Observations on Liver Abscess: Recent Trends In Aetiopathogenesis and Management Modalities

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ABSTRACT
Background:- Liver abscess continues to be an important cause of morbidity and mortality in tropical countries. However, recent advances in interventional radiology, intensive care, progress in antibiotic therapy, liberal use of sonography and computerized tomography scanning of abdomen have led to early diagnosis and treatment of patients of liver abscess, thus improving the patient outcome.
Materials and methods:- The study was a prospective study of diagnosed cases of liver abscess from August 2014 to November 2016 conducted at Patna Medical College & Hospital, Patna. A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). Both the groups were investigated to ascertain etiopathogenesis and to compare the treatment modalities.
Results:- Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli. Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%). We found average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days), this difference however didn't had statistical significance. 72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group.
Conclusion:- Liver abscess is common in male having habit of drinking alcohol or today. E.coli is most common causative organism causing pyogenic liver abscess. Percutaneous catheter drainage appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity.

Keywords:-Amoebic & pyogenic liver abscess, Etiopathogenesis, Observation, Percutaneous aspiration, Pigtail catheter drainage

I. INTRODUCTION

Liver abscess is pus filled mass inside the liver. Recognised since Hippocrates (Circa 400 B.C) who speculated that the prognosis of the patients was related to the type of fluid within the abscess cavity[37]. It is a suppurative cavity in liver resulting from the invasion and multiplication of micro-oganisms, entering directly from an injury through the blood vessels or by the way of the biliary ductal system. Liver abscess are most commonly pyogenic, amoebic or mixed infections. Less commonly these may be fungal in origin.

Amoebic Liver Abscess

Amoebic liver abscess is an inflammatory space occupying lesion of the liver caused by Entamoeba histolytica and is an important clinical problem in tropical regions of the world and accounts for a high number of hospital admissions. It is commonest extra-intestinal clinical syndrome associated with E.Histolytica infection and its incidence has been reported to vary between 3% and 9% of all cases of amoebiasis.

In 1995, the world health organization (WHO) estimated that 40 to 50 million people suffer from amebic colitis or amebic liver abscess worldwide resulting in 40,000 to 100000 deaths each year. Often starting with non-specific symptom, amoebic liver abscess must be excluded in all patients presenting with pain in right upper quadrant of abdomen or right lower thoracic pain, radiating to scapular region and right shoulder with or without fever. Nausea, vomiting, anorexia, weight loss may also be present.

Fortunately Amoebic liver abscess is a readily treatable form of hepatic infection & mortality is negligible and treated in its early course. However if left untreated , it may lead to serious life threatening complications like rupture into the pleural , peritoneal ,or pericardial cavities.

Pyogenic Liver Abscess

Pyogenic liver abscess is a rare, life-threatening disease that has an increasing incidence rate in the United States and Europe. Mutiple pathogens are associated with cases of pyogenic liver abscess like:

Gram-positive cocci: *Streptococcus sp* (especially *S. intermedius* group), *enterococci* and *Staphylococcus aureus.*

- Anaerobes: Bacteroides species, *Fusobacterium* sp, Actinomyces sp, Clostridium sp, etc.
- Enterobacteriaceae (*E. coli*, Klebsiella sp., etc) and other Gram negative bacilli.
- *Yersinia enterocolitica*: rare cause of liver abscess, consider underlying hemochromatosis.

Pyogenic hepatic abscesses generally occur in middle-aged adults (40's and 50's) and signs and symptoms: include fever (60%) associated with chills and malaise, RUQ pain, tenderness and or hepatomegaly. Diaphragmatic irritation from abscess may refer pain to the right shoulder +/or cough or pleural rub.

Treatment of Amoebic Liver Abscess

Amoebicidal drugs alone or in combination with antibiotics appear to render relief only in number of cases. Bigger abscesses require repeated aspiration or operative drainage in combination with above drugs. For quite a long time aspiration with amoebicidal drugs has been considered to be the sheet anchor of treatment of Amoebic liver abscess. The period of morbidity is long and mortality rate is high. Still majority of workers favor aspiration to open drainage procedure. Recent works in different parts of the country and in abroad show a new trend of treatment of Amoebic liver abscess depending whether it is uncomplicated or complicated.

Complicated Amoebic liver abscess mainly treated by open drainage (anterior or posterior approach), laparoscopic drainage and in fewer cases with hepatic resection while in uncomplicated cases USG-guided needle aspiration with amoebicidal drugs are the treatment of choice.

Surgical drainage was the standard of care until the introduction of percutaneous drainage technique in mid 1970s. With the refinement of image guided technique, percutaneous drainage and aspiration have become the standard of care. Image guided technique include either USG-guided or CT-guided of which USG is readily available, cheap with no hazards of radiation.

Ultrasound gives the details of amoebic liver abscess in terms of its lobe involvement (right/left), site (posterior/superior/inferior), number single/multiple), size and whether it is unruptured or ruptured (intra peritoneal, intra pleural or into pericardial cavity). At the same time we can perform diagnostic and therapeutic USG-guided aspiration. Overall it also lessens the duration of anti-amoebic drugs. In case of multiple abscesses, USG-guided aspiration has an important role in localizing multiple sites of aspiration. It provides a god view for the approach of needle/catheter into the abscess cavity. Percutaneous catheter (PCD) drainage is a preferred method most widely used to drain liver abscesses; recent studies have shown percutaneous needle aspiration (PNA) to be simpler, less costly, and equally effective. Usually needle aspiration is preferred for smaller abscesses and catheter drainage is done in larger ones. But no clear cut guidelines have been laid[153].

Both these techniques have certain disadvantages. Multiple attempts of PNA needed for large abscesses may be uncomfortable and perceived as more traumatic by patients. Also during the period between two aspirations pus may get re-accumulated. For smaller abscesses, daily production of pus may be small, but a larger abscess cavity may produce large quantity of pus, which needs to be drained continuously. PCD has the obvious advantage over the PNA, which may accounted for quicker clinical recovery, lesser failure rate among patients treated with PCD. On the other hand, placing the catheter needs more expertise, nursing care.

Percutaneous aspiration are more effective than conservative medical management alone, however co-morbid conditions of patients and size of liver abscess also influence the outcome.

