



A PROSPECTIVE STUDY OF OUTCOME OF DOUBLE PIGTAIL CATHETER DRAINAGE IN THE MANAGEMENT OF LIVER ABSCESS: ANALYSIS OF OUTCOME

Surgery

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ABSTRACT

A group of 25 patients with a single large liver abscess or interconnected multiple liver abscesses without pleural or peritoneal cavity leakage were successfully treated by percutaneous double catheter drainage inserted under ultrasound guidance under the effect of local anaesthesia. The resultant effect was good. There was no reported recurrence on 3 month follow-up. Double pigtail catheter drainage in appropriately selected cases of liver abscess has superior outcome in compare to published result of other technique for drainage of liver abscess specially in reduction of hospital stay, early resolution of abscess cavity and decreases in the total duration of treatment.

KEYWORDS

Liver abscess, Double Pigtail, Percutaneous Drainage

INTRODUCTION:

A liver abscess is defined as a collection of pus in the different hepatic segments developing due to dissemination of intraabdominal infection through the portal circulation, and less commonly due to hepatic injury⁽¹⁾.

Liver abscesses can be classified as (a) based on cause: pyogenic- *Escherichia coli*, *Klebsiella*, *Streptococcus*, *Staphylococcus*, and anaerobes and amoebic- *Entamoeba histolytica* (b) based on site: right lobe more common than left lobe.

Surgical drainage has been the traditional mode of treatment, however operative drainage is associated with significant morbidity and mortality⁽²⁾.

There are several methods of drainage of the cavity; percutaneous needle aspiration, percutaneous catheter drainage and surgical drainage, the former taking the preference for treatment in uncomplicated and hemodynamically stable patients⁽³⁾ while the latter is now preferred only in cases of intraperitoneal rupture and in hemodynamically unstable patients^(4,5). Liver abscess is a common cause of morbidity and mortality in the lower socio-economic class in India⁽⁶⁾. Needle aspiration can be considered as a less invasive procedure than catheter drainage; with less issues regarding follow-up catheter care. However, failure of this technique can be due to the thick viscous nature of the pus and rapid reaccumulation following aspiration^(7,8). In contrast to percutaneous needle aspiration, single percutaneous indwelling catheter placement has no problems of reaccumulation or incomplete evacuation, however the reasons of failure in some cases can be due to the thick viscosity of the pus, or premature removal of the drainage tube^(3,9).

AIMS OF THE STUDY:

Assessment of

- duration of abscess cavity resolution
- duration required for symptomatic relief (vas score ≤ 2)
- total duration of treatment required
- total duration of hospital stay
- occurrence of residual abscess after catheter removal
- complications of double catheter drainage
- total duration of percutaneous catheter placement

METHODOLOGY:

We have conducted this prospective study at SMIMER Hospital, Surat, Gujarat, India from January 2020 to January 2021 (a period of 12 months), during which 25 cases of liver abscess (single large or multiple intercommunicating) were included in the study and evaluated for outcome for 3 months in this study.

The patients were assessed at 48 hours, 4th day, 6th day, 8th day, 10th day,

and till discharge, followed by at 4 weeks, 8 weeks, 12 weeks.

Inclusion Criteria:

- All patients with single large unruptured liver abscess.
- All patients with multiple unruptured intercommunicating liver abscesses.

Exclusion Criteria:

- All patients with multiple non-intercommunicating liver abscesses.
- All patients with capsular breach leading to leakage of the abscesses into the pleural and/or peritoneal cavity.

Pre-procedural Assessment:

All the patients were admitted on an emergency basis following a visit to the Outpatient Department or Emergency Department of our hospital on the same day. The treatment protocol consisted of Injectable Ceftriaxone 2g iv 12 hourly, Injectable Metronidazole 200mg iv 8 hourly, supportive drugs like Injectable analgesics and Pantoprazole and 3 to 5 doses of Injectable Vitamin K as a prophylactic measure to prevent or treat any alterations in the coagulation profile.

The necessary investigations included Complete Blood Picture, Liver Function Tests, Renal Function Tests, Coagulation Profile and routine pre-procedural antiviral tests such as HIV, HBsAG, HCV. Radiological investigations included a chest X-Ray prior to and followed by the percutaneous double pigtail insertion and an ultrasound of the abdomen and pelvis on admission, followed by repeat ultrasound every alternate day post procedure till discharge.

