

Ultrasound Guided Aspiration versus Open Drainage for the Management of Liver Abscess - A Comparative Analysis at a Tertiary Centre in Northern India

Dr. Juhi Singhal¹, Dr. Mridul Chaturvedi², Dr. Abhishek Nigam³, Dr. Shivam Sharma⁴, Dr. Pavan Maurya⁵

Abstract: ***Background:** Liver abscess is a common condition in our country. World-wide approximately 40-50 million people are infected annually. The prevalence of this infection is higher than 5-10% in endemic area¹ and some times as high as 55%². Treatment of amoebic liver abscess includes medical treatment as well as surgical drainage. Presently, most liver abscess are treated conservatively with antibiotics, anti-amoebic drugs and catheter drainage under the guidance of ultrasound and CT scan. **Objective:** This study was a comparative study to evaluate the efficacy of ultrasound guided aspiration as compared to open surgical drainage in the management of liver abscess. The aim was to find out the better modality in terms of both success rate and complications in the treatment of liver abscess. **Material & Method:** This study was conducted in S. N. Medical College, Agra from January 2017 to January 2018. 80 patients presenting with sign and symptoms of liver abscess were included in this study. **Conclusion:** Open surgical drainage appears better in quickening clinical improvement, decreased duration of medical therapy, and quicker resolution of cavity size.*

Keywords: Liver abscess, USG guided aspiration, open drainage

1. Introduction

Liver abscess is a common condition in our country. World-wide approximately 40-50 million people are infected annually. The prevalence of this infection is higher than 5-10% in endemic area¹ and some times as high as 55%². Treatment of liver abscess includes medical treatment as well as surgical drainage. Presently, most liver abscess are treated conservatively with antibiotics, anti-amoebic drugs and catheter drainage under the guidance of ultrasound and CT scan. However, there are certain conditions where abscess gets complicated and open drainage is required. The present study was conducted at a tertiary center of North India where liver abscess is quite prevalent and endemic in nature, to see which modality of treatment (open drainage v/s ultrasound guided aspiration) is ideal for a particular patient.

2. Aims and Objectives

This study was a comparative study to evaluate the efficacy of ultrasound guided aspiration as compared to open surgical drainage in the management of liver abscess. The aim was to find out the better modality in terms of both success rate and complications in the treatment of liver abscess. Treatment was considered successful if the patient improved clinically, the leukocyte count decreased and there was reduction in the size of abscess.

3. Materials and Method

This study was conducted in S. N. Medical College, Agra from January 2017 to January 2018. 80 patients presenting with sign and symptoms of liver abscess were included in this study. While planning the study patient's profile and general acceptability to various modalities of treatment was kept in mind.

Inclusion Criteria

Inclusion criteria was abscess size more than 3 cm in diameter with no feature suggestive of rupture or impending rupture.

Exclusion Criteria

The patients with complicated liver abscess, multiple abscesses, in shock, peritonitis, bleeding disorder or comorbidities were excluded from this study.

4. Methodology

A total of 80 patients were included in the study and they were divided in 2 groups. In group A, ultrasound guided aspiration was done. A 16 gauge aspiration needle was advanced into abscess cavity and complete aspiration was done under local anaesthesia. In group B, open surgical drainage was done through transperitoneal approach and a large bore soft tube drain 28 French was placed into the abscess cavity. Drain tube was removed only when there was minimal drainage (<10 ml for 2 consecutive days). All the patients were put on anti-amoebic drugs for 10 days and assessed for the time needed for clinical improvement, length of hospital stay, development of any complications. Ultrasound was done on 4th day, 15th day and at end of month. Treatment was considered successful when there was clinical improvement and significant reduction in the size of abscess cavity.

5. Results

Out of 80 patients, 48 were diagnosed as amoebic liver abscess, 22 as pyogenic in nature and 10 were of mixed etiology. Out of 80 patients 40 patients were randomized into group A who were treated with ultrasound guided aspiration and 40 patients were included into group B who were treated with open surgical drainage.

In group A, patients who did not show clinical improvement or there was an increase in cavity size or evidence of refilling on ultrasound done on 4th day, repeat aspiration was done. Repeat aspiration was again done if the subsequent ultrasound did not show reduction of the abscess. Out of 40 patients, 29 were successfully treated, with a success rate of 72.5%. 1 patient developed bleeding from the needle site, 4 developed peritonitis and 7 developed pleural effusion following needle aspiration. They were managed conservatively with ICD (intercostal drainage) and peritonitis patients were managed conservatively with broad spectrum antibiotics. Reduction in cavity size was seen in 7-24 weeks (mean 15.6±5.96) weeks with total hospital stay of the patient being 7-10 days (table 4).

In group B, out of 40 patients 39 patients were successfully managed with open drainage. Out of these 39, 3 developed severe post-operative pain, 2 developed pleural effusion and 1 developed peritonitis. All 39 patients subjected to this therapy improved with success rate of 97.5%. In all the patients regular ultrasound monitoring was done on 4th day, 15th day and end of month. Reduction in cavity size was seen in 5-17 weeks (mean 11.1±4.04) weeks with total hospital stay of the patients being 8-9 days (mean 7.5±1.29) days.

If we compare the success rate in both the groups, those subjects who were on open surgical drainage showed better outcome (table 1). These results are significant, p value is <0.001. If we compare the time needed for total reduction in cavity size and duration of hospital stay results were better in group B as shown in table 2 and 3. This difference is again statically significant. Similarly on comparing the complication rate in both the group, it is more in ultrasound guided aspiration group as shown in table 4.

