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Clinical profile of liver absecess, and role of nonoperative and surgical management

[1] Naveen kushwah, [2] Reeta kushwah

[1] Assistant Professor, Department Of Surgery, Gajraraja Medical College Gwalior Mp

[2] Demonstrator, Department Of Anatomy, Gajraraja Medical College Gwalior M.P.

Abstract
Background: Our tertiary centre is situated in the region where 70% of population belongs to rural areas, where they lack proper sanitation, health education, along with increasing incidence of alcoholics, immune-compromised states. Thus we get large number of patients with liver abscess every day in out-door and emergency basis.
With this changing scenario in incidence, environmental conditions, diagnostic methods, treatment and complications associated with liver abscess has inspired me to do in-depth study regarding clinical profile, risk factors, and diagnostic and management strategies of liver abscess.
Aims and Objectives: To study the clinical features and various techniques used in the management of liver abscess, to study the role of non-operative management in liver abscess, to study the role of surgical management in liver abscess.
Material and Methods: The study was conducted in the department of General Surgery, Gajra Raja Medical College, Gwalior (M.P.). All the patients who was admitted in J.A.H. Group of hospital, Gwalior from July 2013-July 2014, with the clinical features of liver abscess and confirmed by the USG abdomen were studied. The study of the data was performed to document the clinical presentation, aetiology, diagnostic work-up, treatment morbidity and mortality. Radiographically guided aspiration and drainage of abscess was performed under local anaesthesia with an 18-guage needle and a range of different sized drainage catheters (8-12Fr) placed or surgical intervention was done for any complicated condition. Pus aspirated at the time of initial abscess was routinely sent for microbial culture and sensitivity analysis. Following completion of their treatment regimen, all the patients were followed up clinically and radiologically. Patient included were: Male and female 15-50 years, Aspirable and non-aspirable liver abscess, Solitary or multiple liver abscess, with any complications.
Results and Conclusion: Liver abscesses occurred most commonly between 30-60 years. Most of the cases had an acute presentation. Males were affected more than females. Pain abdomen was the most common symptom present in all 100 cases.Fever being the most consistently occurring symptom. Alcohol consumption was the single most important etiological factor for causation of liver abscesses. Alkaline phosphatase is the most consistently elevated among all Liver Function Tests.Raised WBC count, Alkaline phosphatise level, Diabetes, Hypoalbuminaemia, Prolonged Prothrombin time were considered as the predictive factors of complicated (Ruptured) liver abscess in this study.
Diabetes mellitus was more frequently associated condition in cases of liver abscess and especially pyogenic liver abscess cases. Liver abscess usually present as a solitary abscess most commonly in the right lobe of liver. Amoebic serology when performed using ELISA was positive in significant number of cases making it a strong marker in diagnosing Amoebic liver abscess and also Positive in 27 cases of pyogenic liver abscess suggesting significant incidence of mixed infection. The incidence of positive anti HIV serology was only 3.0% in this study. Enterococcus was the most common organism isolated in pyogenic liver abscess. All cases of liver abscesses do not require invasive management. Multiple small abscesses and solitary abscess of volume < 200 cc can be managed successfully on conservative antimicrobial therapy alone but recurrence rate was high.
Ultrasound Guided Percutaneous Aspiration & Pig Tail Catheter drainage procedure is a safe and effective method of liver abscess management. Laparotomy and Drainage or Laparoscopy drainage remains the standard of care in ruptured liver abscess into the peritoneal cavity in this study, as we had no recurrence and mortality associated with it. Cryptogenic was the most common aetiology in Amoebic liver abscess as well as in Pyogenic liver abscess. Peritoneal rupture was the most common complication associated with Liver abscess. There was no Mortality rate in this study.

