



COMPARATIVE STUDY OF OUTCOMES OF PERCUTANEOUS NEEDLE ASPIRATION VERSUS PIGTAIL CATHETER DRAINAGE FOR SOLITARY LIVER ABSCESS.

Surgery

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ABSTRACT

Objective: The aim of this study was to compare the outcomes of ultrasound guided percutaneous needle aspiration and percutaneous pigtail catheter drainage in the treatment of solitary liver abscess with respect to successful drainage, clinical improvement, reduction in size of abscess cavity, duration of hospital stay and procedure related complications.

Methods: Prospective randomized study on 108 patients treated over a period of 30 months. Using standard randomization they were divided equally into two groups A and B. Group A patients underwent usg guided percutaneous needle aspiration for a maximum of three attempts, and Group B patients were treated by pigtail catheter drainage. All the patients received a uniform protocol based supportive care and antimicrobial treatment. Outcomes were compared with respect to successful drainage, resolution of symptom, fifty percent reduction in size of abscess cavity, hospital stay duration and procedure related complications.

Results: A successful drainage was noted in 52(96%) patients in group B treated with PCD and 46 (84%) patients in group A treated with PNA. 8(11%) patients in group A did not respond to three attempts due to very thick pus and they were offered pigtail catheter drainage. The duration required for initial clinical improvement and fifty percent reduction of size of abscess cavity was significantly lesser in group B. Though the duration of hospital stay was lesser in group B the difference was not statistically significant. Complication was noted only in group B where one patient developed perihepatic and subdiaphragmatic collection and the other had peritonitis. Both were cured after surgical intervention.

Conclusion: Both percutaneous needle aspiration and pigtail catheter drainage are almost equally effective in the treatment of solitary liver abscess. Though pigtail catheter drainage helped in earlier clinical improvement and reduction in cavity size but the difference in duration required for full recovery and complete resolution of abscess cavity was not statistically significant. Hence the selection of the procedure needs to be individualized and should take into account various factors like patient's general condition, laboratory parameters, and nature of abscess cavity.

KEYWORDS

Liver abscess, percutaneous needle aspiration, pigtail catheter drainage.

INTRODUCTION

Liver abscess is a common occurrence worldwide especially in developing countries leading to significant morbidity and mortality and its incidence appears to be increasing. It is the collection of pus in liver parenchyma due to bacterial, parasitic, fungal, or mixed infections. In tropical countries including India amoebic liver abscess is fairly common. Amoebic liver abscess (ALA) accounts for 3–9% of all cases of amoebiasis (1). Earlier surgical management were the mainstay of treatment for draining the abscess but for last few decades percutaneous approaches have become standard method to drain the abscess cavity (2). The two widely practiced methods are image guided percutaneous needle aspiration and percutaneous catheter drainage. In our study, comparative analysis was done between outcomes of usg guided percutaneous needle aspiration and pigtail catheter drainage for the cases of solitary liver abscesses, with respect to successful drainage, time to achieve clinical improvement, time to achieve fifty percent reduction in size of abscess cavity, duration of hospital stay and procedure related complications. The study was done over a period of 30 months on patients who came to emergency and opd and were diagnosed to have solitary liver abscess. Standard protocol based supportive and antimicrobial treatments were provided to all.

MATERIAL AND METHODS

This was a prospective study over a period of 30 months, done on 108 patients, who came to opd or emergency who were diagnosed to have solitary liver abscess. They were selected after following preformed criteria and obtaining consent for the participation in study as well as treatment methods. They were divided into two groups, group A and group B, assigned after randomization keeping in view their age sex and size of abscess cavity. Each group comprised 54 patients. In Group A, patients were offered percutaneous usg guided needle aspiration and in group B, they were provided usg guided pigtail catheter drainage using Seldinger technique. The supportive and antimicrobial treatment was done uniformly according to standard protocols. Independent t-test and chi square test was used for statistical analysis and the level of statistical significance was fixed at $P < 0.05$.

INCLUSION CRITERIA - solitary liver abscess sized 3 cm or more, age 18-70 years.

EXCLUSION CRITERIA- ruptured liver abscess, multiple abscesses, abscess cavity less than 5cm size, other associated condition like peritonitis, septicemia uncorrectable coagulopathy and malignancy, history of prior intervention or treatment.

In Group A, aspiration was done under usg guidance using 18 gauge LP needle. The abscess cavity was followed with repeat usg after 72 hours. Other parameters were evaluated along with. Re-aspiration were performed when fifty percent reduction in size were not achieved. A maximum of three attempts were made. If the response after three attempts was not satisfactory then it was marked as failed needle aspiration and further drainage was done using pigtail catheter. These patients were excluded from the study.

In Group B after successful initial drainage, patients were followed up for several days focusing on clinical and laboratory parameters as well as amount of drainage in every 24 hour. In case the total drainage from the catheter decreased to less than 10 ml/24 hours for 2 consecutive days, an ultrasound evaluation was done. If there was no collection, catheter was removed. In case of residual collection and blockage, the catheter was flushed and repositioned appropriately. The catheter was removed when there was no significant collection and the drainage was less than 10 ml per day for two days.

All the patients were assessed clinically and with laboratory tests until discharge from the hospital. The intervention was termed successful when the procedure provided adequate drainage of abscess with clinical improvement. All The patients were followed up fortnightly for 2 month and monthly for 6 months. The Outcome parameters were clinical improvement, duration required in achieving fifty percent reduction in abscess cavity size, duration required to achieve total or near total resolution of abscess cavity, duration of hospital stay and procedure related complications.

