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A STUDY ON CLINICO-ETIO-PATHOLOGICAL ASPECTS OF LIVER ABSCESS

General Surgery

Dr. Ayyar Srinivas Mahesh Assistant Professor Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India

Dr. K. Visweswara Rao* Associate Professor Department of General Surgery Alluri Sitarama Raju Academy of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India *Corresponding Author

Dr. N. Venkata Naga Praneeth Postgraduate Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India

ABSTRACT

Liver abscess is a common condition in India. India has 2nd highest incidence of liver abscess in the world. Liver abscesses are caused by bacterial, parasitic or fungal infection. WHO reported that Entamoeba Histolytica causes approximately 50 million cases and 100,000 deaths annually. In the wake of HIV epidemic in our country, this study also tries to investigate the relation between liver abscess and immunocompromised state of AIDS. This study has tried to delineate clinical profile, risk factors and management strategies of liver abscesses. This prospective study was obtained from 100 patients diagnosed to have Liver Abscess. We found that Alcohol consumption was the single most important predisposing factor. Raised WBC count, Alkaline phosphatase level, Diabetes, Hypoalbuminemia, Prolonged PT were considered as the predictive factors of complicated (Ruptured) liver abscess in this study. Ultrasound Guided Percutaneous Aspiration & Pig Tail Catheter drainage procedure is a safe and effective method of liver abscess management. Laparotomy or Laparoscopy drainage remains the standard of care in ruptured liver abscess. Cryptogenic was the most common etiology in Amoebic liver abscess as well as in Pyogenic liver abscess.

KEYWORDS

liver abscess, HIV, predisposing and predictive factors.

1. Introduction:

Liver abscess is a common condition in India. India has 2nd highest incidence of liver abscess in the world. Liver abscesses are caused by bacterial, parasitic or fungal infection. In 1938, Ochsner's classic review heralded surgical drainage as the definitive therapy; however, despite the more aggressive approach to treatment, the mortality rate remained at 60-80%.[1] Pyogenic abscesses account for three quarters of hepatic abscess in developed countries. While amoebic liver abscess cause two third of liver abscess in developing countries. Amoebiasis is presently the third most common cause of death from parasitic disease. WHO reported that Entamoeba Histolytica causes approximately 50 million cases and 100,000 deaths annually. In a country like India where majority of population lives below poverty line, basic sanitary facilities are lacking. This coupled with overcrowding and urban slums and also outdoor unhygienic eating habits sets the stage for communicable diseases like Amoebiasis. Up to 40% of patients develop complications from pyogenic liver abscesses, with the most common being generalized sepsis. In the wake of HIV epidemic in our country, this study also tries to investigate the relation between liver abscess and immunocompromised state of AIDS. This study has tried to delineate clinical profile, risk factors and management strategies of liver abscesses.

2. Aims and Objectives:

The objective is to determine

- Demographic profile, Etiology, Spectrum of Clinical Presentations, Evaluate laboratory investigations profile, the efficacy of Radiological studies in determining the etiology of liver abscess and in differentiating it from other hepatobiliary conditions.
- To study the bacteriological characteristics including its antibiotic sensitivity, Amoebic Serology Tests Using ELISA.
- To study the influence of alcohol, HIV leading to increased incidence of Liver abscess and to evaluate efficacy, recurrence rate, complications, morbidity & mortality, duration of hospital stay associated with various Management Strategies followed.

3. Materials and Methods:

The data for this prospective study was obtained from 100 patients diagnosed to have Liver Abscess and treated at Alluri Sitarama Raju Academy of Medical Sciences (ASRAM), Eluru, between January 2012 to May 2013 inclusive of a follow up period of 6 months.

Inclusion criteria:

1. All cases of liver abscess diagnosed clinically and/or ultrasonographically.
2. All cases of bacterial and parasitic liver abscess.
3. All cases in evolving liquefied & ruptured stage with or without peritonitis.

Exclusion criteria:

1. Age <18yrs not included.
2. Traumatic Liver Abscess.
3. Abdominal or biliary surgery antecedents.
4. Abdominal neoplasia antecedents.
5. Patients lost in early follow up.

Detailed history & physical findings of patient were taken.

Haemogram, LFT, Prothrombin time, Serology for amoebic antigen and USG of Abdomen & Pelvis were done.