Table 1: Success Rate in Different Groups

	Treatment Groups				P value (by chi square test)
	Group A USG guided aspiration (n=40)		Group B Open surgical drainage (n=40)		
	No. of Patients	Value	No. of Patients	Value	
Success Rate	29	72.5%	39	97.5%	0.00174

Table 2: Time Needed for Total Reduction in Cavity Size

	Group A	Group B	p value
No. of weeks	7-24 15.6±5.96	5-17 11.1±4.04	0.004

Table 3: Hospital Stay

	Group A	Group B	p value
No. of days	7-10 8.33±1.53	6-9 7.5±1.29	0.0174

Table 4: Complications of Patients Treated by USG Guided Aspiration and Surgical Drainage

Complications	Group A USG guided aspiration (n=40)	Group B Open surgical drainage (n=40)	P value
Bleeding	1	3	
Pleural Effusion Requiring Drainage	7	2	

Peritonitis after drainage	4	1	
No. of patients with complications	12 (30%)	6 (15%)	0.1016

6. Discussion

The study was conducted to compare the two modalities of treatment in uncomplicated liver abscess of size >3 cm. In patients who had under gone percutaneous needle aspiration, success rate was 72.5%. In first aspiration it was 50%, which increased to 72.5% in second aspiration. The success rate in other various literature varies from 79-100% (Beak et al 1993³, Giorgio et al 2006⁴, Stain et al 1991⁵, Dietrick et al 1984⁶). In other studies, higher success rate was probably due to multiple repeated aspirations. However, subjecting the patients to multiple needle aspiration over a short period is traumatic and an unpleasant experience for the patient and may not be acceptable.

Zerem et al 2007⁷, considered a third attempt of percutaneous needle aspiration as failure of treatment after two aspiration. Only one of the 11 aspiration was successful on the 3rd attempt. One important reason for failure of needle aspiration was inability to completely evacuate the thick viscous pus that may be present in some of the abscess. Singh JP 1989⁸, Giorgio et al 1995⁴ reported rapid accumulation of pus in the abscess after needle aspiration, as another problem described by Dietrick et al 1984⁶. In our study open surgical drainage had a success rate of 97.5%. Open surgical drainage allowed better breakdown of loculations, more complete drainage and accurate placement of catheter in the liver abscesses.

7. Conclusion

Three methods of drainage of liver abscess are available in our hospital setup currently

- 1) Needle Aspiration
- 2) Open Drainage
- 3) Pig Tail Catheterization

Though pig tail catheterization per-se is better for abscess drainage there was no study available in our tertiary center, comparing needle aspiration with open drainage. Frequently, we have to go in for needle aspiration, as patient is apprehensive about pig tail catheterization and does not want to have a tubing (pig tail) inserted in liver. So, this study was undertaken to arrive at a conclusion, where we can go in for needle aspiration (as it was more acceptable to the patients). Due to financial constraints, inflammatory markers were not studied but we plan to study them in further studies.

Though a cavity size of >3 cm may appear more conducive for open drainage, yet in a pilot project done before starting this study, we did not find this size as a limiting factor for needle drainage. Yes, more than 1 puncture was required in few cases, but overall acceptability and therapeutic efficacy was not affected. In our study patients subjected to open surgical drainage had a better success rates as compared to patients who had under gone percutaneous needle aspiration. Time taken for normalization of laboratory parameters in both interventional groups was almost similar while

complications such as pleural effusion requiring drainage and peritonitis were more common in ultrasound guided aspiration group. Total reduction of size of cavity needed more time in ultrasound guided aspiration group than those who were surgically drained. Open surgical drainage appears better in quickening clinical improvement, decreased duration of medical therapy, and quicker resolution of cavity size. From the above study it is clear open surgical drainage appears to be more aggressive approach initially but ultimate outcome is definitely better in this group. So initial fear for aggressive management in this developing country must be forgotten.

References

- [1] Blazquez S, Rigotherier MC, Huerre M, et al. Initiation of inflammation and cell death during liver abscess formation by *Entamoeba histolytica* depends on activity of the galactose/N-acetyl-Dgalactosaminelectin. *Int J Parasitol.* Mar 2007; 37 (3-4): 425-33.
- [2] Stanley SL Jr. Amoebiasis. *Lancet.* Mar 22 2003; 361 (9362): 1025-34
- [3] Baek SY, Lee KS, Lee SC, Sung KB, Auh YH. Therapeutic percutaneous aspiration of hepatic abscesses: effectiveness in 25 patients. *AJR* 1993; 160: 799-802
- [4] Giorgio A, de Stefano G, Di Sarno A, et al. Percutaneous needle aspiration of multiple pyogenic abscesses of the liver: 13-year single center experience. *AJR Am J Roentgenol.* 2006 Dec. 187 (6): 1585-90.
- [5] Stain SC, Yellin AE, Donovan Aj, Brien HW. Pyogenic liver abscess: modern treatment. *Arch Surg* 1991; 126: 991-996.
- [6] Dietrick RB. Experience with liver abscess. *Am J Surg* 1984; 147: 288-291.
- [7] Zerem E, Hadzic A., Sonographically Guided Percutaneous Catheter Drainage Versus Drainage Versus Needle Aspiration in the Management of Pyogenic Liver Abscess. *AJR* 2007; 189; 138-142.
- [8] Singh JP., Kashyap A. A comparative evaluation of percutaneous catheter drainage for resistant amoebic liver abscesses. *AM J Surg* 1989; 158: 58-62.