



PRESENTATION OF THE LIVER ABSCESS AND ITS MANAGEMENT THROUGH PERCUTANEOUS CATHETER DRAINAGE: A RETROSPECTIVE STUDY

Surgery

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ABSTRACT

Background: Liver abscess is associated with mortality and morbidity, caused due to pyogenic, amoebic or mixed infection. A combination of antibiotics and Percutaneous Catheter Drainage (PCD) is usually the first-line treatment in liver abscess patients. The study aimed to evaluate the clinical profile and efficacy of PCD in liver abscess. **Material and methods:** The retrospective study was performed on the data of 30 cases of liver abscess who underwent ultrasound guided PCD. Medical reports including detailed history of the patient, laboratory investigations, chest X-ray, ultrasonography, computed tomography findings and clinical profile of the patient were reviewed, and outcomes analysed. The efficacy of PCD was assessed in terms of clinical improvement and duration of hospital stay. **Results:** Abdominal pain (93.33%), fever (96.67%) and anorexia (93.33%) were the commonly observed signs and symptoms in the patients. Increased alkaline phosphate (73.33%), serum bilirubin (66.67%), and leucocytosis (63.33%) were observed in the patients and the prevalence of abscess was more in the right lobe (80%). The success rate of PCD was 100%. Improvement in patients was observed from the 2nd day to 30th days of intervention with 7 to 30 days of hospital stay. **Conclusion:** PCD was effective in all cases of liver abscess without any post-operative complications. PCD along with broad-spectrum antibiotics provides excellent results in liver abscess cases especially those with large volumes of pus.

KEYWORDS

Liver abscess, Percutaneous pigtail catheter, Ultrasonography

INTRODUCTION

Liver abscesses (amoebic and pyogenic) are an important cause for morbidity and mortality in tropical countries including India.¹ It is a suppurative lesion of the liver caused due to invasion and multiplication of microorganisms entering from injured vessels or by way of the biliary duct system, characterized by fever with rigors and pain in the right upper quadrant of the abdomen.^{1,2} Recent advances in interventional radiology, intensive care, progress in antibiotic therapy and wide use of sonography and computed tomography facilitate early diagnosis and treatment of liver abscesses.²

Amoebic liver abscess is primarily treated by medical management; however, 15% of these are refractory to medical therapy.³ Around 20% of amoebic liver abscesses are complicated by the presence of secondary bacterial infection.⁴ In such cases, surgical drainage is the go-to choice of treatment but this is associated with higher risks of morbidity and mortality (10-47%).^{5,6} In recent times, image-guided percutaneous drainage is commonly used in the treatment of liver abscesses with a 70-100% success rate.²

Percutaneous pigtail catheter drainage (PCD) is often effective in the treatment of solitary liver abscesses with volume > 150ml. This is best performed with transabdominal ultrasonography under aseptic conditions. USG guided PCD is advantageous in allowing smaller and multiple lesions to be sampled for culture and sensitivity. This retrospective study is aimed to evaluate the clinical presentation, predisposing factors and outcome of liver abscess patients managed through ultrasound-guided percutaneous catheter drainage.

MATERIAL AND METHODS

Upon obtaining clearance from the institutional ethics committee, the retrospective study was performed at a tertiary care centre in Kolhapur, India from August 2017 to September 2019. The data of 30 patients presenting with liver abscess with more than 150-900 c.c of pus in at least one dimension (Verified sonographically) were included in the study. Written informed consent to use their data was obtained from the subjects. Patients with multi-lobulated thick abscesses, ruptured liver abscess, peritonitis, biliary tract malignancies and coagulopathies were excluded from the study.

Detailed patient information such as age, sex, presenting complaints and illness as well as details of alcohol consumption was recorded. Routine laboratory investigations, clinical examination, reports of chest X-ray, Ultrasound and CT findings and pus culture sensitivity

were noted. Patients with liver abscess with volume ≥ 5 cc are identified by USG or CT out of which patients with volume of pus >150ml were subjected to USG guided PCD after liquefaction of pus. Cases were initially treated with broad-spectrum antibiotics followed by appropriate antibiotics based on the results of culture and sensitivity test.