Patient was put on conservative management and followed up daily clinically and LFT & USG Abdomen was repeated on the 3rd day if patient symptomatically not relieved.

Repeat Ultrasound / CT /MRI Abdomen & pelvis will be done immediately if patient condition does not improve/worsens or after 3-4 days as a routine.

If the patient develops any of the complications like rupture in to any of the serosal cavity, patient was immediately taken up for surgery (Laparotomy drainage or Laparoscopic drainage).

Pus was sent for Gram's stain and culture and sensitivity.

Anaerobic cultures were not done as the facility was not available in our hospital.

Blood cultures were not routinely performed in all cases.
Patient was informed about any surgical procedure and consent taken.

MANAGEMENT:

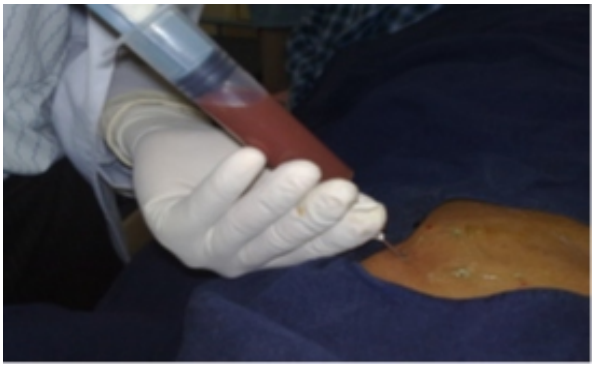
Treatment Modalities

Four groups of different treatment modalities were formed.
Drug therapy only.

USG guided aspiration + Drug.
Percutaneous Catheter Drainage (PCD) + Drug.
Laparotomy and drainage + Drug.

Criteria for Conservative Treatment Only
All uncomplicated abscesses.
No features of rupture /impending rupture.
No compression effect.
Symptoms subsided after 72- 96 hours of treatment.

Criteria for Ultrasound Guided Aspiration
Large abscess having impending rupture/compression sign.
Depending on the site & Size varying from > 5cm / > 200ml – onward.
Multiple abscess both left and right lobe.
Failure in the improvement on non invasive treatment after 4-5 days.

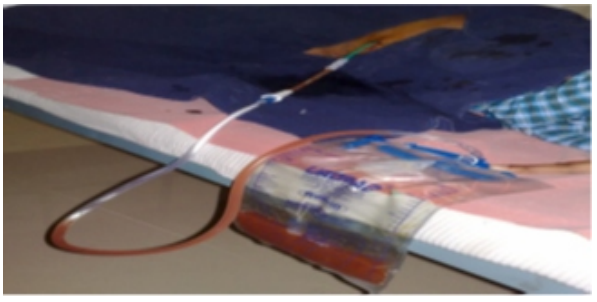


PERCUTANEOUS ASPIRATION USG GUIDED IN THE RIGHT 7TH INTERCOSTAL SPACE SHOWING ANCHOVY SAUCE ASPIRATE.

Criteria for Percutaneous Catheter Drainage
Thick collection not getting aspirated by needle
Failure of ultrasound guided aspiration

When there is impending rupture or compression sign present and features of secondary infection.

8 -12F percutaneous catheter was placed under USG guidance and local anesthesia.



POST PROCEDURE SHOWING 150 ML OF ANCHOVY SAUCE COLLECTION IN THE UROSAC DRAINING FROM LIVER ABSCESS.

Criteria for Laparotomy & Drainage
Ruptured abscess in the peritoneal cavity
Features of peritonitis, involving other viscera.

Complicated ALA ruptured in the pleural/ pericardium cavity if required.

All patients were administered antibiotics intravenously initially upon admission. All patients were started with metronidazole at a dose of 40 mg/kg/day is divided doses for 14 days. If upon aspiration, pus revealed growth of organisms than appropriate antibiotics were instituted in full course (3rd generation cephalosporin + aminoglycoside). Patients were examined daily for clinical improvement. Ultrasonography was done as indicated. Relapses were noted and repeat aspirations were performed when necessary. Patients were followed up Monthly for first 3 months then once after 6 months, for recurrent attacks or development of complications and to monitor the efficacy of the treatment given.

