

Study of Different Modalities of Management in Patients with Liver Abscess in a Tertiary Care Centre

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Abstract

Introduction: Management of liver abscess was exclusively surgical in the past. Modern treatment has shifted toward broad-spectrum antibiotics and imaging-guided percutaneous needle aspiration or percutaneous catheter drainage. This retrospective study has been carried out to evaluate etiology of liver abscess and compare effectiveness of different modalities of treatment.

Methods: This is a retrospective observational study of patients of liver abscess treated during the period of March 1, 2014, to March 1, 2015, at New Civil Hospital, Surat. They were treated by different mode of intervention. All patients underwent clinical follow-up and monitoring during daily rounds until they were discharged from the hospital. Follow-up sonography was performed 24 h after intervention and repeated every 3 days in 1st week, and the size of the abscess was recorded. Criteria for successful treatment were clinical subsidence of infection and sonographic evidence of abscess resolution.

Results: A total of 73 cases of liver abscess were studied at New Civil Hospital, Surat, during the period. It is more commonly seen in adult life with highest incidence in 3rd–5th decade. The most common presenting symptoms are pain and fever. Tenderness is present in most of patients, whereas signs of jaundice, ascites, and shock are rare. Liver abscess is seen frequently in alcoholic patients. Most of the patients with liver abscess are anemic and with elevated total white blood cell count and increased serum alkaline phosphatase. <16% have abnormal chest X-ray with pleural effusion being the most common. Most often right lobe is involved in pyogenic liver abscess. Of 73 cases, 3 cases (4.1%) show at least one of the complications. Rupture of abscess occurred in 2 patients (2.71%) into pleural cavity who were treated by intercostal drainage and in 1 (1.36%) patient into peritoneal cavity treated with exploratory laparotomy with drainage of pyoperitoneum.

Conclusion: Liver abscesses continue to be an important cause of morbidity and mortality in the tropical countries. Percutaneous drainage with systemic antibiotics has become the preferred treatment for the management of pyogenic liver abscesses. In contrast, for amebic abscesses, the primary mode of treatment is medical. Surgical drainage is now used only in cases which fail to respond to percutaneous drainage.

Key words: Amebic liver abscess, Liver abscess, Percutaneous catheter drainage, Pyogenic liver abscess

INTRODUCTION

Liver abscess is a life-threatening disease. The classic presentation of fever, right upper quadrant pain, and

tender hepatomegaly is unusual. The frequency of any particular symptoms varies widely among reports. Management of liver abscess was exclusively surgical in the past. Modern treatment has shifted toward broad-spectrum antibiotics and imaging-guided percutaneous needle aspiration (PNA) or percutaneous catheter drainage (PCD). Percutaneous pigtail catheterization reduces chances of exploration by surgery for liver abscess. Surgical intervention is only indicated for ruptured liver abscess, multiple lesions that cannot be effectively managed percutaneously and abscesses that do not respond to less invasive methods.

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The advantage of ultrasonography (USG) over computed tomography (CT) scan is that sonography is a real-time imaging technique that allows monitoring of the course of the needles and catheters as they traverse tissues. While CT scan-guided aspiration is usually associated with longer procedure times, because it is necessary to scan the region of interest every time for confirmation of catheter.

Continuous catheter drainage is widely accepted and in combination with antibiotics is considered a safe and effective method of management of liver abscess. Some authors prefer repeated needle aspiration, considering it as effective and safe as PCD but easy to perform, less complicated, less risky for post-procedure septicemia, and less expensive. This approach requires careful follow-up and often repeated imaging procedures to monitor response to therapy.

This retrospective study has been carried out to evaluate etiology of liver abscess and compare effectiveness of different modalities of treatment.^[1]

MATERIALS AND METHODS

This is a retrospective observational study of patients of liver abscess treated at New Civil Hospital, Surat.

Inclusion Criteria

Patient admitted to new civil hospital with confirmed diagnosis of liver abscess from March 1, 2014 to March 1, 2015.

Exclusion Criteria

No exclusion criteria.

