

# Management of Ruptured Liver Abscess: A Study of 54 Cases

Nirmal Desai<sup>1</sup>, Chetan Savani<sup>2</sup>, Dhruvit Soni<sup>3</sup>, Nitin Parmar<sup>4</sup>, Shubham Negi<sup>5</sup>

<sup>1</sup>Second year resident, Department of General Surgery, Civil Hospital, Ahmedabad, India

<sup>2</sup>Third year resident, Department of General Surgery, Civil Hospital, Ahmedabad, India

<sup>3</sup>Third year resident, Department of General Surgery, Civil Hospital, Ahmedabad, India

<sup>4</sup>Associate professor and Head of Unit, Department of General Surgery, Civil Hospital, Ahmedabad, India

<sup>5</sup>Assistant professor, Department of General Surgery, Civil Hospital, Ahmedabad, India

**Abstract:** Liver abscess is a common condition in the tropical countries and associated with significant morbidity and mortality. Two major classifications are pyogenic abscess and amoebic abscess. Rupture of the liver abscess is common and fatal and a cause of fraction of the deaths in tropical countries like India and is an important part of the differential diagnosis of patients with acute abdomen in this region. Improved imaging techniques have aided in the diagnosis of hepatic abscess and have role in treatment also. As previously open surgery was the only choice, with invent of effective antimicrobials, USG, CECT, laparoscopy, mortality associated with the condition has significantly decreased. With this study various pathological and epidemiological factors in patients with rupture liver abscess are analysed for better management and insight into the prognosis for such patients. USG is the investigation of choice as diagnostic as well as therapeutic purpose. Percutaneous needle aspiration is effective in majority. Insertion of pigtail catheter is effective in selected cases. Emergency open surgery is usually the treatment of choice in critically ill patients and with associated intra-abdominal rupture. Laparoscopic drainage is highly effective in management of large and freely ruptured abscess with decreased mortality, post-operative recovery and complications.

**Keywords:** Liver abscess, USG, Drainage, Rupture, Septicemia.

## 1. Introduction

Liver abscess is a common condition in tropical countries and is associated with significant morbidity and mortality. Traditionally, there are two major classifications of hepatic abscess; pyogenic and amoebic. However, with the increase in patients with acquired immunodeficiency syndrome and other types of immunosuppression; the reports of fungal and mycobacterial abscesses is increasing.

There are various complications associated with hepatic abscesses, of which, rupture of the abscess is the most common and fatal. Rupture of abscess is a cause of fraction of the deaths in tropical countries like India and is an important part of the differential diagnosis of patients with acute abdomen in this region.

Improving imaging techniques have aided the clinicians in the diagnosis of hepatic abscesses and have subsequently become important treatment tools, decreasing the number of cases treated with surgical intervention. Furthermore, the demographics of the hepatic abscess have changed.

Previously open surgery was the only choice. With invent of effective antimicrobials, newer methods of radio diagnosis like USG and CECT and interventional radiological techniques like USG, CT guided aspiration, percutaneous catheter insertion, mortality associated with this condition has significantly decreased.

Though open surgery still remains most commonly used management modality, with advent of minimally invasive

surgery, laparoscopic drainage of the ruptured abscess have been described with few complications. Thus, multiple management options are available today and ruptured liver abscess is a preventable and manageable pathology. However, what to do is decided by the clinicians based on the patient's medical status. No specific guidelines are available for choosing the modality of treatment.

Hence, despite changes in classification, diagnosis and treatment, hepatic abscesses still carry significant morbidity and mortality and continue to challenge the clinicians with diagnostic and therapeutic dilemmas. The purpose of this study is to analyse the various pathological and epidemiological factors in patients with ruptured liver abscess for better management and insight into the prognosis for such patients. Also, an attempt has been made to compare the outcome of the various modalities of management in such cases so as that the modality best suited to the pathological state of the patient may be chosen in future.

## 2. Materials and Methods

All patients with ruptured liver abscess admitted in our hospital between July 2011 and December 2013 are included in the study. A retrospective and prospective case analysis of all cases of ultrasonographically confirmed ruptured liver abscess from the medical record library of the institute was carried out.

