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Original Research Article

Comparative Study of Conservative Management, Ultrasound Guided Needle Aspiration and Ultrasound Guided Pigtail Drainage of Uncomplicated Amoebic Liver Abscess

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Conflict of interest: Nil

Abstract

Background: Ultrasound guided aspiration and pigtail catheter insertion in ultrasonographic guidance are safe procedures without any major or life threatening complications. This study was conducted in The Department of General Surgery and Radiodiagnosis in Maharaja Agrasen Hospital, Punjabi Bagh, New Delhi, on patients who were admitted from casualty and outpatient department with a diagnosis of amoebic liver abscess (ALA).

Methods: A total of 60 patients were identified as the study group for the purpose of thesis. The mean duration of symptoms at presentation in Study Group I was 15.710.77, in Group II was 14.110.34 and in Group III was 16.49.37. VAS was measured at completion of 48 hours of therapy allotted to each group. The change in TLC in these patients was statistically significant (p=0.00).

Results: In Group I (16/20) patients, the mean hospital stay was 5.750.68 and 4.470.72 days, respectively. Group II (17/20) cases showed no improvement in VAS. Group III (20/20): The mean TLC was 84401522.947 cells/mm3. In Group II (20/20), 4 nonresponders (20 %) of Group I, were shifted to Group II and 3 non-responders (15 %) from Group II, were moved to Group III due to persistent pain & fever and no improvement of TLC & abscess size.

Conclusion: Our study shows marked and rapid clinical, biochemical and radiological improvement in patients of ALA treated with USG guided indwelling catheter drainage along with medical treatment particularly in large abses or abcess containing thick pus.

Keywords: Laparoscopic cholecystectomy, Antibiotic therapy, SSI, Prophylaxis.

Introduction

Liver abscess is a common condition in India. It is associated with high morbidity and mortality. It is a common disease of tropical region. Abscess develops in liver due to various reasons, but is broadly classified into amoebic and pyogenic. Invasive amoebiasis is caused by Entamoeba histolytica. Entamoeba involves about 10% of world population, in which only 10% of infected cases develop the clinical syndrome of amoebic manifestations. Out of this, only 3-9% cases develop amoebic liver abscess [1].

Colonic amoebae are mainly responsible for the development of the abscess. Ingestion of E. histolytica cysts through faeco-oral route is the cause of Amoebiasis [2]. Excystation occurs in caecum and colon, where pH is optimal and trophozoites are released. Normally, no invasion occurs and patient develops Amoebic Dysentery alone and becomes an asymptomatic carrier. In some cases, the trophozoites invade the intestinal mucosa, travel through the mesenteric lymphatics and veins, and begin to cumulate in the hepatic parenchyma causing thrombosis with infarction and local necrosis. Liquified hepatic parenchyma with blood and debris gives a characteristic Anchovy paste appearance [3].

The options in managing amoebic liver abscess are medical and percutaneous or open surgical drainage. [4] Uncomplicated amoebic liver abscess has been managed conservatively with amoebicidal and antibiotic drugs. However, ultrasound guided pigtail catheter drainage has been advocated more recently.

There are different views and protocols for the management of this disease. [5]

Aims and Objectives

1. To compare the therapeutic efficacy of conservative management, USG guided needle aspiration and USG guided pigtail catheter drainage along with medical treatment of uncomplicated Amoebic Liver Abscess.
2. To study the safety of ultrasound guided aspiration and pigtail drainage of uncomplicated amoebic liver abscess.

Materials and Methods

This study was conducted in The Department of General Surgery and Radiodiagnosis in Maharaja Agrasen Hospital, Punjabi Bagh, New Delhi, on patients who were admitted from casualty and outpatient department with a diagnosis of amoebic liver abscess (ALA). The diagnosis of ALA was based on clinical history of fever, right upper abdominal pain with or without diarrhoea, malaise and anorexia, and findings of tender hepatomegaly, leucocytosis, amoebic serology, ultrasonographic evidence of amoebic liver abscess and cytology & culture of aspirated pus. On this basis a total of60 patients were identified as the study group for the purpose of thesis. They were further divided in the following three groups:-

Study Group I [n=20] : These patients were treated with antiamoebic and antibiotic drugs.

Study Group II [n=20] : These patients were treated by ultrasound guided needle aspiration in addition to antiamoebic and antibiotic drugs.

Study Group III [n=20]: These patients were treated by ultrasound guided indwelling pigtail catheter drainage in addition to antiamoebic and antibiotic drugs.

Inclusion Criteria :

Patients with Amoebic liver Abscess with size of ≥ 6.0 centimeters in maximum diameter or volume of ≥100 mililiters.

