



## A COMPARATIVE STUDY TO EVALUATE THE EFFECTIVENESS OF USG GUIDED PERCUTANEOUS PIG TAIL CATHETER DRAINAGE AND PERCUTANEOUS NEEDLE ASPIRATION IN THE MANAGEMENT OF MODERATE TO LARGE SIZE (>8 CM DIAMETER) LIVER ABSCESSSES.

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### ABSTRACT

Liver abscesses are an important cause of morbidity and mortality, in India and other tropical countries. Early diagnosis and treatment has improved patients outcome with the advent of newer modalities in the diagnosis & treatment. Ultrasonographic guidance has revolutionized the percutaneous drainage procedure with high accuracy and limited complications.

This study is aimed to compare percutaneous catheter drainage (PCD) versus percutaneous needle aspiration (PNA) in the treatment of moderate to large size liver abscesses.

**Methodology:** Total of 80 cases of liver abscesses (amoebic 58, pyogenic 22) referred for therapeutic drainage, were randomly selected for percutaneous catheter drainage or percutaneous needle aspiration (40 each). Parenteral antibiotics were given to both groups for at least 10 days. Direct puncture pig tail catheter was used for percutaneous drainage which were inserted in continuous USG guidance. Needle aspiration was done with 16 – 18 G Lumber puncture needle with stylet. PNA repeated every third day and cavity size was monitored. Persistence of cavity of > 50% size was considered failure of treatment.

**Result & Conclusion:** PCD is found more effective than percutaneous needle aspiration in the management of moderate to large size liver abscesses in terms of successful drainage of abscess and recurrence rate on follow up.

**KEYWORDS :** Liver Abscess, drainage, Percutaneous.

### INTRODUCTION:

Liver abscess is an important cause of morbidity and mortality, at least in the tropical countries like India [1]. Liver abscesses are mostly amoebic and pyogenic in origin. Pyogenic liver abscess is more common in western world while amoebic liver abscess is more commonly found in developing countries like India, where more people living under low socio economic conditions. Amoebic liver abscesses are usually solitary large abscesses and pyogenic abscesses are usually multiple and smaller in size. USG remains the main diagnostic modality while contrast CT is 95%-100% sensitive. Diagnosis of pyogenic liver abscess is confirmed usually by aspiration and positive culture while the culture for amoebic liver abscess are usually negative or sterile and confirmation is usually done by serological tests for anti amoebic antibodies.

The liver abscess has been described since the time of Hippocrates (400 BCE) but the first published review about liver abscess was by Bright in 1936. Surgical drainage was the standard of care until the introduction of percutaneous drainage techniques in the mid-1970s; however, despite the more aggressive approach to treatment, the mortality remained at 60-80%. [2] With the development of new radiologic techniques, improvement in microbiologic identification and the advancement of drainage techniques, as well as improved supportive care, have reduced mortality to 5-30%.

Percutaneous needle aspiration and percutaneous catheter drainage of liver abscess are established treatment modalities for liver abscess. The objective of this study is to evaluate the effectiveness of USG guided percutaneous catheter drainage and percutaneous needle aspiration in the management of moderate to large size (>8 cm diameter) liver abscesses.

### MATERIAL AND METHODS:

The study was carried out on 80 patients of moderate size sonographically diagnosed liver abscesses having diameter greater than or equal to 8 cms, which were referred to the Department of Radiodiagnosis for therapeutic management. The study was conducted at Department of Radiology, Index medical college and research centre, Indore (M.P.) from April 2019 to August 2020. The study was approved by the Institutional Ethical committee. Patients were randomized into

two groups according to the drainage procedure, 40 patients in Group A (percutaneous catheter drainage) and 40 patients in Group B (percutaneous needle aspiration). All patients were received adequate doses of parenteral antibiotics for an appropriate period. Each procedure was conducted under local anaesthesia with adequate aseptic precautions.

Patients with grossly deranged INR were excluded.

All drainage procedures were performed by single experienced Radiologist. Written informed consent was obtained from all patients after explaining the therapeutic benefit of procedure and probable complications.