Surgical open drainage is rarely indicated and may be required in the setting of:

- Large abscess with poor yield on needle aspiration or percutaneous drainage
- Clinical deterioration despite attempted needle aspiration
- Complicated Amoebic liver abscess (like ruptured abscess in peritoneal cavity with feature of peritonitis)
- Complicated Amoebic liver abscess (ruptured in the pleural cavity / pericardial cavity / adjacent viscera)

Treatment of Pyogenic Liver Abscess

Abscess drainage is the optimal therapy for pyogenic liver abscesses. Aspirate should be sent for gram stain and aerobic/anaerobic culture; evaluation for fungal and mycobacterial pathogens. *E. histolytica* should be considered based on epidemiologic factors.

CT or US-guided percutaneous needle aspiration +/- catheter drainage initial method of choice with a success rate in up to 90% of cases.

If drainage inadequate, surgical drainage may be required.

Percutaneous aspiration without catheter placement, recently found to have better success rates as compared to catheter placement. Catheter placement should be considered in larger abscesses (>5 cm diameter).

Complications of percutaneous drainage: include perforation of adjacent abdominal organs, pneumothorax, hemorrhage and leakage of abscess contents in peritoneum.

Surgical drainage: may consider as primary treatment in certain settings.

- Complex abscess
- Multiple abscesses
- Percutaneously unreachable abscess
- Larger abscesses (> 5 cm)
- If associated surgical problem also present
- Drainage may be done laparoscopically

Hepatotomy: generally successful approach, but improvements in percutaneous techniques make it secondary management in most cases.

Medical management: consider in patients at high risk for drainage procedures or with small/multiple abscesses not amenable to drainage.

Antibiotic treatment

Empiric coverage should include coverage for Enterobacteriaceae, enterococci, anaerobes, and in certain situations staphylococci and streptococci.

In stable patient antibiotics may be deferred until post-aspiration/drainage to increase culture yield. Culture results may help narrow coverage, but for pyogenic abscess anaerobic coverage must not be discontinued considering the difficulty in culturing these organisms.

Empiric regimens: may narrow based on culture results.

Inj Ceftriaxone 1 g IV 12 hourly, Inj Amikacin 500 mg IV 12 hourly and Inj Metronidazole 200 mg IV 8 hourly.

Duration: If adequate drainage achieved with resolution of fever and leukocytosis, often 14-42 days total. Longer courses (up to several months) may be required in the patient who is inadequately drained or treated without drainage.

II. MATERIAL AND METHODS

The study was a prospective study of diagnosed cases of pyogenic and amoebic liver abscess from August 2014 to November 2016. A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). Both the groups were investigated to ascertain aetiopathogenesis and better treatment modality.

The patients included in the study were diagnosed cases of liver abscess; admitted through surgical outdoor or emergency department in the indoor wards of Rajendra Surgical Block of Patna Medical College & Hospital or those referred from Department of Medicine, Patna Medical College and Hospital from August 2014 to November 2016.

INCLUSION CRITERIA

1. All the patients diagnosed to have liver abscess clinically and radiologically (on USG and /or CT-scan) irrespective of its size.
2. Patients who didn't respond to drug therapy alone within 48-72 hours

EXCLUSION CRITERIA

1. Uncertain diagnosis
2. Uncorrectable coagulopathy
3. Ruptured liver absecess
4. Patient who didn't consent for the study

A. PERCUTANEOUS USG-GUIDED NEEDLE ASPIRATION OF LIVER ABSCESS

PROCEDURE

The patient was kept NPO for a period of six hours. The procedure was carefully explained to patient. Risk bond was duly signed by patient attendant describing him the risk of operation. Intravenous line was maintained using wide bore cannula and oxygen was made available. Inj. Atropine 0.6 mg was given half an hour before procedure to counteract the vagal stimulus. Inj. Ceftriaxone 1g was also administered.

The aspiration was undertaken in radiology department under proper aseptic precautions. Affected area was prepared and painted with savlon, spirit, betadine and draped.

The site of aspiration was determined by as per following criteria:

- ✓ Abscess cavity to be localized under ultrasound guidance and a shorter and a safer pathway to be looked for (no vitals structure should be encountered in path).
- ✓ Presence of a pointing abscess or a localized buldge of the chest wall.
- ✓ The location of point of tenderness.

During the procedure, USG was done to guide the needle to the right spot, to indicate the depth to be introduced. When an abscess was pointing and the overlying skin was taught and thin, then puncture was made in the surrounding normal, healthy skin to avoid sinus formation and subsequent secondary infection.

Position of patient was determined by the site chosen for puncture. If anterior or lateral, the patient laid semi recumbent leaning against a back rest, if however the site was posterior, the patient was made to lean forward. The selected area after proper cleaning and draping, was infiltrated with 5-6 ml of 1% xylocaine using 24G needle, 2 to 3 minutes prior to insertion of lumbar puncture needle.

Percutaneous aspiration was done using 16G lumbar puncture needle and a syringe of 50 cc.

Patient was asked to take shallow breath throughout the procedure and to hold his breath while the needle was being manipulated, to minimize the risk of liver trauma and hemorrhage. While aspiration, effort was made to avoid traversing the pleural or peritoneal cavity.

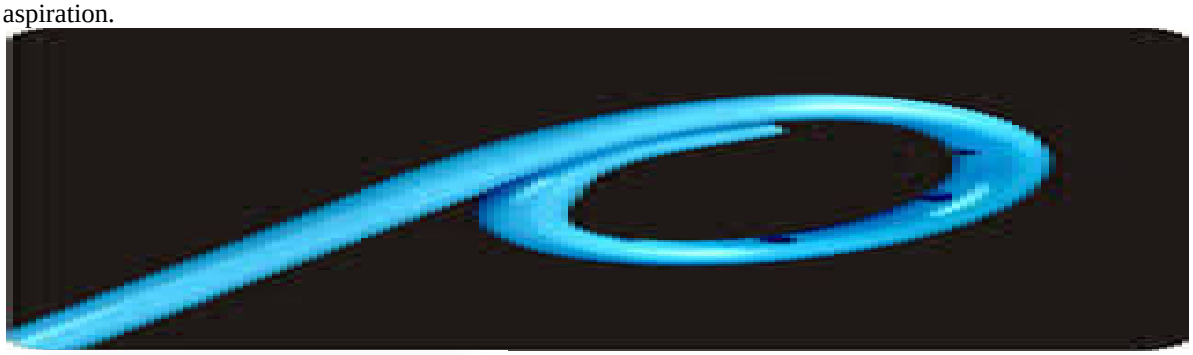
Pus came out from free end of needle, once it entered the abscess cavity. A 50 ml syringe was then attached to create a negative force which was regulated according to the resistance to the flow of pus.