4. Results:
Age of the patients included in this study varied from 19-75 years with mean age of 47. The highest incidence was noted in the age group of 31-40 years (25.0%) and 51-60 years (25%). 89% of patients were male and 11% were female**.**

In this study patients presented acutely with onset of symptoms < 7 days in 60/100 (60.0%) of cases. Sub acute, presentation between 7 days – 2months was noted in 37/100 (37.0%). Chronic duration of onset > 2 months was seen in 3/100 (3%) of cases.

On evaluation of symptoms abdominal pain was present in all cases (100.0% of patients). Fever was the most consistent symptom occurring in 94/100 (94%). Diarrhea occurring in 16/100 (16%), jaundice was present in 24% (24/100) of patients. 30 patients (30%) presented with respiratory symptoms like cough. On evaluation of the clinical signs Fever was present in 94.0% (94/100) of the cases. Abdominal tenderness was elicited in right hypochondrium and some cases in epigastrium in all 100 cases. Hepatomegaly was seen in 50/100 (50%) of cases. Icterus was observed in 24/100 (24%) of cases clinically. 3(23.0%) had pallor on general examination while 4(4%) presented with shock and features of shock.

Respiratory findings included right pleural effusion, basal consolidation, and basal crepts. In the present study, respiratory findings were present in 61(61%) of the cases.

84% of the patients are Alcoholic with 95%CI (75.58-89.90) which is statistically significant. Out of that 79 cases were male (94.3%) cases with 95% CI (86.06 – 96.87) which is statistically very much significant and one case was a female case.

On laboratory investigations 72% of the patients had WBC >11000 with 95%CI (62.51-79.86) which is statistically significant Anemia (Hb < 10 gm/dl) were found in 23(23%). Mean Hb in this study group was 11.46 gm/dl. The Hb% of the patients ranged from 6.4-17.0 gm%. Leucocytosis (> 11,000c/cumm) was found in (72/100) 72.0% of cases. Mean WBC count was 14,770 c/cumm and it ranged from 5000-42,400 c/cumm. 29/100 (29 %) were found to be diabetic with RBS > 200mg/dl. The mean RBS was 120 mg/dl and ranged from 60-390 mg/dl, raised urea (> 45 mg/dl) was found in 21(21%) of the cases. Mean urea levels in cases was 33mg/dl and it ranged from 18-82 mg/dl and Serum Creatinine (>1.4g/dl) was seen in 16% cases.

84% of the patients had S.albumin < 3mg/dl with 95%CI (75.58-89.90) and 83% had ALP >150 IU/L with 95%CI (74.45-89.11) which is statistically significant. Serum Bilirubin > 2.4 gm/dl was found in 23 (2%) of the cases in this study. Alkaline phosphatase was found to be raised in 83(83%) of cases. Increased prothrombin time > 20 sec was seen in 29(29%) of cases. Increased SGOT and SGPT were seen in 52% and 45%of the cases in this study.

Table 1: LIVER FUNCTION TEST ANALYSIS

LFT	%	Number of patients (n=100)	95%CI
S. albumin(<3mg/dl)	84	84.0	75.58-89.90
ALP (>150 IU /L)	83	83.0	74.45-89.11
SGOT >40 IU	52	52.0	42.32-61.54
SGPT>40 IU	45	45.0	35.61-54.76
Prolonged PT (>20 seconds)	29	29.0	21.01-38.54
S. Bilirubin (>2.4 mg/dl)	23	23.0	15.84-32.15

On pus culture analysis Enterococcus was the most common organism cultured in our study (34.2%). E.coli & Klebsiella pneumoniae were other organisms cultured (9.45% & 17.56% respectively). Staph. Aureus was found only in 1(1.35%). 59.45 % of the Cultures showed no growth.

On amoebic serological study: (ELISA IgG) Negative Controls which showed 100% negativity with 95%CI (72.25–100) which is statistically significant to rule false positive results. Out of 100 cases 85 cases were analyzed 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 between amoebic liver abscess and amoebic serology test which is statistically

significant. Out of 30 cultures positive cases of Pyogenic liver abscess 27 cases came as amoebic serology positive. So out of 79 cases 27 cases had mixed infection (34%).

