



Original Study

A Prospective Observational Study on Various Management Modalities of Liver Abscess

Authors

Dr K.Ravichandran¹, Dr R.Ramesh², Dr M.V. Pradeep Anand³, Dr V. Uvaraj⁴

¹Associate Professor of Surgery, Dept of Surgery Rajah Muthiah Medical College, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu

²Professor of Surgery, Dept of Surgery Rajah Muthiah Medical College, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu.

^{3,4}Post Graduate Student, Dept of Surgery Rajah Muthiah Medical College, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu

Abstract

Objective: The purpose of this study is to determine the effectiveness of various management modalities of Liver abscess and assess their outcome.

Materials and Methods: Sixty patients with pyogenic liver abscess who presented to Rajah Muthiah Medical college and hospital were randomly selected for a prospective observational study. Management modalities like antibiotic administration, usg guided percutaneous aspiration [PCA], USG guided percutaneous drainage [PCD] with pigtail catheter, laparoscopic aspiration and laparotomy drainage were done for the patients depending on their condition, size of abscess cavity and their outcomes was observed and assessed.

Keywords: antibiotic therapy, interventional sonography, liver abscess, PCD-Percutaneous drainage, laparoscopy and laparotomy.

Introduction

Liver abscess is a relatively uncommon lesion with a high mortality rate because of delayed detection and treatment. The classic presentation of fever, right upper quadrant pain, and tender hepatomegaly were not always present in all cases. The frequency of any particular symptom varies widely among reports. Management of liver abscess was exclusively surgical in the past. Modern treatment has shifted toward IV broad-spectrum antibiotics and image-guided percutaneous needle aspiration or percutaneous

catheter drainage (PCD). Surgical intervention is still indicated for inaccessible, multiple, multiloculated and multilobar complicated lesions, that cannot be effectively managed percutaneously, and abscesses that do not respond to less invasive methods.

Continuous catheter drainage is widely accepted and in combination with antibiotics is considered a safe and effective method of management of liver abscess. Some prefer repeated needle aspiration, considering it as effective and safe as PCD but easier to perform, less complicated, less

aggressive, less risky for post procedure septicemia, and less expensive. This approach requires careful follow-up and often-repeated imaging procedures to monitor response to therapy. The objective of our randomized observational study was to assess the outcomes and patient criteria to subject them to the ideal management modality.

Methods

All patients with pyogenic liver abscess who were admitted to our hospital – Rajah Muthiah Medical College and Hospital between march 2015 and December 2017 were considered as candidates for the study. A patient was enrolled if he or she had symptoms and signs of pyogenic liver abscess and if liver abscess was confirmed at sonographic or CT examination. We excluded patients with coexisting cystic conditions of Liver [necrotising liver secondaries/ biliary cyst/parasitic cyst/congenital cyst]. Patients aged less than 14 years were excluded from the study. All patients gave written informed consent.

At presentation, all patients except ones with ruptured liver abscess included in the study were treated with IV Piperacilin & tazobactam 4.5 g two times a day and Metronidazole 500 mg three times a day for 10 days. Percutaneous treatment was performed within 24 hours after admission in 45 patients. Immediately after catheter or needle placement, into the abscess cavity, pus was drained. The antibiotics were adjusted according to the results of culture and sensitivity testing of the pus drained during the procedure. Patients with negative culture results were continuously treated with a combination of piperacilin & tazobactam and metronidazole. If antibiotic therapy was changed according to the results of sensitivity testing, new antibiotics were administered for 10 days. IV antibiotic therapy was followed by a 1-week course of appropriate oral antibiotics and 2 week course of metronidazole. Patients presenting with multiloculated liver abscess were treated with laparoscopic aspiration. 2 patients who presented

with ruptured liver abscess were treated with laparotomy, peritoneal lavage and were followed up with iv antibiotics.

Percutaneous Catheter Drainage

The drainage technique was a trocar method with an 8-French multiple-sidehole pigtail catheter introduced into the abscess cavity. The procedure was performed with local anesthesia, in supine position. Careful localization of the abscess and proper selection of the entry site were required. The optimal route of access traversed the least possible amount of liver tissue and avoided bowel and pleura. Aspiration was performed with the catheter until no more pus was removed. The catheter then was secured to the skin for continuous external drainage and was left in place until production of content stopped. Residual cavities of abscesses were managed by catheter repositioning and aspiration or by introduction of a new catheter.

Needle Aspiration

Evacuation of pus from an abscess was performed with an 18-gauge disposable trocar needle. Sonography was performed every 3 days, and the size of the abscess cavity was recorded. If there was no significant reduction in the abscess cavity, aspiration was repeated. Repeated aspiration was attempted a maximum of twice for each patient not responding; patients not responding to third aspiration attempt was considered failure of treatment, and a catheter for continuous drainage was introduced.

