnosis of liver abscess was made based on history, clinical features, laboratory investigations, radiology, serological investigations, blood culture, and culture from the aspirate. Patients were treated with medical treatment with or without one of the following-percutaneous needle aspiration, percutaneous catheter drainage or open surgical drainage. Cure was defined as improvement clinically with subsidence of fever, and local signs, symptoms, decrease in

WBC count and follow-up ultrasonography showed reduction in size <3 cm in diameter and no evidence of relapses.

The patients are asked to attend surgical outpatient department after 6 weeks and repeat sonography of abdomen is done to know resolution of the abscess.

All the data obtained from medical records was entered into a proforma questionnaire. At analysis, each item in the questionnaire was analysed separately using the tally method. Statistical analysis was done using mean, averages, Chi-Square and Fisher Exact test to find the significance of proportion wherever applicable using MS Word, Excel and online Graph Pad 3.0 and results compared with the background of recent available literature. Different data presentation methods (Pie charts, bar charts, etc.) were used for all the study parameters and presented in the results.

RESULTS

Of the total 50 patients screened, 32 (64%) had PLA and 15 (36%) had ALA. The major epidemiological findings and clinical features recorded were as follows:

Radiology

a. Amoebic liver abscess- chest X-ray was abnormal in 44.44% patients. Ultrasonogram of the abdomen showed right lobe involvement in 88.88% cases and left lobe involvement in 11.11%. In 77.77% patients, the abscess was single and in 22.22% it was multiple. About 77.77% patients had abscess cavity with size between 5-10 cm, 5.55% with size <5 cm and 16.66% with size >10 cm.

b. Pyogenic-chest X-ray was abnormal in 68.75% patients. Ultrasonogram whole abdomen showed right lobe involvement in 75% cases, left lobe in 12.5% cases, and both lobes in 12.5%. The abscess was single in 53.12%, multiple in 46.87% cases. About 37.5% patients had abscess cavity with size between 5-10 cm, 21.87% with size <5 cm and 40.62% with size >10 cm.

Blood and Culture Aspirate

Microbiological confirmation was done in 26 cases out of 32 cases of PLAs. In 4 cases, size of abscesses was less than 2 cm so it was not done, and in another two cases abscess was very thick and organised so it was not done. Aerobic culture at 37°C for 48 hours revealed growth of *E. coli* in 7 cases (21.87%), it was the most common organism cultured in our study.

Klebsiella Pneumoniae and *Staphylococcus Aureus* were other organism cultured in 4 (12.5%) and 1 (3.12%) case respectively. In 14 (43.75%) cases, culture showed no growth.

Out of 18 cases of ALAs, amoebic serology (IgG antibody) was found to be positive in 16 cases (88.88%) and negative in 2 cases (11.11%).

Treatment Outcome

Of 18 patients with ALA, 11 patients were treated with medical or conservative treatment with a success rate of 91.66%, 4 patients were treated with percutaneous needle aspiration with a success rate of 100%, 3 patients were treated with percutaneous catheter drainage and the success rate of this procedure was 100%. No complications were observed in the present study. None of the patient had to undergo surgical intervention. There was no mortality. Of the 32 patients of PLA, 6 were treated conservatively, 1 was

treated with percutaneous needle aspiration with the success rate of 100% after 3rd attempt, and 24 patients were treated with percutaneous catheter drainage with the success rate of 100%. In one case, laparotomy was done for intraperitoneal rupture of a liver abscess, the patient died on 3rd post-operative day due to multiorgan failure.

DISCUSSION

In our study, the maximum age incidence for ALA was 21-40 years, with male: female ratio of 2:1, [Table 1] which is consistent with previous reports.^[2-3] Among PLA patients, the maximum age incidence was 41-60 years, with male: female ratio of 1.66:1 which is consistent with other reports.^[4-5]

Demographic Parameter	PLA	ALA
No. of Patients (%)	32 (64%)	18 (36%)
Male: Female	20:12 (1.66:1)	12:6 (2:1)
Age Wise Distribution %		
21-40	7 (21.87)	14 (77.77)
41-60	18 (56.25)	1 (5.55)

Table 1. Comparison of Demographic Data between the Two Study Groups

The clinical features observed by us in patients with ALA were abdominal pain (100%), fever (100%), jaundice (22.22%), right upper quadrant tenderness (55.5%), hepatomegaly (77.77%), [Table 2, Figure 1] and are consistent with previous reports.^[6] The main clinical features observed in PLA were abdominal pain (90.62%), fever (93.75%), jaundice (21.87%), right upper quadrant tenderness (40.62%), and hepatomegaly (34.37%). Several reports have suggested fever and abdominal pain^[7,8] being the main presenting feature [Table 2, Figure 1] in PLA.

Symptoms/Signs	PLA (%)	ALA (%)
Abdominal Pain	29 (90.62)	18 (100)
Fever	30 (93.75)	18 (100)
Weight Loss	4 (12.5)	0
Vomiting	5 (15.62)	5 (22.22)
Diarrhoea	0	4 (22.22)
Cough	8 (25)	5 (27.77)
Jaundice	7 (21.87)	4 (22.22)
Right Upper Quadrant, Tenderness	13 (40.62)	10 (55.55)
Hepatomegaly	11 (34.37)	14 (77.77)

Table 2. Comparison of Sign and Symptoms between Two Groups

Figure 1. Comparison of Symptoms between Two Groups

In case of ALA, the laboratory investigations revealed leukocytosis (44.44%), and anaemia (44.44%). The most

marked LFT abnormality was raised alkaline phosphatase (55.55% cases). Abnormal prothrombin time was observed in 33.33% cases. Most marked LFT abnormality in patients with PLA was abnormal alkaline phosphatase (62.5%) and 28.12% patients had abnormal prothrombin time. About 50% patients with ALAs and 75% of PLAs in our study had hypoproteinaemia [Table 3, Figure 2]. In our study, 12.5% patients with PLA and 60% patients were diabetic, [Table 3] which is consistent with previous reports.^[9] The higher incidence of liver abscesses in diabetics may be due to lower immunity in this patient population.

