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### RESEARCH ARTICLE

#### CLINICAL PROFILE, DIAGNOSIS AND THERAPEUTIC MANAGEMENT OF PYOGENIC LIVER ABSCESS

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##### Manuscript History

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#### Abstract

**Introduction:** Liver abscess comprises 48% of all the visceral abscesses. Liver abscess is broadly divided into amoebic and pyogenic liver abscess with majority of the amoebic etiology in developing countries and pyogenic in developed countries. Early detection and localization secondary to advancements in CT and ultrasonography (US) advanced the treatment of pyogenic liver abscess considerably. Nowadays percutaneous treatment of pyogenic liver abscess whether single or multiple abscesses has become the standard of care. In addition, endoscopic and laparoscopic option for drainage in patients who are not responsive to antibiotic treatment have been explored with good outcomes.

**Results:** In our study, mean age of patients was 46.37 +/- 17.93, Our youngest patient was 19 years of age and elder most was 80 years of age. 53.33% (24) patients were males and 46.67% (21) were females. 37 (82.22%) had high-grade fever. Majority i.e., 15/45 patients (33.33%) showed growth of Escherichia coli after 48 hours of inoculation. Streptococcus was other major group, growth was present in 24.44% of patients, in ten out of 45 patients (i.e., 22.22%), no growth was seen after 48 hours of inoculation. Klebsiellas and staph aureus was seen in five (11.11%) and four (8.89%) patients respectively. Majority 23/45 of our patients were managed by pigtail drainage i.e., 51.11%. 17/45 patients were managed by IV followed by oral antibiotics making this category of patients 37.77% of our total sample population. Open surgical drainage was done in four patients (8.88%), two out of them were directly taken for surgical intervention and other two after failure of pigtail drainage. Only one patient had to undergo Usg guided pigtail drainage after failure of IV antibiotic therapy.

**Conclusions:** Hepatic abscesses are a relatively rare occurrence, but an important health problem nonetheless. Slight male preponderance as compared to female population. Percutaneous catheter drainage is safe and effective treatment option than minimal invasive/open surgical procedure, and is the most reliable and effective means of management.

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### Introduction:-

Liver abscess comprises 48% of all the visceral abscesses<sup>1</sup>. Liver abscess is broadly divided into amoebic and pyogenic liver abscess with majority of the amoebic etiology in developing countries and pyogenic in developed countries<sup>2</sup>. During the early years of 20<sup>th</sup> century, pyogenic liver abscess was seen most often secondary to appendicitis but later on biliary tract diseases usually precede the pyogenic liver abscess<sup>3</sup>. More recently pyogenic liver abscess can be associated with secondary infection of a primary liver tumor or metastatic liver lesions as well as their treatment particularly as complications of trans-arterial chemoembolization or radiofrequency ablation<sup>4,5</sup>. In a situation where following full investigations, no obvious source of extra-hepatic infection was determined the pyogenic liver abscess is labelled as cryptogenic<sup>6</sup>. Early detection and localization secondary to advancements in CT and ultrasonography (US) advanced the treatment of pyogenic liver abscess considerably. Nowadays percutaneous treatment of pyogenic liver abscess whether single or multiple abscesses has become the standard of care. In addition, endoscopic and laparoscopic option for drainage in patients who are not responsive to antibiotic treatment have been explored with good outcomes<sup>7,8,9,10,11</sup>.

### Etiology

Although there are multiple etiologies of pyogenic liver abscess, ascending infection of the biliary tree associated with obstruction is currently the most commonly identified cause. Geographic differences account for observed differences in etiology of obstruction leading to ascending infection and subsequent pyogenic liver abscess. In many Asian countries hepatolithiasis with associated biliary strictures account for most of the cases of pyogenic liver abscess<sup>12,13</sup>. Whereas in western countries obstruction secondary to underlying malignancy such as an obstructing cholangio-carcinoma with associated ascending cholangitis is a very common scenario<sup>14,15,16</sup>. Furthermore, the widespread use of bile duct stents and biliary tract manipulation in these situations has also greatly increased the risk of cholangitis and subsequent pyogenic liver abscess. Other causes of pyogenic liver abscess include haematogenous spread from sources other than gastrointestinal tract, such as bacterial endocarditis, intravenous drug use and other infectious processes that can produce bacteremia.

### Microbiology:-

Bacteria are more likely to be isolated from the abscess cavity than from blood culture. Reports in the literature describe varying rates of mono microbial versus polymicrobial isolates in pyogenic liver abscess with 33% to 55% of hepatic abscess cultures being polymicrobial, compared with a lower rate of polymicrobial blood culture isolates. E coli, streptococcus, enterococcus are often cultured in patients with pyogenic liver abscess with E.coli and streptococcus being the most frequently isolated bacterial flora in most series in the western literature. Pyogenic liver abscess with clostridium perfringens has also being reported. Klebsiella pneumoniae is especially prevalent in Asia compared with western population. A separate syndrome invasive klebsiella pneumoniae liver abscess syndrome associated with metastatic klebsiella infection has been described most commonly reported in individuals of Asian descent with diabetes.