#### A. Inclusion criteria

- 1) Cases where there was clinical suspicion of ruptured liver abscess followed by USG / CT confirmation of liver abscess with rupture- whether contained or free ruptured were included
- 2) Ruptured abscess irrespective of the aetiology and with or without associated intra-abdominal pathology were included

#### B. Exclusion criteria

- 1) Ultrasonographic / CT evidence positive for presence of liver abscess but no evidence of rupture into the body cavity (pleura, peritoneum, pericardium) or viscus.
- 2) All other Space occupying lesions of the liver

All patients were given intravenous antibiotic (cephalosporins, aminoglycosides, metronidazole) regardless of the mode of management. Amoebic liver abscess was diagnosed on clinical, USG and serological findings. Diagnosis of pyogenic ruptured liver abscess was confirmed microbiologically and /or pathologically. Patients with Hb less than 9 gm/dl were considered anaemic. Pathogenesis, signs and symptoms, lab data, diagnostic tests, treatment, pathology, bacteriology, complication, and outcome were analysed.

The pathogenesis was considered to be extra hepatic biliary disease if obstruction of the CBD/ cholangitis was documented. The portal vein was implicated as the route of bacterial spread in all intra-abdominal infections within the portal system but remote from the liver abscess. The source of liver abscess was considered to be generalized septicaemia with bacterial entry via the hepatic artery, if the primary infection arose outside the portal system. No source of infection could be positively identified in cryptogenic abscess. Based on clinical and USG findings a rough evaluation of whether the rupture was a contained rupture/ free ruptures was deduced.

The various modalities of treatment used were

- 1). Single/repeated percutaneous aspiration under US guidance
- 2). USG/CT guided pigtail catheter insertion Open surgical drainage
- 3). Laparoscopic drainage

Bacterial data was compiled from the initial culture result only. Hospital stay was counted from date of admission to date of discharge. Mortality was defined as death within 30 days of ruptured or before discharge from hospital. The average follow up of the patients was 3 months to 6 months and the data regarding recurrence or resolution of the abscess are in relation to it only.

### 3. Result and Discussion

Total number of patients in the study was 54 out of which 50 were males and 4 were females. Out of the 54 cases, 9 cases were studied retrospectively and other 45 were followed prospectively. The male: female ratio is skewed in cases of liver abscess. Studies report ratios ranging from 1.5:1 to 7:1 for pyogenic abscess (regional variations) and 4:1 for amoebic liver abscess. The ratio in our study for ruptured

liver abscess is further skewed- 12.5:1. This might probably be correlated with increased alcohol consumption and smoking in males which are predisposing factors for liver abscess. Also low haemoglobin and decreased iron stores in Indian women decreases the chances of amoebic liver abscess [1].

Patients were of age ranging from 22 years to 80 years. The mean age was calculated as 48.5 years ranging from 22 to 80 years. This is slightly higher as compared to other studies possibly due to the inclusion of cases of only ruptured liver abscess which is a complication more common in older age group [4,6].

The peak was in 30s for patients with ruptured amoebic abscess and in 50s in patients with ruptured pyogenic liver abscess. Of a total of 54 patients 29 (53.7%) had a history of alcoholism and 25 (46.3%) were smokers. which points towards a predisposition in such patients. Of the 29 alcoholic patients, 10 were amoebic and 19 were pyogenic.

33.3% of the patients had other co-morbidities like, diabetes, hypertension, COPD, Pulmonary Koch's and cirrhosis which are found to be associated with high mortality.

Of a total of 54 cases studied, 16 (29.6%) were amoebic and the rest pyogenic (70.3%). This can be correlated to the endemicity of this region for amoebiasis.

Based on the Aetiology of the abscess, classification showed 16 cases of ALA (29.6%), and 38 cases of pyogenic liver abscess (70.3%). [hepatobiliary tract pathology - 3/38 - 7.9% , haematogenous- 7 / 38- 18.4%, portal pyemia 15/ 38-39.5% - and cryptogenic 13/38-34.2%] . This was typical of an endemic population for amoebiasis in a developing country where awareness of hygiene and sanitation is still improving.

Rupture can occur into any of the body cavities (pleural, peritoneal, pericardial) or into hollow viscus. We report 51 cases of rupture into the peritoneal cavity and 3 cases of rupture into the pleural cavity; rupture into the pericardium or viscus being rare events. As per recent studies, the relative percentages of rupture into peritoneum is 2 – 30 % , rupture into pleura and pulmonary complications occur in 7 – 20 % cases and pericardial rupture occurs in 1.3 to 2 % cases [3].

