Percutaneous Aspirations of Liver Abscesses: A Study from Kolkata, India

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ABSTRACT

Liver abscess is a common global health dilemma among the lower socio economic people. It can be managed either by medicine, or ultrasound guided needle aspiration or open surgical drainage. The aim of the present study was to evaluate the ultrasound guided percutaneous needle aspiration for cost effective management of liver abscess in Kolkata, India. A total of 97 patients with 122 liver abscesses were treated using ultrasound guided aspiration. Information on socio-demographic, clinical, complications and management of the patients was collected after taking written consent of the patients. Fever and leukocytosis were common in most of them. Out of 97 patients, 42 (43.3%) were treated as day care patients and discharged without any institutionalised treatment. These patients exhibited high rates of recovery. Poor economic status, with poor personal hygiene and a history of alcoholism (80%) was prevalent. Perhaps, alcoholism showed significant co-existence with liver abscesses. The present study evaluated the status of percutaneous needle aspiration in liver abscess as cost effective therapy. Further studies are necessary to draw any conclusion for the efficacious and as safe use of percutaneous needle aspirations on liver abscess as compared to Ultrasound guided drainage.

Keywords: amoebic liver abscess, aspiration, ultrasound guided drainage, pyogenic abscess, leukocytosis

INTRODUCTION

Liver abscess remains an important clinical problem with significant mortality rate in both developing and developed countries, including India.[1] It could result as a complication of various intra-abdominal infections; by hematogenous spread via portal vein from the gastrointestinal tract; or, may develop after traumatic injury to the liver. The two most common varieties of liver abscess are pyogenic and amoebic.[2]Amoebic liver abscess is an important cause of space-occupying lesions of the liver; mainly in developing countries accounted for 3-9% of all cases of amoebiasis.[3] Amoebic liver abscesses are caused by *E. histolytica*. *E. histolytica* exists in 2 forms: the cyst stage, which is the infective form, and the trophozoite stage, which causes the invasive disease. Invasion by *E. histolytica* into mesenteric venules can result in the amoebae entering the portal circulation and travelling to the liver where they typically form large abscesses.[4] Pyogenic abscesses of the liver often occur secondary to infections of the adjacent tissues, biliary- or intestinal tracts, or hematogenous seeding, and are associated with a mortality rate of 20% - 60%, even with appropriate medical-surgical management.[5]Though medical treatment is the primary mode of treatment, as many as 15% of amoebic abscesses and pyogenic abscesses need aspiration or drainage, either under image guidance or by surgery.[2] Percutaneous placement of drainage catheters is reported to be a preferred mode of treatment to percutaneous aspirations.[6-12] The present study evaluated the effectiveness of ultrasound guided aspirations in liver abscesses. A number of study reported about liver abscess aspirations from India and abroad.[6,13-14] However, there was very little information on liver abscess in Kolkata, India. Present study evaluated in depth the types of liver abscess, its clinical presentation along with other important factors, in Kolkata.

MATERIALS AND METHODS

The cross sectional study was conducted in the Department of Radiodiagnosis, Quadra Medical Services Private Limited, Kolkata, India and conducted from January 2010 to December 2011. Ninety seven consecutive patients included in the study with liver abscesses, diagnosed by imaging, were referred to the clinic of Department of Radiodiagnosis, Quadra Medical Services Pvt. Ltd. Kolkata for percutaneous aspiration or drainage. Patients who did not show any clinical improvement or showed signs of deterioration even after twenty four hours of the initiation of medical treatment were considered not to have responded to medical therapy. Indications for percutaneous aspiration in the present study were: (i) poor response to medical treatment (ii) abscesses more than 5 cm in diameter, (iii) uncertain etiology and imminent rupture of the abscesses. If the rim of liver tissue surrounding the

abscess was less than 1 cm, it was considered to be a sign of imminent rupture.