### Clinical Presentation:

The signs and symptoms of pyogenic liver abscess are summarized below:

SYMPTOMS	PERCENTAGE	SIGNS	PERCENTAGE
Abdominal pain	89-100 %	Normal finding	38 %
Fever	67-100 %	Right upper Quadrant tenderness	41-72 %
Chills	33-38 %	Hepatomegaly	51-92 %
Anorexia	38-80 %	Mass	17-18 %
Weight loss	25-68 %	Jaundice	23-43 %
Cough	11-28 %	Chest finding	11-48 %

### Laboratory studies:

A complete blood count should be obtained. Anemia is observed in 50-80% of the patients. Leucocytosis of more than 10000/ $\mu$ L is observed in 75-96% of the patients. Liver function tests are helpful. An elevated ALP level is observed in 95-100% of the patients. Liver enzymes (ALT and AST) are increased in 48-68% of the patients. Hypoalbuminemia is frequently present likely reflecting disease chronicity. Hyperbilirubinemia is seen in 30-70% of the patients.

### Imaging studies

Chest radiographic examination in 50% of the cases may show an elevated right hemidiaphragm, sub-diaphragmatic air fluid levels of gas forming organisms are present, pleural effusions and atelectasis. Ultrasound is usually the initial study of choice for imaging of the liver and biliary tree due to its low cost, the lack of exposure to ionizing radiation and the high

sensitivity. Ultrasound has a reported sensitivity of 83% to 95%, ultrasound can also characterize the degree of maturation of liver abscess. CT scanning is highly sensitive to distinguish pyogenic liver abscess from other intrahepatic lesions. The reported sensitivity for detection of pyogenic liver abscess is between 93% and 100%. Magnetic resonance imaging does not appear to offer any significant advantage in the detection of pyogenic liver abscess when compared with ultrasound and CT scan, given their high sensitivity. However, if there is a diagnostic uncertainty magnetic resonance imaging may be able to characterize intrahepatic lesions and delineate differences between pyogenic liver abscess and cystic or necrotic lesions.

### **Approach Considerations**

At present, most liver abscesses are treated with antibiotics and catheter drainage under the guidance of ultrasonography or computed tomography. In some cases, however, surgical drainage is indicated. The five indications for surgical drainage are as follows:

1. Failure of antibiotic therapy.
2. Failure of percutaneous aspiration.
3. Failure of percutaneous drainage.
4. Coexistence of intra-abdominal disease that requires operative management.
5. Abscess that is not amenable to percutaneous drainage because of its location.

Relative contraindications for surgery include the following:

1. Multiple abscesses.
2. Polymicrobial infection.
3. Presence of associated malignancy of immunosuppressive disease.
4. Coexistence of other multiple and/or complicated medical problems or conditions.

### **Antibiotic Therapy**

After the diagnosis of pyogenic liver abscess is suspected, blood cultures should be immediately obtained, percutaneous aspiration or drainage with gram stain and culture of the abscess cavity contents is helpful to guide initial antibiotic management. Therapy should not be delayed while waiting for blood or abscess culture results and broad-spectrum empiric antibiotic coverage should be started immediately. Biliary disorders commonly yield gram negative bacteria whereas abscess as a result of pylephlebitis yield gram negative and anaerobic bacteria. Antimicrobials such as extended spectrum penicillin's, carbapenems or second-generation cephalosporin's with or without metronidazole depending on antimicrobial anaerobic coverage are good initial antibiotic choices for the treatment of pyogenic liver abscess. Modifications of the antibiotic regimens can be made after the speciations and sensitivities are obtained from blood cultures or abscess cavity aspirate cultures. Antimicrobial therapy is usually initiated parenterally for duration of 2-3 weeks with conversion to oral antibiotics to complete 4-6 weeks course. Klebsiella pneumoniae abscesses should be treated with 3<sup>rd</sup> generation cephalosporin's especially in the setting of meningitis and endophthalmitis.

### **Percutaneous aspiration and percutaneous catheter drainage**

Percutaneous drainage has become the first line treatment of pyogenic liver abscess with diminished need for open surgical drainage. Needle aspiration is simple procedure has better patient comfort and is cost effective. Percutaneous aspiration has a higher success rate, a shorter duration of hospital stay and a lower mortality rate. Particularly difficult patients are those with hepato-biliary malignancies which have traditionally been associated with high failure rates for percutaneous drainage and high mortality rates in general. However, when the often associated underlying biliary communication or obstruction is treated, percutaneous drainage becomes an effective and safe therapeutic option. Predictors of failure with percutaneous drainage included abscess culture isolates containing yeast and communication of the abscess cavity with the biliary tree<sup>17</sup>. Although percutaneous methods are safe and effective, attention must be paid to patients worsening clinically or failing to improve in which case surgical drainage and or hepatic resection may be the most effective option.