Investigations	PLA (%)	ALA (%)
Leukocytosis (>12,000)	15 (46.87)	8 (44.44)
Hb% <10 g	23 (71.87)	8 (44.44)
Bilirubin >2.4 mg/dL	7 (21.87)	4 (22.22)
ALKP Raised	20 (62.5)	10 (55.55)
SGOT Raised	20 (62.5)	13 (72.22)
SGPT Raised	17 (53.12)	10 (55.55)
PT >16 Sec	9 (28.12)	6 (33.33)
RBS >200 mg/dL	4 (12.5)	0
S Albumin <3 g/dL	24 (75)	9 (50)

Table 3. Comparison of Laboratory Investigations between Two Groups

ALA-Amoebic liver abscess, PLA-Pyogenic liver abscess.

The most important and accurate diagnostic tool in our study was USG. CECT abdomen was performed in some cases where there was diagnostic confusion. In ALAs, right lobe (88.88% patients) was most commonly affected. In 77.77% patients, the abscess was single and in 22.22% it was multiple. In cases of PLA, the right lobe was involved in 75% cases and abscess was single in 53.12% and multiple in 46.87% cases, which are consistent with previous report.^[10,11]

Figure 2. Comparison of Laboratory Investigations between Two Groups

The main aetiology of PLA in our study was *E. coli* (21.87% cases) as opposed to *Klebsiella pneumonia* reported by other studies.^[12]

In the present study out of 32 cases of PLA, 6 cases (15.75%) were managed conservatively, percutaneous catheter drainage (Pig tail catheter) was done in 24 cases (75%). In 1 case (3.12%), percutaneous needle aspiration (PNA) was done and in another 1 case (3.12%) laparotomy was done.

In the present study, conservative group had a success rate of 100%. There was no mortality in this group. Success rate in the group PNA was also 100% after 3rd aspiration with no mortality.

Smith EH et al¹³ (1974) noticed a success rate of 85%, whereas Giorgio et al⁴ (1995) observed the success rate of 98.3% in needle aspiration group. Percutaneous catheter drainage group had success rate of 100% and 0% mortality.

Wong et al¹⁴ (2009) reported success rate of 94% in PCD group.

Out of 32 cases of PLA, 1 death was reported. It was a case of intraperitoneal rupture of a liver abscess, who underwent surgical management. The patient died on 3rd post-operative day due to multiorgan failure.

Out of 18 cases of ALA, 11 cases (61.1%) were managed exclusively by drug therapy, other 3 cases (16.66%) were treated by combination of drugs and percutaneous catheter drainage (PCD). Another 4 cases (22.22%) were treated by percutaneous needle aspiration (PNA). Out of the 12 cases, who were managed conservatively (Drug therapy alone), 11 cases responded very well within 4 to 6 days, with success rate of 91.66%. 4 cases were treated with PNA and 3 cases were drained by pigtail catheter, with the success rate of 100%.

In the present study, needle aspiration after first attempt was successful in 1 case (25%) only. Rest required multiple attempts which were similar to other report.^[15]

None of ALA patients underwent surgical exploration.

CONCLUSION

Liver abscesses are found to be an important and serious problem in surgical practice in this part of the country, as in other part of the world, because of its obscure nature in the terms of clinical presentation and delayed diagnosis in many instances. Delayed diagnosis and treatment can lead to increased mortality, morbidity, and significant economic impact. Pyogenic liver abscess is found to be common in 5th decade of life, whereas amoebic liver abscess is common in 3rd decade and 4th decade of life. Incidences are little higher in males for both types of abscesses. Early diagnosis and treatment is of paramount importance. A high index of clinical suspicion and repeated and diligent search for unusual signs are required for the diagnosis as most of the bacteriological, haematological and biochemical investigations are nonspecific for intra-abdominal abscesses and give only clues to the infectious process and severity of illness. Ultrasonography is the first radiological procedure to be performed and is sufficient. In the both PLAs and ALAs, most of the lesions are solitary and situated in the right lobe of liver.

E. coli is the most common organism isolated from PLAs.

Most of the cases of PLAs are treated with US guided percutaneous catheter drainage. In fact, PCD is a better modality of treatment than needle aspiration as the latter required repeated aspirations and often failed to drain thick viscid pus. Cases with solitary abscess, and smaller than 3 cm can be treated conservatively. Surgical drainage is mostly entertained in cases of failure of PCD and in case laparotomy is required for any other underlying pathologies like intraperitoneal rupture of abscess. In brief, PCD is the treatment of choice for pyogenic liver abscesses.

For amoebic liver abscesses, drug therapy with Metronidazole remains the treatment of choice for abscesses of size less than 10 cm. Percutaneous needle aspiration is required mostly in cases of Metronidazole resistance and to differentiate between amoebic and pyogenic variety. Catheter drainage is required if there is a large abscess and threatening to rupture.

The mortality is correlated to the severity of the underlying cause, a delayed diagnosis, inadequate drainage, and unsuspected foci of infection within the peritoneal cavity or elsewhere.

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