

Research Article



INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

EVALUATING THE CONTRIBUTION OF PERCUTANEOUS ASPIRATION AND PIGTAIL CATHETER DRAINAGE TO THE DRAINAGE OF LIVER ABSCESES

Dr. Ankit Ashok Agrawal,¹ Dr. Durgesh Surajlal Bhat^{2*}

^{1,2*} Assistant Professor, Department of General Surgery, Government Medical College, Nagpur

Corresponding author

Dr. Durgesh Surajlal Bhat

Email: durgeshbhat31@gmail.com

How to cite: **Agrawal AA, Bhat DS.** Evaluating the contribution of percutaneous aspiration and pigtail catheter drainage to the drainage of liver abscesses. International Research Journal of Pharmacy, 2025,16:2:34-37.

Doi:10.7897/2230-8407.110484

ABSTRACT

Background: In tropical nations like India, liver abscesses are a serious health hazard. Appropriate medicines and drainage of the abscess cavity are essential components of effective therapy. The use of pigtail catheterization for percutaneous abscess drainage is becoming more and more common worldwide.

Aim: The objective is to evaluate the contribution of percutaneous aspiration and pigtail catheter drainage to the drainage of liver abscesses.

Methods: 128 patients with liver abscesses of both sexes were evaluated in this study, which also included subjects who were admitted to the Institute for liver abscesses within the specified study period and who were at least 18 years old. Three groups of participants were created: Group I had conservative therapy, Group II received percutaneous needle aspiration, and Group III received pigtail catheter drainage.

Results: In the current study, 93.75% of the participants were men. Group III had a considerably greater mean abscess volume (307.7 ± 212.6 ml) than Group I and II (130.6 ± 72.7 and 177.0 ± 129.3 ml, respectively; $p=0.02$). The three research groups did not significantly vary in terms of the volume of residual abscess or length of hospital stay at release. In patients with an abscess volume <150 ml, pigtail catheterization reduced the length of hospital stay.

Percutaneous pigtail catheterization is an operational choice for the treatment of liver abscesses, according to the current study's findings. The current study also finds that better clinical outcomes are obtained when pigtail catheterization is used in patients with abscess volumes greater than 150 ml.

Keywords: amoebic, liver abscess, pigtail catheter drainage, pyogenic, percutaneous needle aspiration

INTRODUCTION

A liver abscess is characterized by a pus-filled cavity that is caused by the invasion of microorganisms either through hematogenous spread or the biliary ductal system. Pyogenic or amoebic etiology, as well as occasionally mixed infections, are the common etiological factors associated with liver abscesses; polymicrobial pyogenic abscesses are more common in developed countries, while amoebic abscesses are more common in tropical countries.^{1,2} Despite advancements in treatment modalities and sanitization, pyogenic and amoebic liver abscesses are considered major causes of mortality and morbidity in subtropical and tropical regions.

Approximately one-fifth of patients with liver abscesses continue to be resistant to or refractory to antibiotic treatment. Liver abscesses are now diagnosed and treated early because to the widespread use of CT (computed tomography) and ultrasound screening of the abdomen.³ For liver abscesses with extensive cavities that are resistant to conservative care

with antimicrobial medication, PCD (pigtail catheter drainage) and PNA (percutaneous needle aspiration) have shown greater utility. Pigtail catheterization appears to be the preferred method for treating liver abscesses, according on data from the literature currently in publication. There is little information on how decision-making is influenced by abscess volume and cavity size. 4. Therefore, the purpose of the current study was to evaluate the contribution of percutaneous aspiration and pigtail catheter drainage to the drainage of liver abscesses.

MATERIALS AND METHODS

The current retrospective analytical study set out to assess the role that pigtail catheter drainage and percutaneous aspiration play in the drainage of liver abscesses. The Institute's Department of Surgery provided the research participants. All participants provided both verbal and written informed consent before to participation.

Evaluations were conducted on 128 patients with liver abscesses of both sexes who were hospitalized to the Institute throughout the study period. A liver abscess required to be confirmed by abdominal ultrasound results and clinical features, and research participants had to be at least 18 years old and willing to participate. Exclusion criteria included those with inadequate hospital records, those under the age of eighteen, and those who refused invasive treatments.

Following final inclusion, premade structured proforma were used to collect data on clinical signs and symptoms, test results, comorbidities, treatment regimens, and outcomes. Amoebic etiology was assumed for subjects with positive stool microscopy for amoebic cysts or trophozoites and/or positive *Entamoeba histolytica* on serology. For a positive blood culture or pus culture for bacteria, pyrogenic origin was used. Both pyogenic and amoebic culture-positive individuals were given mixed etiology. Following inclusion, all patients received 500 mg of metronidazole tid and 1 gm bid ceftriaxone empirically intravenously while they were in the hospital. After then, antibiotics were changed according to culture sensitivity and after the first round of treatment failed.