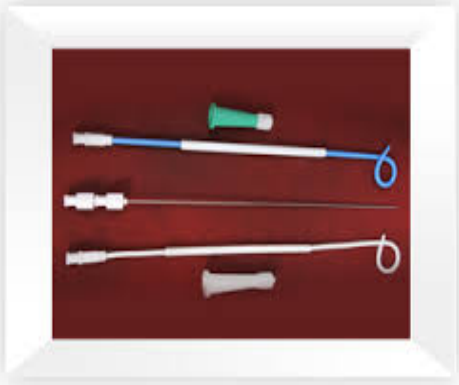
The pus was apirated. The last part of aspirate had a more bloody appearance and at this stage patient might experience an aching pain in the liver or right shoulder and occasionally coughing. The terminal aspirates were rich in trophozoites and therefore sent immediately for culture and smear in sterile container. USG was repeated at the end of procedure to check complete evacuation or any residual abscess. If residual abscess was found, then position, depth of needle or even the puncture site was changed till there was complete evacuation. The number of aspiration was noted. The procedure was withheld if the patient was in distress.

At the end of procedure, needle was taken out with caution and puncture site was sealed and covered with dressing. Inj. Dilona was given to relieve pain. Patient was kept under observation for pulse, B.P, temperature, respiration, abdominal girth for initial period of 12-24 hrs so that signs of haemorrhage or peritonitis might not be missed. Also patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia, hepatomegaly was considered successful treatment. To see the resolution of abscess, ultrasonic scan were repeated.

REPEATED ASPIRATIONS

The need of repeat aspiration in any patients depended on clinical symptoms and signs and any residual abscess after first aspiration. It is required in any patients with large abscess in whom the symptom persisted or worsened in a few days after first aspiration. Persistence of abscess on repeat USG after first evacuation of a sufficient quantity of pus also contributes an indication of repeating aspiration.





Pus being drained through pigtail catheter

Prior to procedure USG guided localization being performed

B: PIGTAIL CATHTER DRAINAGE PROCEDURE

A trocar with a 14 Fr multi-sidehole pigtail catheter was inserted into the abscess cavity under local anesthesia and USG guidance. The contents of abscess were aspirated and the catheter was fixed to the skin and connected to a bag. The first review USG was done when drainage over 24 hours had declined to <10 ml. if the abscess had resolved, the catheter was removed. If residual cavity was present, the catheter was flushed with metronidazole injection and aspirated till no material was aspirated. Any loculations of residual cavity were treated with catheter manipulation under local anesthesia. Further rescan were done every third day and the catheter was

removed if the catheter drainage had remained minimal. Otherwise, the catheter was left until catheter drainage had stopped. US was repeated until the cavity had either decreased by 50% or more of its original size, or been static with clinical recovery.

AFTER CARE

Monitoring of pulse, b.p, respiratory rate, abdominal girth 2 hrly.Monitoring of drain output, urine output, input-output chart. When the drainage from the catheter completely stopped then it was removed in about 5-7 days.

A comparative study has been done to evaluate advantage and disadvantage of each procedure i.e. percutaneous USG- guided aspiration vs open surgery in terms of hospital stay, operative time, antibiotics used, cost-effectiveness, complications in each case with their final outcome and follow-up.

FOLLOW UP

Patients were assessed daily for clinical improvement and for abscess size using USG. Intervention was considered successful, if there was complete clinical recovery and disappearance of abscess cavity. Duration to attain clinical recovery (relief of pain and fever), duration of antibiotics use, duration of hospital stay, complications, failure of intervention and death were recorded. After the discharge, the patients were followed clinically and by US, in the outpatients clinic biweekly for the first 2 months and then monthly for next 4 months.

III. RESULTS

The results are represented in following table and charts

Case

Distribution:

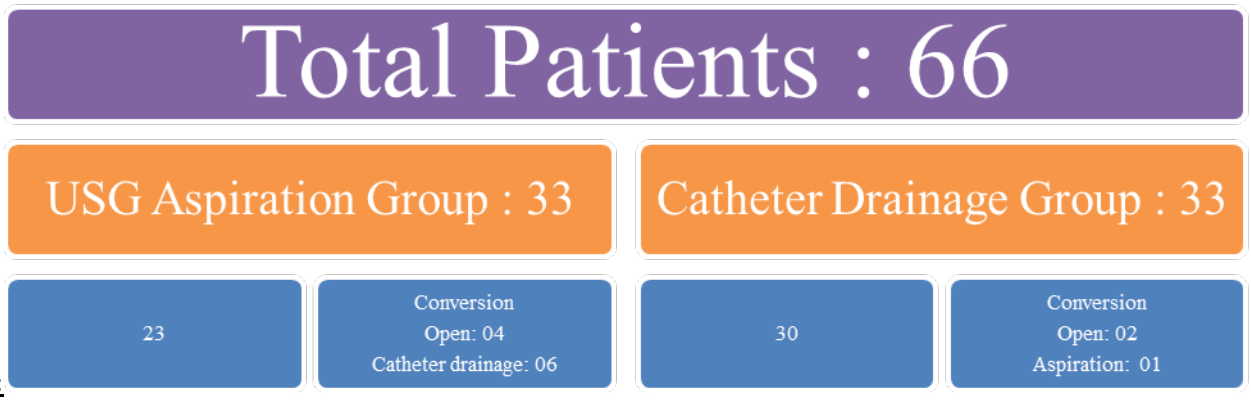


Figure 1: Case Distribution in the Catheter Drainage and USG Guided Aspiration Group

