Section: General Surgery

Original Research Article

STUDY OF LIVER ABSCESS DRAINAGE BY NEEDLE ASPIRATION VERSUS PIGTAIL CATHETER IN SOUTH KARNATAKA POPULATION

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Received : 29/08/2024
Received in revised form : 23/10/2024
Accepted : 08/11/2024

Keywords:
Needle aspiration, percutaneous catheter, drainage, amoebic liver abscess, pyogenic abscess.

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DOI: 10.47009/jamp.2024.6.6.6

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2024; 6 (6); 25-28

Abstract

Background: There are two types of liver abscesses: pyogenic liver abscess and amoebic liver abscess (AML). Both are lethal if untreated or drainage is not done properly; hence, drainage is mandatory to avoid mortality in patients with liver abscesses. **Materials and Methods:** Out of sixty-two (62) liver abscess patients, 31 were drained by needle aspiration and 31 were with a pigtail catheter, and successful rates, volume of pus, and duration of antibiotic treatment were compared and noted. **Result:** Clinical manifestations were 59 (95.1%) had pain at right hypochondriaum, 53 (85.4%) had fever, 54 (87%) had nausea and vomiting, 57 (91.9%) had anorexia, 35 (56.4%) had weight loss, 31 (50%) had night sweat, 17 (27.4%) had rigors, and 23 (37%) had diarrhea. In aspiration by needle 134 ml, by pigtail catheter 140 ml of pus was drained. By pigtail catheter, successful rate of drainage was 93.5% and 83.5% by needle aspiration. **Conclusion:** It is concluded in the present study that the pigtail catheter technique was successful in draining a large amount of pus in a short duration compared to needle aspiration. Hence, pigtail catheter technique is preferred for liver abscess.

INTRODUCTION

The liver is the largest organ of the body, as it is the main metabolic center. This organ is subjected to numerous systemic infections, viral, bacterial, and parasitic, and lies at the distal end of the portal circulation.[1] Liver abscess has been diagnosed or recognized since the days of Hippocrates (400 BC). Hippocrates hypothesized that the prognosis of patients was related to the type of fluid within the abscess cavity.[2]

Liver abscesses are infections with space-occupying lesions in the liver; the two most common abscesses are pyogenic and amoebic liver abscess (PLA), a rare but potentially lethal condition whose severity depends on the source of infection and the underlying condition of the patient. Ameobic liver abscesses (ALA) are common in tropical regions, mainly where "entamoeba histolytica" is endemic and is more prevalent in individuals (mostly young males) with suppressed cell-mediated immunity.[3] The clinical presentations of both types are effusive, with presentations of fever, right upper quadrant pain, and hepatomegaly with or without jaundice.

Previously, liver abscess was regarded as a high-morbidity disease requiring open surgical drainage with mortality rates of between 10 to 80%. If untreated, uniformly fatal percutaneous drainage of liver abscess has been an important advancement in both types of liver abscess.[4] Moreover, one more technique is the pigtail catheter, which is also widely used; hence, an attempt is made to compare the potentiating of drainage and duration of drainage in both techniques.

MATERIALS AND METHODS

62 adult patients visited to surgery OPD of Srinivas Institute of Medical Sciences and Research Centre Mukka, Surathkal Mangaluru-574146, Karnataka were studied.

Inclusive Criteria

Patients with liver abscess more than 100 cc volume (>100 cc), fully liquefied on USG, abnormality in LFT, and given consent for study were selected.

Exclusion Criteria

Patients with abnormal INR of > 1.5, partially liquefied abscess, and the abscess already got raptured at the time of admission and showing the features of peritonitis were excluded from the study.

