

**Original article:**

## **Comparison of USG guided needle aspiration VS tube drainage in management of liver abscesses**

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### **Abstract**

**Background:** Liver abscesses are a common cause of morbidity and mortality in tropical countries including India. They are mainly divided into pyogenic and amoebic types based on causative organism. Treatment for liver abscesses has conventionally been use of antibiotics, followed by surgical drainage in refractory cases. In last decade the used of USG guided needle aspiration and catheter drainage has come forward as a viable alternative for the same.

**Aim:** To compare the effect and usefulness of needle aspiration and catheter drainage in treatment of liver abscesses.

**Materials and Methods:** Fifty- seven patients with liver abscess were treated using either needle aspiration or catheter drainage and results compared and analyzed. All patients received same group of antibiotics.

**Results:** Thirty-one patients were treated using needle aspiration and twenty-five using catheter drainage. Of these three patients who underwent needle aspiration were not adequately treated, whereas all the patients who underwent catheter drainage were successfully treated.

**Conclusion:** Catheter drainage has better success rate as compared to needle aspiration, however acceptability of needle aspiration is better among patients.

**Key Words:** Catheter drainage, liver abscess, needle aspiration.

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### **Introduction**

Liver abscesses are common cause of morbidity and mortality in our country, including both pyogenic and amoebic abscesses. These patients often present late when abscesses become large [1]. Fever, right upper quadrant pain and tender hepatomegaly are the usual presenting symptoms. In past, these were treated only with surgical drainage [2]. Presently liver abscesses are usually treated by antibiotics along with USG- guided

aspiration or percutaneous catheter drainage with surgical drainage as the rarely used modality [3,4].

Preference of choice of treatment among various specialists has been prevalent for a long time. Although continuous catheter drainage with antibiotics is widely considered safe and acceptable some authors prefer repeated needle aspiration due to ease of performing procedure, less complicated, less aggressive, less risky for post procedure

complications and less expensive. Repeated procedures associated with regular follow up is often required for needle aspiration [5,6].

In last few years emphasis has been placed on relative efficacy of both procedures. We hereby also undertook a study to compare the two methods in their efficacy for treatment of various liver abscesses.

#### **Materials and methods**

A 2-year prospective study was undertaken extending from January 2013 to December 2014 and included 56 patients of both sexes. Diagnosis of liver abscess was made using ultrasonography and computed tomography was used in doubtful cases. All patients underwent either USG-guided needle aspiration (NA) or catheter drainage (PCD) depending on size, location, number and general condition of the patient.

Patients with coexistent malignant disease of biliary system, preexisting coagulopathy or presence of complications like perforated abscess with associated peritonitis were excluded.

All patients received oral metronidazole (in a dose of 800mg TID for 10 days) and intravenous (if required) metronidazole or tinidazole antibiotics. Written informed consent was taken from all patients. Coagulopathy profile of every patient was checked before procedure.

#### **Needle Aspiration**

Under all aseptic precautions under USG guidance & local anesthesia using 18G disposable trocar needle and syringe pus was aspirated. In multiloculated lesions needle tip was inserted into various lesions for pus removal. Review ultrasound was done every week and the size of residual lesion was noted.

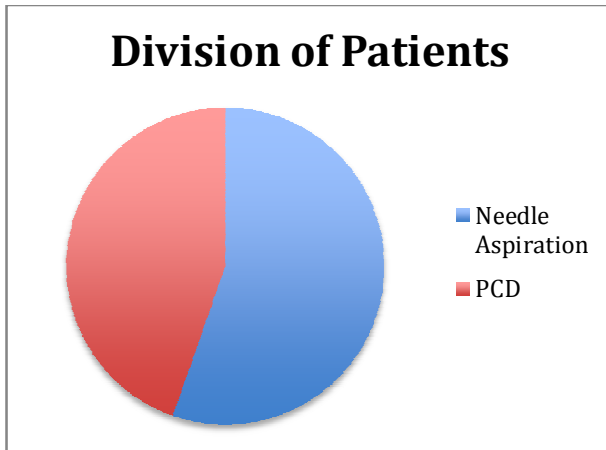
Repeat aspiration was done if size of cavity did not decrease by 50% and a maximum of three attempts were made per patient. If the size of cavity did not reduce by 50% or more then the procedure was deemed to be failure.

