

**“A CLINICOPATHOLOGIC STUDY AND MANAGEMENT
STRATEGIES OF LIVER ABSCESS”**

**A Dissertation Submitted to
THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY
CHENNAI**

*In Partial Fulfillment of the Regulations
For the Award of the Degree of*

**M.D. (GENERAL Surgery) - BRANCH – I
Reg. No: 221711154**



Government Kilpauk Medical College

Chennai

May -2020

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled
**“A CLINICOPATHOLOGIC STUDY AND MANAGEMENT
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Hospital is a bonafide work of Dr. Gowtham. K submitted to The Tamilnadu
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award of the degree of M.S. BRANCH I (GENERAL SURGERY) examination
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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation “**A CLINICOPATHOLOGIC STUDY AND MANAGEMENT STRATEGIES OF LIVER ABSCESS**” at Govt. Kilpauk Medical College Hospital is a bonafide and genuine research work carried out by me in the Department of General Surgery, Government Kilpauk Medical and Hospital, Chennai-10, under the guidance of our Chief **Prof. Dr. R. LAKSHMANA KUMAR, MS.**, Government Kilpauk Medical College and Hospital.

This dissertation is submitted to **THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI** in partial fulfillment of the University regulations for the award of M.S degree (General Surgery) Branch I, examination to be held in MAY 2020.

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This is to certify that the dissertation titled
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PLAGIARISM CERTIFICATE

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ABBREVIATIONS

DC	-	Differential count
LFT	-	Liver Function Tests
TLC	-	Total Leucocyte Count
RFT	-	Renal Function Test
USG	-	Ultrasound
CT	-	Computerized Tomography
MRI	-	Magnetic Resonance Imaging
ALP	-	Alkaline phosphatase
SGOT	-	Aspartate Amino Transferase
SGPT	-	Alanine Amino Transferase
HIV	-	Human Immunodeficiency virus
DM	-	Diabetes Mellitus

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ETHICAL COMMITTEE CERTIFICATE

GOVT. KILPAUK MEDICAL COLLEGE,
CHENNAI-10

Protocol ID. No.248/2019 Meeting held on 05/09/2019

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A CLINICOPATHOLOGIC STUDY AND MANAGEMENT STRATEGIES OF LIVER ABSCESS" submitted by Dr. K.Gowtham, M.S Post Graduate, Dept of General Surgery, Government Kilpauk Medical College, Chennai-10.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

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INTRODUCTION

NEED FOR THE STUDY

Though Liver abscess was described early as 460-377 B.C. by Hippocrates, it still remains a challenging situation (especially in tropical countries due to poor hygiene & sanitation and reduced literacy rate) due to its highly variable presentation, causing diagnostic difficulties.

India being a tropical country and home to 400 million people harbouring *E.histolytica*, the causative organism of amoebic liver abscess, it assumes immense importance for thorough understanding of the same.

- The rising incidence in alcoholics, diabetics & immune compromised individual has become a matter of grave concern as complication rate are high especially in this sub-group leading to increased morbidity and mortality.
- Liver abscesses is, even to-day, considered a 'desperate disease' and it is no wonder that many 'desperate' measures have been tried to cure this condition.
- As more advanced facilities for investigation are now available, a more concrete picture of liver abscesses is slowly evolving. Much work, however, remains to be done. The story has not ended: it has only just begun.

All these factors has inspired me towards selection of Liver Abscess as my thesis topic which assumes more importance in our country where rural population constitutes approximately 70% and therefore it mandates appropriate & realistic guidelines to be drawn up for early diagnosis and change in management strategies in order to reduce the morbidity and mortality associated with it.

OBJECTIVES OF THE STUDY

My objective is to study 50 cases of Liver abscess and to determine,

1. Demographic profile (Age, Sex, Ethnicity, Residence, Migrants),
2. Spectrum of Clinical presentations
3. Etiology
4. Laboratory investigations .
5. To evaluate efficacy of Ultrasonographic (Radiological) studies in determining size and the treatment.
6. Bacteriological profile
7. To study the incidence of Liver abscess in alcoholism, diabetics & immunocompromised diseases (esp. HIV)

8. To evaluate efficacy, recurrence rate, complications, morbidity & mortality, duration of hospital stay associated with

Management Strategies followed:

- Antibiotics alone (in uncomplicated Abscess measuring <5cms)
- Sonographic guided percutaneous drainage + Antibiotics Coverage (in unruptured Abscess measuring >5cms.)
- Open Surgical drainage

MATERIALS AND METHODS

Fifty patients diagnosed as a case of liver abscess admitted in Govt. Kilpauk medical college from January 2019 to September 2019.

Inclusion criteria

1. All cases of liver abscess diagnosed clinically and/or ultrasonographically.
2. All cases of bacterial and parasitic liver abscess
3. All cases in evolving, liquefied & ruptured stage with or without peritonitis
4. All cases of Diagnosed Liver Abscess being referred to Government Kilpauk medical college.