### **Laparoscopic drainage**

Now that practitioners have gained greater increased experience with the laparoscopic approach to liver lesions, laparoscopic drainage of pyogenic liver abscesses is being performed safely, and the time required to carry out the procedure has been reduced. Indications for laparoscopic drainage are as follows:

1. Failure of medical management and percutaneous drainage.
2. Contraindication to percutaneous drainage
3. Septic shock on presentation requiring emergency surgical interventions; a surgically accessible liver abscess with minimal risk of injury to major vessels and the biliary tree; no previous major surgery in the right upper quadrant; no

concomitant conditions requiring additional surgery. Purported advantages of laparoscopic hepatic abscess drainage are those attributed to laparoscopic surgery for other indications as well including shorter length of hospital stay fast recovery, reduced immunosuppression and better cosmesis, operative time and time to oral intake have been reported to be shorter in patients with laparoscopically drained pyogenic liver abscess. The possibility of air embolism if there were injury to the hepatic veins is a cause of concern.<sup>18</sup>

### Surgical Therapy

Open operation is primarily indicated for failure of medical management, failure of percutaneous drainage and complications secondary to percutaneous treatments such as bleeding or spillage of pus into the peritoneal cavity. Primary surgical treatment may be required to treat abdominal pathology responsible for pyogenic liver abscess such as diverticulitis, appendicitis and pyogenic liver abscess rupture into the peritoneal cavity with subsequent peritonitis or an obstructed biliary tree which cannot be treated by endoscopic or interventional means. Surgical drainage is done usually through middle laparotomy or an extended subcostal incision. Localization of hepatic abscess with palpation of liver and intraoperative ultrasound is performed next. Needle aspiration to confirm location of the abscess, obtain material for culture and gram stain. Surgical approach may be transperitoneal, transpleural or extra-peritoneal. Transperitoneal approach is safe and is preferred approach because it allows thorough inspection of the peritoneal cavity and permit the mobilization necessary for adequate drainage. In cases of infection secondary to hepatic malignancy and hepatic abscess associated with chronic granulomatous diseases of childhood hepatectomy/hepatic resection should be considered.

### Aims and Objectives:-

1. To study the clinical features, radiological findings and microbiological profile of patients with pyogenic liver abscess.
2. To study the role of antibiotic therapy in pyogenic liver abscess.
3. To study the efficacy and outcomes of percutaneous drainage of pyogenic liver abscess.
4. To study the role of surgery (open/laparoscopic) in pyogenic liver abscess.

### Inclusion Criteria:

1. All consenting patients with the age above 18 years.
2. Patients presenting with consistent symptoms of pyogenic liver abscess.
3. Patients diagnosed with pyogenic liver abscess radiologically (ultrasonography and CECT scan, if required).

### Exclusion Criteria:

Patients not giving consent for the study.

### Descriptive Statistics: -

#### Baseline Characteristics Of The Patients

##### Age distribution of study subjects:

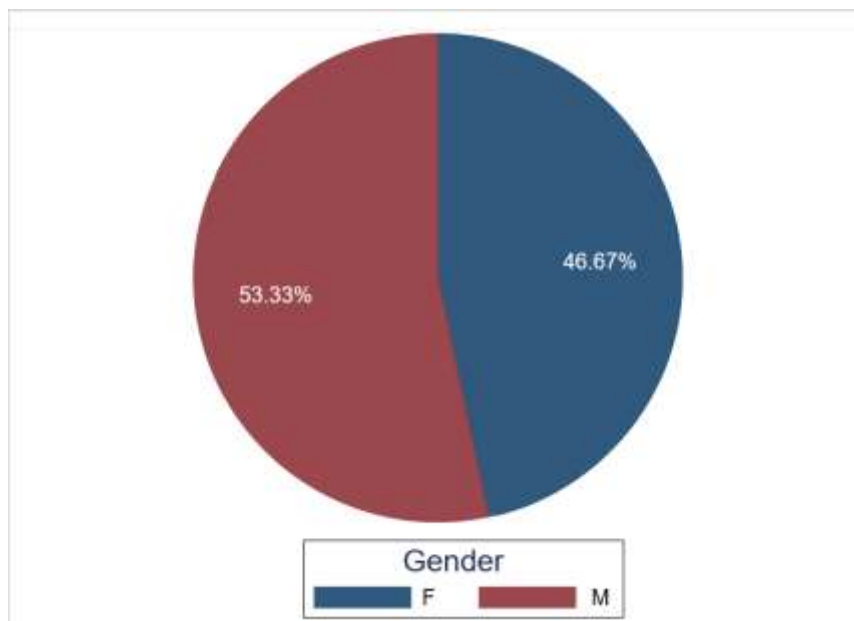
In our study, mean age of patients was 46.37 +- 17.93, Our youngest patient was 19 years of age and elder most was 80 years of age. Majority (48.89%) of the patients belonged to age group of less than 40 years, followed by 28.89 % patients in 41 years to 60 years age group, rest of the patients were in age group >60 years (22.22 %). These observations are shown in table.

