



PROSPECTIVE STUDY OF MANAGEMENT OF LIVER ABSCESS.

General Surgery

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ABSTRACT

Background: Liver abscess is a burning problem in tropical countries with often lethal consequence and diagnostic/therapeutic challenges. We have determined etiopathological, clinical, radiological and bacteriological characteristics of this condition and review its management strategies.

Material and Methods : During the period of 24 months from December 2015 to November 2017, a prospective study was performed involving 100 patients admitted in the IPD of the Department of General Surgery , Indira Gandhi Institute of Medical Sciences , Patna and their diagnosis was made on the basis of clinical features such as right upper abdomen pain, fever, laboratory investigation and radiological evidence of liver abscess.

Results: Amoebic liver abscess was the most common (89%) type of liver abscess among the study groups. There was a strong correlation with the occurrence of liver abscess and addiction to alcohol, history of diabetes mellitus and low socioeconomic status. The most common etiology of pyogenic liver abscess was *Escherichia coli*. Ultrasonography of the abdomen was accurate and cost effective in diagnosis of liver abscess. Percutaneous catheter drainage (PCD) was the most effective method of treatment (with 100% success rate).

Conclusion: Most patients in our study had liver abscess of amoebic origin and had temporal relationship with diabetes, alcoholism, and staggering socio economic status. We suggest early recognition of clinical features and prompt abdominal ultrasound as cost effective means for treatment initiation and reducing complications.

KEYWORDS

Amoebic Liver Abscess , Pyogenic Liver Abscess , Ultrasonography.

INTRODUCTION

Liver abscess are associated with mortality of up to 20%¹ and are categorized into various types based on etiology, among which amoebic liver abscess (ALA) and pyogenic liver abscess (PLA) are major types. Interestingly, ALA is more common in the developing nations.¹ PLA constitutes the bulk of hepatic abscess in developed nations. PLA result from ascending biliary tract infection, hematogenous spread through portal venous system, septicemia with involvement of liver by way of hepatic arterial circulation and secondary spread from intraperitoneal infection. *Escherichia coli*, *Klebsiella*, and *Streptococcus* are the most common etiology of PLA. Although no distinct clinical criteria exist for distinguishing ALA and PLA, the differential diagnosis can be made based on the following criteria - younger age, resident or h/o recent travel to areas of endemic amoebiasis, diarrhoea and marked abdominal pain , raise clinical suspicion of ALA. The diagnosis is confirmed by ultrasonography , serological tests such as indirect agglutination test, reddish brown (anchovy paste like material) aspirate from the abscess, negative gram stain and rapid resolution after metronidazole treatment. The diagnosis of PLA is based on picket fence configuration of temperature chart, nausea, vomiting, anorexia, hematological analysis of leukocytosis, anaemia and positive blood or aspirate culture for bacterial etiology. The treatment of liver abscess has evolved remarkably with minimal invasive drainage taking the center stage. Radiological imaging has improved diagnostic competence and has altered therapeutic strategy by allowing the possibility of percutaneous approach using needle aspiration or catheter drainage (PCD) . Open surgery should be reserved for management of complicated cases. We have designed a prospective study to analyze the relationship of occurrence of liver abscess to patient particulars such as age, sex, religion, socio economic status, source of drinking water, addiction to alcohol and history of diabetes mellitus. We also aimed to identify a fast, accurate and cost effective diagnosis of liver abscess and evaluate the most effective treatment for liver abscess.

MATERIAL AND METHODS

This prospective study was carried out over a period of 24 months from December 2015 to November 2017. All patients included in the study were admitted in the IPD of the Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna. The diagnosis of liver abscess was made based on history, clinical features, laboratory investigations, radiology, serological investigations, blood culture and culture from the aspirate. Patients were treated with medical

treatment with or without one of the following - percutaneous needle aspiration, percutaneous catheter drainage (PCD) or open surgical drainage.

Following parameters were recorded:

- From history - age, sex, religion, socio economic status, drinking water source, addiction to alcohol and medical history of diabetes mellitus.
- Clinical features - Symptoms - abdominal pain, fever, jaundice, weight loss, diarrhoea, anorexia, cough and others. Signs - right upper quadrant pain, intercostal tenderness, hepatomegaly, jaundice, chest infections and others.
- Laboratory findings - leukocytosis, eosinophilia, raised ESR, Hb% (<10 g%), bilirubin (>1 mg/dl), raised alkaline phosphatase, raised serum glutamic oxaloacetic transaminase, raised serum glutamic pyruvic transaminase, abnormal prothrombin time and hypoalbuminemia.
- Radiology - X-ray chest, X-ray abdomen, ultrasound abdomen (nature of the abscess - single or multiple, the lobe involved and size of the abscess)
- Culture from the aspirate
- Blood culture
- Response to type of treatment - all patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia, hepatomegaly, improved liver function test, ultrasonographic evidence of decrease in size of abscess cavity were considered criteria for successful treatment.
- Total days of stay in hospital
- Follow up - after discharge, each patient was followed up weekly for 1 month and then every 2 months for 6 months.