Exclusion Criteria:

- Ruptured abscess.
- Paediatric age group
- Pyogenic liver abscess

Methodology

The patients in study group were subjected to:

a) A complete general medical and physical examination.

b) Routine and Specific Investigations

- Complete Haemogram
- Liver function test
- Amoebic serology test
- Prothrombin time
- Upper Abdominal Ultrasound
- Chest Skiagram
- Abdominal C T Scan
- Microscopic examination and culture of aspirated pus

For quantitative data: To compare the means between two groups, t-test for independent values was used while for paired values, paired t-test was used.

For qualitative data: Difference between two proportions was calculated by chi square test for independent groups while for paired values, Mc-Nemar Test was applied.

Observation

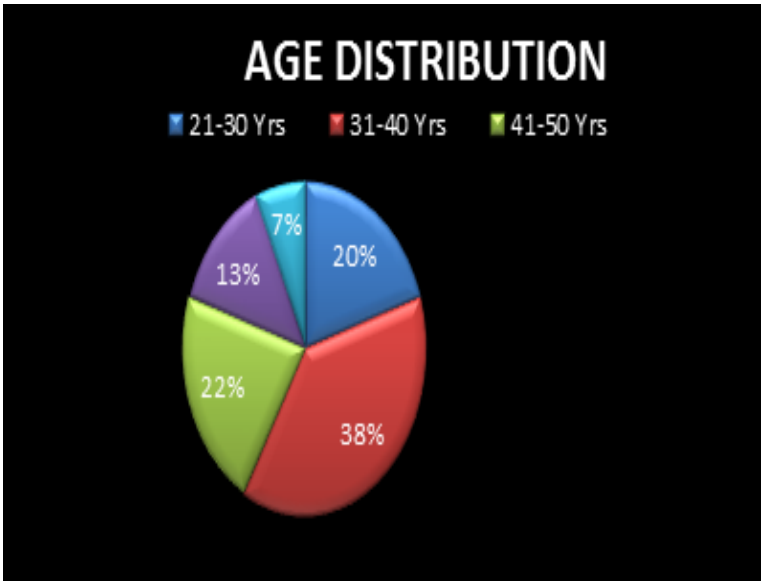
Age Distribution

Out of the study cases of ALA, large number (n=48; 80%) of cases, presented in patients <50 years of age and maximum number of cases (n=23; 38.3%) were seen between the age group of 31-40 years.

In the study Group I patients, the age ranged from 25 years to 63 years with a mean age of 40.85±10.03 years. The range of age in Group II patients was 22-66 years and mean age being 40.3±12.38 years. The range of age in Group III was 21-65 years and mean age being 40.45±11.11.There was no statistically significant difference between the mean of these groups {p>0.05 (0.987)}.

Table 1: Age distribution

Age group (years)	Study groups (n=60)			Total
	Group I (n=20)	Group II (n=20)	Group III (n=20)	
21-30	3	5	4	12 (20.04 %)
31-40	8	8	7	23 (38.41 %)
41-50	5	2	6	13 (21.71 %)
51-60	3	3	2	8 (13.36 %)
>60	1	2	1	4 (6.68 %)



Sex Distribution

In our study groups, there were 18 (90 %) males in Group I and group II. Group III has 19 (95 %) males. Whereas, there were 2 (10 %) females in group I & II and only 1 (5 %) female in group III.

Table 2: Sex distribution

Case Groups	Males	Females
I	18	2
II	18	2
III	19	1

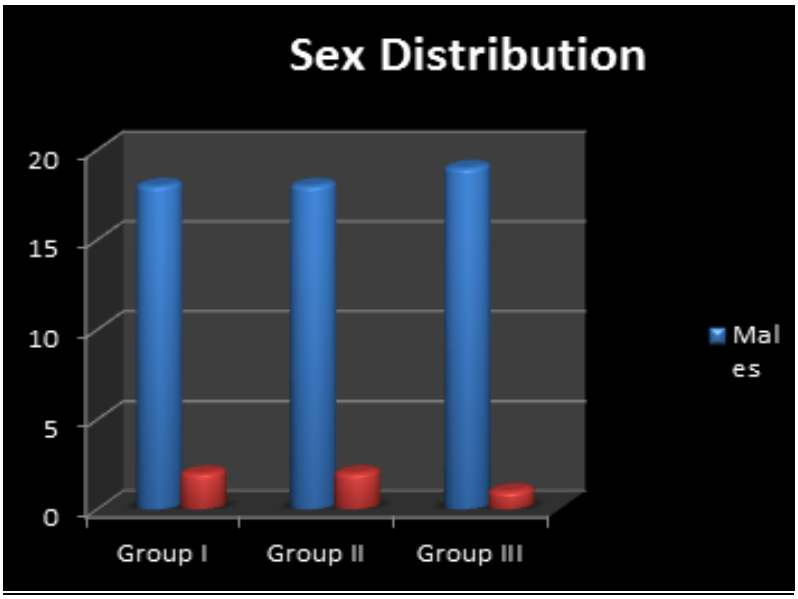
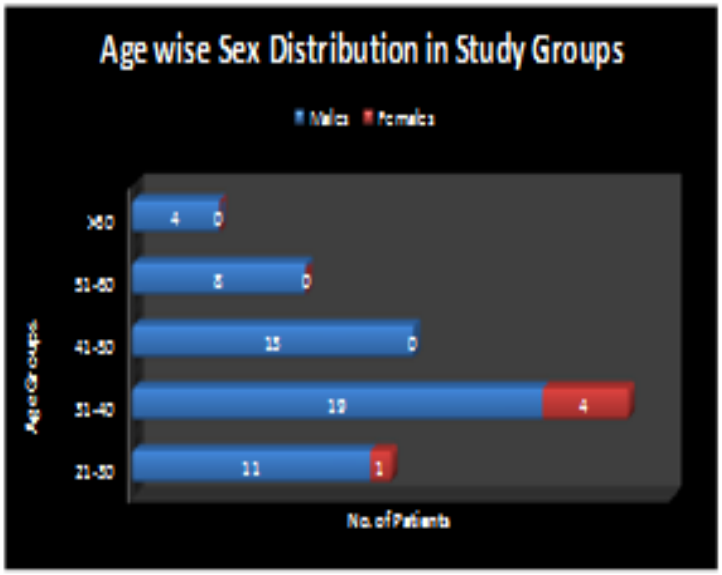