##### Age Statistics of Study Subjects

Age in years	Freq.	Percent	Cumulative percent
<=40 years	22	48.89	48.89
41-60 years	13	28.89	77.78
>60 years	10	22.22	100.00
Total	45	100.00	

##### Gender Distribution of Study Subjects

In this study, 53.33% (24) patients were males and 46.67% (21) were females.



### Gender distribution of study subjects

Distribution of Study Subjects on the basis of pre-existing morbidity:

Distribution of Study Subjects on the basis of co-morbidity

Comorbidity	Frequency	Percent	Cumulative percent
COPD	1	2.22	2.22
DCM	1	2.22	4.44
HTN	8	17.78	22.22
HTN, T2DM	3	6.67	28.89
HYPOTHYROID	1	2.22	31.11
NIL	27	60.00	91.11
T2DM	4	8.89	100.00
Total	45	100.00	

Distribution of Study Subjects on the basis of features in clinical examination:

We tried to elicit clinical signs in all of our sample population and categorized patients based on presence or absence of same. The following clinical signs were looked for: fever, pain, tenderness in right hypochondrium and jaundice i.e., yellowish discoloration of sclera.

Distribution of patients on the basis of presence of fever:

Most of our patients had fever. Of our 45 patients, 37 (82.22%) had high-grade fevers.

presence of fever in our study population:

Fever	Freq.	Percent	Cum.
NO	8	17.78	17.78
YES	37	82.22	100.00
Total	45	100.00	

Distribution of patients on the basis of presence of pain in RHC:

Most of our patients had fever. Of 45 patients, 37 (82.22%) had high-grade fevers.

presence of pain in RHC

Pain RHC	Frequency	Percent	Cumulative percent
NO	10	22.22	22.22

YES	35	77.78	100.00
Total	45	100.00	

#### Distribution of patients on the basis of presence of tenderness in RHC:

Most of our patients had tenderness present in right hypochondrium although not as frequent as fever. Of 45 patients, 27 (60 %) had tenderness positive in right hypochondrium, and in 18/45 tenderness in RHC could not be elicited. These findings are presented in table 8 and figure 5.

#### Tenderness in RHC

Tender RHC	Frequency	Percent	Cumulative percent
NO	18	40.00	40.00
YES	27	60.00	100.00
Total	45	100.00	

#### Distribution of patients on the basis of presence of clinical jaundice:

Clinically, we were unable to detect jaundice in most of our patients, 34/45 i.e., 75.56% of patients were having clear sclera and skin on clinical examination, and 11/45 i.e., 24.44% were having jaundice.

#### Derangements of Liver Function of Test

Parameter of LFT	Frequency	Percent	Cumulative percent
Raised Bilirubin	6	13.33	13.33
Raised Enzymes	4	8.88	22.21
Raised Enzymes & Bilirubin	1	2.22	37.76
WNL	34	75.56	100.00
Total	45	100.00	

#### Distribution of patients on the basis of derangements of complete blood count:

Laboratory analysis on automated CBC analyzer was done in all patients, 23/45 patients were having normal parameters on complete blood count, making these patients 51.11% of our total sample population, leukocytosis defines as leucocyte count more than 10 thousand were seen in 22/45 patients i.e., 48.89%.

#### Distribution of patients on the basis of culture and sensitivity results:

BD BACTEC automated Blood Culture System with fluorescent technology was utilized to grow bacteria from blood in all our patients. Majority i.e., 15/45 patients (33.33%) showed growth of Escherichia coli after 48 hours of inoculation. Streptococcus was other major group, growth was present in 24.44% of patients, in ten out of 45 patients (i.e., 22.22%), no growth was seen after 48 hours of inoculation. Klebsiellas and staph aureus was seen in five (11.11%) and four (8.89%) patients respectively.

#### culture and sensitivity results

Organism	Frequency	Percent	Cumulative percent
E. Coli	15	33.33	33.33
Klebsiella	5	11.11	44.44
Staph Aureus	4	8.89	53.33
Sterile	10	22.22	75.56
Streptococcus	11	24.44	100
Total	45	100.00	

#### Distribution of patients on the basis of imaging studies:

Imaging with both ultrasound and contrast enhanced computed tomography was done in all patients, 24/45 patients i.e., 53.33% of patients were having abnormalities evident on CT and 21/45 patients i.e., 46.66% were having features of pyogenic abscess on ultrasonography.

#### Distribution of patients on the basis of imaging studies

Imaging study	Frequency	Percent	Cumulative percent
CECT ABDOMEN	24	53.33	53.33

USG ABDOMEN	21	46.66	100
Total	45	100.00	

#### Distribution of patients on the basis of management:

We followed guidelines-based treatment for management of pyogenic abscesses. Majority 23/45 of our patients were managed by pigtail drainage i.e., 51.11%. 17/45 patients were managed by IV followed by oral antibiotics making this category of patients 37.77% of our total sample population. Open surgical drainage was done in four patients (8.88%), two out of them were directly taken for surgical intervention and other two after failure of pigtail drainage. Only one patient had to undergo Usg guided pigtail drainage after failure of IV antibiotic therapy.