ANAESTHESIA:

All procedures of ultrasonographically guided double pigtail insertion in the patients with liver abscesses were done under local anaesthesia.

MATERIALS AND METHODS:

A total of 25 patients with liver abscesses underwent double pigtail insertion, after explaining the procedure and its complications. Informed verbal and written consent were obtained prior to the procedure.

Under ultrasound guidance, with a pre-procedural antibiotic, local anaesthesia and all aseptic precautions, two pigtail catheters of preferably same sizes- 16Fr/14Fr (depending on the availability) were inserted at two different sites, in a side-to-side approach. The purpose of such an insertion was intermittent 6 hourly 20ml to 100ml normal saline flushes alternately to both the catheters for maintaining patency and ensuring free flow drainage as well as microdebridement of the abscess cavity. The drainage volume was calculated with the help of the connected transparent drainage bags. The follow up ultrasounds were done every alternate day until a residual abscess of less than 15 cc

was obtained. The pigtail catheters were removed simultaneously maintaining aseptic precautions, following minimal or no possible aspirable contents.

After discharge, patient was given Tab Cefixime 200mg twice daily and Tab Metronidazole 400mg double dose thrice daily for a period of 10 days, with follow up visits and ultrasound done at 4 weeks, 8 weeks, 12 weeks.



RESULTS

25 patients with liver abscesses underwent double pigtail insertion under guidance of ultrasound, of varying ages and irrespective of the liquefaction status. There were no major complications during the procedure. Post-procedural pain and inflammation was minimal, lasting for not more than 36 to 48 hours. Almost all of the patients were successfully treated within 7 days of insertion, with removal of the drains done simultaneously following ultrasound report of residual abscess less than 15 cc. The sites of catheter insertions healed with minimal scarring within 7 days of removal. Injectable antibiotics were given for the first 3 to 5 days of admission and oral antibiotics were started from Day 4/5 of admission. During follow-up, there were no cases of recurrence. The recurrence was recorded till a period of 3 months.

Table 1: Findings

No.	Volume of Abscess	Lobe and segment involvement	Days before symptomatic relief (vas score ≤ 2) (post catheter insertion)	Radiological resolution (usg) (total days from radiological diagnosis)	Catheter placement (total days)	Residual abscess volume at the time of catheter removal (<15 cc)	Hospital Stay
1	223cc	Right-vii	4	5	4	8 cc	3
2	647cc	Right - v, vii, viii	3	10	10	14cc	5
3	320cc	Left- ii, iv a Right- v, viii	5	6	5	12cc	5
4	854cc	Left- ii, iv a; Right- v, vii, viii	4	7	7	12cc	7
5	510cc	Right- v, vii, viii	3	8	7	11cc	7
6	181cc	Right-vii, viii	2	4	4	9cc	4
7	408cc	Right-v, vii	5	6	6	10cc	5
8	365cc	Right-	4	6	5	10cc	6
9	267cc	Right	3	9	8	13cc	4

10	423cc	Right	2	10	8	9cc	7
11	198cc	Right	4	7	5	11cc	6
12	293cc	Right	3	6	6	10cc	8
13	454cc	Right	5	12	10	12cc	9
14	286cc	Right	3	8	7	15cc	7
15	347cc	Right	4	9	7	14cc	5
16	280cc	Right	4	5	5	10cc	4
17	340cc	Right- v, vii	6	7	7	13cc	6
18	290cc	Right-vii, viii	4	5	5	9cc	5
19	343cc	Right-v, vii	6	8	8	10cc	8
20	430cc	Right	7	9	9	12cc	8
21	360cc	Right	4	10	9	8cc	7
22	290cc	Right	3	6	7	9cc	6
23	340cc	Right	4	8	9	12cc	5
24	260cc	Right	5	6	6	8cc	4
25	330cc	Right	6	7	7	12cc	4