Table 2: AMOEBIC SEROLOGICAL STUDY: (ELISA IgG)

AMOEBIC SEROLOGICAL STUDY	Number of patients	%	95%CI
Total number of patients	85	100.0	-
Positive	79	92.9	85.44-96.72
Negative	6	7.1	3.28-14.56
Total number of Negative Controls (sample Index <1.1)	10	100.0	-
Positive	0	0.0	-
Negative	10	100.0	72.25-100.00
Total number of positive controls (sample Index >1.1)	1	100.0	-
Positive	1	100.0	-
Negative	0	0.0	-

On analyzing the incidence of HIV in liver abscess patients only 3(3%) of cases were found to have Positive anti HIV serology while 97(97.0%) were negative.

USG abdomen was done in all cases. Solitary abscess was observed in 78(78%) of cases with 95% CI (68.93 – 85.00) which is statistically significant while multiple abscesses were noted in 22(22%) of the cases. Isolated right lobe abscess were seen in 74(74%) of cases with a 95% CI (64.53-81.60) which is statistically significant and left lobe abscesses were seen in 4(4%) of cases. Both lobe involvement was seen in 4(4%) of cases. Multiple right lobe liver abscess in 18 cases (18%). No. of cases with single abscess <200cc were 26(26%) and > 200 cc were 74(74%) with 95% CI (64.63 – 81.60) which is statistically significant. Ruptured liver abscess presenting in right lobe was found in 80% with a 95% CI (60.00-92.33) which is statistically significant. In cases of ruptured liver abscess 18 cases (85%) presented as Solitary abscess with a 95% CI (65.36 – 95.02) which is statistically significant and 3 cases as multiple abscesses.

Of the 100 cases of liver abscesses included in this study, 26 cases (26%) who had abscess less than 200 cc or multiple small abscess involving both lobes were managed conservatively. 74 (74%) who had abscess > 200 cc or left lobe abscesses were subjected to Intervention. Out of 74 cases 49 cases underwent percutaneous aspiration under antibiotic coverage with a 95% CI (39.42 – 58.65) which is significant. 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). 12 Cases underwent Laparotomy procedure and 9 cases underwent laparoscopic drainage for ruptured liver abscess cases (21%) and 3 patients required ICD insertion.

On evaluation of number of aspirations 71.4% of patients (95% CI (57.59-82.15) required Percutaneous aspiration only once for resolution of the abscess which is statistically significant. 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.

Alcoholism (>10yrs), Alkaline Phosphatase (>300IU/ml), Albumin (<2.0mg/dl), Prothrombin time (>20 seconds), TLC (>20,000 cc/mm), Pleural effusion and Hospital stay (>3weeks) were found to have strong correlation with complicated liver abscess with a statistically significant as P value <0.001 which shows they are good predictive marker of complications associated with liver abscess (Ruptured Liver Abscess).

TABLE 3: CORRELATION OF PREDICTORS OF COMPLICATED LIVER ABSCESS ACCORDING TO MANAGEMENT

Predictors	Cons(liver abscess < 200cc) (n=26)	PCA (liver abscess > 200 cc) (n=53)	Ruptured liver abscess (n=21)	P value
Alcoholism(>10 yrs)	0	10(18.9%)	21(100.0%)	<0.001**
Alkaline phosphatase (>300 IU/ml)	3(11.5%)	3(5.7%)	18(85.7%)	<0.01*
Albumin (<2.0mg/dl)	0	5(9.4%)	18(85.7%)	<0.001**
Prothrombin time (>20 seconds)	2(7.7%)	6(11.3%)	21(100.0%)	<0.001**
TLC(>20,000 cc/mm)	0	1(1.9%)	21(100.0%)	<0.001**
Pleural effusion	6(23.1%)	33(62.3%)	21(100.0%)	<0.001**
Hospital stay (>3weeks)	0	6(11.3%)	17(80.9%)	<0.001**
Onset (<7 days)	16(61.5%)	25(47.2%)	19(90.5%)	0.002**

Cryptogenic and Alcoholism was the most common Etiology in Amoebic Liver Abscess which is statistically significant as P value <0.005 which is very significant.

Cryptogenic, Alcoholism and Biliary Tract Disease, Tuberculosis was the most common Etiology in Pyogenic Liver Abscess which is statistically significant as P value <0.005 which is very significant.

There was no recurrence in 92% of patients with a 95% CI (85-95).