During each visit after discharge, patient's body weight was recorded, any new clinical symptom was noted, ultrasound of the upper abdomen was performed. The data collected was analyzed. Raw data were entered into a MicroSoft Excel spreadsheet (Microsoft corporation 2007, Washington, US) and analyzed using standard statistical software SPSS® statistical package version 18.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

Of the total 100 patients screened, 89 (89%) had ALA and 11 (11%) had PLA. The major epidemiological findings and clinical features recorded were as follows:

Radiology

- Amoebic Liver Abscess - X-ray chest was abnormal in 50% patients. Ultrasonogram of the abdomen showed right lobe involvement in 80% cases, left lobe involvement in 10% and in rest (10%) both lobes were involved. In 80% patients, the abscess was single and in 20% it was multiple. About 87% patients had abscess volume >300cc and 13% had volume <300cc.
- Pyogenic Liver Abscess - X-ray chest was abnormal in 40% patients. Ultrasonogram of the abdomen showed right lobe involvement in 60% cases, left lobe involvement in 20% and both lobes in 20%. The abscess was single in 60% and multiple in 40% cases. 80% patients had abscess volume >300cc and 20% <300cc.

Blood and aspirate culture

Blood culture was positive in 1 case of PLA showing presence of *E.coli*. Culture from aspirate was positive in 3 cases of PLA showing the presence of *E. coli*.

Treatment outcome

Of the 89 patients with ALA, 11 patients were treated with medical / conservative treatment with a success rate of 70%, 40 patients were treated with percutaneous needle aspiration with a success rate of 67%, 28 patients were treated with percutaneous catheter drainage and the success rate of this procedure was 100% and 10 patients presented with features of peritonitis, treated with surgical exploration and drainage. The success rate in this group was 65%.

Of the 11 patients with PLA, 1 was treated conservatively, 5 were treated with percutaneous needle aspiration with the success rate of 50% and 5 patients were treated with percutaneous catheter drainage with the success rate of 100%.

Total, 88 patients with ALA (98.87%) were treated successfully. There was 1 death. This patient was treated with surgical exploration and drainage. The main cause of death was diffuse peritonitis due to rupture of the abscess. This patient had presented late and had poor general condition. Interestingly, all patients with PLA were treated successfully and subsequently discharged.

DISCUSSION

In our study, the maximum age incidence for ALA was 21- 40 years, with M:F ratio of 79:10 (Table -1) which is consistent with previous reports.^{2,5} Among PLA patient, the maximum age incidence was 41-60 years, which although contradicts the report by Alvarez *et al.*,⁶ is consistent with other reports.⁷ We observed a higher incidence ratio of PLA in males (M:F::10:1). However, in their study, Gyroffly *et al.*⁸ found slightly higher incidence in females (M:F::13:20), which contradicts our and other studies.⁹⁻¹⁰ Nevertheless, males tend to have a poorer prognosis from PLA.

In our study, 28.08% patients with ALA had a recent history of diarrhoea, but not dysentery, while 9.09% PLA patients had a history of diarrhoea (Table -2). A previous study has reported lower incidence of diarrhoea among ALA patients⁷ and hepatic complications are reported in individuals who never had amoebic dysentery.

In our study, 33.70% patients with ALA and 81.81% patients with PLA were diabetic (Table - 1) which is consistent with previous reports.^{5,11} The higher incidence of liver abscess in diabetics may be due to lower immunity in these patient population.

Consistent to previous studies,^{3,5} we observed 78.65% and 90.90% patients with ALA and PLA with history of addiction to alcohol respectively (Table - 1). The higher incidence of ALA in chronic alcoholics is due to higher content of iron deposition in their liver. 67.41% patients in ALA group and 45.45% patients in PLA group in our study were of lower socio economic status suggesting that liver abscess are more common in people of lower socioeconomic status (Table - 1). The main reason for this was poor living conditions such as crowded home, poor hygiene and drinking contaminated water.

The clinical features observed by us in patients with ALA were abdominal pain (95.50%), fever (89.88%), anorexia (62.92%), jaundice (22.47%), intercostal tenderness (91.01%) and hepatomegaly (73.03%). Several reports have suggested fever^{9,10,13} and abdominal pain³ being the main presenting feature (Table - 2 & Table - 3) in PLA.