#### Management of patients:

Management	Frequency	Percent	Cumulative percent
Iv & Oral Antibiotics	17	37.77	37.77
Iv & Oral Antibiotics Followed by Usg guided Pigtail Drainage	1	2.22	39.99
Open Surgical Drainage	2	4.44	44.43
Pigtail Drainage	23	51.11	95.54
Pigtail Drainage Followed by Open Surgery	2	4.44	100.00
Total	45	100.00	

#### Distribution of patients on the based upon stay needed in hospital:

We followed all our patients till discharge from hospital premises. Mean hospital stay in our patient population was 9.53+- 2.95 days. Maximum days spent in hospital were 20 and minimum was one day. Majority (34/45) of patients stayed for six to ten days in hospital (75.56%), 17.78% were admitted for eight days, only two patients needed prolonged admission of 16-20 days.

#### Hospital stay of patients:

Hospital Stay	Frequency	Percent	Cumulative percent
<=5	1	2.22	2.22
6-10	34	75.56	77.78
11-15	8	17.78	95.56
16-20	2	4.44	100.00
Total	45	100.00	

#### Mean and Standard deviation of Hospital stay:

Total number of patients	Mean hospital stay	Standard Deviation	Minimum	Maximum
45	9.53	2.95	1	20

#### Distribution of patients on the based upon development of complications during hospital stay:

Majority of our patients didn't develop any complications, 42/45 (93.33%) patients had unremarkable hospital stay, however two patients had recurrence of pyogenic abscess and one had recurrence associated with septic shock.

#### Development of complications during hospital stay

Complications	Frequency	Percent	Cumulative percent
Nil	42	93.33	93.33
Recurrence	2	4.44	97.78
Recurrence With Septic Shock	1	2.22	100.00
Total	45	100.00	

#### Comparative Statistics:

Comparison of patients based upon principal symptom of presentation and treatment modality response:

Majority of our patients were treated with pigtail drainage (25/45) i.e., 45.55%, followed by antibiotics (40%) and open drainage (4.44%). when a group comparison was done with these treatment modalities, none of them was

found significant when compared with presenting clinical manifestation like pain, fever, tender RHC as well as significant lab abnormality like leukocytosis and abnormalities in liver function test.

#### Symptom of presentation and treatment modality response

Symptom/sign	Pigtail drainage (n=25)	IV and oral antibiotics (n=18)	Open drainage (n=2)	p-Value
Tender RHC	14	11	2	0.595
Pain RHC	20	13	2	0.830
Fever	22	13	2	0.398
Jaundice	6	4	1	0.706
Leucocytosis	11	9	2	0.431
Abnormal LFT	6	4	1	0.706

#### Comparison of efficacy of different treatment modalities according to hospital stay:

We took early discharge from hospital and less hospital stay as marker of efficacy of treatment modality, in our patient population majority had hospital stay of 6-10 days in both pig tail drainage and antibiotic categories, only open surgical drainage patients had prolonged stay, with one patient admitted for greater than 11 days and one greater than sixteen days. Duration of admission was statistically significant in open surgical drainage cases as compared to conservative (antibiotics) and semi conservative (pit-tail drainage) approaches.

#### Efficacy (hospital stay) of different treatment modalities

Management	Hospital stay (<5days)	Hospital stay (6-10 days)	Hospital stay (11-15 days)	Hospital stay (16-20 days)	Total
Pigtail drainage	1	22	1	1	25
IV and Oral antibiotics	0	12	6	0	18
Open Surgical drainage	0	0	1	1	2
Total	1	34	8	2	45
Pearson Chi 2 (6) = 19.4493					=0.003
Pr					
Fisher exact = 0.003					

#### Comparison of efficacy of different treatment modalities according to recurrence:

We also took recurrence of abscess formation as marker of efficacy of treatment modality, in our patient population only three patients had recurrence and this was seen more in pigtail drainage as compared to open surgical drainage, but owing to small sample size statistical significance of this finding can't be established with p value of 1.00.

#### Efficacy (recurrence) of different treatment modalities

Management modality	Complications (recurrence)		Total
	yes	no	
Pigtail drainage	23	2	25
IV and Oral antibiotics	17	1	18
Open surgical drainage	2	0	2
Total	42	3	45
Pearson chi (2) = 0.2500			
Pr =0.882			
Fisher Exact = 1.000			

#### Discussion:-

Pyogenic liver abscess is still a serious illness and a diagnostic challenge owing to lack of specificity of clinical signs and laboratory results. Recent imaging techniques such as ultrasound and CECT scan have made diagnosis simpler but still cannot always reliably rule out other differentials such as parasitic abscesses or primary and metastatic hepatic tumor. Radiological advances, combined with improvements in microbiological identification and treatment, have helped to decrease mortality rates.