Method: Instruments and equipment used in this study are (1) Portable Ultrasound Unit—All the procedures were performed with the real-time ultrasound guidance curvilinear transducer ranges from 2.5 to 3.75 MHz; (2) Aspiration Needle—18 G Needle: 18 G:: 20 G: 21 G spinal needle (3) Pigtail

ISSN (O): 2687-5365; ISSN (P): 2753-6556

catheter set (with trocar, dilatators, and guide wire (6 to 14F); (4) trolley settings: (1) towel sponge holder 50 ml syringe, sterile gloves, kidney tray, scalpel blade with Bard Parker handle, iodine spirit for cleaning local parts, injection lignocaine 2% (LA), sterile pad, and gauge pieces. In all cases, the abscess was located by USG. The patients were subjected to routine hematological.

Investigations: Blood samples were taken for culture and sensitiveness. A chest x-ray was taken to note any pulmonary complications in terms of position of the diaphragm and any effusion in the pleural cavity. Only those patients in whom the abscess was liquefied are taken for aspiration. While the others where the abscess were unified, even liquefied but of single small size (<5 cm), multiple small size, abscess near the porta-hepatis for such abscess only antibiotics were given.

Pre-aspiration Procedure: (1) Baseline investigation of Hb%, LFT (liver function lest), coagulation profile BT, CT, PT, platelet count, setting up for IV lines, availability of emergency tray, premedication were (a) Inj. Vitamin K intramuscular, (2) Inj. Atropine 0.02 mg/kg Im, (3) Inj. Hydrocortisone 2 mg/kg iv, (4) Xylocaine sensitivity test Monitoring of vital signs prior to and during the procedure was done.

Technique

(A) For needle aspiration

Depending upon the abscess to be drained, the patient was given an appropriate position.

- Intravenous lines were setup.
- The appropriate part of the abdomen and lower chest was cleared thoroughly with salon spirit and betadine. The cleared part was then draped. The transducer probe was covered with sterile gloves.
- The abscess cavity was located, and an appropriate route was decided to avoid important structures (bowel and costo-phrenic recess).
- The shortest path that causes minimal liver parenchyma trauma was chosen
- Depth of the abscess from the skin, appropriate angle approach, and exact site of puncture were determined.
- Local anaesthesia 2% xylocaine was given so as to raise small wheal, and then at the site of the puncture, a small nick was given on the skin with the help of a scalpel.
- The patient was asked to hold its breadth, and the 18-G needle was passed towards the abscess cavity with a predetermined depth.
- The presence of a needle in the abscess cavity was confirmed by a giving-way sensation scanning needle tip echo and the free flow of pus.
- A syringe was applied to the 18-gauge needle and aspirated. A pus sample collected in a sterile specimen bottle was sent for microscopy, culture, and sensitivity, and pus was drained until the cavity collapsed (as conformed by ultrasound) or till no more pus was aspirated even after manipulating the needle.
- Intermittent needle aspiration will be done with disposable needles. Aspiration will be repeated if there is either no clinical improvement or no reduction in size of the abscess cavity or cavities. Aspiration is done up to a maximum three times.

B pigtail drainage: The same procedure as described above was done until local anesthesia was induced and a nick was given over the marked site of the skin.

- Thereafter, the Seldinger technique was used. The trocar of the pigtail set was slowly inserted until it reached the abscess cavity (confirmed by ultrasound), then a guide wire was passed through it, and over the guide wire, the trocar was removed.
- With the help of dilators (provided with a pigtail catheter set), the tract was dilated by serially passing the dilators (of increasing caliber) over the guide wire, and then a pigtail catheter drain was kept in the abscess cavity.
- The draining catheter was properly sutured in its place and connected to a collecting system. At this point, the first USG is done, and if the abscess cavity is completely resolved, the catheter is removed. If a residual cavity is still present, the catheter is flushed with normal saline, which is aspirated back, and the catheter is left in situ.
- From this point, USG is done every third day, the abscess cavity disappears, decreases in size, or remains static compared with the previous USG, and the catheter is removed if it has been draining for the last 24 hours.

Postoperative precautions: The patients were kept (1) NBM (nil by mouth) for further six hours (2) IV fluids (3) watch for signs of peritonitis (4) TPR/BP charting (5) systemic antibiotics (6) analgesics (sos). Follow-up ultrasound after three days for size of abscess cavity (residual volume) and echogenicity of the abscess cavity was performed. Follow-up was kept in all cases.