Written informed consent was obtained from all the patients. Before aspiration, the coagulation profile was assessed in the clinic. Patients who had a (Prothrombin time index) PTI of less 70% was not aspirated and therefore not included in the present study. However, two patients were aspirated even though the PTI was less, because the size of the abscess was very large and, therefore, it was unlikely that the PTI would revert back to normal unless they were aspirated. Fresh frozen plasma was arranged in case of any emergency. In this study, 18 G Spinocaine needles were only used in deep seated abscess but preferred size of the needle was 16 G Jelco. The shortest and safest route to the abscess was followed carefully avoiding the (Cardio pulmonary) CP angle. Special care was taken to avoid puncturing any major branch of portal vein or tributary of hepatic vein. The aspiration was done after connecting a three way connector to the needle with a 2 ml syringe. The aspirations were done under aseptic precautions under local anaesthesia, with analgesia and sedation whenever required.

The procedures were performed under real time sonographic guidance using a free hand technique. The first aspirate was sent for microbiological examination. Attempts were made to evacuate the abscess cavity completely. In patients with multiple liver abscesses, the abscesses which were more than 2.5 cm in diameter were subjected to needle aspiration. The patients continued the antimicrobial therapy which they were already receiving.

The patients had a repeat ultrasound done after 1 week to assess the success of the treatment unless they were forced to comeback due to the lack of clinical improvement. Aspiration was considered successful if : a) the patients improved clinically (subsidence of fever and pain), b) follow up imaging showed resolution of abscess (size less than 2.5cm in diameter) and c) no evidence of relapse or recurrence were seen during the follow up. The clinical well being of the patient was also enquired during the second visit. Those who did not turn up for the follow up were questioned about their well being and followed up over telephone whenever possible.

RESULTS

Percutaneous needle aspiration was performed in all the abscesses. The needle length, 8 cms (18G) and 6 cms (16G), was adequate in all but three patients where a longer 16G needle had to be used. In multiple abscesses more than one abscess cavity were aspirated by the same needle if it was technically possible to negotiate the needle in them. Thereby the number of puncture of the liver capsule was reduced.

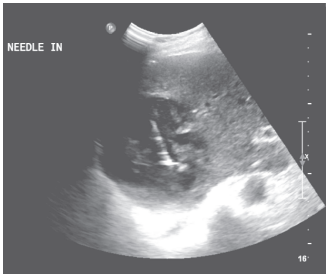

Fig. 1: Liver abscess with a thin rim of liver tissue suggesting impending rupture.

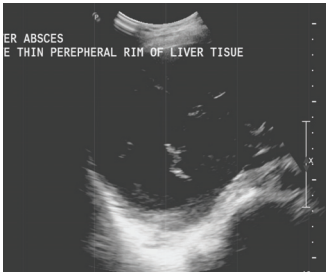

Fig. 2: Liver abscess was aspirated by a 16 G needle in situ.

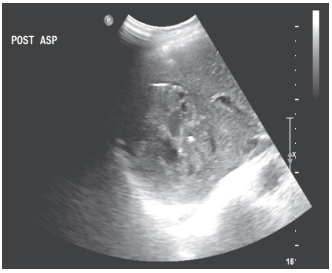

Fig. 3: Post aspiration picture shows complete evacuation of pus from the abscess cavity

Percutaneous aspiration of abscess was successful in 87 patients (89.6%). Immediate relief of pain and tenderness was reported by 55 patients. The immediate relief was more common in patients with larger abscesses where more than 200 ml of pus was aspirated. Repeat aspirations were necessary in 6 patients within a week's time. In 4 patients the pus re-accumulated in the abscess cavity with a recurrence of symptoms. In two patients the initial aspiration was incomplete as the pus was too thick to be aspirated by a 16G needle. In all these patients, the subsequent aspiration yielded pus which was thinner in consistency and could be easily aspirated. In another 8 patients the initial aspiration was not completed. However, a re-aspiration was not necessary in 6 patients who were cured with medication. Two patients did not report for subsequent follow up.