The most common signs and symptoms of patients with ruptured liver abscess are reported as RHC pain- (95-97%), fever (74%), nausea (50%), diarrhoea (9.5% cases of ala), jaundice (12.9%) and hepatomegaly (26%). Since we only dealt with ruptured liver abscess, acute presentations with diffuse or generalized abdominal pain and signs of toxemia were more frequently observed (31% and 20% resp). Sharma et al, in a study of ALA found hepatomegaly in 84 % of the cases[2].

#### Symptoms of Patients Presenting with Ruptured Liver Abscess in our Study

No.	Examination findings	No. of patients	% in this study
1.	RUQ tenderness	25	46.3%
2.	Gen abdominal tenderness	25	46.3%
3.	Fever	20	37%

  

Type of abscess	Percentage of alcoholics
1)Amoebic	10 / 16 - 62.5%
2)Pyogenic	19 / 38 - 50 %

  

4.	Pedal oedema	8	14.8
5.	Hepatomegaly	5	9.25%
6.	Jaundice	7	12.9%
7.	Pallor	4	7.4%
8.	Toxaemia	11	20.4%

#### Analysis of the Laboratory Data

Average haemoglobin of the patient is 9.8 g/dl.  
 30 patients with haemoglobin less than 10 g/dl.(55.5%)

Total leucocyte ranged from 7600 to 58600  
 Out of the 14 deaths, 10 patients had a total count of greater than 15000

6 out of the 14 patients who died had bilirubin >4.

Average A/G ratio- 0.9  
 Average total protein level-5.5  
 Average albumin level-2.6  
 In patients who died, the average A/G ratio was still less- 0.79

Mean T INR- 1.6

Anaemia was present in 55.5% of our patients and leucocytosis was a general finding-94%. TLC >20,000 was present in 10 out of 14 patients who died and can be correlated to the septicemia in patients with ruptured liver abscess. Hyperbilirubinemia was observed in 26%(14/54) of the patients and which is twice that observed in other studies of liver abscess and was associated with mortality due to acute liver failure and MODS.

The A/G ratio of 99% of the patients in our study was reversed showing a chronic hepatic dysfunction associated with this pathology, the average being 0.9%. those who presented with toxaemia were even less than that- 0.79%. The PTINR levels were not found to be highly altered, the average being 1.6%. Also, the liver enzymes were elevated (3 times) in 30% of the patients.

X ray findings showed elevated right diaphragm (44.4%), pleural effusion (50%), consolidation (13%) and air fluid levels in 15% cases. This is significantly greater as compared to other studies of liver abscess without rupture. Air fluid levels in the X ray could be correlated with free rupture or contained rupture with other bowel pathology. Free gas was observed in one patient who had bowel perforation associated with ruptured liver abscess.

We used ultrasound in guiding diagnostic and therapeutic aspiration. We found that needle aspiration combined with chemotherapy represents a successful therapeutic approach in the treatment of contained rupture. All cases of ruptured liver abscess in this study were preliminarily diagnosed using abdominal ultrasound.

CECT was done in four cases for confirmation of the USG findings and in cases where the patients were managed conservatively with percutaneous aspiration or percutaneous catheter drainage or were treated in plan with laparoscopic drainage of the abscess.

#### Characteristics of the Liver Abscess Found at Radiologic Imaging

##### Characteristics of abscess in the study

1.Rupture into pentoneum - 51 , rupture into pleura – 3
2.Single abscess: multiple abscesses (33:21) was 1.6:1.
3.Abscess in Right lobe-43(79.6%) Left lobe-8(14.8%) Both right and left lobe-3(5.5%)
4.Average size of the ruptured liver abscesses - 374.67 cc.
5.Contained rupture : free rupture - 22:32 ( 0.68:1)

Out of the 54 cases, 32 showed no growth (59.25%). This could be due to the widespread use of early empirical antibiotics and the possibility of patients being treated by antibiotics before presentation to our hospital. Of the 22 cultures, 10 (45.4%) showed e.coli, 18% kliebsiella.13% acinetobacter, proteous and 4% each of staphylococci and pseudomonas.