Under local anesthesia, all patients underwent percutaneous pigtail catheter drainage in either supine or left lateral position. The position facilitating minimal trauma to liver parenchyma was chosen. The abscess cavity was then identified and the depth of abscess from the skin and the exact site was determined. A small incision was made over the marked part of the skin using Seldinger's technique under sonographic guidance. The initial puncture was done with 18 G Needle of 0.038". The straight tip guidewire was inserted through the skin stab and guided into the center of the abscess cavity. The tract was dilated with plastic dilators serially up to 14 Fr size which was then passed over the guidewire and aspiration was performed with the catheter. The catheter was then secured to the skin for continuous external drainage by attaching a collecting bag to the catheter and the patient was sent back to the ward. Most of the pus was drained off actively on the first day. After 48 hours, a follow-up USG abdomen was done. If an abscess cavity was absent, the catheter was removed. If a residual cavity was present, then the catheter was flushed with normal saline and aspirated until the return was clear. USG abdomen was repeated every 3 days until the cavity either disappeared or showed significant reduction along with clinical recovery. The PCD was considered successful when the cavity collapses or was reduced to >20ml with no relapse of the abscess. Signs of clinical relief and duration of hospital stay were noted.

Statistical analysis

The data was collected, compiled and analysed using Microsoft XL. The qualitative variables were expressed in terms of percentage. The quantitative variables were both categorized in terms of percentages or terms of mean & standard deviation. All tables were graphically represented.

RESULTS

The average age of the cases was 39 ± 11.34 years ranging from 18-60 years and most of the patients were male 93.33% (n=28). Abdominal pain (93.33%), fever (96.67%), and anorexia (93.33%) were the commonly observed signs and symptoms in patients followed by dysentery/diarrhea (26.67%), and icterus (43.33%). History of alcohol

consumption was observed in 63.33% of patients. The abnormal laboratory findings of the patients are shown in figure no. 1.

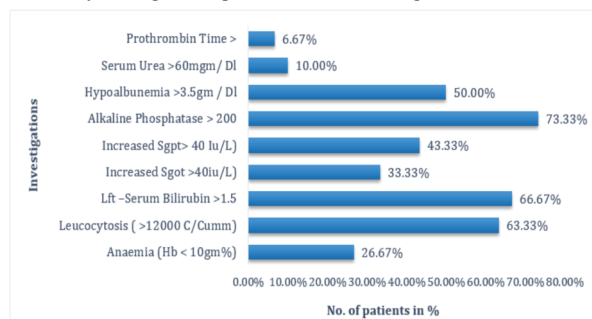


Figure 1. Laboratory investigation of patients

The X-ray findings revealed that 23.33% of patients had pleural effusion. The findings of ultrasound showed the prevalence of abscess was more in the right lobe (80%) followed by left lobe (10%) and both lobes (10%). The success rate of PCD was 100% with no complications. Detailed results of PCD are shown in table 1.

Table 1. Results of PCD

Variables	Value(min-max)
Volume of abscess	150-900 cc
Clinical improvement	2 - 30 days
Success	100%
Hospital stay	7 - 30 days
Time for total resolution	7-30 days
Duration of drainage	1-28 days

**PCD: Percutaneous Catheter Drainage*

In most of the cases, the pus culture showed no growth of bacteria (70%). However, the growth of bacteria such as *E. coli*, *Klebsiella* SPP, *Pseudomonas* SPP, and *S. Aureus* was found in 10%, 10%, 6.7%, and 3.3% of the cultures, respectively.

DISCUSSION

Liver abscess is divided into two types, pyogenic and amoebic. Pyogenic liver abscess is common in tropical regions and caused due to increased biliary interventions, stenting, cholecystitis and cholangitis, etc.² In recent years, combined antibiotic therapy and PCD have become the first-line of treatment in liver abscess cases.⁷ The retrospective study was aimed to evaluate the clinical presentation, predisposing factors and outcome of liver abscess patients treated by ultrasound-guided percutaneous catheter drainage.

As per literature, Liver abscess is common in males, has no age predilection and presents with signs such as pain in the right upper quadrant of the abdomen, fever etc.² In this study the average age of the patients was 39±11.34 years and 93.33% of the patients were males. It was observed that the prevalence of disease increased with age. Fever (96.67%), upper quadrant abdominal pain (93.33%) and anorexia (93.33%) were the commonly observed presenting features whereas diarrhoea (26.67%) and respiratory complaints (43.33%) were the least common. Similar findings were observed in the study of Gupta AK et al, Trivedi M et al. and Manza J et al.^{1,2,8} Liver abscess results from pathogenic organisms such as bacteria, fungus, protozoa and parasites.⁹ Alcohol and its metabolic products such as acetaldehyde is responsible for liver injury which turns into inflammation in alcoholic hepatitis through a classic sterile necrosis response. Also, increased gut permeability and changes in microbiome leads to alcoholic liver disease.¹⁰ Alcohol can induce liver abscess by various mechanisms such as damaging the liver, lowered body resistance, decreased liver function due to poor nutrition status of alcoholics, presence of amoebae in locally prepared liquor under poor aseptic procedure and decreased immune system in chronic alcoholics.¹¹ According to previous Indian studies, 67.5% of cases of liver abscesses occur in lower income groups and 72% were alcoholics.¹² In this study, the prevalence of chronic alcohol consumption was 63.33%, which was lower than the prevalence in the study by Gupta AK et al (84.4%).¹