Follow-Up and Outcome

All patients underwent clinical follow-up and monitoring during daily rounds until they were discharged from the hospital. Follow-up USG was performed 24 hours after intervention and repeated every 3 days, and the size of the abscess was recorded. Criteria for successful treatment were clinical signs of subsidence of infection and USG evidence of abscess resolution, such as disappearance or marked decrease in the abscess cavity (more than 80% reduction of longest diameter before treatment)

After discharge from the hospital, patients underwent follow-up evaluations in the outpatient clinic at least once a week during treatment and biweekly until 6 months from the beginning of the treatment. Patients discharged with a catheter, underwent follow-up USG every 3 days until there was no collection for 24 hours, and then the catheter was removed. Patient outcome, including length of hospital stay, complications related to the procedure, and treatment failure, were recorded.

Results

IV antibiotics alone was given for 8 patients with small abscess cavities, followed by oral antibiotics and the same sufficed for 5 patients, 3 of them treated with antibiotics required percutaneous aspiration later. USG guided Percutaneous needle aspiration was successful in 30 patients [First aspiration- 12 patients, Second aspiration – 14 patients and 4 patients required third aspiration]. PCD was curative in 15 patients after single sitting in 14 patients and 1 patient required a second sitting of PCD. All abscesses 5 cm or less in longest diameter were successfully managed, 10 by percutaneous needle aspiration and 12 by PCD. Patients who underwent percutaneous needle aspiration with multiloculated abscesses required further or repeat procedures irrespective of the size of abscess cavity. Hospital stay did not differ significantly between the groups. There were no complications related to the procedure. 5 patients were treated with laparoscopic aspiration and 2 of them required laparotomy who presented with ruptured liver abscess into the peritoneal cavity at the time of admission.

Age and sex incidence

Age/Sex	Male	Female	Total
18-29	2[3.3%]	0	2
30-39	9[15%]	1[1.6%]	10
40-49	19[31.6%]	0	19
50-59	16[26.6%]	2[3.3%]	18
>60	9[15%]	2[3.3%]	11
Total	55[91.6%]	5[8.3%]	60

Distribution of Symptoms among the patient group

	Numbers	Percentage
Fever	34	56.6
Rt. Hypochondrial pain	31	51.6
Jaundice	6	10
Vomiting	18	30
Dyspnea	5	8.3

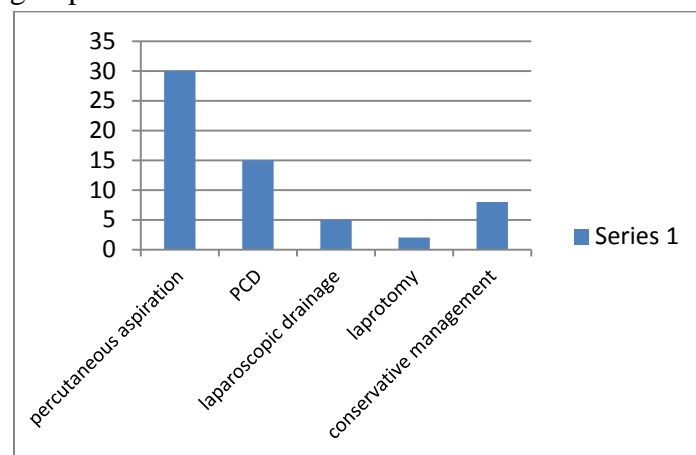
Analysis of Pus Culture and sensitivity among the patients group

Organism	numbers	Percentage
Entamoebahistolytica	32	53.3
E. coli	4	6.6
Klebsiella	3	5
Staph. aureus	5	8.3
Polymicrobial	13	21.6
No growth	3	5
Total	60	

Size/number/lobe wise distribution of liver abscess

Investigation		Number of cases	Percentage
Size	<5cm	31	51.6
	>5cm	29	48.3
Number	Single	48	80
	multiple	12	20
Lobe	Right	51	85
	Left	9	15

Various management modalities among patient groups



Management modalities	Numbers	Percentage
Percutaneous aspiration	30	50%
Percutaneous drainage	15	25%
Laparoscopic aspiration	5	8.3%
Laparotomy	2	3.3%
Conservative management	8	13.3
Total	60	

Clinical outcome of patients treated with PCA/PCD		
Result	Percutaneous aspiration	Percutaneous drainage
Total	30	15
First procedure	12	14
Second procedure	14	1
Third procedure	4	-
Success rate in <5cm cavity	8/8	4/4
Disappearance of abscess	6/8	10/11
<50% reduction in cavity size	16/22	1/11