Table 3: Age wise sex distribution

	Group I (20)		Group II (20)		Group III (20)		Total	
Age (Years)	Males	Females	Males	Females	Males	Females	Males	Females
21-30	3	0	4	1	4	0	11	1
31-40	6	2	7	1	6	1	19	4
41-50	5	0	2	0	6	0	13	0
51-60	3	0	3	0	2	0	8	0
>60	1	0	2	0	1	0	4	0

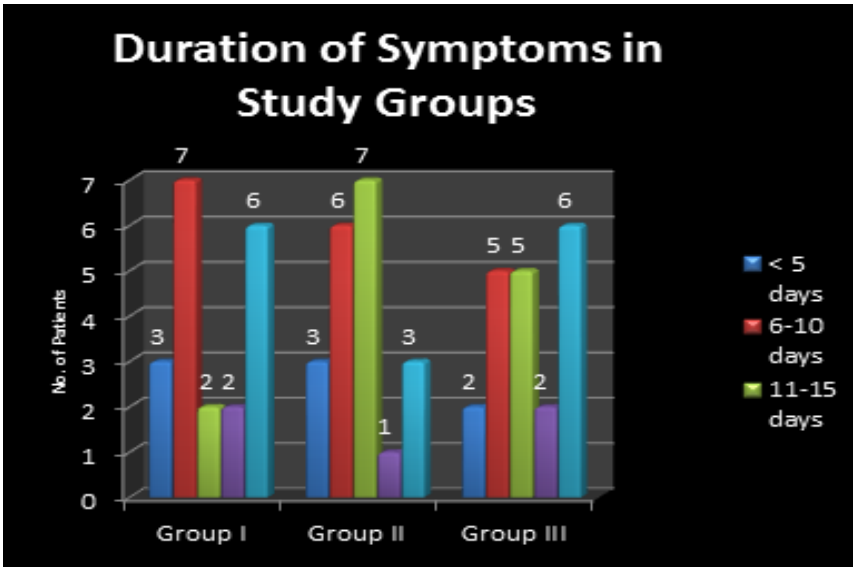


Duration of Symptoms In Study Groups

The mean duration of symptoms at presentation in Study Group I was 15.7±10.77, in Group II was 14.1±10.34 and in Group III was 16.4±9.37. There was no significant difference between the groups {p > 0.5 (0.779).

Table 4: Duration of symptoms in study groups

Duration (Days)	Group I	Group II	Group III
<5	3	3	2
6-10	7	6	5
11-15	2	7	5
16-20	2	1	2
>20	6	3	6



Alcohol Intake

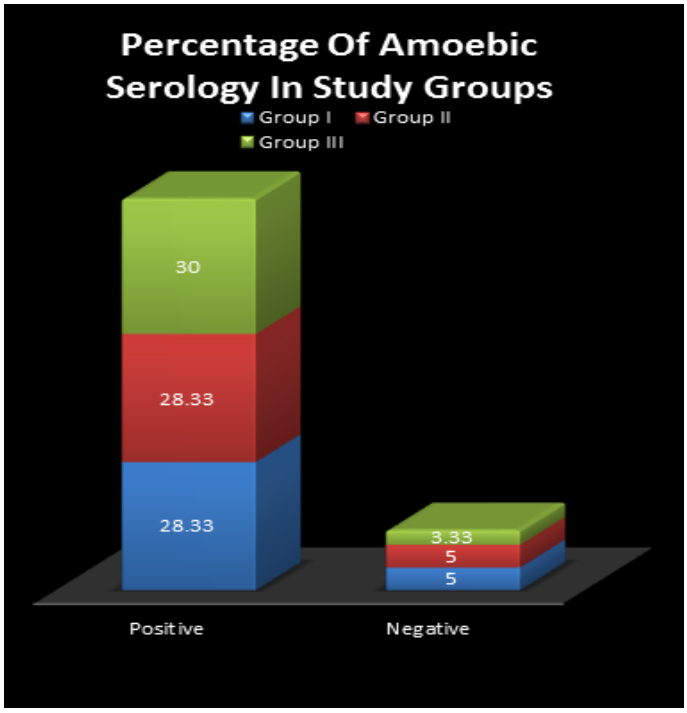
In 31/60 (56.67 %) cases in study groups, there was history of alcohol intake.