Following history and physical examination, laboratory and diagnostic evidence are evaluated to determine the reason for patient's complaints and to confirm or rule out liver abscess.¹³ Laboratory tests

such as leucocytosis, increased inflammatory markers, increased alkaline phosphatase and abnormal liver function tests are often noted in these cases.¹⁴ In this study increased alkaline phosphatase, serum bilirubin and leucocytosis were observed in 73.33%, 66.67%, and 63.33% of the patients respectively. These findings were in accordance with the study of Kemparaj T. et al.¹⁵ and Rismiller K et al.¹⁶ In this study abnormal X-ray findings were observed in 23.33% patients whereas, 80% of the abscess was observed in the right lobe of the liver which was similar with the study of Trivedi M. et al.² and Manza J et al.⁸ The higher prevalence of abscess in the right lobe of the liver may be due to the streaming effect in portal circulation thereby receiving most of the blood draining from the right colon.² Amoebic liver abscess can be treated successfully with a short course of antimicrobial therapy and drainage is generally not required. In pyogenic liver abscess along with antibiotic therapy percutaneous aspiration, percutaneous drainage and open surgical drainage is performed to manage it.¹⁷ In this study along with antibiotic therapy pigtail catheter drainage was performed to remove pus. The volume of pus ranged from 150-900 c.c. The microbiological examination of pus showed the presence of *E. coli* and *Klebsiella* in 10% of the patients. Growth of *S. aureus* was seen in 1 (3.3%) patient while *Pseudomonas* species was found in 2 (6.6%) of the patients. In the study by Singh et al, the volume of pus was in the range of 98-770 c.c.¹⁸ In the study of Sreeramulu et al. relatively higher percent (33.3%) of subjects were found with *E. coli* while 11.1% showed the presence of *Klebsiella*.¹⁹ In the study by Kulhari et al, relatively higher percent (18.4%) of subjects have *E.coli*, while 10.5% showed the presence of *Klebsiella* while lower percent was observed for *pseudomonas* (2.1%) and *S.aureus* (1.1%).²⁰

In this study, all the patients were initially treated with broad-spectrum antibiotics followed by appropriate antibiotics based on culture and sensitivity and underwent PCD. Studies have shown PCD to be preferred over aspiration in the management of liver abscess as it provides higher rates of success, reduced time to achieve clinical relief and supports a 50% reduction in abscess cavity size.^{21,22} Sreeramulu et al advocate the use of catheter drainage using pigtail in patients who present with cavities of volume greater than 200 c.c. Percutaneous catheter drainage procedure was done to treat all cases of pyogenic liver abscess while anti-amoebic drugs were used to manage amoebic liver abscess.¹⁹ Singh et al concluded that as compared to percutaneous needle aspiration, percutaneous catheter drainage is better especially in cases with a large abscess.¹⁸ Because of the production of a large quantity of pus in a large liver abscess, percutaneous catheter drainage is preferred over needle aspiration, which may result in lesser failure rate, reduced duration of parenteral antibiotics and accelerated clinical recovery.²² The study showed 100% success in the management of liver abscess. Improvement in patients was observed from the 2nd day to 30th days of intervention and the hospital stay was 7 to 30 days. Similar findings were observed in previous reports.^{8,18,23}

The study showed that PCD was effective in the management of liver abscess in all the patients without any complication. Limitations of the study is the relatively small sample size. A study with a large sample and comparison with other modalities is the further recommendation of the study.

CONCLUSION

Fever and abdominal pain were the common symptoms observed in the study. USG is better in determining liquification of abscess as compared to CT. PCD was effective in the treatment of liver abscess with a 100% success rate. No complications were observed during the procedure. All the patients were initially treated with broad-spectrum antibiotics followed by appropriate antibiotics given based on culture sensitivity. PCD along with broad-spectrum antibiotics is recommended as the treatment of choice in the early management of liver abscess especially with large volumes of pus.

Funding :None

Conflict of interest: None declared

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