Sex Distribution

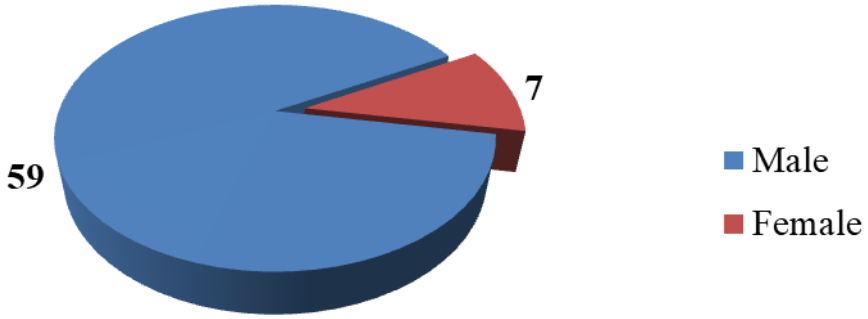


Chart 1.1: Sex distribution of study subject

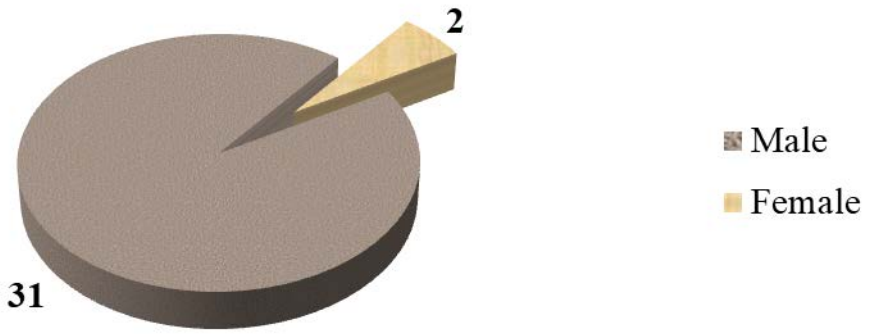


Chart 1.2: Sex distribution in USG guided aspiration group

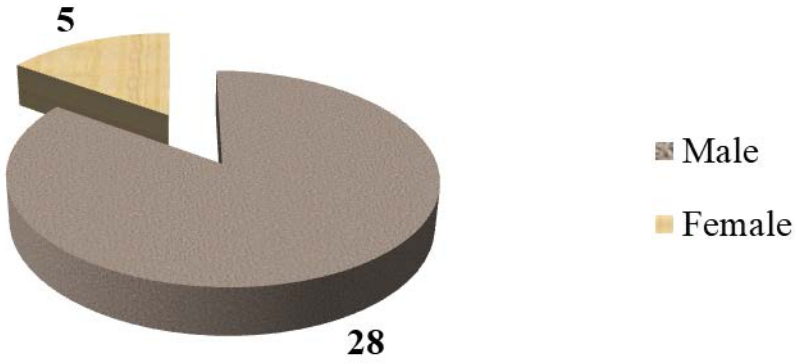
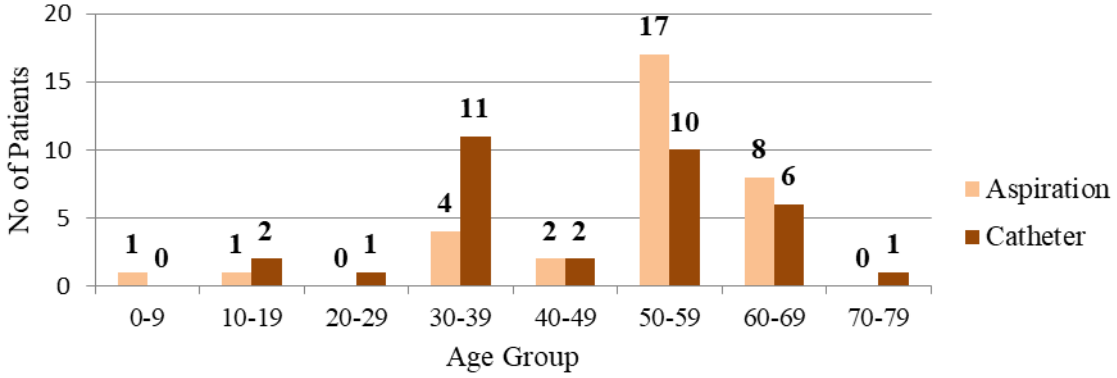


Chart 1.3: Sex distribution in catheter drainage group

The male / female ratio (chart1.2 and 1.3) in the two groups were compared with chi-square test and the difference was found to be non significant (p value = 0.42)**.**



Age Distribution

Chart 2: Age distribution of patients in both groups

The mean age of patients in two group was compared with chi-square test and the difference was found to be non significant (p value >0.05)

Association with Alcohol:

	Alcohol Consumer		Alcohol Non Consumer
	Todi	Others	
Aspiration	14	13	15

Catheter	16	13	17

Table1: Representation of study subject with habit of alcohol consumption

About 50% of patients in both the groups had the habit of drinking alcohol toddy or other forms of alcohol containing beverages.

Symptom:

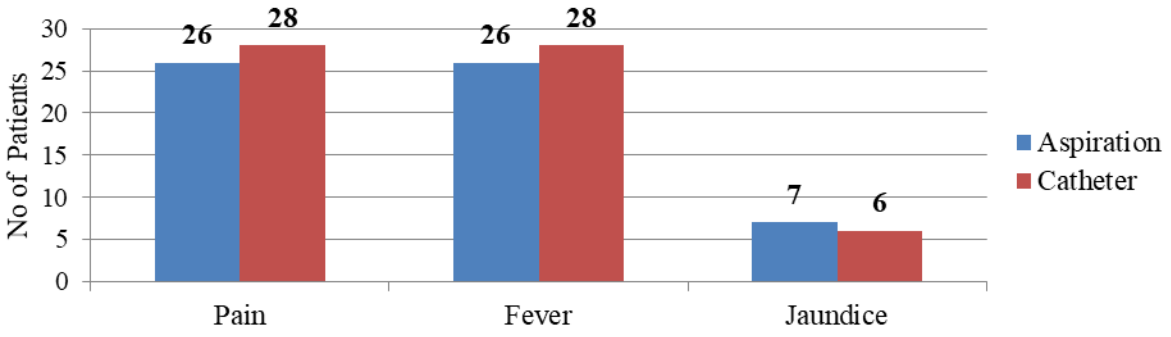


Chart 3: Symptom distributions in both groups

The incidence of presenting symptoms like Pain, Fever and Jaundice were compared between the two groups with p value being 0.52, 0.52, 0.76 for the three symptom category respectively and hence the patients in two groups were comparable in terms of presenting symptoms.