Amoebic Serology

The Amoebic Serology was positive in 52/60 (86.67 %) cases of study groups and negative in 8/60 (13.33 %) cases. In group I & II, it was positive in 17/20 (85 %) cases of each group, while it was negative in 3/20 (15 %) in these groups. In group III, it was positive in 18/20 (90 %) cases and negative in 2/20 (10 %) cases.

Table 5: amoebic serology

	Positive	Negative
Group I	17	3
Group II	17	3
Group III	18	2
Total	52 (86.67 %)	8 (13.33 %)



Total Serum Bilirubin

The mean value of total serum bilirubin in Group I was 1.03±0.29 mg/dl, with range of 0.6-1.5 mg/dl. In Group II, it was found 1.24±0.31 mg/dl, with range of 0.7-1.8 mg/dl. In Group III, the mean was found 1.20±0.31 mg/dl and the range was 0.8-1.7 mg/dl.

Serum Alkaline Phosphatase

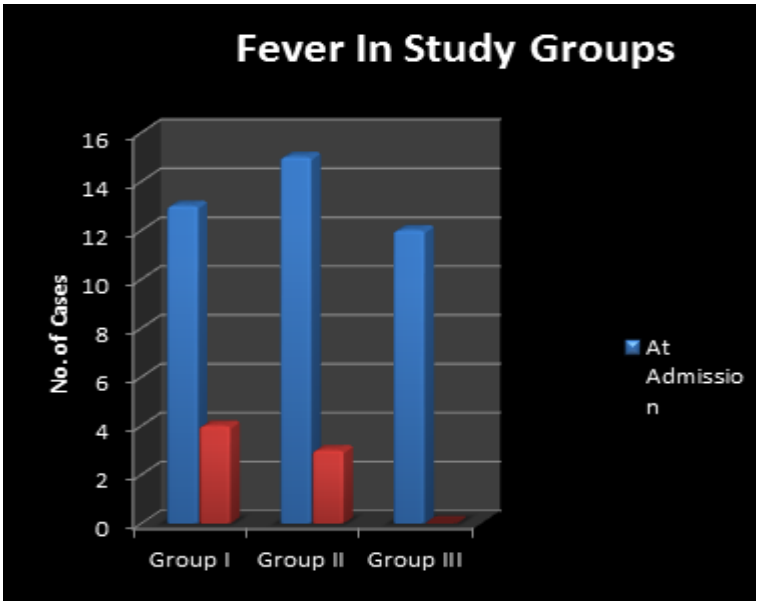
The mean value of Serum Alkaline Phosphatase in group I was 19.8±9.21 KA and the range was 7-42 KA. In group II, it was 20.7±12.09 KA, with range of 7-47 KA. In group III, the mean was found 20.0±12.45 KA and the range was 4-45

Clinical Presentation in Study Groups

Common clinical presentation in our patients were loss of appetite, right upper abdominal pain, generalised weakness and low grade fever.

Table 6: Clinical presentation in study groups

Symptoms	No. of Cases	Percentage
Anorexia	57	95
Right Upper Quadrant Pain	55	91.67
Weakness	52	86.67
Fever	50	83.33
Hepatomegaly	48	80
Nausea/ Vomiting	40	66.67
Weight Loss	28	46.67
Chills & Rigors	22	36.67
Night Sweats	20	33.33
Cough	17	28.33
Right Shoulder Pain	15	25
Diarrhoea	12	20
Dyspnoea	6	10



Fever

At admission, 13 patients in Group I, 15 in Group II and 12 in Group III, presented with complaint of fever. Rest of the patients in the groups were afebrile at admission.

After 48 hours of initiation of therapy, 4 patients in Group I and 3 patients in Group II, were suffering from fever. No patient with fever was documented in Group III after 48 hours.