### Patient Selection And Pre-procedural Evaluation:

Pre procedure laboratory investigations included platelet count, prothrombin time, international normalized ratio (INR), and activated partial thromboplastin time. If patient had INR > 1.5, it was corrected to below 1.5 before starting the procedure. Platelet counts <50,000/ $\mu$ L were also corrected before the procedure.

Relative contraindications to percutaneous drainage procedures were included uncooperative patients, malignant disease of biliary origin, smaller lesions close to the diaphragm, and patients with deranged coagulation profile.

Local anaesthesia: 2% Lignocain (Xylocaine 2%, AstraZeneca) was used for local anaesthesia. Full care was taken that the needle tip should not touch the liver surface. Liver surface injury may lead to perihepatic hematoma.

### Percutaneous Needle Aspiration:

Abscess cavity was localized and appropriate path for needle insertion was decided. Local anaesthesia was given at the entry site and a 16 – 18 G disposable trocar needle (Lumber puncture needle) was inserted under direct Ultrasonographic guidance. Manual suction of abscess from the cavity was done through disposable sterile syringe until no pus comes out even after safe manipulation of the needle. Caution was taken not to pierce the adjacent hepatic vessels. After drainage attempt needle was removed and appropriate dressing of needle insertion site was done.

Sonography was performed every third day, and the size of the abscess cavity was recorded. If there was no significant reduction in the abscess cavity on control examination,

aspiration was repeated. Repeated aspiration was attempted for maximum of three times. Failure of treatment was considered if no significant reduction in size of cavity even after third aspiration; such patients were converted to catheter insertion for continuous drainage however such patients were not included in the PCD group.

**Percutaneous Catheter Drainage:**

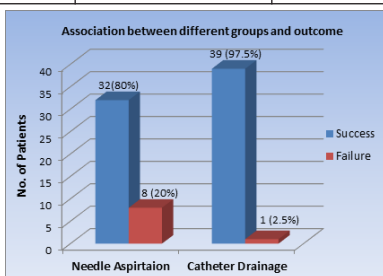
Careful sonographic evaluation and localization of the abscess cavity was done and proper selection of the entry site was made. The optimal route for catheter insertion was chosen which has the least traversing path through the liver tissue. Care was taken to avoid bowel and pleura. Local anesthesia was given and procedures were mostly done in supine or left lateral decubitus position. 10 – 16F direct puncture trocar pig tail catheter with multiple side holes was inserted in abscess cavity under USG guidance. The catheter was sutured to the skin and connected to the sterile collection bag. From the day of procedure, USG was repeated every third day till abscess cavity is fully evacuated and catheter was removed if the collection was nil or less than 15 ml for the last 24 hours. All patients were observed for any postoperative pain, biliary leakage, perihepatic collection, liver hematoma or peritoneal collection by the follow up sonography examinations. Residual cavities of abscesses were managed by catheter repositioning and aspiration or by introduction of a new catheter replacing the blocked catheter.

**OBSERVATION AND RESULTS:**

Characteristics of Liver Abscesses Managed with Percutaneous Catheter Drainage (PCD) and Needle Aspiration (PNA)

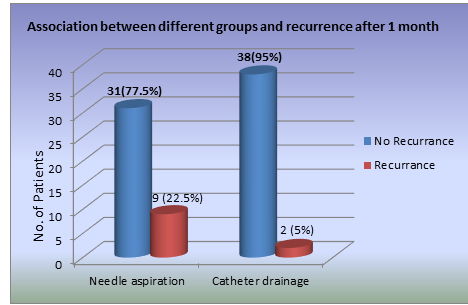
Table 1

Characteristic	Percutaneous Catheter Drainage (n=40)	Percutaneous Needle Aspiration (n=40)
Diameter of abscess (mm)	80 – 140 mm	80 – 120 mm
Volume of pus drained in first treatment (cc)	250 - 600cc	150 – 350 cc
<b>Site of abscess</b>		
Right lobe	36	33
Left Lobe	04	07
<b>No. of abscesses</b>		
Single	34	32
Multiple	06	08
<b>Cause of abscess</b>		
Amoebic	29	27
Pyogenic	11	13
<b>Success Vs Failure</b>		
Success	39	32
Failure	01	08
<b>Recurrence in one month follow up</b>		
No Recurrence	38	31
Recurrence	02	09
<b>Gender</b>		
Male	33	29
Female	07	11



Graph 1

- Percutaneous catheter drainage has very high success rate with higher chances of failure in percutaneous needle aspiration.



