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Is Percutaneous Aspiration Better Than Catheter Drainage In Liver Abscess? A Randomized Control Trial.

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ABSTRACT

Background: To compare the efficacy of percutaneous catheter drainage (PCD) and percutaneous needle aspiration (PNA) in the management of liver abscess > 6 cm in diameter. **Methods:** Fifty patients were included in this comparative study. Computer generated randomization was done by double blind trial and the patients were divided into two groups, 25 patients in each PCD and PNA group respectively. Comparison of effectiveness was done between the two groups in terms of duration of hospital stay, time to achieve clinical improvement, duration of intravenous antibiotics needed, reduction in the size of abscess cavity and total /near total resolution of abscess cavity. **Results:** Percutaneous catheter drainage (PCD) was found to be superior then percutaneous needle aspiration in terms of duration of hospital stay, clinical recovery, reduction in abscess cavity size/ volume and duration for intravenous antibiotics. **Conclusion:** Percutaneous catheter drainage is better option as compared to percutaneous needle aspiration especially for large abscesses which are partially liquefied or with thick pus.

Keywords: Amoebic liver abscess (ALA), Pyogenic liver abscess (PLA), Percutaneous catheter drainage (PCD), percutaneous needle aspiration (PNA).

INTRODUCTION

Liver an important organ of the body lies at the distal end of portal circulation is subjected to various infections Bacterial, Viral and Parasitic.[1]

Liver abscesses has been described since Hippocrates (400 B C) who suggested that the prognosis of the patients depends upon the contents of the abscess cavity.[2]

Liver abscesses both amoebic liver abscess (ALA) and pyogenic liver abscess (PLA) are common problems in India and other tropical countries.[3]

Previously the liver abscesses have been managed by open surgery only.[4] Because the radiological imaging has evolved for the past 3 decades and there has been a paradigm shift to minimally invasive procedures.[5] Surgical open drainage is reserved for patients who fail to respond to minimally invasive procedures.[6]

The percutaneous intervention can be either a percutaneous needle aspiration (PNA) or percutaneous catheter drainage (PCD), but to date Which should be the first line of management is debatable. We conducted this study to compare the effectiveness of PNA and PCD in the management of liver abscesses > or equal to 6 cm in diameter.

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MATERIALS AND METHODS

This study was conducted in the department of Surgery Govt. Medical College Jammu. Patients with Pyogenic liver abscesses > or equal to 6 cm were enrolled in the study. Fifty 50 patients were included in this study. The patients were divided into two groups using computer generated random numbers.

Group – A: Patients who underwent Percutaneous needle aspiration (PNA).

Group - B: Patients who underwent percutaneous catheter drainage (PCD).

Inclusion criteria:

All patients with Pyogenic liver abscess > or equal 6 cms in diameter irrespective of age and gender.

Exclusion criteria:

- Patients with < 6 cm liver abscesses
- Uncorrectable coagulopathy
- Coexistent Hepatobilliary malignancy
- Ruptured liver abscesses

Diagnosis of liver abscesses was made by ultrasonography (USG) and or CT scan.

Immediately after diagnosis, empirical intravenous antibiotics, ceftriaxone, amikacin and metronidazole were started. Intravenous antibiotic therapy was changed according to the culture sensitivity reports. Indirect hem agglutination test and serology was done to rule out amoebic liver abscess. Intravenous antibiotics were continued for at least 10 days and until fever has subsided for at least 48 hours. This was followed by enteral antibiotics for the next 4 weeks.

Percutaneous needle aspiration (PNA)

Under Ultrasonographic guidance, the pus was aspirated from the abscess cavity using 14 G trocar needle and syringe. In multiloculated abscess, the needle was reinserted into various loculi for complete pus aspiration. Review USG was done every third day and the size of the residual cavity was noted. Aspiration was repeated if the abscess cavity did not show 50% reduction in size irrespective of clinical response. Failure of abscess size to decrease below 50% of original size or of clinical improvement after 3rd day was considered as failure.