Keywords: liver abscess, nooperative management, surgical management

Introduction

Liver abscess is the commonest infection affecting the liver and is a commoncondition in India. Based on aetiology it is classified into bacterial, parasitic and fungal. Amoebic liver abscess is more common than pyogenic liver abscess (PLA) on a global scale, but in tropical areas like India both amoebic and pyogenic liver abscess continues to be an important cause of morbidity and mortality [1]. The world health organisation reported that Entamoebahistolytica causes approximately 50 million cases and 100,000 deaths annually [2]. The vast majority of these infections are acquired in the developing countries like India where majority of population lives below poverty line and basic sanitary facilities are lacking. This coupled with overcrowding, urban slums and also outdoor unhygienic eating habits sets the stage for communicable diseases like amoebiasis. Locally made alcoholic drinks like neera, arrack may be the faeco-oral route for amoebic cysts. In developed parts of the

world, pyogenic liver abscess is relatively common to amoebic liver abscess. Pyogenic infections may be due to portal infection, and may be of biliary, arterial, or traumatic origin (often in young people secondary to acute appendicitis, and other intra-abdominal inflammatory condition). Ascending infection of the biliary tree secondary to obstruction is now the most identifiable cause of PLA. The aetiology of biliary obstruction has some geographic differences: in Western countries this scenario is common in patients with 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 [3]. Between 15 to 55% patients in different series, no identifiable cause or source for PLA was found (hence called cryptogenic) [4-6].

Though a readily treatable disease, if left untreated, liver abscess can be potentially fatal, leading to mortality ranging from 60-80% [7]. 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 intervention which is associated with significant morbidity and mortality ranging from 10-47% is now becoming unnecessary [8]. Primary prevention by improving sanitation, health education, early diagnosis and prompt treatment may result in lowering morbidity/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 [9]. Our tertiary centre is situated in the region where 70% of population belongs to rural areas, where they lack proper sanitation, health education, along with increasing incidence of alcoholics, immune-compromised states. Thus we get large number of patients with liver abscess every day in out-door and emergency basis. With this changing scenario in incidence, environmental conditions, diagnostic methods, treatment and complications associated with liver abscess has inspired me to do in-depth study regarding clinical profile, risk factors, and diagnostic and management strategies of liver abscess.

Aims and Objectives

- To study the clinical features and various techniques used in the management of liver abscess
- To study the role of non-operative management in liver abscess
- To study the role of surgical management in liver abscess

Material and Method

The study was conducted in the department of General Surgery, Gajra Raja Medical College, Gwalior (M.P.). All the patients who was admitted in J.A.H. Group of hospital, Gwalior from July 2013-July 2014, with the clinical features of liver abscess and confirmed by the USG abdomen were studied. The study of the data was performed to document the clinical presentation, aetiology, diagnostic work-up, treatment morbidity and mortality. Radiographically guided aspiration and drainage of abscess was performed under local anaesthesia with an 18-guage needle and a range of different sized drainage catheters (8-12Fr) placed or surgical intervention was done for any complicated condition. Pus aspirated at the time of initial abscess was routinely sent for microbial culture and sensitivity analysis. Following completion of their treatment regimen, all the patients were followed up clinically and radiologically. Patient included were: Male and female 15-50 years, Aspirableand non-aspirable liver abscess, Solitary or multiple liver abscess, with any complications

Results

Study Design: A Prospective Clinico-Pathological study with 100 patients diagnosed to have Liver Abscess and undergoing treatment in Department of Surgery, G.R. Medical College, Gwalior (M.P.) between july 2013 to july 2014. inclusive of a follow up period of 6 months, is undertaken, to study the Clinical, Pathological and Management Strategies in Liver Abscess.

Statistical Methods: Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. 95% Confidence Interval has been computed to find the significant features. Confidence Interval with lower limit more than 50% is associated with statistical significance.

Statistical software: The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1 ,Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate results.