Discussion

60 patients with Pyogenic Liver abscess who were admitted in Rajah Muthiah Medical College and hospital between march 2015 to march 2017 were evaluated in the study. 8 patients with abscess cavity smaller than 5 cm were treated conservatively, of whom 3 required aspiration post antibiotic trial. Percutaneous aspiration was done to 30 patients of which 22 had abscess cavity >5 cm and 8 had < 5cm abscess cavity. Of the patients who underwent PCA, 12 settled with one aspiration, 14 required two aspirations and 4 required third aspiration. Percutaneous drainage [PCD] was done to 15 patients of whom 11 had abscess cavity more than 5 cm and 4 had abscess cavity <5cm. among the 15 patients 14 patients settled with one procedure and one patient required second PCD. Laparoscopy was done to 5 patients. Laparotomy was done to 2 patients who presented symptoms of ruptured liver abscess.

Percutaneous aspiration and percutaneous drainage were found to be effective management for patients with Liver abscess with antibiotic cover. Patients could be tried on IV, followed by oral antibiotics if they present with a small

abscess cavity. For patients having multiloculated liver abscess, laparoscopic drainage was done. Patients presenting with complicated or perforated liver abscess, laparotomy seemed ideal.

Conclusion

PCD is effective than percutaneous needle aspiration in the management of liver abscess. Percutaneous needle aspiration can be used as a valid alternative for simple abscesses 5 cm in diameter or smaller. These were done under antibiotic cover as only antibiotics was not curative for larger abscess cavities. Laparoscopic aspiration was done for few patients. And patients who presented with ruptured liver abscess during admission or large multiloculated liver abscess required laparotomy.

Reference

1. Hoffner RJ, Kilagbhan T, Esekogwu VI, Henderson SO. Common presentations of amebic liver abscess. Ann Emerg Med. 1999;34:351–355. [PubMed]
2. Sharma MP, Kumar A. Liver abscess in children. Indian J Pediatr. 2006;73:813–817. [PubMed]
3. Khan R, Hamid S, Abid S, et al. Predictive factors for early aspiration in liver abscess World J Gastroenterol. 2008; 14:2089–2093. [PMC free article] [PubMed]
4. Chou FF, Sheen-Chen SM, Chen YS, Chen MC. Single and multiple pyogenic liver abscesses: clinical course, etiology, and results of treatment. World J Surg. 1997;21:384–388. discussion 388–389. [PubMed]
5. Wong W-M, Wong BCY, Hui CK, et al. Pyogenic liver abscess: retrospective analysis of 80 cases over a 10-year period. J Gastroenterol Hepatol. 2002;17: 1001–1007. [PubMed]
6. Wang JH, Liu YC, Lee SS, et al. Primary liver abscess due to Klebsiella pneumoniae in Taiwan. Clin Infect Dis. 1998;26:1434–1438. [PubMed]

7. Stain SC, Yellin AE, Donovan AJ, Brien HW. Pyogenic liver abscess. Modern treatment. Arch Surg. 1991;126:991–996. [PubMed]
8. Do H, Lambiase RE, Deyoe L, Cronan JJ, Dorfman GS. Percutaneous drainage of hepatic abscesses: comparison of results in abscesses with and without intrahepatic biliary communication. AJR 1991;157:1209–1212. [PubMed]
9. Gupta SS, Singh O, Sabharwal G, Hastir A. Catheter drainage versus needle aspiration in management of large (>10 cm diameter) amoebic liver abscesses. ANZ J Surg. 2011;81:547–551. [PubMed]
10. Mukhopadhyay M, Saha AK, Sarkar A, Mukherjee S. Amoebic liver abscess: Presentation and complications. Indian J Surg. 2010;72:37–41. [PMC free article] [PubMed]
11. Mathur S, Gehlot RS, Mohta A, Bhargava N. Clinical profile of amoebic liver abscess. J Indian Acad Clin Med. 2002; 3:367–73.
12. Alvarez JA, González JJ, Baldonado RF, Sanz L, Junco A, Rodríguez JL, et al. Pyogenic liver abscesses: A comparison of older and younger patients. HPB (Oxford) 2001;3:201–6. [PMC free article][PubMed]
13. Bugti QA, Baloch MA, Wadood AU, Mulghani AH, Azeem B, Ahmed J. Pyogenic liver abscess: Demographical, clinical, radiological and bacteriological characteristics and management strategies. Gomal J Med Sci. 2005;3:10–4.
14. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: Recent trends in etiology and mortality. Clin Infect Dis. 2004;39:1654–9. [PubMed]
15. Krige JE, Beckingham IJ. ABC of diseases of liver, pancreas, and biliary system. BMJ. 2001;322:537–40. [PMC free article] [PubMed]
16. Seo TJ, Park CH, Lee SH, Park JH, Lee WS, Joo YE, et al. A clinical study on liver abscess for recent 15 years in Gwangju-Chonnam Province. Korean J Med. 2005;68:26–38.
17. Zafar A, Ahmed S. Amoebic liver abscess: A comparative study of needle aspiration versus conservative treatment. J Ayub Med Coll Abbottabad. 2002;14:10–2. [PubMed]
18. Gyorffy EJ, Frey CF, Silva J, Jr, McGahan J. Pyogenic liver abscess. Diagnostic and therapeutic strategies. Ann Surg. 1987;206:699–705. [PMC free article] [PubMed]
19. Sharma MP, Ahuja V. Amoebic liver abscess. J Indian Acad Clin Med. 2003; 4:107–11.
20. Boonyapisit S, Chinapak O, Plengvanit U. Amoebic liver abscess in Thailand, clinical analysis of 418 cases. J Med Assoc Thai. 1993;76:243–6. [PubMed]
21. D'Angelica M, Fong Y. The liver. In: Beauchamp RD, Evers BM, Mattox KL, editors. Sabiston Text Book of Surgery. 19th ed. Ch. 54. Philadelphia: Elsevier Saunders; 2012. pp. 1411–75.
22. Sharma N, Sharma A, Varma S, Lal A, Singh V. Amoebic liver abscess in the medical emergency of a North Indian hospital. BMC Research Notes. 2010;3(1):21.
23. Cheng EY, Zarrinpar A, Geller DA, Goss JA, Busuttil RW. Liver. In Brunicaardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Matthews JB et al. Schwartz's Principles of Surgery. 10th edition. Mc Graw Hill. 2015:1263-1307.
24. Ghosh S, Sharma S, Gadpayle AK, Gupta HK, Mahajan RK, Sahoo R, et al. Clinical, laboratory, and management profile in patients of liver abscess from northern India. Journal Tropical Med. 2014;1:8.
25. Kumar V, Abbas AK, Aster JC. Liver, gall bladder and biliary tract. In Robbins basic