Table 1: Characteristics of the patients and abscess in the study

Characteristics	Number
Total number of subjects/patients	97
Patient age range	15-84 years
Sex	
Male	89 (91%)
Female	8 (9%)
Abscess characteristic	
Number of abscesses	122 (in 97 patients)
Solitary abscesses	85
Multiple abscesses	13 (2-7 abscess)
Location of the abscess	
Right lobe	82 (84.5%)
Left lobe	12 (12.4%)
Both lobes	3 (3.1%)
Range of volume of pus	8-1200 ml
Mean volume of pus	202 ml
Signs of impending Rupture	45
Causes of abscess	
Amoebic	35 (36.1%)
Pyogenic	20 (20.6%)
Indeterminate	42 (43.3%)
Complications following aspiration	
Right sub-phrenic abscess	1
Pneumothorax	1
Haemorrhage after aspiration	13
Transient bacteraemia	6
Excruciating pain	2
Pain & respiratory difficulty	20
Repeat aspiration necessary	6
Number of patients turned up for follow up	12
Clinical characteristic	
Fever > 37.2^{0}C	93 (95.8%)
Biochemical parameter	
Leukocytisis (>10000/mm^3)	85 (87.6%)
No follow up available	12 (12.3%)

As per complication of aspiration, only one patient developed a right subphrenic abscess within 5 days of the aspiration. This was drained using an 8.5F pigtail catheter. The catheter was kept for 11 days. One patient developed pneumothorax and was treated by placing an 8.5F pigtail catheter placed under ultrasound guidance. The catheter was removed after 5 days. The subsequent clinical course was uneventful. Thirteen patients had haemorrhages (13.4%) in the abscess cavity during or immediately after the procedure. One of them also complained of excruciating pain and it was seen that the entire abscess cavity was filled with echogenic material which revealed layering after about an hour. The patient was treated with IV fluid and analgesics. Free frozen plasma was also administered within 3 hours of aspiration. The pain persisted for about 36 hours and had to be managed with intravenous analgesics. The patient also received blood transfusion as the haematocrit was low.

In4 patient (4.1%), the coagulation parameters were altered and aspiration was stopped as the abscesses were large (more than 800 ml). Subsequent to the introduction of the needle, no further needle manipulation was done in them in an attempt to do a complete aspiration, and there was no post procedural haemorrhage in the abscess cavity in this group of patients. Six patients had rigor and fever within one hour of the aspiration due to transient bacteraemia. The vitals were stable in all of them. Intravenous antihistaminics were also administered. They were observed in the clinic for 2-4 hours. The symptoms subsided within 2 hours in all of them and they were subsequently discharged with advice. Four of these patients were day care patients. None of them needed subsequent institutionalised treatment. Twenty patients developed moderate pain and mild respiratory difficulty mostly difficulty in breathing, immediately after the procedure. They were treated at the clinic with oxygen inhalation and IV analgesics. The symptoms subsided within 2 hours. All of them were discharged in stable condition.

Thirty five abscesses (36%) were diagnosed as amoebic liver abscess. All of these were solitary abscesses. Thirty four of them were in the right lobe of liver. Twenty abscesses (20.6%) were pyogenic. *Klebsiella pneumoniae* was isolated in 12 abscesses. *E. coli* was isolated in 6 and *Proteus* in 2 of these patients. 9 of these cases had more than one abscesses in the liver. Culture was done with only one (the first aspirate) sample. The cholangitic abscesses had bilious aspirates. Two of them had history of ERCP (Endoscopic Retrograde Cholanngiopancreatography) within 7 days prior to the aspiration. All the cases had multiple abscesses. 3 yielded *E coli* and 1 yielded *Proteus mirabilis*. In all the community acquired bacterial infections the organisms were sensitive to common antibiotics. 11 of these patients were diabetic.