TABLE 4: 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*

Diabetes (RBS>200mg/dl), Cough, Tenderness and Guarding, Pleural Effusion, Ascites, Jaundice (Bilirubin >2.4 gm/dl), Raised TLC (>11,000 cells/cu.mm), Hypoalbuminemia (Albumin <3gm/dl), Ruptured Liver Abscess (Peritonitis) was statistically significant finding in Pyogenic Liver Abscess and suggests a strong co-relation as P value <0.005 which is significant and 27 cases of pyogenic abscess were amoebic serology positive which indicates that pyogenic liver abscess cases were amoebic liver abscess cases with secondary infection which suggests that Solitary liver abscess can be attributed as a finding associated with Amoebic Liver Abscess which is significant.
The various complications in the 100 cases of liver abscesses were analyzed. Intra abdominal rupture with peritonitis was seen in 21(21%) of cases. Features of shock in 4 (4%), Cholangitis in 3% of cases. Pleural rupture was seen in 3(3%) of cases.

5. 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 other Studies conducted by Shyam Mathur[2] 20 – 45 years (32.5 years) and Antonio Grorgia[3] 16 – 78 years (45.3 years).

Present study shows a very high incidence of Liver Abscess in males [89.0%] as seen in other Indian studies like Shyam Mathur[2] [90.0%].

Right upper quadrant Tenderness (100.0%), Fever (94.0%), Hepatomegaly (50.0%) was common presentation in our series and was comparable to the studies listed below but Jaundice (24.0%) was

more common clinical presentation compared to study done by Hyo Min Yoo et al[4] (7.0%).

84/100 (84%) of the cases of this study were found to be alcoholics as compared to other study by Shyam Mathur et al[2] where 70% of the cases were alcoholic which concludes Alcoholism has a strong association with liver abscess patients.

Enterococcus (34.2%) was the most common organism in our study as compared to other studies like Hyo Min Yoo et al[4] where E.coli (63.0%) was most common and Khee Siang, Chin Ming et al[5] (82.3%) and Hiroshi Okana et al[6] (62.0%) where Klebsiella pneumoniae was the most common organism.

Out of 30 cultures 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 World J Gastroenterology 2008 April 7; 14(13): 2089-2093[7] showed 32% mixed infection.
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 Hyo Min Yoo et al[4] (69%) but isolated left lobe involvement was 4% in our study as compared to other study Hyo Min Yoo et al[4] (11.0%) and Chaturbhuj Lal Rajak et al[8] (20.0%).

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 to Hyo Min Yo et al[4] Study where 100.0% patients underwent intervention. Out of 74 cases 49% cases underwent Percutaneous aspiration under antibiotic coverage as compared to Hyo Min Yo et al Study[4] 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 to Hyo Min Yo et al[4] Study where 21.0% patients underwent surgical intervention.

Complications like Intraabdominal rupture with peritonitis (21.0%), shock (4.0%) pleural rupture (3.0%), Pericardial rupture (0.0%) was much less as compared to Study by Hyo Min Yoo et al[4] (59%) which is significant.

In our series 8.0% recurrence rate with no mortality as compared to other studies like Hyo Min Yoo et al[4] where recurrence rate was 9.0% and mortality rate 11.0% which is very high and Khee – Siang Chin Mint et al[5] where mortality was 6.5%.

In our study Cryptogenic was the most common aetiology of liver abscess (Amoebic + Pyogenic) as compared to other study Hyo Min Yoo et al[4] where Cryptogenic was the most common in Amoebic Liver Abscess and Biliary Tract Disease was most common in Pyogenic Liver abscess Group.

6. Conclusion:

Liver abscess is a very common condition in India. India has second highest incidence of liver abscess in the world. Alcohol consumption was the single most important predisposing factor. Raised WBC count, Alkaline phosphatise level, Diabetes, Hypoalbuminemia, Prolonged PT were considered as the predictive factors of complicated (Ruptured) liver abscess in this study. Ultrasound Guided Percutaneous Aspiration & Pig Tail Catheter drainage procedure is a safe and effective method of liver abscess management. Laparotomy or Laparoscopy drainage remains the standard of care in ruptured liver abscess. Cryptogenic was the most common aetiology in Amoebic liver abscess as well as in Pyogenic liver abscess.

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