Subjects were split into three groups based on treatment methods for additional evaluation: Group I (n = 34) received conservative therapy, Group II (n = 24) had percutaneous needle aspiration, and Group III (n = 70) received pigtail catheter drainage. Since all of the individuals were released from the hospital once they had recovered, the number of days spent there was taken into account when evaluating the results.

The collected data was statistically evaluated using the Student t-test, ANOVA (analysis of variance), Chi-square test, and SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk, NY, USA) for evaluating descriptive measures. To evaluate correlation across different factors, the Pearson correlation coefficient was employed. The findings were presented as frequency, percentages, mean, and standard deviation. A p-value of less than 0.05 was taken into account.

RESULTS

Group I (n = 34) of the study participants received conservative therapy, Group II (n = 24) had percutaneous needle aspiration, and Group III (n = 70) received pigtail catheter drainage. In the current study, there were 6.25% (n=8) females and 93.75% (n=120) men. 78% (n=100), 6.25% (n=8), and 4.7% (n=6) of the individuals had liver abscesses with amoebic, pyogenic, and mixed etiologies, respectively. Pleural effusion, ascites, pallor, and icterus were the disease indicators in 29.7% (n=38), 12.5% (n=16), 7.8% (n=10), and 7.8% (n=10) of the participants, respectively. Weight loss, nausea/vomiting anorexia, fever, and abdominal pain were the symptoms of liver abscess in 40.6% (n = 52), 40.6% (n = 52), 62.5% (n = 80), 78% (n = 100), and 84.3% (n = 108) of the participants, respectively (Table 1).

With p=0.49, the mean age of the research participants was statistically equivalent across the three study groups for comparison of different metrics. Additionally, the three research groups' length of stay was similar (p=0.21). Group I had the lowest amount of abscess volume at admission (p=0.001), whereas Group III had the most, followed by Group II. The three research groups' abscess volumes at discharge were statistically similar (p=0.24). The three research groups' duration of metronidazole ingestion was likewise statistically equal, with p=0.27 (Table 2).

Regarding the research participants' biochemical characteristics, bilirubin levels were found to be statistically similar among the three study groups (p=0.19). ALT (alanine transaminase), AST (aspartate aminotransferase), HsCRP (high sensitivity C-reactive protein), TLC (total leucocyte count), and ESR (erythrocyte sedimentation rate) all had statistically equivalent laboratory results (p=0.29, 0.11, 0.96, 0.12, and 0.23, respectively). With p=0.003, Hb (hemoglobin) was considerably lower in Group III patients and significantly higher in Group I subjects, followed by Group II subjects (Table 2).

Right lobe involvement was seen in 70% (n=24) of the study participants in Group I, 83% (n=20) of the participants in Group II, and 82% (n=58) of the participants in Group III, according to the distribution of right lobe involvement and amoebic etiology. However, at p=0.63, the difference was statistically not significant. 76% (n=26) of Group I

participants, 83% (n=20) of Group II subjects, and 77% (n=54) of Group III subjects had amoebic etiology. This difference was statistically non-significant with $p=0.17$ (Table 3).

DISCUSSION

128 participants were evaluated in the prepared trial and split into three groups: Group I (n = 34) received conservative therapy, Group II (n = 24) had percutaneous needle aspiration, and Group III (n = 70) received pigtail catheter drainage. In the current study, there were 6.25% (n=8) females and 93.75% (n=120) men. 78% (n=100), 6.25% (n=8), and 4.7% (n=6) of the individuals had liver abscesses with amoebic, pyogenic, and mixed aetiologies, respectively.

Pleural effusion, ascites, pallor, and icterus were the disease indicators in 29.7% (n=38), 12.5% (n=16), 7.8% (n=10), and 7.8% (n=10) of the participants, respectively. Weight loss, nausea/vomiting anorexia, fever, and abdominal pain were the symptoms of liver abscess in 40.6% (n = 52), 40.6% (n = 52), 62.5% (n = 80), 78% (n = 100), and 84.3% (n = 108) of the participants, respectively. These findings were similar to those of earlier research by Singh S et al. (2013) and Mukhopadhyay M et al. (2010), who evaluated participants with liver abscess whose etiology, clinical data, and demographics were similar to those of the current study.

The research's findings demonstrated that, when comparing different parameters between study groups, the average age of the participants was statistically equivalent across the three groups ($p=0.49$). Additionally, the three research groups' length of stay was similar ($p=0.21$). Group I had the lowest amount of abscess volume at admission ($p=0.001$), whereas Group III had the most, followed by Group II. The three research groups' abscess volumes at discharge were statistically similar ($p=0.24$).