Pain (Visual Analog Score)

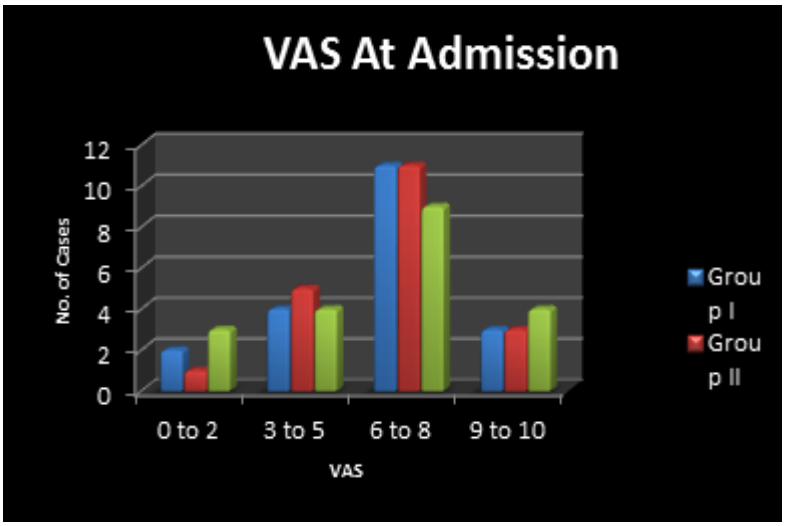
Group I : The mean VAS was 5.95±2.24, ranging from 2-9.

Group II : The mean VAS was 6.50±1.99, ranging from 2-10.

Group III : The mean VAS was 6.05±2.56, ranging from 2-10.

Table 7: Pain (visual analog score)

VAS at admission	Group I	Group II	Group III
0 to 2	2	1	3
3 to 5	4	5	4
6 to 8	11	11	9
9 to 10	3	3	4

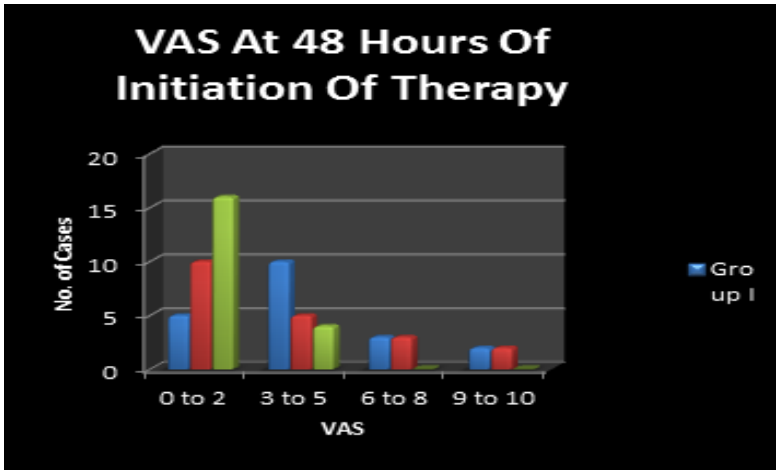


Changes in Vas After 48 Hours of Initiation of Therapy

4 patients in Group I and 3 patients in Group II didn't show any improvement in VAS at completion of 48 hours of therapies, while all patients in Group III responded well to therapy allotted to this group.

Table 8: changes in vas after 48 hours of initiation of therapy

VAS at 48 Hours	Group I	Group II	Group III
0-2	5	10	16
3-5	10	5	4
6-8	3	3	0
9-10	2	2	0



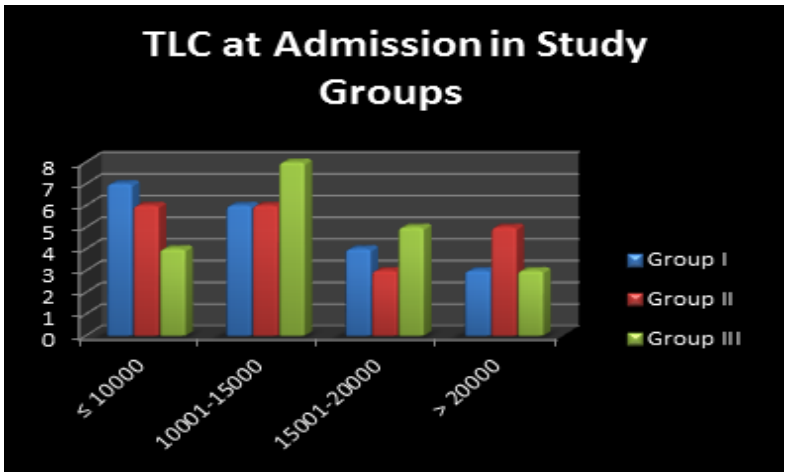
The mean of VAS in Group I responders (16/20) was2.94±1.879 with significant difference (p=0.00). The same was noted 2.53±1.972 and 1.30±1.454 in Group II (17/20) and III (20/20) respectively with significant differences (p=0.00) in each group. A statistically significant difference was noticed between these groups (p=0.019).

Total Leucocyte Count at Admission

The mean TLC value at admission in group I was 13290±5319.86 cells/mm^3, ranging from 5600-23800 cells/mm^3. In group II, mean was found 14885±5487.91 cells/mm^3, with the range of 6800-23200 cells/mm^3. In group III, TLC range was 6300-24500 cells/mm^3 and mean was 14412±4884.074 cells/mm^3. The difference was found insignificant with p value >0.05 (0.606).

