Original Research Article

A study of the different treatment modalities used in the management of amoebic liver abscesses

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ABSTRACT

Background: Amoebic liver abscess (ALA) is the most common extra intestinal manifestation of amoebiasis and is very common in the Indian subcontinent. ALA occurs in 3%-9% of patients with *Entamoeba histolytica* infection. Treatment modalities offered along with anti-amoebic medications are Guided percutaneous aspiration, Guided percutaneous drainage and Surgery. To study the indications and outcomes viz. symptomatic relief and resolution of clinical signs, resolution of the abscess, morbidity and mortality of the treatment modalities used for management of amoebic liver abscesses.

Methods: This observational study included 100 patients diagnosed to harbour amoebic liver abscess. All the patients received metronidazole orally or intravenously in appropriate dose. Percutaneous aspiration (PCA) was used for impending rupture on ultrasonography (rim <10 mm), left lobe abscess, failure of medical management. Percutaneous catheter drainage (PCD) was performed for abscesses more than 150 cc, abscess with localised rupture and failure of medical management. Surgery was treatment offered in generalised peritonitis. Analysis pertaining to reduction of volume, duration of stay, morbidity and mortality was done for each modality.

Results: Of the 100 patients, 33 were treated conservatively with medications alone with failure in 5 patients, 18 treated by percutaneous aspiration, 48 by percutaneous insertion of drain and 6 by surgery for ruptured abscess with generalised peritonitis. The mean duration of hospital stay in PCA group was 5.8 days while it was 9.12 days in PCD group. Bleeding (n=4) and bile leak (n=2) while bile leak (n=4) and death (n=2) were the complications reported in patients undergoing PCD and surgery, respectively.

Conclusions: In Amoebic liver abscess PCA or PCD offers better and accelerated reduction in volume of abscess cavity with treatable morbidity and without fear of mortality and surgery can be avoided in these patients.

Keywords: Amoebic liver abscess (ALA), Percutaneous aspiration (PCA), Percutaneous catheter drainage (PCD)

INTRODUCTION

Amoebic liver abscess (ALA) is the most common extra intestinal manifestation of amoebiasis and is very common in the Indian subcontinent. ALA occurs in 3%-9% of patients with *Entamoeba histolytica* infection.¹ Hippocrates pointed out that "Dysenteries, when they set in with fever and alvine discharges of a mixed character, or with inflammation of liver are bad".² In the ensuing

years, various treatment modalities devised for the management of this deadly disease have reduced the morbidity and mortality associated with the disease, which was invariably fatal a century ago.

Treatment modalities offered along with antiamoebic medications are Guided percutaneous aspiration, Guided percutaneous drainage and Surgery.³

METHODS

This observational study included 100 patients admitted to a tertiary care institute and teaching centre between October 2009 and July 2016. They were diagnosed to harbour amoebic liver abscess on the basis of clinical findings, radiological and laboratory investigations. Clinical findings included primarily fever, pain in right hypochondrium, intercostal tenderness and jaundice. Ultrasonography (USG) of the abdomen and indirect haemagglutination (IHA) for amoebiasis were the investigations used. Hypoechoic lesions with low level internal echoes and absence of significant wall echoes are the ultrasonographic findings of amoebic liver abscess. IHA for amoebiasis is considered significant if dilutions exceed 1:128.

All the patients received metronidazole in the dose of 800 mg three times a day. The modalities used along with medication were percutaneous aspiration (PCA), percutaneous drainage (PCD) and Surgery.

Percutaneous aspiration (PCA) was used for impending rupture on ultrasonography (rim <10 mm), left lobe abscess, and failure of medical management with abscess volume <150 cc. Percutaneous aspiration is performed under USG guidance with no. 18 spinal needle with all aseptic precautions.^{3,5}

Percutaneous catheter drainage (PCD) was performed for abscesses volume more than 150 cc, abscess with localised or pleural or pericardial rupture and failure of medical management with abscess volume $\geq$ 150 cc.

Percutaneous insertion of drain involved insertion of an 8-12 Fr pigtail catheter in the liver abscess cavity under ultrasound guidance with all aseptic precautions. Daily pigtail catheter output was monitored and was removed once the drain output had decreased significantly (<10 ml over 24 hrs). Serial USG was performed to monitor resolution of abscess cavity.^{3,6}

Surgery was treatment offered in ALA rupture with generalised peritonitis, septicaemia from secondarily infected amoebic liver abscess particularly if catheter drainage fails and erosion of the liver abscess into the surrounding hollow viscus. Surgery involved draining the abscess, opening all the loculi, thorough peritoneal lavage with normal saline and placement of drains in the dependent parts of the peritoneal cavity viz. in the abscess cavity, Morrison's pouch and pelvis.^{3,7}

Results of each modality of treatment were analysed as reduction of volume, duration of stay morbidity and mortality.