Table 1 : Comparison of Demographic data between two groups

Demographic parameters	ALA	PLA
No. of patients (%)	89(89%)	11(11%)
Male : Female	79:10	10: 1
Age wise distribution		
21-40	62(69.66%)	03(27.27%)
41-60	27(30.33%)	08(72.72%)
Socioeconomic status(%)		
Low	60(67.41%)	05(45.45%)
Middle	25(28.08%)	06(54.54%)
High	04(04.49%)	0
Addiction to alcohol (%)	70(78.65%)	10(90.90%)
History of diabetes (%)	30(33.70%)	09(81.81%)

Table 2 : Comparison of Symptoms between two groups

Symptoms	ALA	PLA
Abdominal pain	85(95.50%)	11(100%)
Fever	80(89.88%)	09(81.81%)
Jaundice	20(22.47%)	02(18.18%)
Weight loss	35(39.32%)	02(18.18%)
Diarrhoea	25(28.08%)	01(09.09%)
Anorexia	56(62.92%)	03(27.27%)
Cough	10(11.23%)	02(18.18%)
Others	20(22.47%)	02(18.18%)

In ALA group, the lab. investigation revealed leukocytosis (75.45%), raised ESR (81.81%) and anemia (51.81%). The most marked LFT abnormality was raised alkaline phosphatase (62.72% cases). Abnormal prothrombin time was observed in 43.63% cases. Most marked LFT abnormality in patients with PLA was abnormal alkaline phosphatase (93.33%) and 26.66% patients had abnormal prothrombin time. Eosinophilia was a feature observed in PLA (40.90% vs. 08.18% in ALA). About 40% patients in our study had hypoproteinemia (Table - 4, Figure - 1). Abnormally high alkaline phosphatase level (seen in 60-80% cases) is the most reliable and consistent biochemical marker of ALA.⁵

The most important and accurate diagnostic tool in our study was USG, which had accuracy of 96%.¹⁴ CECT abdomen was performed in 2 cases due to diagnostic confusion and right lobe^{3,12} was most commonly affected (80 patients). 87% patients had abscess cavity size >300cc. In cases of PLA, the right lobe was involved in 60% cases and 60% patients had single abscess. USG had accuracy of 100% in this patient group. Serology based anti amoebic antibody estimation using ELISA was not routinely done in our study due to endemic nature of amoebiasis. The main etiology of PLA in our study was *E. coli* (60% cases)⁶ as opposed to *Klebsiella pneumoniae* reported by other studies.^{7,9,15}

11 patients with ALA with abscess size <300cc and without complications were treated conservatively (using metronidazole and chloroquine). The patients who failed to respond to conservative therapy were treated using percutaneous catheter drainage. 40 patients with abscess size >300cc were treated with percutaneous needle aspiration with a success rate of 67%. This result was comparatively less successful in our hands as compared to other studies¹⁶ reporting 96.50% success rate. However, most practitioners do not recommend surgical drainage of ALA.^{4,11,12,17} In our study, 10 patients presented with features of peritonitis and were treated by surgical exploration and drainage. The success rate in this group was 65%. Unfortunately, there was 1 death due to late presentation with features of generalized peritonitis and shock. The overall mortality in ALA patients was similar to other reports.¹⁸ Other authors have reported a mortality rate of 12.3%¹⁴ and 17-20%.¹

PLA should be managed by interventions like needle aspiration or catheter drainage.¹⁹ 1 patient with small abscess was treated with intravenous antibiotics. 5 patients were treated with percutaneous needle aspiration. Out of these 5 patients, 3 patients were treated by needle aspiration and 2 responded further with catheter drainage. 5 patients were managed by catheter drainage. Thus, success rate of needle aspiration and catheter drainage was 60% and 100%, respectively and is consistent with previous report.^{20,21} Nevertheless, needle aspiration^{7,22} has the advantage over catheter drainage in better maneuverability within abscess cavity, possibly less likely of secondary infection, and reduced equipment cost. As the sample size of PLA in our study was small ($n=11$), our findings do not give a strong

support in favor of catheter drainage in management of PLA over needle aspiration despite 100% success rate by catheter drainage.

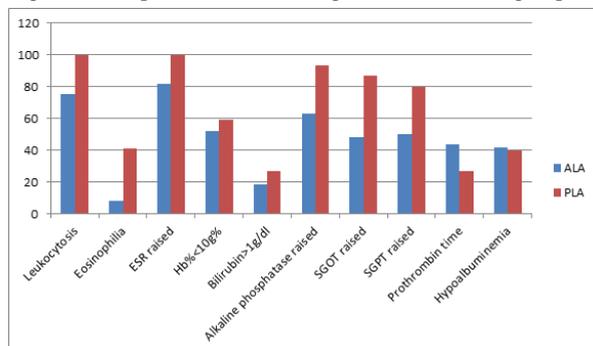
Table 3 : Comparison of Signs between two groups