Duration of Symptoms:

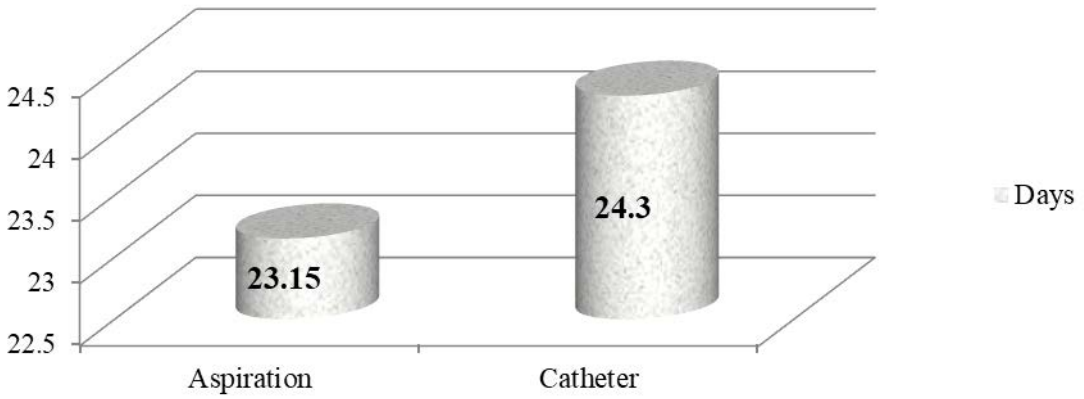


Chart 4: Duration of symptoms in both groups

Mean duration of symptoms at time of presentation was found to be 23.15 days in aspiration group whereas in catheter drainage group was found to be 24.30 days. There was no statistical difference (p value>0.05).

General Examination:

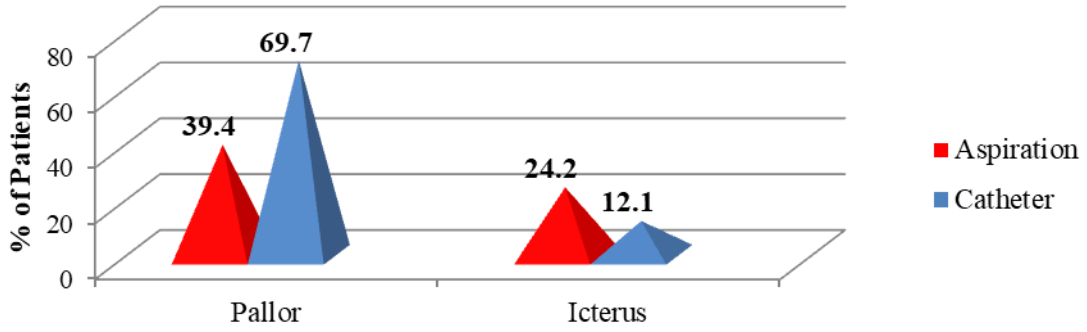


Chart 5.1: Comparison of general examination findings (Pallor and Icterus in %)

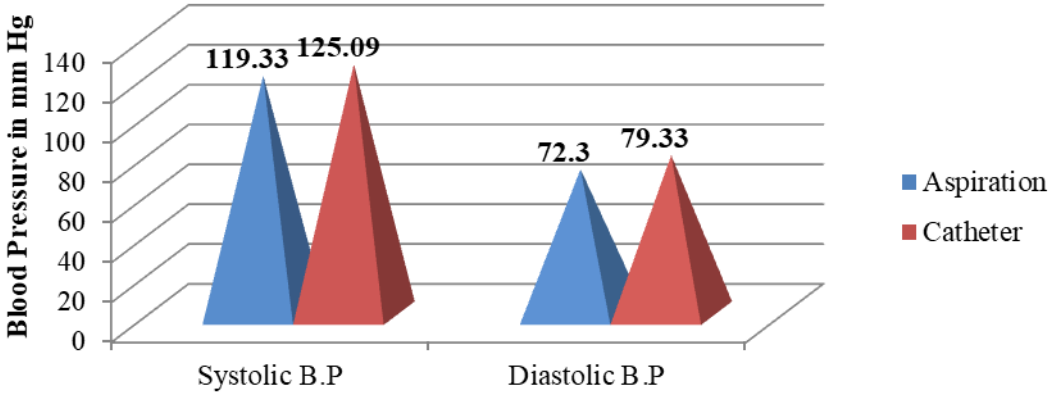


Chart 5.2: Comparison of general examination findings (mean systolic and diastolic B.P)

Hepatomegaly:

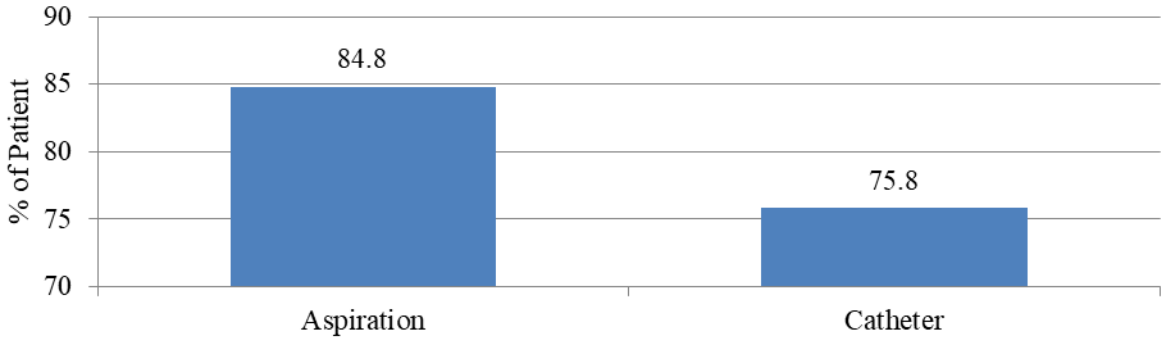


Chart 6:

Percentage of patients presenting with hepatomegaly in each groupsIn the two groups hepatomegaly was found in 28/33 patients (84.8%) in aspiration group and 25/33 patients (75.8%) in catheter drainage group.