Percutaneous catheter drainage (PCD)

A 14 fr pigtail catheter with trocar was used and inserted into the abscess cavity under local anesthesia and under USG guidance. The contents of the abscess cavity were aspirated, the pigtail catheter was left in situ and connected to urobag after it was secured and fixed. First review USG was done when the drainage output for the last 24 hours has been reduced to < 10ml. If the abscess had resolved, the catheter was removed. If the residual cavity was present, the catheter was irrigated with normal saline and aspiration done till no contents aspirated. Any residual loculi were treated with catheter manipulation. Further review USG were done every 3rd day and the catheter was removed once the drainage was minimal or nil for 3 consecutive days, otherwise the catheter was left in cavity until drainage has stopped. USG was repeated till the cavity had decreased by 50% or more of its original size or static with clinical recovery.

Follow up

Patients were assessed daily by clinical improvement and abscess size by USG. Intervention was considered successful after complete recovery and disappearance of abscess cavity. Time to attain clinical recovery (relief of pain and fever), duration of antibiotic use, time of hospital stay, complications, failure of intervention and death if any were recorded. After discharge, the patients were followed up clinically and with USG in the OPD biweekly for first 2 months and then monthly for next 4 months.

Statistical analysis

Independent t- test was used to analyze the data.

RESULTS

50 patients were Included in the study, 25 patients in each group for PNA and PCD respectively. The age group of the patients varies between 18 years to 64 years (Group A between 18 – 61 years and Group B between 20- 64 years). Male to female ratio in group A was 16: 9 and in group B 19: 6.

The patients in each group were thoroughly evaluated by clinical examination, radiological, blood and biochemical parameters [Table 1]. Patients in both the groups had similar characteristics and underlying disease table-1. Patients in the PNA group had more jaundice then PCD group (10/25 vs. 7/25 p=0.12) and anorexia and malaise (21/25 vs. 18/25 p= 0.003).

Table 1: Patient characteristics, clinical picture and lab Parameters.

Parameter	PNA(n = 25)	PCD (n=25)
Age in years median/ range	38(18-61)	42(20-64)
Male : female	16:9	19:6
Cholelithiasis/ choledocholithiasis	16	9
Diabetes	2	3
Cholangitis	2	4
Fever	21	23
Rigors/chills	6	8
Anorexia / malaise	21	18
Jaundice	10	7
Pain RHC	22	21
Hemoglobin	9.6 (7.1-12.4)	9.4 (6.9-12.1)
TLC	14.8(3.6-21.2)	14.5(3.4-21.1)
PT/INR	1.9 (1-2.4)	1.6(0.9-2.3)
Abscesses solitary : multiple	18 :7	21: 4
Location R: L	17 :08	20: 05
Volume of largest cavity (mean) in CC	410	680

The number, location and nature of the abscess were also evaluated and found to be similar in both the groups. The PNA group had large no of patients with left lobe of liver abscesses then PCD group (8/25 vs. 5/25 p=0.41) and multiple abscesses (7/25 vs. 4/25 p= 0.32).

Pus culture and sensitivity was performed in both the groups and only 16 patients had culture positive. 10 patients were positive for E-coli, 3 for staph. aureus and 3 for klebsiella respectively. Cholelithiasis and choledocholithiasis were most common coexistent pathology being present in 24/50 (48 %) followed by cholangitis in 6 and diabetes in 5 patients. Needle aspiration was found to be successful in 21/25 (84 %). 8 patients needed single aspiration, 10 patients needed 2 aspirations and 3 patients needed 3 aspirations.

PCD was successful in 24/25 (96 %). The duration of catheter drainage ranges between 6- 31 days, with mean duration of 11.8 days. Mean duration of

intravenous antibiotics and mean duration to clinical relief were shorter in PCD group [Table 2].

Table 2: Showing intervention and outcome in two groups.

