



## Comparison between Percutaneous Needle Aspiration vs Pigtail Catheter in Liver Abscess Drainage: A Prospective Study

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### Abstract

**Background:** Liver abscess is one of the most common condition associated with right upper abdominal Pain and fever. The introduction of Ultrasound guided percutaneous interventions have led to a reduction in morbidity and mortality compared to open surgery. In this study we compared the two most common percutaneous interventions i.e., between percutaneous needle aspiration (PNA) and pigtail catheter drainage (PCD) in outcomes.

**Methods:** A study was conducted in 60 patients admitted to KIMS hospital, Bengaluru between August 2017-December 2018.patients were divided into two randomised groups 1) PNA and 2) PCD. All interventions were performed under ultrasound guidance.

The success rate was measured in terms of clinical improvement, reduction in abscess cavity and need for redo-procedure.

**Results:** The success rate is higher with the pigtail catheter than compared to the percutaneous needle aspiration in terms of clinical Improvement and reduction in abscess cavity and need for redo-procedure.

**Conclusion:** From the study we can conclude that pigtail catheter is better modality of treatment for partially liquefied abscess or full liquified abscess when compared to percutaneous needle aspiration.

**Keywords:** PNA=Percutaneous Needle Aspiration, PCD=Pigtail Catheter Drainage.

### Introduction

Liver abscess is one of the most common cause of right upper quadrant pain and hepatomegaly. Liver abscess is of infective pathology may or may not be associated with jaundice. Liver abscess is broadly classified into pyogenic and amoebic according to infective organism. The patients may present with nausea, malaise and vomiting. The patients may present with peritonitis if there is

rupture of cysts. The investigation required in establishing the diagnosis is radiographic imaging. Chest X-ray may be helpful if there is gross hepatomegaly pushing the diaphragm up. USG and CT imaging being the main stay of investigation in liver abscess. USG demonstrates the round or oval shaped lesion which is less echogenic from the surrounding area. sensitivity of CT being the higher than the USG in diagnosing liver abscess

even the micro abscesses. Modern treatment has shifted the treatment of liver abscess toward IV broad-spectrum antibiotics and imaging-guided percutaneous needle aspiration or percutaneous catheter drainage (PCD).<sup>1,2</sup>

### Aim of the Study

The aim of the study is to compare the effectiveness of different Ultrasound guided interventions for liver abscess drainage i.e between percutaneous needle aspiration and pigtail catheter drainage.

### Method of Study

The study included 60 subjects who are prospectively randomised, conducted in Kempegowda Institute of Medical Sciences, Bengaluru over a period of 17 months I.e from (August 2017- December 2018).

### Inclusion Criteria

All the patients with liver abscess >100cc in volume, fully liquified on USG irrespective of age, sex, abnormality in LFT, who got admitted during the period August 2017- December 2018 in KIMS hospital, Bengaluru.

### Exclusion Criteria

- The patients with abnormal INR of >1.5.
- The abscess with partially liquified.
- The abscesses which already got ruptured at the time of admission and showing the features of peritonitis.

The subjects who are engaged in liver abscess drainage are given pre-procedure instructions regarding the procedure and associated complications and sent for routine blood investigations, LFT, coagulation profile.

The materials used for the procedures are mentioned as follows:

1. USG unit with transducer probe range from 2.5 to 3.75 MHZ.
2. 16G spinal needle.
3. Pigtail catheter of size 7f.

4. 15No. Blade with B.P handle
5. Local Anesthetic (2% lignocaine).
6. Mersilk no.1.
7. Uroset bag.
8. Liver abscess aspiration set.

Liver abscess aspiration set included two pus collection bottles, hole towel, sponge holding forceps, straight and curved artery forceps, sterile gauze pieces, small cup.

### Procedure

The patient is positioned according to the site of abscess. The part of abdomen and chest is painted using Betadine and then draped. Transducer probe is used to locate the abscess cavity and marked the site over skin surface. Local anaesthesia was given at the site. The patient is asked to hold his breath and 16G spinal needle is introduced at an angle to probe and abscess cavity is entered. Presence of needle tip is confirmed by giving away and by scan. Syringe is applied and aspirated. Pus is sent for culture and sensitivity. Similar procedure is done for pigtail catheter insertion with securing the tube with mersilk 1-0 and connected to uro-set bag.

### Post Procedure Instructions

The patient is advised for continuation of same antibiotics till the pus culture and sensitivity results are available.<sup>4,5</sup> The patient is watched for post procedure anaphylactic reactions and analgesics were prescribed.

Antibiotics adjustment was done immediately when the sensitivity test was available.<sup>6</sup> Patients with negative culture results were continuously treated with same combination.<sup>7</sup>

### Results

The study was conducted on 60 patients after taking consent divided into two groups of 30 each needle aspiration group and pigtail catheter group. Interventions were done under strict aseptic precautions.