Solitary versus Multiple Abscess:

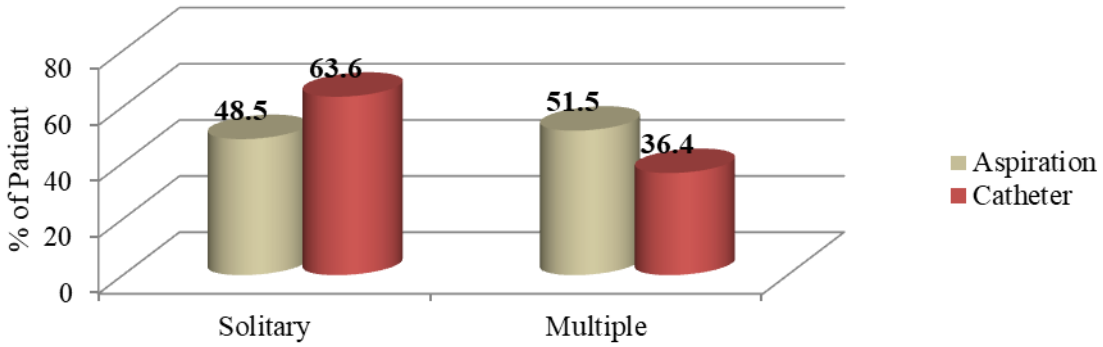


Chart 7: Percentage of solitary and multiple liver abscesses in both groups

Distribution of patients in two groups were irrespective of the types of abscesses i.e. solitary or multiple, however by chance solitary abscesses were more common in catheter drainage group (63.6% in catheter versus 48.5% in aspiration group had solitary abscess).

Abscess Volume:

Chart 8: Comparison of average volume (in ml) of abscess cavity in both groups

Mean volume of abscess cavity in aspiration group was 411.45 ml (Maximum volume: 1300 ml and Minimum volume: 50 ml) and in catheter drainage group was 330.9 ml (Maximum volume: 1130 ml and Minimum volume: 80 ml). However there was no statistical difference and both groups were comparable in terms of volume of cavity.

Microbiological Analysis:

Growth	Aspiration		Pigtail	
	No	%	No	%
E. coli	14	42.4	6	18.2
K. pneumoniae	9	27.3	4	12.1
Proteus	1	03.0	0	00.0
Pseudomonas	1	03.0	1	03.0
S. aureus	1	03.0	4	12.1
S. viridans	2	06.1	2	06.1
Serratia	1	03.0	1	03.0

Table 2.1: Isolation of different bacteria in both groups as evident from pus culture

Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli.

	Aspiration Group		Catheter Group	
	No.	%	No.	%
Growth +ve, Elisa +ve	7	21.2	2	6.1
Growth +ve, Elisa -ve	22	66.7	16	48.5
Growth –ve, Elisa +ve	4	12.1	14	42.4
Growth –ve, Elisa -ve	0	0.0	1	3.0
Total	33	100	33	100

Table 2.2: Distribution of Pyogenic, Amoebic and Amoebic with secondary infection types of liver abscess

Most of the abscesses (66% in aspiration group and 48% in catheter drainage group) were purely pyogenic as is evident from growth from pus culture and negative Elisa test for E.histolytica. Rests of the abscesses were either purely amoebic (growth –ve Elisa +ve) or secondarily infected amoebic abscess (growth +ve Elisa +ve).

	Female		Male	
	No.	%	No.	%
Growth+ve Elisa+ve	1	14.3	8	13.6
Growth+ve Elisa-ve	5	71.4	33	55.9
Growth– ve Elisa+ve	1	14.3	17	28.8
Growth–ve Elisa+ve	0	0.0	1	3.0
Total	7	100	59	100

Table 2.3: Sex wise categorization of different types of liver abscesses

Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%)**.**

	Solitary		Multiple	
	No.	%	No.	%
Growth+ve Elisa+ve	4	10.8	5	17.2
Growth+ve Elisa-ve	18	48.6	20	69.0
Growth-ve Elisa+ve	15	40.5	3	10.3
Growth-ve Elisa-ve	0	0.0	1	3.5
Total	37	100	29	100

Table 2.4: Solitary versus multiple liver abscess according to causative micro organism

Microbiological analysis of pus from both solitary and multiple types of liver abscess showed positive growth on culture and also showed positive Elisa antibody test.

Hospital stay:

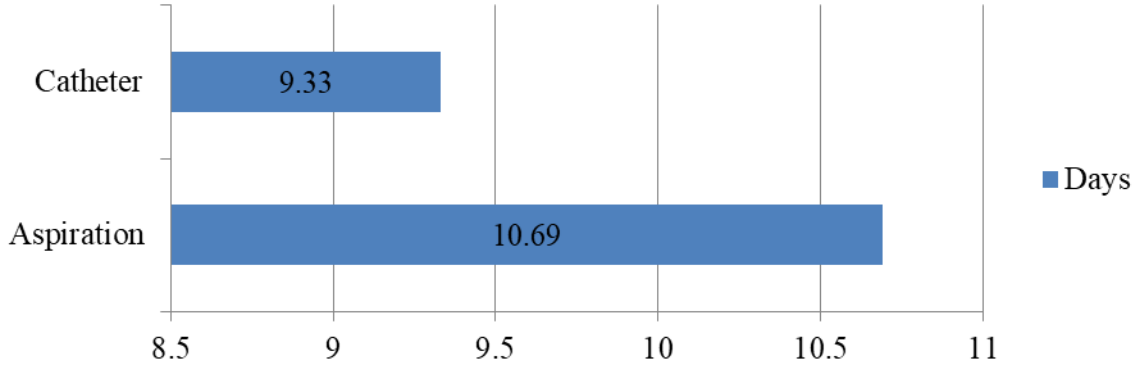


Chart 9: Comparison of average durations (in number of days) in aspiration and catheter drainage group

Average duration of hospital stay in catheter drainage group (9.33 days) is less than aspiration group (10.69 days).

Complication:

Complication	Aspiration Group
Death	12.1%
Repeated Aspiration	48.5%
Rupture	12.1%
Total	72.7%

Table 3.1: Percentage wise complication in aspiration group

Complication	Catheter Group
Bleeding	3.0%
Death	6.1%
Blockage of drain	18.2%
Rupture	6.1%
Total	33.4%

Table 3.2: Percentage wise complication in catheter group

72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group. The most common complication in aspiration group was repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%.

IV. DISCUSSION

A total of 66 patients were included in the study. The patients were randomly allocated into two groups on basis of treatment modality, Group A: USG guided percutaneous aspiration (n=33) and Group B: Percutaneous pigtail catheter drainage group (n=33). 6 patients out of 33 in USG guided aspiration underwent conversion to catheter drainage later due to need for repeated aspiration. 4 patients out of this group later on underwent laparotomy and peritoneal toileting due to rupture of liver abscess into peritoneal cavity. Out of 33 patients in USG guided pigtail catheter drainage group, 2 patients underwent laparotomy due to rupture of liver abscess in to peritoneal cavity. Also 1 patient out of this catheter drainage group underwent coversion to USG guided percutaneous needle aspiration.