Reduction of volume of abscess by percutaneous interventions was compared and analysed with conservative treatment by one way ANOVA (Analysis of

Variance) test using Excel (Windows version 8). Results were considered statistically significant when $P < 0.05$.

RESULTS

The age of the patients of this study spanned from 13 years to 90 years. The patient population comprised of just 5 female patients. Out of the 100 cases, right lobe abscesses were seen in 73 patients, left lobe abscesses were seen in 18 patients and 9 harboured abscesses in both lobes.

Fifteen patients had multiple abscesses. Six patients had two or more abscesses in right lobe, 8 had abscesses in both lobes. One patient had three abscesses, one in right lobe and two in left lobe.

The volume of abscess ranged from 25-950 cc. The abscess was ruptured in 11 patients. Rupture localised to subdiaphragmatic region was seen in four patients while in one subject abscess had ruptured into the pleural cavity. In the remaining six there was generalised peritonitis.

Of the thirty three patients where conservative treatment was instituted, twenty eight patients recovered with drugs alone. Five patients required intervention. A total of seventy two patients required intervention. Of these 72 patients, 5 patients were subjected to interventions due to failure of conservative treatment. All these patients had unliquified abscess at time of presentation. One patient underwent percutaneous aspiration and four were subjected to percutaneous catheter drainage.

In percutaneous aspiration (PCA), the volume of the abscesses which were aspirated varied from 80 cc to 140 cc (mean of 114.30 cc). The residual abscess volume was ranging between 16 cc to 45 cc (mean of 30.56 cc). There were no complications of this procedure in any of the 18 subjects. There were no failures and the mean hospital stay was 5.8 days (range 4 days to 15 days).

Percutaneous catheter drainage (PCD) was performed in 48 patients. The volume of abscesses drained ranged from 150 cc to 950 cc (mean of 344.63 cc). The residual volume ranged from nil to 150 cc (mean 43 cc). The catheter was removed when drainage decreased to less than 10 cc in 24 hours. Bleeding was encountered in four patients immediately after drainage of abscess and it resolved spontaneously in all the cases. Major bile leak (>200 cc) was seen in two patients. The leak was controlled by ERCP and stenting. The mean stay in this group was 9.12 days (range 4 days to 20 days).

Six patients underwent surgery. Exploratory laparotomy, peritoneal lavage and dependent drainage were the procedure performed. Two patients died due to septicaemia and multiorgan failure (33.33%). Four patients had post-operative bile leak, one of whom died. In the three who survived, one patient required biliary

stenting for control of biliary leak. The mean hospital stay in the survival group was 19.5 days (13 days to 24 days).

The mean percentage reduction in the volume of abscess following the usage of drugs was 18.56 with a range of 5.5% to 56%. The mean percentage reduction in volume of abscess following percutaneous aspiration (PCA) was

73.2% with a range of 55% to 90% and in percutaneous catheter drainage (PCD) was 93.34% with a range of 26.25% to 100% were significantly high over that achieved by the use of drugs alone 18.56 indicating a more rapid radiological resolution of the abscesses following the use of these modalities as demonstrated by the application of the one way ANOVA test to our data.

Table 1: Percentage reduction in volume of abscess with different treatment modalities for ALA.

Modality		N	Mean	Std. deviation	Minimum	Maximum	P value
Percentage reduction in volume of abscess	Percutaneous aspiration	18	73.2025	7.88484	55.00	90.00	<0.001
	Percutaneous catheter insertion	48	93.3474	61.77971	26.25	100.00	
	Drugs	28	18.5611	12.55874	5.50	56.00	

(One way ANOVA test) Where N is frequency (P < 0.05 Significant)

DISCUSSION

ALA is a common extraintestinal manifestation of amoebiasis in our country caused by *Entamoeba histolytica*.^{3,8} ALA is often an accident and is a dead end for trophozoite form of the organism. This is precisely the reason why the treatments offered are effective as there is no multiplication of trophozoite form in the liver. The trophozoite survives on hepatocytes leaving the connective tissue and the reticuloendothelial system intact. Hence the pathological appearance: non liquefaction in early stages and control with medications. The present study compares the role of interventions in decreasing the volume of liver involvement and consequent result on hospital stay. The study also tries to streamline indications for various interventional procedures.