Statistical difference found in different age, sex, religion, etc are mentioned below.

Most common age group seen is between 30-70 years.

Most common occurrence of liver abscess is seen in males 54(90%) than in females 6(10%).

Most common symptom seen in both the group is Right upper Quadrant pain 50cases (83.33%) than fever 10 cases (16.66%).

Most common lobe of liver involved in both the groups was Right 42cases (70%) than in Left I.e.,18 cases(30%).

Most common cause for liver abscess including both the groups is Amoebic 36 cases (60%) than in Pyogenic 24 cases (40%).

Solitary abscess 44 cases (73.4%) more common than multiple I.e., 16 cases (26.6%) (p value 0.147).

Volume of pus drained in first sitting was significantly more in catheter group(210ml) than in needle aspiration group(120ml).

More common organism seen is E.coli > S.aureus > proteus > klebsiella.

Mean duration of hospital stay was more in catheter group (8days) than in needle aspiration (5days) (p value 0.001).

### Discussion

As per Mukhopadhyaya and Balaji et. al. liver abscess is very common clinical problem in India, which if not taken seriously carries high mortality.<sup>8,9</sup> First review of liver abscess was done by bright 1936.

Berger and Osborne reported improvement after needle aspiration in 15 patients only two require more than two aspirations.<sup>10</sup>

In our study most, common complaint was found to be right upper quadrant pain I.e., 93.33% (28) in catheter group, 73.33% (22) in aspiration group.

**Table1:** Comparative finding of most common symptom among different studies are as below.

Study	m.c symptom	%
Rajak's et al (1998)	Right hypochondrial pain	96%
Simon Yu's et al (2003)	Fever	83%
Zarem and Hadzek et al (2006)	Right hypochondrial pain	93.22%
Our study	Right hypochondrial pain	83.3%

There are three types of liver abscesses namely amoebic, pyogenic and fungal.<sup>11</sup> In our study there was no case found to be of fungal origin. Amoebic abscesses were more common 60% as compared to pyogenic 40%.

It was observed that solitary abscesses were more common 73.4% (44) as compare to multiple liver abscess 26.6% (16) including both the groups. On comparing two groups by chi-square test p value is 0.30 (>0.05) which is non-significant I.e., there is no statistical difference in distribution of type of liver abscess between two groups. "

In United States pyogenic hepatic abscess constitute over 80% of liver abscesses rest being amoebic in nature".<sup>12</sup> It also states that "Entamoeba histolytica is endemic in many parts

of the world mainly eastern countries which accounts for more incidence of amoebic liver abscess in these countries probably because of poor sanitation".<sup>13</sup> However the overall incidence of amoebic liver abscess worldwide is higher than that of pyogenic liver abscess.<sup>14</sup> Rajak in his study conducted at Post Graduate Institute of Chandigarh in 1998 also found that incidence of amoebic liver abscess were more common i.e. 80% (20 patients out of 25).<sup>15</sup>

There was no statistically significant difference found between the patients of two groups when white blood cell count, bilirubin level, serum level of alkaline phosphatase, which is commonly elevated in patient with liver abscess, serum protein level and prothrombin time were analyzed.

72% of total patient had leucocytosis (TLC>11,000/mm<sup>3</sup>), where as in Rajak's and Simon's study the figures were 83% and 89% respectively.

Volume of pus drained in first sitting among numerous studies is shown in (Table 2). Table 2: volume of pus drained in first sitting among different studies is shown as below (ml).

Study	Treatment group	Volume of pus drained (ml)
Simon yu et al 2004	Aspiration	38.5
	Catheter	37.5
Zerem and Hadzic et al 2006	Aspiration	139
	Catheter	150
Our study 2018	Aspiration	120
	Catheter	210

The average duration of hospital stay in different studies are shown in (Table 3).

**Table 3:** Duration of hospital stay in different studies

Study	Treatment group	Mean duration (DAYS)
Simon yu et al 2004	Aspiration	11
	Catheter	15
Zerem and Hadzic et al 2006	Aspiration	8.5
	Catheter	9
Singh et al 2013	Aspiration	10.5
	Catheter	11.3
our study 2018	Aspiration	5
	Catheter	8

In present study success rate between aspiration group is 92% and catheter group is 98%, catheter group is more successful than aspiration group on applying chi-square test p-value is 0.045.

Simon YU's et al. in 2003 done on 64 patients of liver abscess cases to compare these two treatment modalities concluded both these techniques equally effective and safe for treatment as for as hospital stay, clinical relief, morbidity, mortality, success rate etc. are concerned while because of easier procedural technique, less time consuming and cost effectiveness the intermittent needle aspiration techniques deserve to be considered as first line drainage approach for liver abscess.)<sup>16</sup>

### Conclusion

Our study concluded that in view of greater volume of pus drainage in first sitting, clinical recovery and slightly more success rate in continuous catheter drainage is effective percutaneous treatment modality than needle aspiration.

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