Parameter	PNA (n=25)	PCD (n=25)	P- value
Mean duration of intravenous antibiotics (days)	15.4	11.2	< 0.005
Clinical relief (days)	10	8.1	0.02
Time for 50% reduction in abscess cavity (days)	11.5	9.6	<0.005
Duration of hospital stay (days)	21.6	20.1	> 0.005
Success rate %age	84% n=21/25	96% n=24/25	0.02
Time for total resolution of abscess cavity (weeks)	10.5	10.1	0.005

Success rate in PNA group was 84 % (21/25) and in PCD group it was 96% (24/25). PCD failed in one patient who had rupture of the abscess during procedure and needed exploration. PNA failed in 4 patients, all had multiple abscesses liver abscesses and needed open drainage. One patient in PNA group developed sub capsular hematoma subsided with conservative treatment. One patient in the PCD group had rupture and underwent open surgery. One patient had prolonged drainage.

The mean size of abscess cavity at discharge 3.9 cms in PNA and 3.0 cms in PCD group respectively (p=0.66).

Table 3: Culture sensitivity and Microbiology of Pus.

Organism	No. of patients (N=50)	Percentage
Sterile pus	34	68% (34/50)
E. coli	10	20% (10/50)
Staph aureus	3	6% (3/50)
Klebsiella	3	6% (3/50)

DISCUSSION

PCD is the most preferred and commonly used modality for the management of liver abscess.[7] The percutaneous approach to liver abscess was first described by Ma Fadzean in 1953.[8] PNA has certain advantages over PCD like less invasive, simple, cost effective and multiple abscesses can be drained in a single setting.[9] Usually the PCD is preferred for large abscesses and PNA for smaller ones.

There are numerous comparative studies between PCD and PNA. Yu et al did a comparative study between PCD and PNA and the results show no difference between the two procedures.[10] Rajak et al showed PCD is superior then PNA but they limit the aspiration number to two which may be the limiting factor behind their low success rate of PNA.[11]

Hadzic also had the same results with PCD superior then PNA.[12]

Giorgio A et al had a better results with PNA combined with systemic antibiotics.[13] Performed on an average of 2.2 aspirations in 115 patients and the success rate was 98%. The mean duration of clinical improvement was 5.5+- 1.9 days.

Both techniques have some disadvantages as PNA needs multiple attempts for large abscesses which may be uncomfortable and more traumatic to the patient and there may be re accumulation of pus between the two aspirations. PCD has advantage over PNA being single time procedure, better drainage, quick recovery, less failure rate and intravenous antibiotics needed for less duration, but needs more expertise and good nursing care.

In the present study 50 patients underwent percutaneous intervention (PCD and PNA) without any major complication and mortality. Out of 25 patients in PNA group 21 patients were treated successfully with a success rate of 84% (21/25). The mean volume of largest cavity was 410 cc. The mean time for clinical recovery was 10 days and the mean time for 50% reduction in abscess cavity was 11.5 days and the mean time for total resolution of abscess cavity was 10.5 weeks. The mean duration of hospital stay was 21.6 days. Our results were better than sukhjeet et al who had a success rate of 77%.[14]

In PCD group, 24/25 patients were treated successfully with a success rate of 96%. The mean volume of largest abscess cavity was 680 cc. The mean duration of clinical improvement 8.1 days with mean time for 50% reduction in abscess cavity 9.6 days. The mean time for complete resolution of cavity was 10.1 weeks and the mean duration of hospital stay was 20.1 days, comparable to sukhjeet et al.

An important reason for the failure of PNA is thick pus and rapid re accumulation of pus within the cavity.[15] The reason behind the failure of PCD may be thick pus and premature removal of catheter.[16] No recurrence in any of the patient was seen during follow up.

CONCLUSION

Both PCD and PNA are equally effective but PCD is better modality in terms of success rate, early clinical relief and duration of intravenous antibiotics needed, with no significance in hospital stay.

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