Significance of age of incidence of pyogenic liver abscess and its possible role as a prognostic factor remains controversial. Very few studies have specifically explored how the clinical features and management of elderly patients with this entity differ from those of younger individuals. Knowledge of such differences may heighten clinical suspicion, given the atypical presentation of illness often seen in elderly patients. With the development of more sophisticated diagnostic techniques and longer lifespan, the demographic for peak incidence of liver abscess is shifting towards the sixth and seventh decades of life. In our study mean age of patients was 46.37 ± 17.93 years, Majority (48.89%) of the patients belonged to age group of less than 40 years, very few of our patients were seen in extremes of age groups with only two of our patients above 60 years of age, this is similar to results found in other major study, Ochsner A, et.al<sup>19</sup>, presented an analysis of 830 cases of pyogenic hepatic abscess collected from the world literature, they found pyogenic liver abscesses are most commonly observed in adults 41 - 50 years, accounting for 49% of their study population. In our study, significantly more males (53.33%) were affected than women, our data corroborate with other major studies showing a male majority of patients. Chen SC, et.al<sup>20</sup> did a retrospective review of patient records from January 2007 to June 2008, and identified 140 cases of liver abscess hospitalized in a medical center in northern Taiwan, they found pyogenic liver abscess more common in males than females (78 males vs 44 females) i.e., 55.71%. Although some recent reports also suggest a trend to an equal sex incidence, our study contradicts that view, e.g.

Pearce NW, et.al did a review of liver abscess treated at their center over the last 7 years, they recorded forty-two patients with median age of 53 years and Male: Female ratio of 18:24, were admitted with liver abscess.

Typical clinical manifestations of pyogenic liver abscess are fever and abdominal pain. In our study fever, right upper abdominal pain, nausea, and vomiting were main presenting symptoms, with fever in 37 and pain in 35 out of 45 patients, while on physical examination tender right hypochondrium was recognised in 60% and jaundice in 24.44% of cases, these results are in accordance with other studies, C J Huang<sup>21</sup> et.al, documented changes in the etiology, diagnosis, bacteriology, treatment, and outcome of patients with pyogenic hepatic abscesses over 4 decades, an analysis of records of 233 patients with pyogenic liver abscesses was done, fever was found in approximately 90% of patients with liver abscess, and abdominal symptoms like pain, guarding, tenderness was found in 50 to 75% of cases.

In addition to presenting symptoms, the presence of a raised white blood cell count, bilirubin, liver enzymes and alkaline phosphatase should suggest the possibility of pyogenic liver abscess, our data found leucocytosis in 51.11% and laboratory abnormalities of liver function in 22.22%, (mainly hyperbilirubinemia) of patients. Bhatti AB et.al<sup>22</sup>, did a study of 68 patients with liver abscess, patients were divided into two groups: the pyogenic (n = 47) and amoebic group (n = 21), leucocytosis was seen in 100% of patients with pyogenic abscess as compared to 85.7% of amoebic liver abscess, High Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST) was found in all patients of pyogenic liver abscess as compared to 80% in parasitic.

Influence of co-morbidity on outcome of pyogenic liver abscess is somewhat controversial, with some studies suggest presence of comorbidity increases incidence of sepsis and consequent mortality especially in children. Thavamani Aravind et.al<sup>23</sup> did an analysis of 4075 cases of pyogenic liver abscess admitted in their hospital over the period of 12 years, authors concluded that patients with pyogenic liver abscess and associated co-morbidity had 12 times increased odds of having associated severe sepsis. In our study at the time of presentation to the hospital, 60% of our patients did not have any known or preexisting conditions, hypertension was most common co-morbidity, seen in 17.78% of our study population, followed by diabetes in 8.89% and only minority had some other significant past history of COPD, DCM, or hypothyroidism, a comparative analysis of influence of co-morbidity on mortality and morbidity was not done in our study.

Contemporary radiological techniques such as ultrasound and CT scanning have greatly aggrandized our ability to bring into being the diagnosis of hepatic abscess and have increased our comprehension of the natural history of this disease process. Ultrasonography is the preferred initial tool for the diagnosis of liver abscess with a sensitivity of 85% to 95%.

Ultrasound can identify lesions more than 2 cm in diameter and is also cost effective as compared to CT scan. On the other hand, CT offers several advantages over ultrasonography. It has a sensitivity of 95% and can detect abscesses as small as 0.5 cm. Lin AC<sup>26</sup> et al. did a retrospective study of patients diagnosed with pyogenic liver abscess in the emergency department (ED) of a tertiary care teaching hospital for a period of 5 years, Of the 268

patients 38 had false negative findings on ultrasonography (sensitivity 85.8%) and required abdominal CT scanning for definitive diagnosis, on the other hand in 230 cases, ultrasonography alone was sufficient for diagnosis. CT also helps in detecting any associated intra - abdominal pathology including but not limited to pancreatic masses, colonic cancers, diverticulitis, appendicitis and intraperitoneal abscesses. All our patients were subjected to ultrasound examination and a sensitivity of 46.66% in diagnosis was achieved. Predominant number 24/45 (55.33%) of patients in our series needed CT scan examination for confirmation of diagnosis, this apparent discrepancy with major studies can be explained by subjective nature and expertise dependence of USG as compared to CT. Ultrasound was also found to be useful in management of patients with hepatic abscess (the percutaneous drainage group), USG was very useful technique for documentation of the course of the hepatic abscess in our series.