Table 1: Duration of Illness

Duration of illness	Number of patients
Acute < 7 days	60
Subacute > 7 days	37
Chronic > 2 months	3

Table 2: Liver Function Test Analysis

LFT	Number of patients (n=100)	95%CI
S. albumin(<3mg/dl)	84	75.58-89.90
ALP (>150 IU /L)	83	74.45-89.11
SGOT >40 IU	52	42.32-61.54
SGPT>40 IU	45	35.61-54.76
Prolonged PT (>20 seconds)	29	21.01-38.54
S. Bilirubin (>2.4 mg/dl)	23	15.84-32.15

Table 3: Pus Culture

PUS culture	Number of patients (n=74)	95%CI
• Enterococcus	13	10.58-27.77
• Klebsiella pneumoniae	9	6.53-21.53
• E. coli	7	4.66-18.26
• Staph aureus	1	0.2-7.27
• Nil (Anchovy Sauce)	44	48.1-69.91

Table 4: Chest X-Ray Findings

Chest X-ray findings	Number of patients (n=100)	95%CI
Normal	39	30.02-48.80
Abnormal	61	51.20-69.98
• RPEF	52	42.32-61.54
• B/L PE	8	4.11-15.00
• KOCHS Lesion	1	0.18-5.46

Table 5: Usg Findings

USG findings	Number of patients (n=100)	95%CI
Solitary abscess	78	68.93-85.00
• Right lobe abscess	74	64.53-81.60
• Left lobe abscess	4	1.57-9.84
Multiple abscess	22	15.0-31.07
• Both lobe abscess	04	1.57-9.84
• Right Lobe (Multiple liver abscess)	18	11.70-26.67
Volume of liver abscess (cc)/Size (cms)	100	-
• <200/ <5 cms	26	18.40-35.37
• >200/ >5cms	74	64.63-81.60

Table 6: Usg Findings in Ruptured Liver Abscess

Treatment	Number of patients (n=21)	95%CI
Solitary abscess	18	65.36-95.02
• Right lobe abscess	17	60.00-92.33
• Left lobe abscess	1	0.8-22.67
Multiple abscess	3	4.98-34.64
• Both lobe abscess	1	0.8-22.67
• Right Lobe (Multiple liver abscess)	2	2.65-28.91

Table 7: Treatment

Treatment	Number of patients (n=100)	95%CI
Antibiotic coverage only (Conservative)	26	18.40-35.37
Percutaneus Aspiration under Antibiotic Coverage	49	39.42-58.65
Laparoscopy Drainage	09	4.81-16.23
Laparotomy & Procedure	12	7.00-19.81
Pig Tail Catheter	4	1.57-9.84
Thoracoscopy + Diagnostic laparoscopy	1	0.2-5.45
ICD Insertion	3	1.03-8.45

Table 8: Recurrence

Recurrence	Number of patients (n=100)	%	95%CI
Yes	8	8.0	4.11-15.00
No	92	92.0	85.00-95.89

Table 9: Correlation of Clinical Features with Type of Liver Abscess

Clinical features	Type Liver Abscess		P value
	ALA (n=70)	PLA (n=30)	
1.Solitary liver abscess	53 (75.7%)	25 (83.3%)	0.399
2.Multiple liver abscess	17 (24.3%)	5 (16.7%)	0.399
3.Pain	70 (100%)	30 (100%)	NS
4.Fever	64 (91.4%)	30 (100%)	0.174
5.Diarrhoea	10 (14.3%)	6 (20%)	0.475
6.Cough	14 (20%)	16 (53.3%)	0.001**
7.Tenderness + guarding	26 (37.1%)	23 (76.7%)	<0.001**
8.Hepatomegaly	34 (48.6%)	16 (53.3%)	0.663
9.Pleural effusion	36 (51.4%)	24 (80%)	0.008**
10.Ascites	7 (10.0%)	8 (26.7%)	0.032*
11.Jaundice	12 (17.1%)	12 (40%)	0.014*
12.Increased alkaline phosphatise	56 (80%)	27 (90%)	0.222
13.RBS >200 mg/dl	9 (12.9%)	20 (66.7%)	<0.001**
14.Wbc count >11,000	46 (65.7%)	26 (86.7%)	0.032*
15.Albumin <3g/dl	55 (78.6%)	29 (96.7%)	0.024*
16.Bilirubin (>2.4 gm/dl)	11 (15.7%)	12 (40%)	0.008**
17.Ruptured (Peritonitis)	10 (14.3%)	11 (36.7%)	0.012*