In the present series of 66 cases, male have been found to suffer more from amoebic liver abscess than females, with male : female ratio of 8.4:1 as shown chart 1.1. Also the male and female ratio (chart 1.2 and chart 1.3) in aspiration and catheter drainage groups were compared with chi-square test and the difference was found to be non significant with a p value=0.42, and hence the two groups were comparable. Preponderance of liver abscess in male has been observed by Min (1971), Teh LB (1988), Kapoor (1990), Rmani (1995), Dyossou F (2000), Zafar & Ahmed (2002)[137]. Wells and Arguedas (2004) reported that male constitutes about 86% cases of Amoebic liver abscess and it occurs 10 times more frequently than in females. Above findings of sex incidence of liver abscess is favored by Singh V, Bhalia A (2008), evaluated 12 patients prospectively presented with features of liver abscess and found 11 cases were male and 1 female women who is close to it[142]. Preponderance in male has been also observed by Mukhopahyay M, Saha A.K (2010) who studied 72 patients and found that there were 66 males (91.67%) and 6(8.33%) females[147].

Preponderance of liver abscess in male has been mainly attributed to toddy drinking and alcoholism (Rogers 1921)[88]. Alcohol causes nutritional deficiency due to gastrointestinal catarrah and poor appetite. Also they are exposed to more hard labour causing greater stress and strain of life. No other apparent cause has been described for this male preponderance so far.

In study of 66 patients, it was observed that most common age group of liver abscess is 50 to 59 years and 40.9% cases belonged to this age group (chart 2). Overall disease is more common in third to fifth decade of life. Also the mean age of patients in USG guided aspiration group and catheter drainage group was compared and the difference was found to be non significant (p value>0.05).

Above observation is similar to that of **Patren (1914),** who observed that maximum number of patients suffering the liver abscess belonged to 3rd and 4th decades of life[114]. Similar age incidence have also been reported by Napier (1946), Manson Bahr (1950), Misshra S.C. (1952), Singh H.S.K (1959), S.J.Aptekar and Bhalerao etal (1970)[73&146]. According to Wells and Arguedas (2004), most cases of liver abscesses are found in 3rd to 5th decades of life. Above finding is favored by Singh V, Bhalia A (2008) who evaluated 12 patients prospectively and found mean age OF 41.3 years. Mukhopahyay M, Saha A.K (2010), studied 72 patients and found the age of incidence of liver abscess ranged from 21-71 years (the mean age being 43.64 yrs)[147]. The 31-40 years age group showed the highest incidence, consisting of 40.28% cases. Sharma N, Sharma A, Verma S (2010), in his retrospective study of 86 indoor cases of liver abscess, observed the mean age of 41.3 years[148]. Sukhjeet Singh, Poras Chaudhary (2013), found in his study of 60 patients that age of patients varied from 16 years to 58 years with the age range from 31-40 years (21 patients), 2nd most common age 21-30 (19 patients) and then the number of patients was less in extreme of age[155]. Above age incidence is also favored by Alpesh B Ami, Rajesh D Patel (2015), observed in his study of 51 patients with age range was between 16-75 with mean age of 40 years with higher number of cases of 12 in 35-45 of age group. From observations of different workers it is evident that disease is more common in 3rd to 5th decade of life which favors present study.

It is observed from the table 1, out of 66 cases, 34 patients (51.51%) had the habit of drinking alcohol or toddy or other forms of alcohol containing beverages. Toddy (which is fermented palm extract) drinkers are more susceptible because of ingestion of large doses of E. histolytica and bacteria. Above data is favored by Ramani (1995) in prospective study of 200 cases of liver abscess found that 64% of patients gave history of alcohol consumption which is locally fermented brands[137]. Mathur (2002) observed that alcohol intake was seen in a significant number (43%) of patients of liver abscess[70]. Makkar (2006) observed that higher incidence of liver abscess in alcoholics is possibly due to their high Iron content. Singh V, Bhalia A (2008), evaluated 12 patients prospectively presented with features of Amoebic liver abscess and noted that 44 (61.11) patients gave history of alcohol consumption which support the above finding of association of alcohol consumption and Amoebic liver abscess[142]. Alpesh B Ami, Rajesh D Patel (2015), observed in his study of 51 patients that alcohol addiction was among males with 28 (48%) cases having less than 10 years duration and 16 (33%) cases with > 10 years duration also supports the present findings[77].

In the present work, pain in right upper quadrant of abdomen was observed in 81.8% cases, fever in 81.8% and jaundice in 19.7% (chart3). Singh V, Bhalia A (2008), evaluated in 12 patients prospectively that pain was most commonly located in right hypochondrium in 60 patients (83.33%) cases. Fever was observed in 58 patients (80.56%). Mukhopahyay M, Saha A.K (2010), studied 72 patients and found fever, pain abdomen and diarrhoea in 94%, 90% and 10.5% cases respectively[147]. Above present finding is favored by Sukhjeet Singh, Poras Chaudhary (2013), found in his study of 60 patients, noticed pain in RUQ of abdomen as most

common symptom found in 93% cases[155]. Weakness (90%) and fever (88%) were frequently presenting symptoms. So the symptoms which are found in the study are in general agreement with those of other authors.

Mean duration of symptoms at time of presentation was found to be 23.15 days in aspiration group whereas in catheter drainage group was found to be 24.30 (chart 4). So the above observation does not hold well with the findings of Mukhopahyay M, Saha A.K (2010), who studied 72 patients and found that that duration of symptom < 2 week in 48% cases[147]. Sharma N, SharmaA, Verma S (2010), in his retrospective study of 86 indoor cases of liver abscess, found mean duration of illness 13.8 days[148].

On systemic examination pallor was found in 36 (54.5%) cases, and icterus was found in 12 (18.2%) cases. It shows that persons having poor hygiene and poor health are more prone to develop liver abscess.

According to Kapoor (1990) the general signs are less important in the diagnosis of liver abscess but give the idea about the prognosis. Pyrexia, sweating, pallor were commonly found. Rarely edema of feet, mild ascites and icterus may be present[45].

Tachycardia was due to toxemia and bacterial peritonitis and tachypnoea was due extension of liver abscess pushing diaphragm upward or due to rupture into pleural cavity or due to toxemia.