RESULT

All the patients came in either opd or emergency with chief complaints of pain in right upper quadrant of abdomen, fever, weakness, anorexia, nausea and jaundice in variable combination. Most of the patients were males in the age group of 25 -55 years and history of regular consumption of alcoholic beverage was most consistent observation. In our study pyogenic abscess was found most commonly followed by amoebic and mixed type. The common microorganism identified were escherichia coli, klebsiella pneumoniae, staphylococcus aureus, enterobacter sp. etc.

Table-1

parameters	group A	group B	P value
number of patients with successful drainage	46	52	0.659

number of patients having clinical improvement within 7 days	12	33	0.003
number of patients having clinical improvement after 7 days	34	17	0.043
Number of patients having 50 % reduction in size of cavity within 7 days	14	36	0.004
Number of patients having 50 % reduction in size of cavity after 7 days	32	16	0.048
Number of patients discharged within 7 days	8	16	0.134
Number of patients discharged after 7 days	38	36	0.857
Number of patients having almost total resolution of abscess within 1 month	20	25	0.528
Number of patients having almost total resolution of abscess after 1 month	26	27	0.91

In our study we observed that the outcome was overall superior when pigtail catheter drainage was done. But the benefits did not reach significant level in parameters like successful drainage, duration of hospital stay and time required for complete healing. Initial clinical improvement and reduction of abscess cavity size was better in group B treated by pigtail catheter and the difference was statistically significant. However no significant difference was noted in hospital stay and time of complete recovery. Moreover two patients developed complication during the course of treatment in group B. Overall cost of treatment was less group A treated by percutaneous needle aspiration.

DISCUSSION

Abscess formation in the liver parenchyma is still major cause of morbidity and mortality, though with advancement in diagnostic and imaging modalities its management has become less invasive and more effective. These conditions were also identified long back since 400 BC by Hippocrates, who postulated that their prognosis was related to the type of fluid in the lesion. Osler, in 1890, was the first to describe the presence of amebae in a patient's abscess and stools, but it was only in the early 20th century that amoebae were correlated to the formation of a liver abscess. In 1938, Ochsner described surgical drainage of liver abscess though this aggressive approach resulted in a very high mortality of 60–80% [3]. The progress in radiological and therapeutic intervention methods supported by precise microbiological identification reduced the death rate to the level of < 5–30% [4]. In our experience we noted very high incidence of this condition. Most consistent predisposing factor was found to be regular consumption of alcohol. We included only uncomplicated and solitary liver abscess in this study and we did not see any mortality. The nature of the abscess was mostly frank pus followed by pus of mixed consistency. In very few cases we saw pure anchovy sauce like pus. The most common pathogen identified was *Escherichia coli*, *Klebsiella Enterococcus* and anaerobic streptococci. In few cases the etiology was not identified. In general the most common causes of pyogenic abscesses are *Escherichia coli*, *Klebsiella* and *Enterococcus*. Among the anaerobic bacteria, *Bacteroides*, anaerobic streptococci and *Fusobacterium* predominate. Aerobic, anaerobic or microaerophilic streptococci are isolated in 25-30% of cultures from pyogenic liver abscesses (5). During procedure we found the consistency was thick and turbid in majority of cases especially during first aspiration or drainage but latter on they became more liquefied and aspirable. In our experience we noted that aspiration on third day after presentation was most effective with respect to relief of symptoms and successful drainage. However there was no fixed protocol for the timing of aspiration. It was tried as early as possible after necessary optimization. We noted that the needle aspiration were more successful in small abscesses of size less than 5 cm in diameter and with increasing size the success rate diminished. Pigtail catheter drainage was more cost effective in larger abscess. Chung et al suggested that abscesses over 5 cm should be called large abscess because they necessitate a longer hospital stay, and the needle aspiration is associated with a high risk of failure (6). Liao et al reported on the basis of computed tomography scans of 175 patients that abscesses larger than 7.3 cm are a risk factor as regards effective abscess drainage (7). In our study we did not find much difference in the overall outcome of pigtail drainage and needle aspiration. Some authors have shown catheter drainage to be better while others vice versa. Rajak et al. concluded that catheter drainage was better with respect to success (8). Zerem and Hadzic in their study supported needle aspiration for simple abscesses of 5 cm or lesser in dimensions (9). A small number of studies also state that the initial size of the abscess cavity does not influence the final result (10). In our experience

we did not see any major complication after needle aspiration. The two complications noted in the pigtail catheter drainage group were managed with surgical intervention. Apart from these the cost of treatment was overall more in the catheter drainage group. Baek et al. and Giorgio et al. have documented a considerable lesser frequency of complications with needle aspiration than with catheter drainage (11, 12)

CONCLUSION

In every case the selection of the procedure needs to be individualized and should take into account various factors like patients general condition, laboratory parameters, and nature of abscess cavity. Both percutaneous needle aspiration and pigtail catheter drainage are almost equally effective in the treatment of solitary liver abscess. Though pigtail catheter drainage helped in earlier clinical improvement and reduction in cavity size but the difference in duration required for full recovery and complete resolution of abscess cavity was not statistically significant. The procedural technique of percutaneous needle aspiration is simpler and the incurred cost is also lesser, hence this method may be favored as first choice for wider application in case of uncomplicated solitary liver abscesses if appropriate. Pigtail catheter drainage may be favored as first choice in large collection and in anticipated thick or turbid abscess.

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