Table 9: Total leucocyte count at admission

TLC (cells/mm^3)	Group I	Group II	Group III	Total
≤10000	7	6	4	17 (28.33 %)
10001-15000	6	6	8	20 (33.33 %)
15001-20000	4	3	5	12 (20 %)
>20000	3	5	3	11 (18.33 %)



Response in TLC After 48 Hours of Initiation of Therapy

Study Group I (20): 16 patients responded to the conservative management in form of fall of leucocyte counts, while 4 patients didn't show any improvement in TLC.

Study Group II (20): 17 patients responded to USG guided needle aspiration, while 3 patients didn't show any improvement in TLC.

Study Group III (20): All 20 patients responded to USG guided Pigtail drainage in form of decrease in leucocyte counts.

Table 10: Response in tlc after 48 hours of initiation of therapy

	Responders	Non-responders
Group I	16 (80 %)	4 (20 %)
Group II	17 (85 %)	3 (15 %)
Group III	20 (100 %)	0 (0 %)

Changes in TLC in Responders

Study Group I (16/20): The mean of TLC in responders was 10125±3416.919 cells/mm^3. The change in TLC in these patients was statistically significant (p=0.00).

Study Group II (17/20): The mean of TLC in responders was 10753±3667.785 cells/mm^3.The change in TLC in these patients was statistically significant (p=0.00).

Study Group III (20/20): The mean of TLC in responders was 8440±1522.947 cells/mm^3.The change in TLC in these patients was statistically significant (p=0.00).

These changes were found statistically significant in between these groups (p=0.047).

Ultrasonographic Findings

An ultrasound examination of liver was done at admission to assess the site, number, size and any associated complications of the abscess. This examination was routinely performed to assess the therapeutic response.

Table 11: Location of abscesses

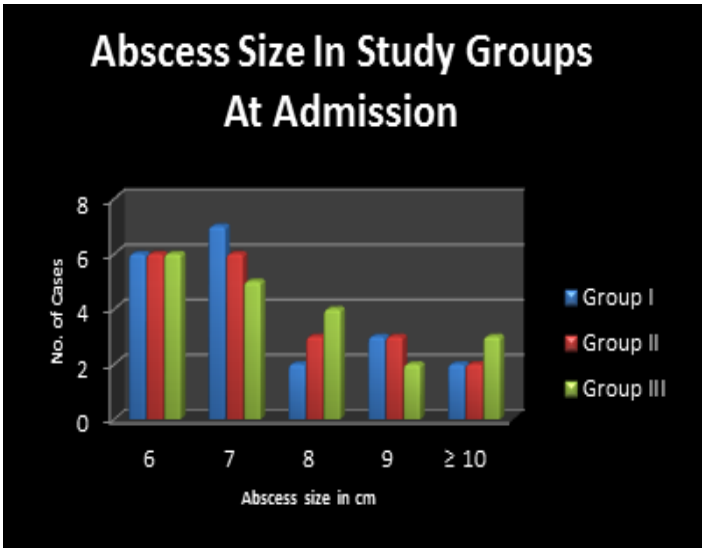
	Right Lobe	Left Lobe	Multiple
Group I	14	3	3
Group II	12	3	5
Group III	15	3	2
Total	41 (68.33 %)	9 (15 %)	10 (16.67 %)

Size of Ala at Admission

The mean abscess size at admission in Group I was 7.55±1.43 cm. It was found 7.45±1.36 cm in Group II and 7.40±1.35 cm in Group III. There was no statistically significant difference (p > 0.05) in abscess size at admission.

Table 12: Size of ala at admission

Abscess Size (approx. max. diameter in cm)	Group I	Group II	Group III
6	6	6	6
7	7	6	5
8	2	3	4
9	3	3	2
≥ 10	2	2	3



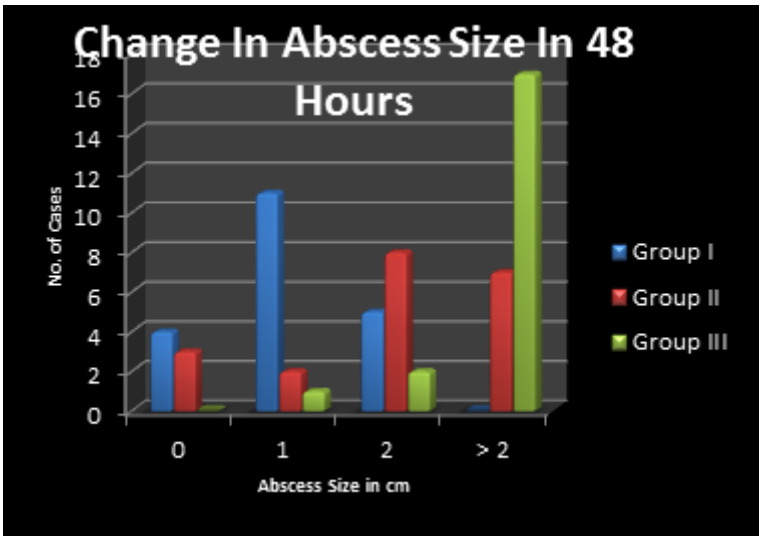
Change in Abscess Size After 48 Hours of Initiation of Therapy

