

A Comparative Study of Needle Aspiration and Pigtail Catheter Drainage in Management of Liver Abscess

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Abstract

Background: Liver abscess was one of the high mortality diseases prior to the availability of percutaneous drainage techniques. Usg guided percutaneous drainage of liver abscess has been gained increased acceptance nowadays in combination with parenteral antibiotics and is the choice of procedure in most cases. Patients who failed to respond and with poor compliance are candidates for surgical drainage. **Aim:** To compare the therapeutic effectiveness of intermittent needle aspiration and pigtail catheter drainage in management of liver abscess. **Methods:** A comparative study was carried out among 60 subjects attending Department of Surgery, K.R. Hospital, Mysuru over a period of 12 months. Subjects of either sex with diagnosed cases of pyogenic and amoebic liver abscess were included in the study. Patients with poor compliance, ruptured liver abscess, uncertain diagnosis, terminal disease and liver malignancy were excluded from the study. **Results:** The mean age group of the study subjects was 44.6 (range 38-84) years. The gender distribution showed a higher number of males (53) as compared to females (7). Needle aspiration procedure showed a better outcome statistically as compared to pigtail drainage. Two patients in catheter drainage groups required surgery due to persistent sepsis and inadequate drainage. **Conclusions:** Percutaneous intermittent needle aspiration is easier, simpler and less expensive preferred method of drainage as compared to pigtail catheter drainage approach for liver abscess.

Keywords: Percutaneous Drainage; Pigtail Catheter; Intermittent Needle Aspiration.

Introduction

Liver Abscess is a common condition in India which is associated with high morbidity and mortality. It is the common disease of tropical region which develops due to various reasons but is broadly classified as amoebic and pyogenic liver abscess. Although liver abscess was historically managed with surgery; advances in imaging techniques have advocated the shift to minimally invasive interventional procedures which can either be percutaneous needle aspiration or pigtail catheter drainage [1].

50 Million cases of entamoeba histolytica has been reported by WHO and is the most commonest cause of liver abscess in developing countries like India with many people below poverty line and lacking basic sanitary facilities. However, pyogenic liver abscess is more commoner in developing parts of the world with biliary spread. Ascending infection of the biliary tree secondary to obstruction is now the most identifiable cause of pyogenic liver abscess. The aetiology of biliary obstruction in Western countries follows a malignant disease, while in Asia, gall stone disease and hepatolithiasis are more common. Immunosuppression as in AIDS, intensive chemotherapy or transplant recipients is also increasing the number of liver abscesses due to opportunistic organisms in India [2].

Liver abscess can be potentially fatal, leading to mortality ranging from 60-80%. However, with the advances in radiological investigations like ultrasonography and CT scan for diagnoses together with interventional radiology has reported a success rate ranging from 75-100% for treatment of liver abscess, decreasing mortality to 5-30%, and surgical

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intervention which is associated with significant morbidity and mortality ranging from 10-47% is now becoming unnecessary [3].

Primary prevention by improving sanitation, health education, early diagnosis and prompt treatment may result in lowering mortality associated with the disease. Primary mode of treatment of amoebic abscess is medical; however many cases are refractory to medical therapy. Also secondary bacterial infection may complicate about 20% of amoebic liver abscess. In such patients and patients with pyogenic liver abscess may require aspiration or percutaneous placement of indwelling catheter to drain liver abscess [4]. Our Study aims at comparing the therapeutic effectiveness of intermittent needle aspiration and pigtail catheter drainage in management of liver abscess.

Materials and Methods

After obtaining Institutional ethical committee approval, a prospective, open label, randomized, comparative, single centered study was conducted among 60 subjects attending General Surgery OPD, K.R. Hospital, Mysuru meeting the inclusion and exclusion criteria over a period of 12 months (Jan – Dec 2016) after obtaining a written informed consent using a purposive sampling technique.

Subjects of either sex with diagnosed cases of pyogenic and amoebic liver abscess were included in the study. Patients with poor compliance, ruptured liver abscess, uncertain diagnosis, terminal disease and liver malignancies were excluded from the study.

Descriptive statistics, Unpaired t-test, Fischer Exact Chi-square test were used to analyse the results.

Results

During the 12 months study period, 30 patients had underwent needle aspiration and 30 patients had there liver abscess treated by pigtail catheter drainage. The mean age group of the study subjects was 44.6

(range 24-66) years. The gender distribution showed 55 males (91.67%) as compared to 5 females (8.33%). Mixed type of liver abscess 48(80%) were predominant over amoebic 10 (16.67%) and intermediate type 2 (3.33%). All the pyogenic were found in association with amoebic etiology.