While imaging studies are critical means to diagnose liver abscess, microbiological diagnosis is absolutely essential in establishing a causal relationship and strategizing further therapeutic plans. The most common pathogens of the pyogenic hepatic abscesses are *E. coli*, *K. pneumoniae*, *Bacteroides*, *Enterococci*, *Streptococci*, and *Staphylococci*. Liisa Meddings<sup>16</sup> et al. did a population-based study of pyogenic liver abscesses in the United States, they identified 17,787 PLA discharges from 1994 to 2005, the most commonly recorded bacterial infections were *Streptococcus* species (29.5%) and *Escherichia coli* (18.1%). Nowadays, some studies suggest *K. pneumoniae* surpassed *E. coli* to become the predominant cause of pyogenic liver abscess<sup>85</sup> as is also seen in sepsis overall. In a review done by Jae bum jun et.al<sup>85</sup> community-acquired *K. pneumoniae* liver abscess was found to be a major health problem in parts of Asia, accounting for 80% of all cases of pyogenic liver abscess in Taiwan and Korea, but only reported sporadically elsewhere in Asia, North America, Europe, and Australia. Our data was suggestive of *E. coli* as the predominant pathogen, which was found in 42.85.% of the culture-positive patients, followed by *Streptococci* (31.4%), we found *K. pneumoniae* only in five of our patients.

Percutaneous catheter drainage is considered as standard treatment of choice for liver abscess. It is safe, effective, and has been praised for its simplicity and excellent results. In a study done by Avnish Kumar Saxena<sup>25</sup> et.al., a comparison of USG Guided Pigtail Catheterisation Vs Open Drainage in the Management of Liver Abscess was done, in 60 patients with pyogenic liver abscess, half were randomized to pigtail drainage group (PD) and other half to open surgical drainage (SD), Total clinical improvement was seen in 4-8 days and 4-7 days in Group PD and Group SD respectively. Time needed for total reduction was 5-17 weeks in Group PD and 7-24 weeks in group SD. Hospital stay was 5-18 days and 6-21 days in group PD and SD respectively. Morbidity is 30% in group PD and 36.6% in group SD. In our study 23 patients (51.11%) were subjected to pigtail drainage and only 2 patients (8.69%) among them subsequently needed open surgical drainage because of inadequate response to percutaneous drainage. Although of considerable benefit, some studies suggest it may be associated with a higher failure rate than surgical drainage which our study contradicts. Shamsul Bari et.al<sup>27</sup> conducted a study over a period of 10 years from January 1991 to December 2000 and total of 129 cases were studied, of the 129 cases, 49 were treated with antibiotics alone, 55 cases were taken for open drainage, and 27 cases were taken for percutaneous aspiration under USG guidance. Percutaneous aspiration failed in five patients who were later taken for open drainage. Authors concluded that open method is still the best modality of management, although percutaneous aspiration is safe and effective but needs lot of expertise. Antibiotics were used in all of our patients, but 37.77% (n=17) of our patients were put exclusively on antibiotics only, this was also seen as highly effective modality of treatment with only one patient (5.88%) requiring subsequent pigtail drainage after antibiotic failure. In our study both pigtail drainage and antibiotic only, modalities were effective and have shown statistically significant reduction in hospital stay as compared to open drainage.

### Conclusions:-

Hepatic abscesses are a relatively rare occurrence, but an important health problem nonetheless. Slight male preponderance as compared to female population. Percutaneous catheter drainage is safe and effective treatment option than minimal invasive/open surgical procedure, and is the most reliable and effective means of management.

### Conflict Of Interest:

None.

### Bibliography:-

1. Dori F, Zaleznik, Dennis L, Kasper. Liver abscess. In: Braunwald E, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, eds. *Harrisons principles of internal Medicine*. 15th ed, McGraw-Hill inc: New York, 2001; 1: 832-3.