4 patients in group i and 3 patients in group ii didn't show any size reduction, but all group iii patients, treated with pigtail drainage showed marked abscess size reduction

Table 13: Change in abscess size after 48 hours of initiation of therapy

Change in Abscess Size in 48 hrs (approx. diameter change in cm)	Group I	Group II	Group III
0	4	3	0
1	11	2	1
2	5	8	2
>2	0	7	17

After 48 hours of initiation of therapy



Change in Abscess Size in Responders

The mean abscess size in Group I responders (16/20) was 5.62±1.02 cm. The change was statistically significant (p=0.00) as compared to size at the time of admission in same patients.

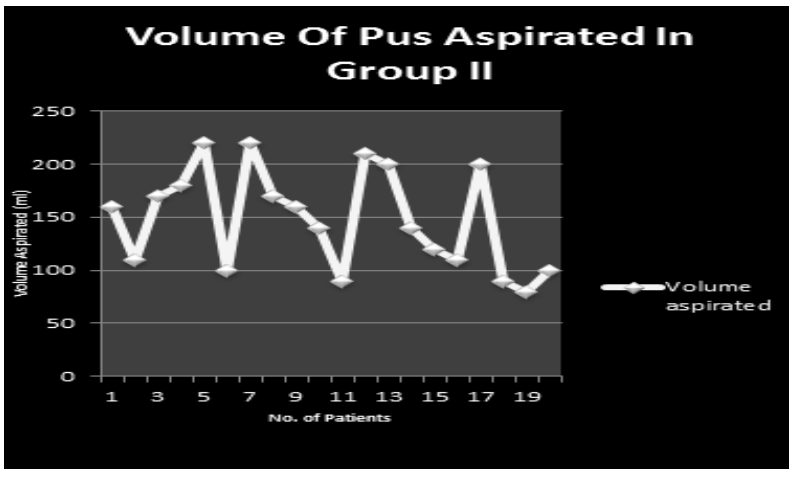
The mean abscess size in Group II responders (17/20) was 4.88±0.99 cm. The change was statistically significant (p=0.00) as compared to size at the time of admission in same patients.

The mean abscess size in Group III responders (20/20) was 3.95±0.89 cm. The change was statistically significant (p=0.00) as compared to size at the time of admission in same patients.

The overall change in abscess size between the study groups was statistically significant (p=0.00).

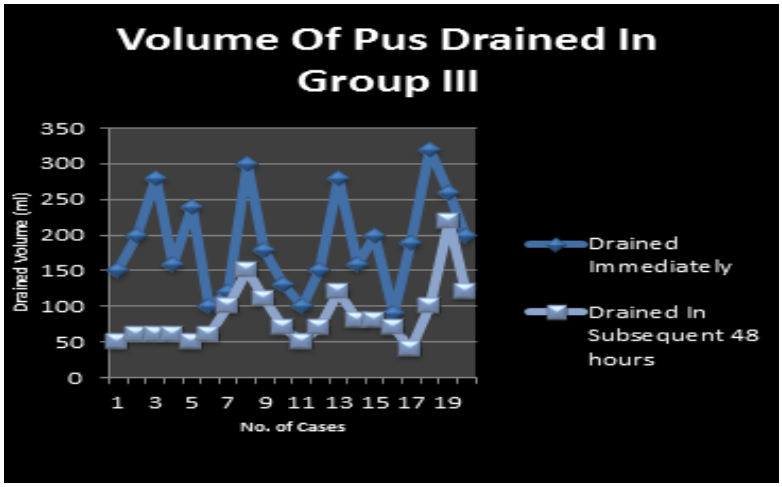
Volume Of Pus Aspirated In Group Ii

The volume of pus aspirated ranged from 80-220 ml with a mean of 148.50±46.82 ml in single time aspiration