Subjects

All patients with confirmed diagnoses of liver abscess who were admitted in NCH, Surat, from March 1, 2014, to March 1, 2015, were considered as study participants. A patient was treated by various modes of intervention. Initially, patients were treated with intravenous antibiotic treatment with Inj. Amikacin 10 mg/kg 12 h, Inj. Ceftriaxone 15 mg/kg 12 h, and Inj. Metronidazole 15 mg/kg 8 h.

PNA

Percutaneous treatment was performed within 24 h after admission in case of liquefied abscess. In case of partially liquefied abscess initially 3 days intravenous antibiotics given and reassessed with follow-up USG, if suggesting abscess is liquefied, then percutaneous intervention done otherwise antibiotics continue and again reassessed. The antibiotics therapy was adjusted according to the results of culture and sensitivity test of pus aspirated at the time of the drainage procedure. Patients with negative culture results were continuously treated with a combination of Inj. Ceftriaxone,

Inj. Amikacin, and Inj. Metronidazole. The antibiotic regime was changed for patients with poor treatment response. Intravenous antibiotic therapy was continued for a minimum of 7 days. All percutaneous interventions were performed under USG guidance. A sample of pus was routinely taken and sent for microbiological analysis including microscopy, culture, and antibiotic sensitivity tests.

Continuous Catheter Drainage

In drainage technique, an 8–14 French multiple-side-hole pigtail catheter was introduced into the abscess cavity by Seldinger technique. The procedure was performed with local anesthesia with the patient supine or the left lateral position. Careful localization of the abscess and proper selection of the entry site were required. The optimal route of access traversed the least possible amount of liver tissue and avoided bowel and pleura. Aspiration was then performed with the catheter until no more pus could be removed. After that, irrigation done with normal saline and again pus was aspirated, if no more pus could be drain, then catheter was secured to the skin for continuous external drainage and the patient was sent back to the ward. When catheter output had stopped for 24 h, a follow-up sonography was performed. If an abscess cavity was absent, the catheter was removed. If a residual cavity was present, the catheter was flushed with saline and aspirated until the return was clear. Residual loculations of abscess were treated with catheter repositioning and aspiration. Further, sonography was performed 3 days later and the catheter was removed if there is no residual collection. Otherwise, the catheter was left *in situ* until catheter output had stopped.

Management of Complications

Intercostal drainage (ICD) tube insertion was done under local anesthesia in case of ruptured liver abscess into pleural cavity. Exploratory laparotomy with drainage of pyoperitoneum done in case of rupture liver abscess into peritoneal cavity.

Patient Follow-up and Outcome

All patients underwent clinical follow-up and monitoring during daily rounds until they were discharged from the hospital. Follow-up sonography was performed 24 h after intervention and repeated every 3 days in 1st week and the size of the abscess was recorded. Criteria for successful treatment were clinical subsidence of infection and sonographic evidence of abscess resolution, such as disappearance or marked decrease in the abscess cavity (more than 50% reduction of longest diameter before treatment). Patients discharged with a catheter underwent follow-up sonography until there was no catheter output for 24 h, and then, the catheter was removed. Patient outcomes including length of hospital stay, complications related to the procedure, and treatment failure and death were recorded.

RESULTS

A retrospective study was carried out among 73 confirmed diagnoses of liver abscess cases who were admitted in New Civil Hospital, Surat, enrolled from March 1, 2014 to March 1, 2015. Mean age of study participants was 43.27 ± 13.26 years [Table 1]. Liver abscess is more common in male patients than female, but reasons still unknown. It may be due to addiction of alcohol, tobacco chewing, and smoking in male gender [Table 2]. In this study, all patients are having one of two addiction with 38% patients having both addictions. Liver abscess is seen frequently in alcoholic patients. Association of addiction with liver abscess possibly explains male preponderance of disease. Liver abscess is most common in low socioeconomic status group of patients. 64% patients presented with acute onset of disease. The most common symptoms are pain and fever seen in 64.5% and 64%, respectively. Tenderness is present in most of patients (60%), whereas jaundice, ascites, and shock were present in less number of patients. It is comparable to other studies [Table 3]. Most of the patients with liver abscess are anemic and with elevated total white blood cell count and increased serum alkaline phosphate. <16% have abnormal chest X-ray with pleural effusion being the most common. In this study, the right lobe of liver was affected in 80% of patients. Of 73 cases, we encountered with only complication rupture of liver abscess in 3 cases (4.1%). There were no