Frequency of symptoms include pain abdomen in all the patients 60 (100%), fever a more consistent symptom 58 (96.67%), malaise a non specific symptom in 38 (63.33%) jaundice was present in 11(18.33%), respiratory symptoms like cough was present in 29 (48.33%) and dyspnoea in 26 (43.33%). 16 (26.66%) of patients had previous history of liver abscess and 3 (5%) patients with previous history of systemic illness. 47 (78.33%) cases was a known alcoholics and 13 (21.67%) cases were non-alcoholic. Abdominal tenderness was elicited in right hypochondrium to epigastrium in 60 (100%) of the cases. 51 (85%) cases had hepatomegaly with 7 (11.67%) showing signs of peritonitis.

Klebsiella and E.coli were the most commonest organisms cultured in 14 (18.33%), 7 (11.67%) cases were positive for entoamoeba histolytica, s.aureus, enterobacter and acinetobacter were cultured in 5 (8.33%), 3 (5%) and 2 (3.33%) cases respectively. 29 cases yielded no growth in culture. Isolated right lobe liver abscess was the most commonest finding seen in 49 (81.67%) cases. 8(13.33%) cases showed isolated left lobe abscess and 3 (5%) cases had abscess in both the lobes. 14 (23.33%) cases had single abscess cavity and 46 (76.67%) cases had multiple abscesses.

Percutaneous needle aspiration was successful in all 30 patients. The mean cavity volume in percutaneous needle aspiration was found to be 236+/- 94ml (p 0.003). Although pigtail catheter drainage was successful only in 28 patients. Patients who underwent percutaneous needle aspiration showed early clinical improvement as repeated aspiration was possible to approach multiple abscess cavities in 5.6+/- 1.4 days (p 0.0021) and 50% decrease in abscess cavity volume 6.1+/- 1.6 days. Two patients in catheter drainage groups required surgery due to persistent sepsis and inadequate drainage. Duration of hospital stay or time required for near total resolution of cavity was same in both the groups (Table 1).

Table 1: Assesment parameters

Parameters	No of Pts	Mean +/- SD (PNA)	No Of Pts	Mean +/- SD (PCD)	p Value
Volume Of Largest Cavity (ml)	30	236+/- 94	30	322+/- 106	0.003
Clinical Improvement (Days)	30	5.6+/- 1.4 days	30	6.2+/- 1.1 days	0.0021
Time For 50% Reduction In Cavity Size (Days)	30	6.1+/- 1.6 days	30	8.4+/- 1.7 days	0.0013
Time For Near Total Resolution Of Cavity (Days)	30	11.6+/- 2.3	30	14.1+/- 2.7	0.005
Hospital Stay (Days)	30	12.1+/- 2.6	30	15.4+/- 2.8	0.0025
Success	30	100	30	96.67	0.001

Discussion

The liver abscess is mainly classified into amoebic and pyogenic. Pyogenic liver abscess which used to be mainly tropical in location is now more common due to increased biliary interventions, stenting, cholecystitis, cholangitis etc. Liver abscess is 3 to 10 times more common in men [4]. Percutaneous drainage (either needle aspiration or catheter drainage) with systemic antibiotics has become the preferred treatment for the management of pyogenic liver abscesses [5]. In contrast, for amoebic abscesses, the primary mode of treatment is medical; however, as many as 15% of these may be refractory to medical therapy, while 20% may be complicated by secondary bacterial infection. Such amoebic abscesses and those involving left lobe, or those with impending rupture also need to be drained. Surgical drainage is now used only in cases which fail to respond to percutaneous drainage [6].

Although, Pigtail drainage is a preferred method most widely used to drain liver abscesses, recent studies have shown percutaneous needle aspiration to be simpler, less costly, and equally effective. Usually needle aspiration is preferred for smaller abscesses and catheter drainage is done in larger ones. But no clear cut guidelines have been laid [7].