2. Ochsner A, Debaquey M, Murray S. pyogenic abscesses of the liver: An analysis of 47 cases with review of literature. *Am J Surg.* 1938; 40 (1) : 292-319.
3. Lardiere- Degnelte S, Ragot E, Armoun K, Piardi T, Dokmak S, Bruno O, et al. Hepatic abscess : diagnosis and management *J. ViseSurg* 2015 ; 152 : 231-243.
4. Haung SF, Ko CW, Chaung CS, Chen GH. Liver abscess formation after trans-arterial chemo-embolization for malignant hepatic tumor. *Hepatogastroenterology* 2003 ; 50 : 1115-1118.
5. Lida H, Aihara T, Ikuta S, Yamanaka N. Risk of abscess formation after liver tumor radiofrequency ablation : A review of 8 cases with a history of enterobiliary anastomosis. *Hepatogastroenterology* 2014 ; 61 : 1867-1870.
6. Mavilia MG, Molina M, WuGY. The evolving nature of hepatic abscess : A review. *J Clin Transl Hepatol.* 2016 ; 4 : 158-68.
7. Noh SH, Park DH, kim YR et al. EUS guided drainage of hepatic abscesses not accessible to percutaneous drainage. *GastrointestEndosc.* 2010 ; 71 (7) : 1314-1319.
8. Seewald S, Imazu H, Omar S et al. EUS guided drainage of hepatic abscess with biliary communications. *Dig Dis Sci* 2012 ; 57 (2) : 524-527.
9. Wang W, Lee WJ, wei PL, Chen TC, Huang MT, Laproscopic drainage of pyogenic abscess. *Surg Today* 2004 : 34 (4) : 323 : 325.
10. TuJF, Huang XF, HU RY, YouHY, Zheng XF, Jiang FZ. Comparision of laparoscopic and open surgery for pyogenic liver abscess with biliary pathology. *World J Gastroenterol.* 2011 : 17 (38) : 4339-4343.
11. Aydin C, Piskin T, Sumir F, Barut B, Kayaalp c. Laproscopic drainage of pyogenic liver abscesses. *JLS* 2010 ; 14 (3) : 418-420.
12. Channanna C, Rehman FU, Choudhuri B, Patil A. A clinical study, diagnosis and management of liver abscess at VIMS Bellary. *J Evidence Based Med Health Care.* 2014 ; 1 : 668-85.
13. Goldman L, Schafer AL, Bacterial, parasitic, fungal and granulomatous infections In : Goldman- Cecil Medicine book . 25th ed. Elsevier ; 2016 ; 1 : 375.
14. Kaplan CG, Gregson DB, Lsupland KB. Population based study of the epidemiology of and the risk factors for pyogenic liver abscess. *Clin Gastroenterol Hepatic* 2004 ;2 (11): 1032-1038.
15. Ochsner A, Debaquey M, Murray S. pyogenic abscesses of the liver: An analysis of 47 cases with review of literature. *Am J Surg.* 1938; 40 (1): 292-319.
16. Meddings L, Myers RP, Hubbard J et al. A population-based study of pyogenic liver abscess in the United States: incidence, mortality and temporal trends. *Am J Gastroenterol* 2010; 105 (1): 117-124.
17. 17 Mezhir JJ, Fong 4, Jacks LM, et al. Current management of pyogenic liver abscess. Surgery is now second line treatment. *J Am coll Surg.* 2010 ; 210 (6) : 975-983.
18. TuJF, Huang XF, HU RY, YouHY, Zheng XF, Jiang FZ. Comparision of laparoscopic and open surgery for pyogenic liver abscess with biliary pathology. *World J Gastroenterol.* 2011 : 17 (38) : 4339-4343.
19. Ochsner A, debaquey M, murray S. PYOGENIC abscess of the liver. An analysis of forty-seven cases with review of the literature. *Am J Surg* 1938 : 292-319.
20. Huang CJ, Pitt HA, Lipsett PA, Osterman FA Jr, Lillemoe KD, Cameron JL, Zuidema GD. *Ann Surg.* 1996 May; 223(5):600-7.
21. Chen SC, Lee YT, Yen CH, Lai KC, Jeng LB, Lin DB, Wang PH, Chen CC, Lee MC, Bell WR. Pyogenic liver abscess in the elderly: clinical features, outcomes and prognostic factors. *Age and ageing.* 2009 May 1;38(3):271-6.
22. Bhatti A, Ali F, Satti S, Satti T. Clinical and pathological comparison of pyogenic and amoebic liver abscess. *Advances in infectious diseases* 2014 ; 4 : 77-123.
23. Continuing changing patterns of disease in pyogenic liver abscess: a study of 38 patients. *Greenstein AJ, Lowenthal D, Hammer GS, Schaffner F, Aufses AH Jr Am J Gastroenterol.* 1984 Mar; 79(3):217-26.
24. Thavamani, A., Umaphathi, K.K., Khatana, J., Roy, A., Augustin, T. and Radhakrishnan, K., 2020. Incidence trends, comorbidities, and outcomes of pyogenic liver abscess among children: a nationwide population-based analysis. *Journal of Pediatric Gastroenterology and Nutrition*, 71(1), pp.106-111.
25. Saxena AK, Singhal J, Gupta A, Rai AK. Comparison of USG Guided Pigtail Catheterisation Vs Open Drainage in the Management of Liver Abscess.
26. Lin AC, Yeh DY, Hsu YH, Wu CC, Chang H, Jang TN, Huang CH. Diagnosis of pyogenic liver abscess by abdominal ultrasonography in the emergency department. *Emergency Medicine Journal.* 2009 Apr 1;26(4):273-5.
27. Bari S, Sheikh KA, Malik AA, Wani RA, Naqash SH. Percutaneous aspiration versus open drainage of liver abscess in children. *PediatrSurg Int.* 2007;23:69-74.