The required data was obtained as per the attached Performa. Antibiotics were given as per the culture and sensitivity reports of pus. Minimum 7 days IV and 4 weeks orally.

The duration of the study was January 2022 to January 2023.

Statistical analysis: clinical manifestations successful rate between both groups. Average volume of pus drained in both groups. Duration of antibiotic therapy in both groups was classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

RESULTS

[Table 1] Clinical manifestations in liver abscess patients – 59 (95.1%) pain right hypochondrium, 53 (85.4%) fever, 54 (87%) nausea and vomiting, 57 (91.9%) anorexia, 35 (56.4%) weight loss, 31 (50%) night sweating, 17 (27.4%) rigors, 23 (37%) diarrhoea.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

[Table 2] Comparison of present study of drainage in the first with previous sitting – The present 134 volume of pus (ml) aspiration, 140 ml catheter

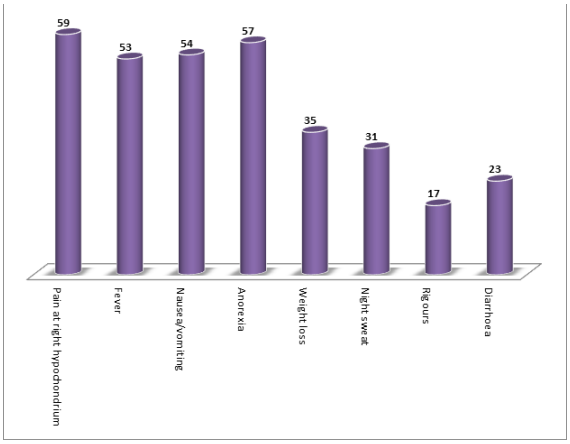

Figure 1: Clinical Manifestation in the liver abscess patients

[Table 3] Comparison of drainage of liver abscess by needle aspiration v/s pigtail catheter 29 (93.5%) successful rate in pigtail catheter and 26 (83.8%) in needle aspiration.

[Table 4] Comparison of average of antibiotic with previous studies. In present study antibiotics days, 10.3 in aspiration 7.5 in catheter cases.

[Table 5] In the comparative study of co-morbidity in previous study was don't. The present study of GBC/CBD calculi had 21.9%.

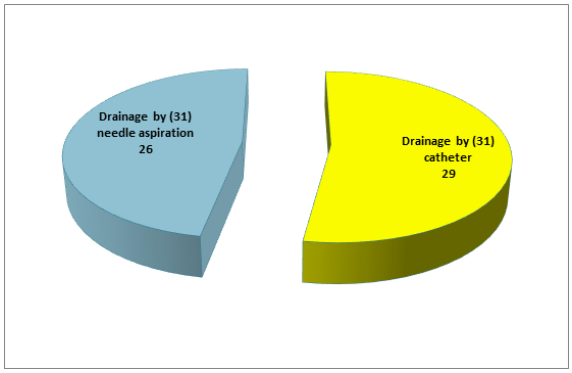

Figure 2: Comparison of drainage of liver abscess drainage by needle aspiration V/s pigtail catheter.

Table 1: Clinical Manifestation in the liver abscess patients.

Manifestation	No. of patients (62)	Percentage (%)
Pain at right hypochondrium	59	95.1
Fever	53	85.4
Nausea/vomiting	54	87
Anorexia	57	91.9
Weight loss	35	56.4
Night sweat	31	50
Rigours	17	27.4
Diarrhoea	23	37

Table 2: Comparison of present study of drainage in the first with previous sitting

Workers in year	Treatment technique	Average workers volume of pus (ml)
Simon Y U .et al (2004)	Aspiration	38.5
	Catheter	37.5
Zareem and Hadzick (2006)	Aspiration	139
	Catheter	150
Arshad khan and Vijay Kumar (2018)	Aspiration	135
	Catheter	140
Prasad BL and Abdul quader (2021)	Aspiration	136
	Catheter	142
Present study (2024)	Aspiration	134
	Catheter	140

The present study is more or less in agreement with previous studies.