Table 10: Correlation of Etiology with Type 0f Liver Abscess

Etiology	Type Liver abscess		P value
	ALA (n=70)	PLA (n=30)	
Cryptogenic	68 (97.1%)	22(73.3%)	<0.001**
Biliary	0	4(13.3%)	0.007**
Amoebic colitis	2(2.9%)	0	1.000
HIV	2(2.9%)	1(3.3%)	1.000
Tuberculosis	0	3(10.0%)	0.025*
Alcoholism	55(78.6%)	29(96.7%)	0.034*

Table 11: complications

Complications	Number of patients (n=100)	%	95%CI
Intraabdominal rupture and peritonitis	21	21.0	14.17-29.98
Shock	4	4.0	1.57-9.84
Cholangitis	3	3.0	1.0-8.46
Pleural rupture	3	3.0	1.0-8.46
Pericardial rupture	0	0.0	-
Death	0	0.0	-

Discussion

Most of the patients who presented with Liver Abscess were in the middle age with patients in third to sixth decade accounting for 71.0% of the cases. Mean age of presentation is 47yrs, which is comparable to previous [10] Studies.

Present study shows a very high incidence of Liver Abscess in males [89.0%] as seen in other Indian studies like past studies [11, 12] The onset of the disease is subjected to great variations depending upon the type, location and quantity of liver abscess. It may be acute, insidious, clinically undetectable or fulminant form.In our study, most patients (60.0%) presented with duration of onset < 7 days (acute) as compared to other Study [13] which had most cases as Subacute Onset. Most of the patients who presented in this series presented with pain in Right Hypochondrium and Epigastriun [100%] and Fever [94.0%] which was more significant as compared to other studies listed below. RUQ Tenderness (100.0%), Fever (94.0%), Hepatomegaly (50.0%) was common presentation in