Table 2: Treatment and treatment outcome of patients

Causes of Abscess	Patients	Cured	Not cured
Amoebic	35	31 (88.5%)	4 (11.5%)
Pyrogenic	20	13 (65%)	7 (35%)
Indeterminate	42	30 (71.4%)	12 (28.6%)

The outcome data showed highly significant in comparison with Pearson's correlation Patient vs. Cured (0.901) and Patient vs. Not cured (0.958) ; Chi-square test represents highly significant results ($p<0.000$) ; Reliability statistics shows Kronbach's alpha <0.920

Most of the patients were from a poor socioeconomic group with very poor personal hygiene. More than 80% of the male patients were alcoholic, mostly consumers of cheap country liquor. In addition, addiction to tobacco in some form was also very common.

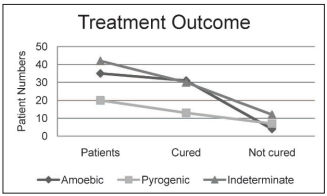

Fig. 4: Effect of percutaneous aspiration of liver abscesses

Fifty five patients (56.7%) were admitted and referred back to the hospitals after aspirations. Forty two patients (43.3%) were treated as day care patients and were released after observing them for 4 hours in the clinic. Antimicrobials were routinely prescribed to them. Twelve out of these 42 patients (43.3%) were lost in follow up. The rest 30 patients (30.9%) responded well to the treatment.

DISCUSSION

Clinical signs and symptoms were fairly reliable and consistent in helping to diagnose liver abscess. However, the clinical features of amoebic and pyogenic abscesses were on the whole remarkably similar and did not help to distinguish between the two.[15] Image guided percutaneous treatment is now the primary modality of treatment of liver abscess and is preferred to surgical drainage. Percutaneous drainage is reported to be the preferred modality to simple aspirations by most of the workers. Most of the reports suggest that catheter drainage is superior to aspiration because the catheter provides continuous drainage; hence the problems of incomplete evacuation and reaccumulation are not associated with catheter drainage. The shortest average hospital stay of patients undergoing catheter drainage is as high as 11 days in a report.[10]Poor personal hygiene and improper catheter care was never a problem with any of the previous studies. Even then secondary bacterial infection was reported in the literature with an indwelling catheter.[6] Results of previous workers revealed the necessity of prospective randomised studies investigating needle aspirations alone to predict the type of abscesses likely to respond to needle aspirations alone. While the diagnosis of liver abscess is reliably made on clinical grounds and easily confirmed by radionuclide scanning, ultrasonography or CT scanning, the diagnosis of abscess type is difficult. This is reflected by the large number of patients placed in the indeterminate group. Clinical signs and symptoms were fairly reliable and consistent in helping to diagnose liver abscess. However, the clinical features of amoebic and pyogenic abscesses were on the whole remarkably similar and did not help to distinguish between the two.

Poor personal hygiene and even poorer catheter care were responsible for the high rate of multi-drug resistant secondary nosocomial bacterial infection. Moreover, the cost of aspiration is much less as compared to catheter drainage. It was difficult to follow-up all the patients due to a number of factors. Even telephonic follow-up was not possible practically. More than 80% of the male patients reported a history of alcoholism (country liquor). Most of them also had poor personal hygiene. A poor and irregular food habit was also very common.

Study showed that empty of pus from almost all the abscesses by 16G needles. Incomplete liquefaction of the liver tissue was the reason for not being able to aspirate in two patients. But even a partial aspiration could relieve the patient of the pain and tenderness. Partial aspiration resulted in reduction of the intracavitary pressure accounting for the relief of symptoms. Further, the bacteria isolated were sensitive to conventional antibiotics. No multi drug resistant bacteria were identified in the pus culture in the study. Pyogenic liver abscesses in the study were more common in diabetics.

In conclusion, it was found that aspiration of liver abscess done in a day care basis very effective as a modality. Moreover, the reduction in expenditure in this mode of treatment perfectly suited the cause of the patients who generally belonged to the lower socioeconomic class and could not afford the costly institutionalised treatment. However, more research work is to be done for exploring this concept.

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