Several previous prospective randomized studies have compared percutaneous needle aspiration with pigtail catheter. There are many reports with reasonably good results in percutaneous needle aspiration along with systemic antibiotics. Giorgio et al [8] performed on an average 2.2 aspirations in 115 patients and reported resolution of symptoms and hepatic lesions in 98% of the patients. In our study we treated 30 patients with percutaneous needle aspiration along with systemic antibiotics. Of these 30 patients, all were successfully treated with 6 requiring only one aspiration, 14 requiring a second aspiration and 10 patients requiring a third aspiration as well. Thus, 30 patients who were successfully treated with aspiration required an average of 2.2 aspirations. The mean duration of time taken for clinical improvement was 5.6 ± 1.4 days ($p = 0.0021$) in this modality of treatment. Rajak et al [9] reported a success rate of 60% with needle aspiration. However, in their study only two attempts of aspiration were made and failure to attain clinical, hematological and radiological improvement was taken as failure of therapy. The success rate of PNA in the literature varies from 79-100%. The success rate in our study after single aspiration was 20%, after second aspiration 66.67% and after third aspiration it was 100%.

The average size of abscess in our study was 322 ± 106 ml and 236 ± 94 ml for the pigtail drainage and percutaneous needle aspiration group respectively, comparable to the study reported by Rajak et al [9] (335 mL and 221 mL respectively). The success rate achieved by Rajak et al [9] was 60%, comparable to 66.67% success rate after the second aspiration in our study. Subsequent aspirations seem to improve the success rate of therapy.

Singh and Kashyap [10], 1989 reported a 15% incidence of secondary bacterial contamination after repeated needle aspirations; however, others (Baek SY et al [11], Giorgio et al [8], Rajak et al [9]) have not encountered this problem. Although secondary bacterial infection remains a possibility with indwelling drainage catheters this complication has been rarely reported in liver abscess. Complications such as hemorrhage, pleural effusion/empyema, persistent bile drainage, catheter displacement, sepsis etc., have been reported with both PNA (4% in series of Baek SY et al [11]) and PCD (12% in the series of Lambiase et al [12]). Baek SY et al [11] and Giorgio et al [8] described the much lower incidence of complications with PNA than with PCD as one of the major advantages of needle aspiration over catheter drainage. However, in our study and some recent studies (Rajak et al [9] 1998, Yu et al [13] 2004), both the procedures were found to be safe if performed properly with minimal complications. There was no mortality in either of the study groups.

However there were few limitations in our study which include; small sample size, open label, hospital based and single center study. Further studies evaluating this, overcoming the above limitations is highly desired.

Conclusion

Percutaneous intermittent needle aspiration is easier, simpler and less expensive preferred method of drainage as compared to pigtail catheter drainage approach for liver abscess.

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Conflict of Interest

Not declared.

Ethical Approval

The study was approved by institutional ethical committee.

References

1. Sherlock S, Dooley J. 9th ed. Oxford: Blackwell Sci Pub; Diseases of the liver and biliary system; 1993.p.471-502.
 2. David A, Pawlosky ZS.: Amoebiasis and its control. A WHO meeting. Bulletin of WHO. 1985 Dec;63(6): 417-426.
 3. Seeto RK, Rockey DC. Pyogenic liver abscess. Changes in etiology, management, and outcome. Medicine (Baltimore) 1996;75:99-113.
 4. Gerzof SG, Johnson WC, Robbins AH, Nabseth DC. Intrahepatic pyogenic abscesses: treatment by percutaneous drainage. Am J Surg. 1985;149:487-494.
 5. Sepulveda B, Manzo NTG. Clinical manifestations and diagnosis of amebiasis. In: Martinez-Palomo A, editor. Amebiasis: Human Parasitic Diseases. No. 2. Amsterdam: Elsevier; 1986.p.169-187.
 6. Petri A, Hohn J, Hodi Z, Wolfard A, Balogh A. Pyogenic liver - 20 years' experience. Comparison of results of treatment in two periods. Langenbecks Arch Surg. 2002;1:27-31. doi:10.1007/s00423-002-0279-9.
 7. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends in etiology and mortality. Clin Infect Dis. 2004;11:1654-9.
 8. Giorgio A, Tarantino L, Mariniello N, et al. Pyogenic liver abscesses: 13 years of experience in percutaneous needle aspiration with US guidance. Radiology. 1995;195:122-124.
 9. Rajak CL, Gupta S, Jain S, Chawla Y, Gulati M, Suri S. Percutaneous treatment of liver abscesses: needle aspiration versus catheter drainage. AJR. 1998;170: 1035-1039.
 10. Singh JP, Kashyap A. A comparative evaluation of percutaneous catheter drainage for resistant amebic liver abscesses. Am J Surg. 1989;158:58-62.
 11. Baek SY, Lee MG, Cho KS, Lee SC, Sung KB, Auh YH. Therapeutic percutaneous aspiration of hepatic abscesses: effectiveness in 25 patients. AJR. 1993;160: 799-802.
 12. 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.
 13. 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.
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