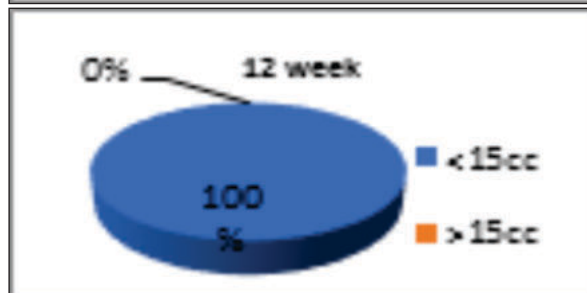
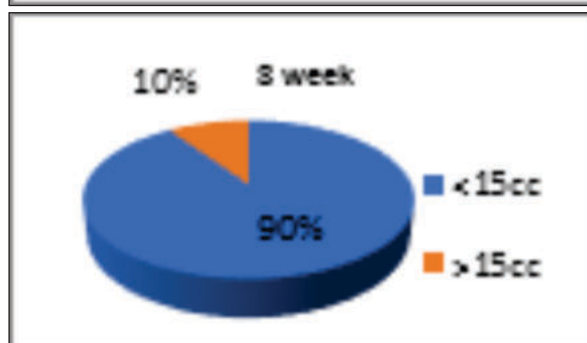
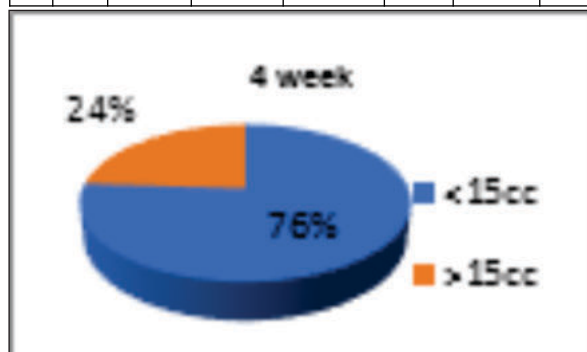


Chart 1: Residual Abscess On Follow Up

Table 2: Outcome (mean)

1.	Mean duration of Cavity resolution (residual abscess of <15 cc)	7.36 days
2.	Symptomatic relief with mean pain score post insertion	2 days; 3.6
3.	Mean duration of percutaneous catheter placement	6.84 days
4.	Mean duration of hospital stay	5.8 days
5.	Mean duration of treatment (inpatient and outpatient)	12 days
6.	Recurrences	none
7.	Complications (other than recurrence)	none

DISCUSSION:

In recent years, the treatment approach to uncomplicated liver abscesses has shifted from open surgical techniques to predominantly percutaneous drainage- whether needle aspiration or catheter drainage.

The average hospital stay in this study (5.8 days), is less than the reported hospital stays in single percutaneous catheter placement (11 days) in the series published by Rajak Lal et al⁽⁸⁾. This shorter duration of hospital stay can be due to the fact that all patients were discharged with catheter in situ post parenteral antibiotic treatment of a minimum 48 to 72 hrs.

The symptomatic pain relief was obtained within 2 days post catheter insertion, with a mean pain score on the visual analogue scale being 3.6 (mild bearable pain). The procedure itself is rendered almost painless due to the application of local anaesthesia; the only slight discomfort is the handling of the two drains post insertion.

The average duration of catheter placement was 6.84 days, with near-complete resolution obtained in average 7.36 days from the time of radiological diagnosis. This is a better outcome as compared to other series⁽⁶⁾. The purpose of double catheter placement is to overcome the disadvantages of the other percutaneous techniques. The needle aspiration has the disadvantage of requiring repeated attempts and recurrences, with viscosity plays an important role in determining successful drainage. Single percutaneous catheter has the disadvantage of large residual volume not drained from the catheter, longer period of catheter placement and longer duration of resolution with more chances of recurrences and longer period of total resolution⁽⁸⁾. Insertion of double pigtailed instead of the routine single catheter is superior in several ways; for large cavities it provides adequate drainage from all corners, quicker drainage and periodic normal saline jet with 10cc syringe provide saline jet microdebridement. The repeated saline flushes ensure reduction in the viscosity of the pus ensuring drainage without any catheter blockages and prevention of reaccumulation due to continuous drainage.

The complete resolution of the liver abscess- as proven ultrasonographically through periodic check-ups was obtained in less than 3 months in all the patients, with no recurrences.

Complications commonly faced were pain at site of insertion- managed by anti-inflammatory drugs, and blockage of the drainage tubes- prevented and managed by periodic normal saline flushes.

LIMITATIONS:

The cost of this treatment is a limitation as compared to the other two percutaneous drainage procedures.

A drawback of this study was failure to identify the cause of the abscess formation, with culture studies showing no growth in almost all the patients.

CONCLUSION:

From our study, we conclude that double pigtail catheter drainage in appropriately selected cases of liver abscess has superior outcome in compare to published result of other technique for drainage of liver abscess specially in reduction of hospital stay, early resolution of abscess cavity and decreases in the total duration of treatment.

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