Table 3: Comparison of drainage of liver abscess drainage by needle aspiration V/s pigtail catheter

Drainage by (31) catheter		Drainage by (31) needle aspiration	
Successful rate	%	Successful rate	%
29	93.5	26	83.8

Table 4: Comparison of Average duration of IV antibiotic with previous studies

Worker with date	Type of technique	Average duration of IV antibiotic (days)
Simon Y U .et al (2004)	Aspiration	12
	Catheter	8.5
Arshad khan and Vijay Kumar (2018)	Aspiration	9.5
	Catheter	6.4
Prasad and Abdul quader (2021)	Aspiration	10.5
	Catheter	7.5
Present study (2024)	Aspiration	19.3
	Catheter	7.4

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Present study is more or less agreement with previous studies

Table 5: Comparison of co-morbidity in previous studies

Worker with date	Co-morbidity	Percentage (%)
Rajak S .et al (1998)	GBC/CBD calculi	17 %
Yon Back .et al (2000)	Cholecystitis	19 %
Simon yus .et al (2003)	Diabetes Mellitus	22 %
Zargy and Hadzick .et al (2006)	Cholecystitis	27 %
Arshad khan and Vijay kumar (2018)	GBC/CBD caliculi	22.6%
Prasad CHBL and Abdul Quder (2021)	GBC/CBD caliculi	20.3 %
Present study (2024)	GBC/CBD caliculi	21.9%

Present study findings are more or less in agreement with previous study
GBC=Gall Bladder Caliculi
CBD=Caliculi of Bile duct

DISCUSSION

Present comparative study of drainage of liver abscess by needle aspiration versus pigtail catheter. In the study of clinical manifestation were 59 (95.1%) had pain at right hypochondrium, 53 (85.4%) had fever, 57 (91.9%) had anorexia, 35 (56.4) had weight loss, 31 (50%) had night sweat, 17 (27.4%) had rigours, 23 (37%) diarrhoea [Table 1]. In the comparison of volume of pus drainage by needle aspiration versus pigtail catheter: Aspiration by needle was 134 ml, 140 ml by catheter drainage present findings are compared with previous workers [Table 2]. Comparison success rate in both techniques was noted 29 cases had 93.5% success rate in pigtail catheter and in 26 cases 83.8% success rate was in needle aspiration procedure [Table 3]. In comparison of duration of antibiotics therapy with previous studies – present study needle aspiration had 10.3 days of duration and 7.5 days of duration in catheter procedure [Table 4]. In the comparative of co-morbidity GBC/CBO caliculi was 21.9% cases [Table 5]. These findings are more or less in agreement with previous studies.[5-7]

Owing to the latest techniques there is minimal invasiveness, per cutaneous treatment (Either needle aspiration or catheter drainage) has become the preferred method for management of liver abscess Moreover appropriate antibiotics also given followed by drainage.[8] Regarding the effectiveness of treatment PCD technique has higher successful rate as compared to PNS technique. Although PCD rates were successful there was more death rates in malignancy of liver.[9] Hence malignancies decreased success rate. But in PCD large amount of abscess (pus) can be drained in first time sitting and sent by culture and sensitive. Due to complete drainage followed by appropriate antibodies leads to early healing of the patients. Moreover due to maximum drainage there is 50% reduction of cavity size and further accumulation of abscess is restricted. By providing continuous catheterization complete abscess will be drained and cavity size will be reduced considerably followed by drainage.[10] Moreover antibiotics may play important role in these outcomes.

Limitation of Study: Owing to tertiary location of research hospital, small number of patients and lack of latest techniques, we have limited findings and results.

CONCLUSION

In the present study greater volume of pus drained in first sitting by PCD leads to early clinical recovery and needs shorter duration of hospital stay moreover appropriate antibiotic enhance early recovery and prevents recurrence of abscess. Hence PCD is preferred that PCN technique.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556