#### **Catheter Drainage**

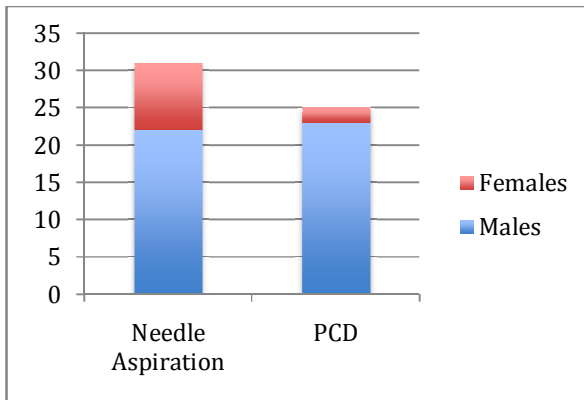
A 12F multiside holed pigtail catheter was introduced into the abscess cavity under USG guidance and local anesthesia under all aseptic precautions. General anesthesia was not used in any patient. Normal saline was used to flush if required. After aspiration of maximum amount of pus possible the catheter was fixed to the skin using continuous sutures. The drainage tube was connected to a bag. Review USG was done 24 hours after procedure. Loculations present in the cavity were managed by catheter manipulation. Catheter was removed if drainage remained minimal even after 3 days or abscess cavity had remained minimal and the patient showed clinical recovery.

#### **Follow UP**

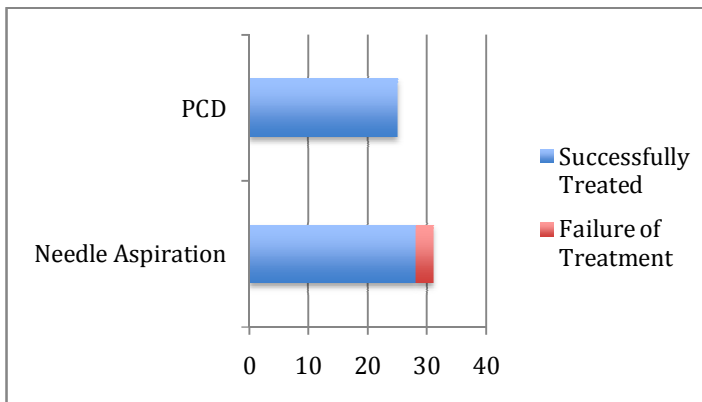
All patients were followed up daily post procedure for clinical improvement and reduction in abscess size. The patients were monitored for various complications like perforation leading to peritonitis, extension into pleural space etc. The data related to patient outcome including length of hospital stay, treatment failure and condition on discharge was recorded. All patients were followed up for a maximum period of 6 months or until US showed **no sign of residual\_cavity (<3cms size)**. Procedure was deemed to be failure if cavity size did not reduce to at least <50% of its original pre-procedure size (in maximum diameter).



**Figure 1:** Division of total number of cases according to procedure chosen.



**Figure 2:** Sex wise distribution of cases according to procedure chosen.



**Figure 3:** Division of total number of cases according to procedure chosen and success of procedure.

## Results

A total of 57 patients were treated using either of the two methods. These comprised of 11 female and 46 male patients. Most of the female patients were treated with needle aspiration, comprising of 9 females. The mean age was 42.1yrs and 33.5 yrs for needle aspiration and catheter drainage groups respectively.

Eleven of the patients showed multiple abscesses, seven of these underwent needle aspiration whereas four of these were treated by percutaneous drainage. Of these one patient had presented with single large abscess but after the first attempt of needle aspiration developed multiple abscesses and was then treated with PCD. He was included in the PCD and multiple abscesses group.

The treatment response of all of the 56 patients was recorded and analyzed. Percutaneous catheter drainage was successful in all of the twenty- five patients (25/25), whereas needle aspiration was successful in only twenty-eight out of thirty- one patients (28/31). Twenty- one (21) of these patients needed only single needle aspiration, five (5) required two needle aspiration attempts and five (5) required three attempts. Three (3) patients who did not show adequate improvement even after three attempts were regarded as failures. Of the untreated patients two had large pre-procedure abscess cavities (>400cc) and one had underlying uncontrolled diabetes mellitus. Overall there was no significant difference in hospital stay of both these group of patients. One of the patients treated with PCD developed subcutaneous hematoma, but was however treated of liver abscesses.

No microbial pathogen was isolated in any patient in either group. All the samples were

sterile and showed no growth. Most of the abscesses were present in right lobe.

## Discussion

Both amoebic and pyogenic liver abscesses are a major cause of morbidity involving gastrointestinal system in tropical countries [2,7]. Even though the mode of treatment for pyogenic abscesses is now percutaneous drainage (either needle aspiration or catheter drainage) supplemented with antibiotics, amoebic liver abscesses are still treated with anti-amoebics only 15% of which don't respond to medical treatment [8]. These amoebic liver abscesses also need to be drained although surgical drainage is reserved for those patients who are not successfully treated by any of these methods [7]. Majority of the patients in our study were males (46/57; >80%). Our studies have found the incidence of liver abscesses more commonly in male population, however exact cause is not known [9,10].