our series and was comparable to the studies [14] but Jaundice (24.0%) was more common clinical presentation compared to another study [15]. Alcoholism was found to be the most consistent etiological factor in this study of liver abscess. 84/100 (84%) of the cases of this study were found to be alcoholics as compared to other study [10] where 70% of the cases were alcoholic which concludes Alcoholism has a strong association with liver abscess patients. Lab. Investigations Leukocytosis, Raised Alkaline Phosphatase, Hypoalbuminaemia, Raised Prothrombin Time are the most important Laboratory Investigations in Diagnosing Liver Abscess. Present series showed trends similar to those of other study [15] but Raised Alkaline Phosphatase Levels was the single most common Labarotory abnormality in our study for Diagnosis of Liver abscess. Enterococcus (34.2%) was the most common organism in our study as compared to other studies [16, 17, 18] where E.coli (63.0%) was most common and other studies shows that klebsiella pneumoniae is most common organism [19, 20]. Out of 100 cases 85 cases were analysed and 10 cases were kept as negative control and one as positive control and the results were positive in 79/85 cases (92.94% cases) which shows there is a strong co-relation amoebic liver abscess and amoebic serology test (High Specificity Rate) comparable other [17, 18] studies. Out of 30 culture positive cases of Pyogenic liver abscess 27 cases came as amoebic serology positive. So out of 79 cases 27 cases had mixed infection (34.17%) as compared to other study [21] Association of Diabetes with pyogenic liver abscess in our series (6.7%) is comparable to other recent study [21] Chest x-ray findings were normal in 39/100 (39%) of the cases and abnormal in 61/100 (61%) of the cases and was comparable to other study [22, 23]. In our series Most cases had right sided pleural effusion 52/100 (52%). Three cases had a ruptured liver abscess into pleural cavity.Ultrasound abdomen was done to all patients in this study and various findings were analysed. Solitary abscess was seen in 78/100 (78.0%) of cases & Multiple abscesses were seen in 22/100 (22.0%) cases comparable to other Studies Right lobe involvement (74.0%) was comparable to other studies listed above but isolated left lobe involvement was 04% in our study as compared to other study [10, 16]. Controversies in the management of liver abscess still exist. Surgical drainage of liver abscess has been an accepted therapy for decades. The diagnosis and treatment of liver abscess has changed due to advances in imaging techniques. Out of the 100 cases in this study, 26 patients who had multiple small abscess and solitary abscess with volume < 200 cc or < 5cms size were treated conservatively. 74/100 (74%) who had abscess > 200 cc or left lobe abscesses were subjected to Intervention as compared past studies [23, 24] .Out of 74 cases 49% cases underwent Percutaneous aspiration under antibiotic coverage as compared previous studies [10] where 79.0% patients underwent Percutaneous Aspiration 4 cases underwent Pigtail catheter drainage under USG guided as abscess cavity was big and not completely liquefied (In our study size of abscess cavity was >10cms). Laparotomy as initial line of treatment was performed in 12/74 ruptured liver abscess cases (16.21%) and Laparoscopy drainage in 9/74 (12.16%) ruptured liver abscess as compared previous study [10] where 21.0% patients underwent surgical intervention. In our Study Intercostal drainage was required in three cases in whom the abscess had ruptured into pleural cavity, Patients survived. Thus in majority of cases percutaneous aspiration was the main form of treatment. All patients were started on antibiotics which were continued for 10- 14 days depending on improvement. Majority of patients responded excellently to percutaneous aspiration and antimicrobials. While patients who had smaller abscesses or multiple small abscesses were successfully managed with antimicrobial therapy alone but relapse rates were high.In 35/49 (69%) of the cases single aspiration was adequate. While 10/49 (19%) required 2 aspirations were required and 4/49 (9%) required 3 aspirations was comparable to other studies [12, 16, 19]. Thick viscous pus was the main reason for repeat aspirations. Average volume of the abscesses was larger in patients who required repeat aspirations in our study. The various complications that arose in the patients with liver abscesses in this study were analysed. Complications like Intraabdominal rupture with peritonitis (21.0%), pleural rupture (4.0%), Pericardial rupture (0.0%) was much less as compared to past Study [10] which is significant. In our series 8.0% recurrence rate with no mortality as compared to other studies [14, 19, 21] where recurrence rate was 9.0% and mortality rate 11.0% & 6.5%.In this study , alcohol consumption, Jaundice, anaemia, cough, diabetes mellitus, pleural effusion, hypoalbuminaemia, raised Alkaline phosphatise levels, Increased total leucocyte count and prolonged Prothrombin time were associated with protracted and longer duration of symptoms, longer time of resolution of symptoms and longer duration of stay. They were also associated with higher incidence of morbidity. Hence these factors are associated with complicated liver abscess and was comparable to other studies [8, 9, 14]. In our study Cryptogenic was the most common aetiology of liver abscess (Amoebic + Pyogenic) as compared to other study[10] where Cryptogenic was the most common in Amoebic Liver Abscess and Biliary Tract Disease was most common in Pyogenic Liver abscess Group. According to our study , liver abscess in HIV positive and HIV negative cases found no important significant difference between cases of liver abscesses who were anti HIV seropositive and anti-HIV seronegative.

Conclusion

Mean age of presentation of liver abscess was 46 years. The highest incidence occurred in the age group 31-60 years (71%). Males (89%) were more commonly affected than females. Acute onset of symptoms (<7 days) was the commonest mode of presentation (60.0%).Fever being the most consistently occurring symptom in 94.0% of cases.