On abdominal examination, enlarged tender liver was found in 53 (80.3%) cases with upward shifting of liver dullness. 28 (84.8%) patients in aspiration group and 25 (75.8%) patients in catheter drainage group presented with hepatomegaly.

Mukhopahyay M, Saha A.K (2010), studied 72 patients and found hepatomegaly in 76% cases[147]. Sukhjeet Singh, Poras Chaudhary (2013), found hepatomegaly in 48 (80%) cases in his study of 60 patients[155]. The above findings are consistent with the findings of present series of study.

Overall solitary types of liver abscess were more common in both groups (56.1%). Categorization of patients in two groups was irrespective of the type of abscess i.e.; solitary or multiple, however by chance solitary abscess was more common in catheter drainage group. 63.6% in catheter versus 48.5% in aspiration group had solitary abscess.

Mean volume of abscess cavity in aspiration group was 411.45 ml (maximum volume: 1300 ml and minimum volume: 50 ml) and in catheter drainage group was 330.9 ml (maximum volume: 1130 ml and minimum volume: 80 ml). However there was no statistical difference and both groups were comparable in terms of volume of cavity.

Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli (Table 2.1). This finding was similar to the analysis of 47 cases of liver abscess by Ochsner, DeBakey and Murray[22]. Sukhjeet singh and Poras chaudhary et al, (2013) found E.coli as the causative agent in 30% of cases[155].

Most of the abscesses (66% in aspiration group and 48% in catheter drainage group) were purely pyogenic as is evident from growth from pus culture and negative Elisa test for E.histolytica (Table 2.2). Rests of the abscesses were either purely amoebic (growth –ve Elisa +ve) or secondarily infected amoebic abscess (growth +ve Elisa +ve). About 3% of subjects did not show any growth on pus culture and were also Elisa negative which may be attributed to faulty laboratory techniques. As several of our patients prior to reporting to our surgery department had been given antibiotics as well as anti amoebic drugs, this might explain the findings of 3% cases with indeterminate etiology. Similar experience has been reported by S.Singh et al, Urbaniak GC and others.

Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%) (Table 2.3). Pyogenic liver abscess which used to be mainly tropical in location is now more common due to increased biliary interventions, stenting, cholecytitis and cholangitis etc.

Microbiological analysis of pus from both solitary and multiple types of liver abscess showed positive growth on culture and also showed positive Elisa antibody test (Table 2.4), which proves an age old axiom that both amoebic or pyogenic abscess can be either solitary or multiple.

When comparing the hospital stay in USG guided percutaneous aspiration group USG guided pigtail catheter drainage group (chart 9) we found that average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days). This difference however didn't reach statistical significance. The increased duration of stay in aspiration group is mainly attributed to failure to resolve and hence repeated aspiration and finally such abscesses were drained with pigtail catheter.

72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group (Table 3.1 and Table 3.2). The most common complication in aspiration group was re accumulation leading to repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%. Both these techniques have certain disadvantages. Multiple attempts of PNA needed for large abscesses may be uncomfortable and perceived as more traumatic by patients. Also during the period between the two aspirations pus may get re-accumulated. For smaller abscesses, daily production of pus may be small, but a larger abscess cavity may produce larger quantity of pus, which needs to be drained continuously. PCD has this obvious advantage over PNA, which may have accounted for quicker clinical recovery, lesser duration of parenteral antibiotics and lesser failure rate among patients treated with PCD. On the other hand, placing a catheter needs more expertise followed by nursing care.

Thus USG guided pigtail catheter drainage and USG guided percutaneous needle aspiration are equally effective in the management of large liver abscesses. PCD appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity.

The higher success rate of PCD over PNA has been supported by several other studies e.g, by Baek SY et al (1993), Rajak CL et al (1998), Singh,et al (2009), Sukhjeet Singh, Poras Chaudhary (2013), and by others.

V .CONCLUSION

Liver abscesses, both amoebic and pyogenic, continue to be an important cause of morbidity and mortality in tropical countries.

- Presentation of liver abscess is varied from asymptomatic to life-threatening septicemia, if timely intervention is not made.
- Male have been found to suffer more from amoebic liver abscess than females, with male : female ratio of 8.4:1.
- Maximum number of patients suffering the liver abscess belonged to 3rd and 4th decades of life.
- 51.51% of patients had the habit of drinking alcohol or toddy or other forms of alcohol containing beverages. Toddy (which is fermented palm extract) drinkers are more susceptible to formation of liver abscess.
- Pain in right upper quadrant of abdomen was observed in 81.8% cases, fever in 81.8% and jaundice in 19.7%.
- Average duration of symptoms at time of presentation was found to be 2 to 3 weeks.
- On systemic examination pallor was found in 36 (54.5%) cases, and icterus was found in 12 (18.2%) cases. It shows that persons having poor hygiene and poor health are more prone to develop liver abscess.
- On abdominal examination, enlarged tender liver (hepatomegaly) was found in 53 (80.3%) cases with upward shifting of liver dullness.
- Overall solitary types of liver abscess were more common in both groups (56.1%).
- There was no statistical difference and both groups were comparable in terms of volume of cavity.
- Most common organism isolated on pus culture was E.coli in both the groups. Pus samples of 20 out of 66 patients had culture positive results for E.coli.
- Most common type of abscess was pyogenic in both male (55.9%) and female (71.4%). Pyogenic liver abscess which used to be mainly tropical in location is now more common due to increased biliary interventions, stenting, cholecytitis and cholangitis etc.
- When comparing the hospital stay in USG guided percutaneous aspiration group USG guided pigtail catheter drainage group we found that average duration of stay in catheter drainage group (9.33 days) was less compared to aspiration group (10.69 days). This difference however didn't reach statistical significance.
- 72.7% of the subjects presented with complications in USG guided aspiration group whereas only 33.4% of people presented with complications in USG guided catheter drainage group. The most common complication in aspiration group was re accumulation leading to repeated aspiration 48.5%. The most common complication in catheter drainage group is blockage of drain due to thick pus 18.2%.
- Earlier the only option for management of liver abscess was blind aspiration or open surgery which used to be with various complications.
- Present study has been taken up with the aim to compare advantages and disadvantages of USG guided percutaneous needle aspiration to USG guided pigtail catheter drainage.
- USG guided pigtail catheter drainage and USG guided percutaneous needle aspiration are equally effective in the management of large liver abscesses. PCD appears better in terms of duration of hospital stay, complications and complete resolution of abscess cavity

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