Multiple drugs are effective in control of ALA. Metronidazole, a member of the nitroimidazole group, in high dose (2400 gm in divided doses) has been the drug of choice since its acceptance.^{3,9} It is remarkable that in this era where resistance to chemotherapeutic agents is rampant in the microorganisms, metronidazole still continues to be the cornerstone of the management. Large abscesses have also been cured without drainage with the help of metronidazole, even by a single dose in some cases, as reported in some old studies.⁹⁻¹³ Ralls et al., Sharma et al and few others have doubted the role of interventions in ALA unless complicated.¹⁴⁻¹⁷ In our study, medical management was successful in 28 out of 33 patients. All these patients had smaller abscesses or large unliquified abscesses. It is in these patients with large abscesses that interventions were required for resolution of symptoms. We felt the need for interventions forecasting speedy recovery by reversing the catabolic to anabolic stage. In our study, USG guided percutaneous aspiration was performed in abscesses less

than 150 cc in 18% of patients. Ramani et al. have been advocates for percutaneous aspiration in 35% of patients in their study with excellent results.¹⁸ Similar good results with needle aspiration have been demonstrated by Zafar et al. in abscesses >300cc leading to faster clinical improvement and decreased hospital stay.¹⁹

Repeated aspirations are necessary for large abscesses as described by Georgio et al.^{5,20,21} In these cases, chances of infection and trauma of repeated aspirations can be nullified by catheter drainage. Moreover, single aspiration runs the risk of leakage of pus from punctured and inadequately decompressed abscess, with peritoneal contamination warranting surgery. We performed percutaneous catheter drainage in abscesses ≥ 150 cc in 48 patients with low morbidity and no mortality. Haemorrhage and bile leak are uncommon morbidities described.^{6,22} Catheter drainage of the liver abscess and drainage of empyema by intercostal drainage tube was also done in one patient for rupture of abscess in pleural cavity in our study. Percutaneous interventions have also been shown to improve outcomes in the treatment of amoebic empyema and catheter drainage could be lifesaving in management of amoebic pericarditis.^{23,24} ALA rupture into the peritoneal cavity might also respond to conservative line of management with percutaneous catheter drainage if localised collections of fluid are noted.²⁵

Bleeding through catheter was seen in four patients (8.33%) but in all it ceased spontaneously. Bile leak through the catheter occurred in two patients who had undergone percutaneous catheter drainage (4.1%). These patients with major bile leak (>200 ml/day) had successful resolution with ERCP and CBD stenting. Similar good recovery was seen in ALA patients with biliary fistula by the help of ERCP guided biliary drainage with stents.²⁶ In most cases of ALA the leak stops spontaneously and no further intervention is

required. The incidence of biliary fistula in our study is low as compared to that reported in other studies ranging from 12-27%.^{26,27}

Mean hospital stay in our study was 5.6 days in the group of patients treated with drugs alone, 5.8 days in those who underwent percutaneous aspiration, 9.12 days in the ones who were catheter drained and 19.5 days in operated patients. The hospital stay following percutaneous aspiration and percutaneous catheter drainage did not differ significantly in studies comparing them with each other.^{5,21,22} In our study, selective use of aspiration in low volume abscess explains the difference in duration of hospital stay in the two groups of percutaneous intervention.

The mean percentage reduction in volume of abscess following percutaneous aspiration was 73.2% (mean duration of stay 5.8 days) and that following percutaneous catheter drainage was 93.34% (mean duration of stay 9.12 days). Both of them were significantly high over that achieved by the use of drugs alone (mean percentage reduction 18.56%) indicating a more rapid radiological resolution of the abscesses following the use of these modalities. Also the mean percentage reduction following catheter drainage was significantly high over that following percutaneous aspiration proving its superiority in resolving the abscess. Decreased average time to 50% reduction in abscess, duration to attain clinical relief and need for parenteral antibiotics, as seen in other studies, also establish a superiority of catheter drainage over aspiration in terms of efficacy and cost-effectiveness.^{5,22,28} As seen from our study, there is a significant advantage of aspiration or drainage over conservative management.

Six percent of the patients required exploratory laparotomy for generalised peritonitis following rupture, which is comparable to 5% in the other study.¹⁸ One patient had peritoneal contamination due to purulent leak post-percutaneous catheter insertion but following surgery, inspite of co-morbidity of retroviral disease (HIV infection), the patient recovered well. Two of the patients who underwent surgery succumbed to septicaemia leading to a mortality rate of 2% in our study. Mortality rates of 0-18% have been reported.⁴ Bilirubin level >3.5 mg/dl, encephalopathy, volume of abscess cavity, albumin level <2 g/dl and number of abscess were the independent risk factors for mortality while the duration of symptoms and type of treatment did not influence mortality.²⁹ Bile leakage through drains post-surgery was seen in four patients. Thus the rate of bile leak post-surgery was very high and the mean duration of stay following surgery was also longer as compared to other modalities indicating that there is high morbidity and mortality associated with rupture of the abscess. Two patients who underwent surgery died, but there was no mortality in the aspirated and drained groups.

CONCLUSION

In Amoebic liver abscess PCA or PCD offers better and accelerated reduction in volume of abscess cavity with treatable morbidity and without fear of mortality and surgery can be avoided in these patients.

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