Pain abdomen was the most common symptom present in all cases (100%), Diarrhoea occurred only in 16% of cases and cough in 30 % cases. Hepatomegaly was present in 50% of cases, Jaundice was found in 24% of the cases, While 04% of patients presented with features of shock. Respiratory findings in the form of pleural effusion, basal consolidation were present in 61% of cases. This study found the Alcohol as the single most consistent etiological factor in all patients of liver abscess. 94.38% of male cases consumed alcohol. All these cases mostly consumed locally made arrack, neera and toddy. All these patients had history of alcohol consumption more than 1 year. Thus it may seem likely that alcoholism may predispose to formation of liver abscesses. Laboratory investigations were analysed. Leucocytosis was found in 72.0% of cases. Anaemia was found in 23.0% of cases. 29% of cases were found to be diabetic. Raised urea levels were seen in 21% of cases. Alkaline phosphatase (83%) was the single most consistent liver function test to be abnormal in cases of liver abscesses.

Hypoalbuminemia was noted in 84% of cases, Prolonged Prothrombin time (>20 sec) in 29% cases and raised SGOT (52%) & SGPT (45%).Raised WBC count (>20,000 cells/cu.mm), Alkaline phosphatase level (>300 IU/l), Diabetes, Hypoalbuminaemia (<2.0mg/dl), Prolonged Prothrombin time (>20 sec) were considered as the predictive factors of complicated (Ruptured) liver abscess in our study. In our study, Diabetes mellitus (29%) was more frequently associated condition in cases of liver abscess and especially Pyogenic liver abscess cases (20/30)-66.67%.Out of these 74 cases, 44/74 cases had 'Anchovy sauce' appearance (suggestive of Amoebic aetiology) of the pus which revealed no growth, giving this a percentage of 59.45%. While growths were obtained in 30/74 (40.54%) of these cases. E. coli was isolated in 7/74 (9.45%) of cases and Klebsiella pneumoniae was isolated in 9/74 (17.56%) of the cases, and Enterococcus in 13/74 (34.2%) patients and in one case Staphylococcus aureus. So Enterococcus was the most common organism isolated in pyogenic liver abscess and 59.45% patients had no growth (Amoebic liver abscess).Chest X-ray were normal in 39 % of cases and abnormal in 61% of cases. Right pleural effusion was noted in 52% of cases. Ultrasonography revealed solitary abscess in 78.0% and multiple abscesses in 22.0%. Isolated right lobe abscess was seen in 74.0% and left lobe abscess in 04%. Both lobe involvement was seen in 18.0% of cases. Number of cases with abscess volume < 200 cc or size <5cms was 26% and those > 200 cc or size >5cms was 74%.Out of the total 100 cases in this study, cases who had multiple small abscesses and solitary abscesses < 200 cc were managed conservatively. 26/100 (26.0%) were managed conservatively but recurrences noted. While 49/100 (49%) were subjected to percutaneous aspiration, 4 cases underwent Pig Tail Catheter Drainage, 12/100 (12.0%) required Laparotomy and Drainage and 9/100 (9%) underwent Laparoscopically drainage for ruptured liver abscess along with (3/100, 3%) required ICD insertion for rupture into pleural cavity. Patients were followed up once monthly for 3 months and thereafter once in six months repeat USG scan were done as indicated. Recurrences were noted in 8/100 (08%) of cases in Conservative Management group. Out of 49 cases 35 cases underwent single aspiration, 10 cases underwent twice aspiration and 4 cases underwent thrice aspiration. 4 cases underwent Pigtail catheter drainage under USG guided as abscess cavity was big and not completely liquefied (In our study size of abscess cavity was >10cms)

Cryptogenic was the most common aetiology in Amoebic liver abscess (97.1%) and Pyogenic liver abscess (73.3%)

Peritoneal rupture (21.0%) was the most common complication associated with Liver abscess.Amoebic serology was performed in 85 cases using ELISA Technique .79/85 cases (92.94%) were positive suggesting a very strong marker in diagnosing amoebic liver abscess cases and also Positive in 27 cases of pyogenic liver abscess suggesting significant incidence of mixed infection (34.17%).HIV serology was done in all patients of liver abscess in this study to investigate the relationship between immunocompromised state and liver abscess. However this study found only 3/100 (3.0%) of cases to have positive anti HIV serology. There is no mortality in our study.

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