Signs	ALA(%)	PLA(%)
Right upper quadrant tenderness	82(92.13%)	10(90.90%)
Intercostal tenderness	81(91.01%)	09(81.81%)
Hepatomegaly	65(73.03%)	07(63.63%)
Jaundice	19(21.34%)	02(18.18%)
Chest infections	11(12.35%)	01(09.09%)
Others	16(17.97%)	02(18.18%)

Table 4 : Comparison of lab. investigation between two group

Investigations	ALA(%)	PLA(%)
Leukocytosis(>10,000)	75.45	100.00
Eosinophilia	08.81	40.90
ESR raised	81.81	100.00
Hb% <10g%	51.81	59.09
Bilirubin>1g/dl	18.18	26.66
Alkaline phosphatase raised	62.72	93.33
SGOT raised	48.18	86.66
SGPT raised	50.00	80.00
Prothrombin time	43.63	26.66
Hypoalbuminemia	41.81	40.00

Figure 1 : Comparison of lab. investigations between two groups



CONCLUSION

Liver abscess is a fatal disease if early diagnosis and proper treatment is not initiated. ALA is the main type of liver abscess among patients attending tertiary care institute. Males are more commonly affected and there is strong relationship in occurrence of liver abscess with diabetes mellitus, addiction to alcohol and lower socioeconomic status; although people of mid and high socioeconomic status are also affected. This may be due to drinking contaminated water. Early recognition of clinical features and proper investigation including abdominal USG (which is relatively cheap and very sensitive) is very important. E. coli was the most common causative organism of PLA in our region. For small abscess, conservative or medical management is effective. However, for larger abscess, (>300cc) and left lobe abscess, medical management plus intervention such as catheter drainage (compared to needle aspiration) results in high cure rates with surgical option reserved for complications such as peritonitis.

REFERENCES

- Perez JY Jr. Amoebic liver abscess: Revisited. *Philip J Gastroenterol* 2006;2:11-3.
- Pillai DR, Keystone JS, Sheppard DC, MacLean JD, MacPherson DW, Kain KC. *Entamoeba histolytica* and *Entamoeba dispar*: Epidemiology and comparison of diagnostic methods in a setting of nonendemicity. *Clin Infect Dis* 1999;29:1315-8.
- Makkar RP, Sachdev GK, Malhotra V. Alcohol consumption, hepatic iron load and the risk of amoebic liver abscess: A case-control study. *Intern Med* 2003;42:644-9.
- Mukhopadhyay M, Saha AK, Sarkar A, Mukherjee S. Amoebic liver abscess: Presentation and complications. *Indian J Surg* 2010;72:37-41.
- Mathur S, Gehlot RS, Mohta A, Bhargava N. Clinical profile of amoebic liver abscess. *J Indian Acad Clin Med* 2002;3:367-73.
- 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.
- 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.
- Gyorfi E, Frey CF, Silva J Jr, McGahan J. Pyogenic liver abscess. Diagnostic and therapeutic strategies. *Ann Surg* 1987;206:699-705.
- Liew KV, Lau TC, Ho CH, Cheng TK, Ong YS, Chia SC, et al. Pyogenic liver abscess — A tropical centre’s experience in management with a review of current literature. *Singapore Med J* 2000;41:489-92.
- Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: Recent trends in etiology and mortality. *Clin Infect Dis* 2004;39:1654-9.

- Krige JE, Beckingham IJ. ABC of diseases of liver, pancreas, and biliary system. *BMJ* 2001;322:537-40.
- Kebede A, Kassa E, Ashenafi S, Woldemichael T, Polderman AM, Petros B. Amoebic liver abscess: A 20 year retrospective analysis at Tikur Anbessa Hospital, Ethiopia. *Ethiop J Health Dev* 2004;18:199-202.
- Chan KS, Chen CM, Cheng KC, Hou CC, Lin HJ, Yu WL. Pyogenic liver abscess: A retrospective analysis of 107 patients during a 3-year period. *Jpn J Infect Dis* 2005;58:366-8.
- Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: Ten years experience in a UK centre. *QJM* 2002;95:797-802.
- 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.
- 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.
- Sharma MP, Ahuja V. Amoebic liver abscess. *J Indian Acad Clin Med* 2003;4:107-11.
- Boonyapisit S, Chinapak O, Plengvanit U. Amoebic liver abscess in Thailand, clinical analysis of 418 cases. *J Med Assoc Thai* 1993;76:243-6.
- 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. p. 1411-75.
- 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.
- 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.
- Yu SC, Ho SS, Lau WY, Yeung DT, Yuen EH, Lee PS, et al. Treatment of pyogenic liver abscess: Prospective randomized comparison of catheter drainage and needle aspiration. *Hepatology* 2004;39:932-8.