Effectiveness of needle aspiration and catheter drainage has been debated to a large extent by various authors. In one of the first ever studies authors concluded that PCD was more effective than needle aspiration [3]. However another group of authors later concluded that both the methods are equally effective if multiple attempts for needle aspiration are made [4]. Later it has been suggested that needle aspiration should be the first line treatment of choice followed by catheter aspiration in cases whereas desired results are not achieved even after three attempts [2]. In our study we found catheter drainage more successful than needle aspiration, which is in concordance with many other previous studies [2,3,4,9,10]. Even though needle aspiration has some benefits as compared to catheter

drainage, like 1) less invasive and less expensive; 2) avoids problems related to catheter care; and 3) multiple abscess cavities can be aspirated easily in same setting [9]. It has now widely accepted that results are better with needle aspiration when maximum diameter of abscess is < 5cms, and for larger abscesses catheter drainage should be tried [2,9].

Various organisms have been associated with liver abscesses eg. Klebsiella, Staphylococcus aureus etc. along with amoebic organisms (most commonly Escherichia coli) [9,10,11]. In our study we did not find any causative organisms. Some of the previous studies have also demonstrated indeterminate culture reports with main reasons being early administration of antibiotics (prior to sampling). Use of high titers for diagnosis has been suggested to exclude false positive results [9,12].

Reasons for failure of needle aspiration are thick pus, which is difficult to evacuate and rapid accumulation of pus in the abscess

[13]. Despite better results acceptability of PCD in patients is less as compared to needle aspiration because it is quite unpleasant, traumatic to the patient and carries with it some life style modification. Complications of the procedures include hemorrhage, pleural effusion/ empyema, persistent bile drainage, catheter displacement, sepsis etc. These are more commonly seen with PCD than with needle aspiration [2,9,10]. One of our patient also developed subcutaneous hematoma post PCD.

We hereby believe that both the procedures carry their own merits and demerits like better results with catheter drainage and easier acceptability & lesser complications with needle aspiration. The choice of procedure therefore depends primarily on abscess size with abscesses < 5cms in largest diameter to be treated with needle aspiration. Moreover needle aspiration along with antibiotic cover can be taken up as the first line treatment of choice for all abscesses because of better patient acceptability.

## References

1. Sharma MP, Ahuja V. Management of amoebic and pyogenic liver abscess. Indian J Gastroenterol 2001; 20(Suppl1): C33-6.
2. Zerem E, Hadzic A. Sonographically Guided Percutaneous Catheter Drainage Versus Needle Aspiration in the Management of Pyogenic Liver Abscess. AJR 2007; 189: W138-W142.
3. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S. Percutaneous treatment of liver abscesses: needle aspiration versus catheter drainage. Am J Roentgenol 1998; 170: 1035-9.
4. Yu SC, Ho SS, Lau WY et al. Treatment of pyogenic liver abscess: prospective randomized comparison of catheter drainage and needle aspiration. Hepatology 2004; 39: 932-8.
5. Lo RH, Yu SC, Kan PS. Percutaneous needle aspiration in the treatment of hepatic abscess: factors influencing patients outcome. Ann Acad Med Singapore 1998; 27: 173-177
6. Giorgio A, Tarantino L, Mariniello N et al. Pyogenic liver abscesses: 13 years of experience in percutaneous needle aspiration with US guidance. Radiology 1995; 195: 122-124.

7. Singh O, Gupta S, Moses S, Jain DK. Comparative study of catheter drainage and needle aspiration in management of large liver abscesses. *Indian J Gastroenterol* 2009 (May-June); 28(3):88-92.
8. Sherlock S, Dooley Y. *Disease of the liver and biliary system*. 9<sup>th</sup> edition. Oxford: Blackwell, 1993;pp. 471-502.
9. Singh S, Chaudhary P, Saxena N, Khandelwal S, Poddar DD, Biswal UC. Treatment of liver abscess: prospective randomized comparison of catheter drainage and needle aspiration. *Annals of Gastroenterology* 2013; 26: 1-8.
10. Baek SY, Lee MG, Cho KS, Lee SC, Sung KB, Au YH. Therapeutic percutaneous aspiration of hepatic abscesses: effectiveness in 25 patients. *AJR* 1993; 160: 799-802.
11. Khan R, Hamid S, Abid S et al. Predictive factors for early aspiration in liver abscess. *World J Gastroenterol* 2008; 14: 2089-2093.
12. Patterson M, Healy GR, Shabot JM. Serological testing for amoebiasis. *Gastroenterology* 1980; 78: 136-141.
13. Dietrick RB. Experience with liver abscess. *Am J Surg* 1984; 147: 288-291.