Table 1: Age group-wise distribution

Age group (years)	n
<40	29
40–60	37
More than 60	7

Table 2: Sex-wise distribution

Name of study	Male:female ratio (66:07)
This study	9.04:1
Zibari <i>et al.</i> , 1996 ^[9]	1.86:1

Table 3: Signs and symptoms wise distribution

Symptoms/signs	Present series number and percentage of patients (%)	Mohsen <i>et al.</i> , 2002 ^[7] (%)	Ogawa <i>et al.</i> , 1999 ^[6] (%)
Fever	32 (64)	70	86
Pain	35 (64.5)	67	32
Nausea/vomiting	22 (44)	41	-
Anorexia/weight loss	20 (40)	35	-
Diarrhea	14 (28)	23	-
Cough	14 (28)	38	-
Jaundice	10 (20)	14	11
Tenderness	30 (60)	54	-
Hepatomegaly	22 (44)	30	-
Ascites	3 (6)	-	-
Shock	2 (4)	-	-

other complications in any patient. Rupture of abscess occurred in 2 patients (2.71%) into pleural cavity who were treated by ICD drainage and in 1 (1.36%) patient into peritoneal cavity treated with exploratory laparotomy with drainage of pyoperitoneum. In comparison to other study, we encountered this complication in less number of patients [Table 4]. Mean hospital stay was 5.37 days with range of 2–13 days. In the present study, reported 65.5% had been diagnosed as amebic liver abscess and 34.25% had been diagnosed as pyogenic liver abscess. In the present study, out of 48 patients of amebic liver abscess, 7 patients were managed conservatively, 25 patients managed by percutaneous needle drainage (PNA), 15 patients managed by PCD, and 1 patient was managed by exploratory laparotomy. In the present study, out of 25 patients of pyogenic abscess, 1 patient managed conservatively, 20 patients managed by percutaneous needle drainage, and 4 patients managed by PCD [Table 5].

DISCUSSION

Liver abscesses, both amebic and pyogenic, continue to be an important cause of morbidity and mortality in the tropical countries. Patients usually present late when the liver abscess attains a large size. Percutaneous drainage (either needle aspiration or catheter drainage) with systemic antibiotics has become the preferred treatment for the management of liver abscesses. In contrast, for amebic abscesses, the primary mode of treatment is medical; however, as many as 15% of these may be refractory to medical therapy, while 20% may be complicated by secondary bacterial infection. Such amebic abscesses and those involving the left lobe, or those with impending rupture also need to be drained.^[2]

Surgical drainage is now used only in cases which fail to respond to percutaneous drainage (PCD). Although PCD is a preferred method most widely used to drain liver abscess, surgical drainage is now used only in case which fails to respond to percutaneous drainage.

Table 4: Complication wise distribution

Rupture	Number of patients	Present series % of patients	Akoad and Golub, 2006 ^[8] (%)
Pleural (PL)	2	2.72	6
Peritoneal (PT)	1	1.36	4
Total	3	4.1	18

Table 5: Different treatment modalities wise distribution

Type of abscess	Conservative (antibiotics only)	PNA	PCD	Exploratory laparotomy	Laparoscopic drainage
Amebic	07	25	15	1	0
Pyogenic	01	20	04	0	0

PNA: Percutaneous needle aspiration, PCD: Percutaneous catheter drainage

Usually, needle aspiration is preferred for smaller abscesses and catheter drainage is done in larger ones. However, no clear-cut guidelines have been laid. Yu *et al.* included only pyogenic abscesses and showed no significant difference between the two techniques.^[3] Qazi *et al.* found that catheter drainage was better terms of success rate, but they limited the number of aspirations to two which may be a reason for lower success rate of percutaneous aspiration.^[4] We compared these two treatment options, exclusively in liver abscesses. In the present study, out of 48 patients of amebic liver abscess, 7 patients were managed conservatively, 25 patients managed by PNA, 15 patients managed by PCD, and 1 patient was managed by exploratory laparotomy. In the present study, out of 25 patients of pyogenic abscess, 1 patient managed conservatively, 20 patients managed by PNA, and 4 patients managed by PCD.