With $p=0.27$, the three study groups' duration of metronidazole ingestion was thus statistically equal. These outcomes were in line with the findings of Kale S. et al. (2017) and Kulhari M. et al. (2019), whose research parameters matched the data from the current investigation.

Regarding the biochemical parameters in the research participants, it was observed that the three study groups' bilirubin levels were statistically equivalent ($p=0.19$). ALT (alanine transaminase), AST (aspartate aminotransferase), HsCRP (high sensitivity C-reactive protein), TLC (total leucocyte count), and ESR (erythrocyte sedimentation rate) all had statistically equivalent laboratory results ($p=0.29$, 0.11, 0.96, 0.12, and 0.23, respectively). But in the case of hemoglobin (Hb), it was significantly higher in Group I subjects followed by Group II and was least in Group III subjects with $p=0.003$. The results of this study were consistent with those of Singh O et al. (2009) and Zerem E et al. (2007), whose biochemical parameter values were similar to those of their respective investigations.

According to the study's findings, when the distribution of right lobe involvement and amoebic etiology was evaluated among the participants, 70% (n=24) of the individuals in Group I, 83% (n=20) of the subjects in Group II, and 82% (n=58) of the subjects in Group III had right lobe involvement. With $p=0.63$, the difference was statistically insignificant. 76% (9n=26) of Group I participants, 83% (n=20) of Group II subjects, and 77% (n=54) of Group III subjects had amoebic etiology.

With $p=0.17$, this difference was not statistically significant. These findings were consistent with those of Yu SC et al. (2004) and Mohsen AH et al. (2002), who indicated that the distribution of right lobe involvement and amoebic etiology in their study participants was comparable to the findings of the current investigation.

CONCLUSIONS

Despite its limitations, the current study comes to the conclusion that percutaneous pigtail catheterization is a surgical option for treating liver abscesses. The current study also finds that better clinical outcomes are obtained when pigtail catheterization is used in patients with abscess volumes greater than 150 ml. To draw a firm conclusion, further prospective longitudinal research with bigger sample numbers and longer tracking is required.

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S. No	Characteristics	Number (n)	Percentage (%)
1.	Gender		
a)	Males	120	93.75
b)	Females	8	6.25
2.	Etiology		
a)	Amoebic	100	78
b)	Pyogenic	8	6.25
c)	Mixed	6	4.7
3.	Etiology		
a)	Alcohol	78	61
b)	Hypertension	8	6.25
c)	Diabetes	12	9.4
d)	Smoking	76	59.4
4.	Signs		
a)	Pleural effusion	38	29.7
b)	Ascites	16	12.5
c)	Icterus	10	7.8
d)	Pallor	10	7.8
5.	Symptoms		
a)	Weight loss	52	40.6
b)	Nausea/vomiting	52	40.6
c)	Anorexia	80	62.5
d)	Fever	100	78
e)	Abdominal pain	108	84.3

Table 1: Demographic data, etiology, and clinical profile of study subjects

S. No	Variables	Group I	Group II	Group III	Total	p-value
1.	Age (years)	40.1±12.7	44.6±20.1	45.3±14.2	44.2±15.1	0.49
2.	Stay duration	14.2±13.5	16.5±8.2	19.6±9.1	17.6±10.4	0.21
3.	Bilirubin	0.7±0.4	1.0±0.7	1.2±0.9	1.0±0.7	0.19
4.	ALT	39.1±34.2	62.1±46.1	52.4±41.3	51.1±39	0.29
5.	AST	35.2±17.9	56.0±42.7	71.2±59.0	58.9±49.4	0.11
6.	Hb (gm%)	12.8±1.8	11.6±1.4	10.8±1.6	11.5±1.8	0.003
7.	HsCRP	130.1±107.6	126.1±64.7	125.6±80.0	126.9±84.1	0.96
8.	TLC	14034±6307	11265±6070	15273±6004	14131±6195	0.12
9.	ESR	74.4±26.3	68.2±24.5	82.9±29.2	77.4±27.7	0.23
10.	Abscess volume at admission	130.6±72.7	177.0±129.3	307.7±212.6	231.3±191.9	0.001
11.	Abscess volume at discharge	16.3±16.4	15.6±14.7	22.7±15.7	19.7±14	0.24
12.	Metronidazole duration	20.2±6.1	23.2±7.3	24.1±8.5	22.9±6	0.27

Table 2: Comparison of various parameters in different groups of study subjects

S. No	Parameters	Group I (n=34) (%)	Group II (n=24) (%)	Group III (n=70) (%)	p-value
1.	Right lobe involvement	24 (70)	20 (83)	58 (82)	0.63
2.	Amoebic etiology	26 (76)	20 (83)	54 (77)	0.17

Table 3: Distribution of right lobe involvement and amoebic etiology in study subjects