- pathology. 9th edition. Philadelphia: Elsevier Saunders. 2013:635.
26. Dudeja V, Fong Y. The Liver. In Townsend CM, Evers BM, Beauchamp RD, Mattox KL. Sabiston textbook of Surgery. 20th edition. Philadelphia: Elsevier. 2016:1418-1481.
 27. Amin AB, Patel RD, Doshi C, Bhuva AV. A comparative study of different modalities of treatment of liver abscess. IAIM. 2015;2(4):11-6.
 28. Thompson JE, Jr, Forlenza S, Verma R. Amebic liver abscess: a therapeutic approach. Rev Infect Dis. 1985;7:171–179. [PubMed]
 29. Seeto RK, Rockey DC. Pyogenic liver abscess. Changes in etiology, management, and outcome. Medicine (Baltimore) 1996;75:99–113. [PubMed]
 30. Sepulveda B, Manzo NTG. Clinical manifestations and diagnosis of amebiasis. In: Martinez-Palomo A, editor. Amebiasis: Human Parasitic Diseases. No. 2. Amsterdam: Elsevier; 1986. pp. 169–187.
 31. Cheng DL, Liu YC, Yen MY, Liu CY, Shi FW, Wang LS. Pyogenic liver abscess: Clinical manifestations and value of percutaneous catheter drainage treatment. J Formos Med Assoc. 1990;89:571–6. [PubMed]
 32. Yu SCH, Ho SSM, Lau WY, et al. Treatment of pyogenic liver abscess: prospective randomized comparison of catheter drainage and needle aspiration. Hepatology. 2004;39:932–938. [PubMed]
 33. Barshak MB, Kaper DL. Intraabdominal abscesses and infections. In Kasper DL, Jameson JL, Fauci AS, Longo DL, Hauser SL, Loscalzo J. Harrison's principles of internal medicine. 19th edition. New York: McGraw-Hill. 2015:850.
 34. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S. Percutaneous treatment of liver abscesses: Needle aspiration versus catheter drainage. AJR Am J Roentgenol. 1998;170:1035–9. [PubMed]
 35. Cheng DL, Liu YC, Yen MY, Liu CY, Shi FW, Wang LS. Pyogenic liver abscess: Clinical manifestations and value of percutaneous catheter drainage treatment. J Formos Med Assoc. 1990;89:571–6. [PubMed]
 36. Yu SCH, Ho SSM, Lau WY, et al. Treatment of pyogenic liver abscess: prospective randomized comparison of catheter drainage and needle aspiration Hepatology. 2004;39:932–938. [PubMed]
 37. Barshak MB, Kaper DL. Intraabdominal abscesses and infections. In Kasper DL, Jameson JL, Fauci AS, Longo DL, Hauser SL, Loscalzo J. Harrison's principles of internal medicine. 19th edition. New York: McGraw-Hill. 2015:850.