Few reports suggest that the initial size of the abscess cavity does not affect the final outcome, while Qazi *et al.* believed that large abscesses are more difficult to evacuate completely in a single attempt. This may be the reason, why many centers prefer PNA for abscesses <5 cm, and PCD for larger abscesses. In our study also PNA failed in larger abscess and also in amebic abscess as pus in amebic abscess is thick. Both these techniques have certain disadvantages. Multiple attempts of PNA needed for large abscesses may be uncomfortable and perceived as more traumatic by patient. Furthermore, during the period between two aspirations pus may get reaccumulated. For smaller abscesses, daily production of pus may be small, but a larger abscess cavity may produce larger quantity of pus, which needs to be drained continuously. PCD has this obvious advantage over PNA, which may have accounted for quicker clinical recovery, lesser duration of parenteral antibiotics, and lesser failure rate among patients treated with PCD. On the other hand, placing a catheter needs more expertise followed by nursing care. At 6-month follow-up, complete resolution of abscess cavity on USG occurred in all patients in both groups, while Qazi *et al.* found that the time needed for total resolution is similar

after PCD and PNA. Thus, PCD and PNA are equally effective in the management of large liver abscesses.^[4]

Qazi *et al.* did randomize 50 patients with liver abscess into a needle aspiration group and a catheter drainage group and showed a significantly higher success rate in the catheter drainage group. Most previous reports have been retrospective analysis of data collected over 2–13 years, and the sample sizes have typically ranged from 15 to 115. A sample size of 50 from 2½ years of data collection would seem reasonable. There was no procedure-related complication such as hemorrhage of any degree of severity, or septicemia, in either group of patients. No statistically significant difference was seen in the main procedure outcome measures in either group of patients. Different authors tended to have favored either continuous catheter drainage or intermittent needle aspiration, while others left the choice of drainage method to the radiologists who performed the procedure. Our institution and others have advocated the use of intermittent aspiration in combination with intravenous antibiotics as the first-line treatment for small liver abscesses, and catheter drainage in large liver abscess and catheter drainage in amebic abscess those which are refractory to medical management.^[5,6]

The current study adds further support to this management strategy. There was no statistically significant difference between the two groups. Theoretically speaking, it would, of course, be ideal to recruit a large enough population to detect small differences that may exist between the two techniques. The result of the present study suggests that both techniques are probably equally effective and safe and further implies that it is justifiable to undertake a multicenter study on the subject to provide a definitive answer. The main disadvantage of the needle aspiration technique is that multiple sessions may be required, but even the use of continuous catheter drainage does not guarantee a single session successful outcome. The current study and our previous work have shown no significant increase in morbidity or mortality from the repeated aspiration sessions.

CONCLUSION

Complications are more in amebic abscess as compared to pyogenic liver abscess. Common symptoms of liver abscess are fever and abdominal pain. USG is the mainstay in diagnosing the liver abscess. Antibiotic or amebicidal drugs treatment as a sole modality of treatment can be used for patients who show initial good response and has relatively small size abscesses. Irrespective of the modality of treatment, antibiotic (for pyogenic), or antiamebic (for amebic) drugs are given to all patients in full course. More than two aspirations can be done with good results. Intermittent needle aspiration considered as first-line management of small liver abscess. Others should be treated with percutaneous drainage if abscess is large and liquefied, but single percutaneous aspiration does not always yield good results. Percutaneous pigtail catheter drainage is more effective in large liver abscess. Percutaneous catheter placement is an acceptable modality of treatment in large abscess that demands repeated aspirations. Surgery is extremely useful for complicated cases. Laparoscopic drainage is useful in patients who have concomitant other biliary pathologies.

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