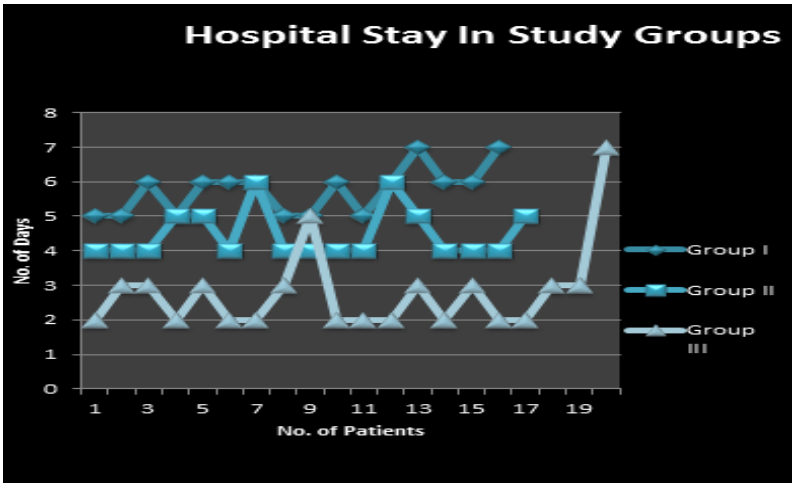
Volume of Pus Drained In Group III

The volume of drained immediately after pigtail catheter insertion ranged from 90-320 ml with a mean of 190.50±69.85. During the subsequent 48 hours, the volume of pus drained ranged from 40-220 ml with a mean of 86±42.85.



Duration of Hospital Stay

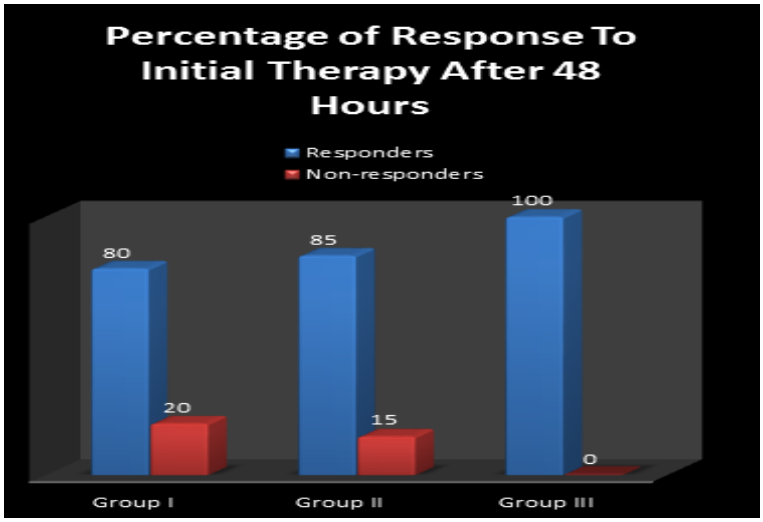
In Group I (16/20) cases, the mean hospital stay was 5.75±0.68 with a range of 5-7 days.
In Group II (17/20) cases, the mean hospital stay was 4.47±0.72 with a range of 4-6 days.
In Group III (20/20) cases, the mean hospital stay was 2.80±1.24 with a range of 2-7 days.
The difference in hospital stay in these study groups was statistically significant (p=o.oo).



Conversion To The Alternate Treatment

After completion of 48 hours of initial therapy allotted to each group, 4 non-responders (20 %) of Group I, were shifted to Group II and 3 non-responders (15 %) of Group II, were shifted to Group III due to persistent pain & fever and no improvement in TLC & abscess size.

No shifting was noted in Group III cases.



Follow Up

The patients in study groups were followed up by their clinical symptoms, leucocyte counts and abscess size in ultrasonography at regular intervals.

Group I: 8 patients came for regular follow up for a duration of 1-4 weeks. 3 patients presented with fever. Vas was ranging from 3-6 with a mean of 4.12±1.13. The mean tlc was 9000±2735.48 cells/mm3, ranging from 6000-12800. The mean abscess size was 5.12±0.83 cm.

Group II: 9 patients came for regular follow up for a duration of 1-5 weeks. 2 patients presented with fever. Vas was ranging from 0-5 with a mean of 2.22±1.79. The mean tlc was 8777.80±1892.60 cells/mm3, ranging from 6500-12000. The mean abscess size was 4.89±1.17 cm.

Group III: 11 patients came for regular follow up for a duration of 1-6 weeks. No patient presented with fever. Vas was ranging from 0-4 with mean of 1.45±1.37. The mean tlc was 7327.30±1434.64 cells/mm3, ranging from 5400-9600. The mean abscess size was 3.45±0.6933333 cm.

Conclusions

- Thus, our study clarifies the fabulous role of ultrasonography in diagnostic as well as therapeutic purposes for amoebic liver abscesses. This is non-invasive, easily assessable, affordable and cost effective diagnostic tool that can detect their exact number, size and position. USG accurately marks the site of needle or pigtail trocar insertion to minimize any major complication or life threatening event.
- Needle aspiration and Pigtail catheter insertion in ultrasonographic guidance are safe procedures without any major or life threatening complications.
- Our study shows marked and rapid clinical, biochemical and radiological improvement in patients of ALA treated with USG guided pigtail drainage along with medical treatment particularly in large abscess or abscess containing thick pus. The hospital stay, in this group, was significantly low.
- USG guided needle aspiration of ALA along with medical treatment is also an effective treatment modality but it fails in abscess containing thick and large volume of pus.
- Medical treatment alone is effective in small abscesses. It showed slower response in patients, with longer hospital stay.

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