Graph 2

- Percutaneous catheter drainage shows near complete drainage of abscess cavity with very minimal recurrence rate and significantly higher rate of recurrence or incomplete drainage in percutaneous needle aspiration group.



Picture 1

- Image showing large hypoechoic abscess cavity in right lobe of liver with large necrotic component.

**DISCUSSION:**

Liver abscess is a common & serious cause of morbidity and mortality, especially among the low socioeconomic population in India and needs adequate medical attention. [3] Therapeutic drainage of liver abscesses of various origins includes percutaneous needle aspiration, percutaneous catheter drainage or open surgical drainage. Nowadays open surgical drainage is almost completely replaced by the percutaneous drainage whether needle aspiration or catheter drainage [4]. The trend in management of liver abscesses has been moving strongly toward nonsurgical methods, whether to perform percutaneous catheter drainage or intermittent needle aspiration remains controversial. Percutaneous drainage of liver abscess by USG guidance is a relatively safe procedure in experienced hands with minimal complications such as hollow viscous perforation, bleeding, septicemia [5]. Surgical drainage is now used only in cases which fail to respond to percutaneous drainage.

Rajak et al [6] compared percutaneous needle aspiration and PCD in a randomized study involving 50 patients with liver abscess and concluded that PCD was more effective than percutaneous needle aspiration. In that study, lack of response to a second attempt at percutaneous needle aspiration was considered failure of treatment.

Zerem and Hadzic [7] included 60 patients of liver abscess, and found percutaneous catheter drainage to be more efficacious. In our study we have also found that percutaneous catheter drainage has 97.5% success rate in comparison to 80 % success rate with percutaneous needle aspiration. Complications of catheter insertion included pain, blockage

of the catheter, and displacement of the catheter tip.

Yu et al [8] performed a randomized trial involving 64 patients with pyogenic liver abscess. Percutaneous needle aspiration was repeated if there was lack of clinical improvement or lack of expected reduction of abscess size. They concluded that percutaneous needle aspiration was probably as effective as continuous PCD. They recommended percutaneous needle aspiration as a first-line approach because of simplicity of procedure, patient comfort, and cost effectiveness and they suggested a multicenter study to provide a definitive answer.

Zerem et al [7] considered a third unsuccessful attempt at percutaneous needle aspiration failure of treatment.

Rendon Unceta P et al had reserved the use of catheters for cases of rapid reaccumulation of exudate and for those without general improvement in the patient's condition [9]. Akinci D et al preferred continuous catheter drainage as a reliable and effective approach to the management of liver abscess [10].

Our study also reveals that percutaneous catheter drainage is better than percutaneous needle aspiration for moderate to large size abscesses with 97.5% success rate in percutaneous catheter drainage group as compared to 80% in percutaneous needle aspiration group.

#### CONCLUSION:

Our study concludes that continuous PCD is more efficient than intermittent percutaneous needle aspiration. USG guided pigtail catheter placement for drainage of liver abscess is a minimally invasive procedure which is a relatively easy and safe, cheaper procedure. Patients treated with ultrasound guided percutaneous catheter drainage improved rapidly than those treated with needle aspiration. Abscess cavity resolves better in case of catheter drainage than needle aspiration. Intermittent percutaneous needle aspiration is a valid alternative for relatively smaller size abscesses and percutaneous catheter drainage is more efficient for multiloculated liver abscesses. Our study also verifies that the recurrence rate is considerably higher in percutaneous needle aspiration.

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