#### MANAGEMENT MODALITY

Management Modality	Percentage (n=54)
1.PA alone	9 (16.6%)
2.PA followed by PCD	2 (3.7%)
3.PA followed by Open surgery	5 (9.25%)
4.Direct PCD	2 (3.7%)

No. of aspirations-  
 Single- 4 patients (44.4%)  
 Twice – 4 patients (44.4 %)  
 Three times – 3 patients (33.3%)  
 2 out of the 3 patients who needed aspiration thrice eventually needed PCD.

Drainage of the abscess by peritoneal lavage was done in 89.6% cases of free rupture and 40.9% having contained rupture. Of the 35 patients treated by open surgery, 8 (22.85%) patients had associated bowel pathology in the form of caecal inflammation, impending bowel rupture and bowel perforation.

Laparoscopic drainage of ruptured liver abscess has been successfully attempted. Laparoscopic method decreases the size of the incision and avoids the post-operative

complications like burst abdomen commonly associated with open surgery for ruptured liver abscess. It also has the added advantage of being able to give ample peritoneal lavage and insight into other intra-abdominal pathology [5]. The 2 cases managed this way had uneventful recovery.

Open surgical drainage has the highest average hospital stay of 13.8 days due to the various wound related complications associated with it. Burst abdomen is a complication in 15.8% of the cases of open surgical drainage. Peri catheter excoriation was common with abdominal drain and PCD (34%). Pulmonary complications prevail in patients of ruptured liver abscess. Intra-abdominal abscess is the most common abdominal complication.

The average hospital stay in these patients with ruptured liver abscess is 11.1 days. The Average time to resolution of the abscess in the study is 4.64 months.

The mortality in this study is 25.9%. 14 out of 54 patients of ruptured liver abscess died. The mortality being maximum in patients of free rupture treated with emergency open surgical drainage with associated comorbidity. The mortality rate in our study 25.9% is significant, maximum being associated with open drainage.

#### 4. Conclusion

Clinical findings remain the most important factor in deciding the management of the patients with ruptured liver abscess. USG is the investigation of choice as it is cost effective, easily accessible and diagnosis of a liver abscess is possible with reasonable accuracy. It is also possible to aspirate the abscess using USG guidance for diagnostic as well as therapeutic purpose. It is also useful in the follow up of patients and to assess resolution of the pathology. USG findings and clinical findings need to be correlated to differentiate free rupture from contained rupture into subdiaphragmatic space. CT scan is useful for confirmation of the USG findings. It is advised when the exact location, dimensions and extent of the abscess need to be evaluated. It also shows any associated abdominal pathology.

Conservative management of patients with contained rupture is possible with USG guided aspiration of abscess contents from sub diaphragmatic and sub hepatic spaces. However, cases that are kept conservative in spite of USG showing rent need to be carefully selected keeping in mind the various factors that affect morbidity and mortality. Percutaneous needle aspiration is effective in majority. Insertion of pigtail catheter effective in selected cases but needs expertise and post procedure care.

Emergency open surgery is usually the treatment of choice in critically ill patients with generalized septicemia who require urgent intervention and with associated intra-abdominal rupture. It is also considered when the approach to the abscess is difficult laparoscopically. Laparoscopic drainage is highly effective in management of large and freely ruptured abscess with decreased mortality, post-operative recovery and complications. It requires expertise and costly set up but nowadays, it is increasingly used and available.

Laparoscopic approach has thus far been shown as a relatively safe alternative and as experience with the use of laparoscope increase, its application in the management of hepatic abscesses continue to evolve. Free rupture into the peritoneal cavity with generalized peritonitis and hypoalbuminemia were found significantly affect morbidity and prolong hospital stay in patients with ruptured liver abscess. Free rupture in to peritoneum and septicemia were found to significantly affect mortality due to ruptured liver abscess.

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#### Author Profile



Dr. Nirmal L. Desai is Second year resident in Department of General Surgery, Civil Hospital, Ahmedabad, India



Dr. Chetan M. Savani is Third year resident in Department of General Surgery, Civil Hospital, Ahmedabad, India



Dr. Dhruvit K. Soni is Third year resident in Department of General Surgery, Civil Hospital, Ahmedabad, India



Dr. Nitin M. Parmar is working as Associate professor and Head of Unit in Department of General Surgery, Civil Hospital, Ahmedabad, India



Dr. Shubham S. Negi is working as Assistant professor in Department of General Surgery, Civil Hospital, Ahmedabad, India