Exclusion Criteria

- Past history of liver abscess
- Bleeding tendency
- Traumatic liver abscess

REVIEW OF LITERATURE

The liver is the organ most subjected to the development of abscesses. 48% are liver abscess in one study of 540 intra abdominal abscesses over a 12 year period.(1)

Drainage of liver abscess as a form of therapy is established by Hippocrates (400 B.C.)(2)

Oschner & Debakey described Pyogenic liver abscess in 47 cases (1938) in their classic paper and reviewed the world literature.(3)

Closed aspiration and antibiotics for treatment of solitary pyogenic liver abscess is advocated by McFadzean and associates in 1953.(4)

Disease characterized by suppurative thrombophlebitis of the portal vein and formation of single or multiple abscesses as described by Waller In 1846.(5)

Previously Pyogenic liver abscess was largely a disease of people of 20- 30yrs age group but now the spectrum of disease has changed to age group 50- 60yrs with biliary tract diseases & cryptogenic as the main etiology.(6)

Incidence of pyogenic liver abscess would be expected to decrease, with the advent and development of antibiotics over the time. but incidence

is increasing as indicated by studies of Huang & Associates(1996) in which there

were 20-22 cases per 100,000 hospital admissions, appears to be double those of previous 2 decades.(6)

In 1883, Koch initially demonstrated amoebas in the capillaries and tissues adjoining the wall of the liver abscess. *Entamoeba Histolytica*, first recovered from the wall of a hepatic abscess by Kartulis in 1887.(7)

Amoebiasis afflicts upto 10% of the population, (most commonly affects young adults 20-30yr age group with 19:1 male to female ratio) around 500 million persons in developing countries with 50 million cases of invasive disease, and may account for as many as 100,000 deaths . Amoebic abscess is the most common complication of intestinal amoebiasis and can occur many years after exposure in endemic areas.(8)

Reliable serologic test for hepatic amoebiasis is indirect haemagglutination test, yielding positive results in atleast 85% of patients with extraintestinal disease and titres often exceed 1:256 almost always noted by 2 weeks into disease and may remain high for many years following successful therapy.(8)

Leukocytosis with white cell counts averaging between 18,000 – 20,000 is noted in great majority of the patients with liver abscess (mostly pyogenic), Anaemia associated with long standing infection, the most

significant chemical abnormality is an elevation of serum alkaline phosphatase raised serum level. .

The “chocolate sauce,” “anchovy paste” aspirate is considered pathognomic of an amoebic abscess.(9)

Most hepatic abscesses involve the right lobe of liver (postero-superior segment), accounting for three-fourth of the cases, the left lobe is involved in 20% of the times and caudate lobe is uncommonly involved. (10)

The hepatic abscesses are polymicrobial in nature and account for about 40% of the cases. The most common organism cultured are Klebsiella and E.Coli.(11)

The classic description of the presenting symptoms of liver abscess are fever, jaundice, and right upper quadrant pain & tenderness. A recent study from Taiwan of 133 patients found fever in 96% of the patients, chills in 80%, abdominal pain in 53%, and jaundice in 29%.(12)

Patients with advanced age, abscess size > 5 cm, both lobes of the liver involvement and duration of symptoms > 7 d were likely to undergo aspiration of the liver abscess, regardless of etiology.(13)

Abscesses smaller than 5cm size were managed by parenteral antibiotic therapy while those above 5cm size were planned to be managed by ultrasound guided percutaneous aspiration/drainage. Very large >10cm

and multi-loculated abscesses with exaggerated necrotic process were managed by open surgery (14).

Liver abscesses, both amoebic & pyogenic, continue to be an important cause of morbidity and mortality in tropical countries. Although the primary mode of treatment of amoebic liver abscess is medical, 15% of amoebic abscesses may be refractory to medical therapy. Also, secondary bacterial infection may complicate upto 20% of amoebic liver abscesses. And hence drainage may be required in many patients with amoebic liver abscesses. Percutaneous drainage is now considered the treatment of choice for most intra- abdominal abscesses and fluid collections.(15)

Ultrasound & CT are the mainstay in the diagnostic modalities for hepatic abscess. The sensitivity of ultrasound in diagnosing hepatic abscess is 80-95% & The sensitivity of CT SCAN in diagnosing hepatic abscess is 95-100%.(16)

Factors independently associated with poor outcome in Amoebic Liver Abscess are elevated serum bilirubin (>3.5mg/dl), encephalopathy, hypoalbuminaemia (<2.0gm/dl), multiple abscess cavities, abscess volume greater than 500ml, anaemia & diabetes.(17)

ANATOMY

LIVER

The liver is a large, solid gland situated in the right upper quadrant of the abdominal cavity. Reddish brown in colour.

In males, Weighs about 1600g and in females 1300gms.

LOCATION

It is situated in the whole of the right hypochondrium, the greater part of the epigastrium, extends into the left hypochondrium. From above, most of the liver is covered by ribs and costal cartilages, except in the upper part of the epigastrium where it is in contact with the anterior abdominal wall.

It is the largest gland of the body. It secretes bile and performs various metabolic functions.

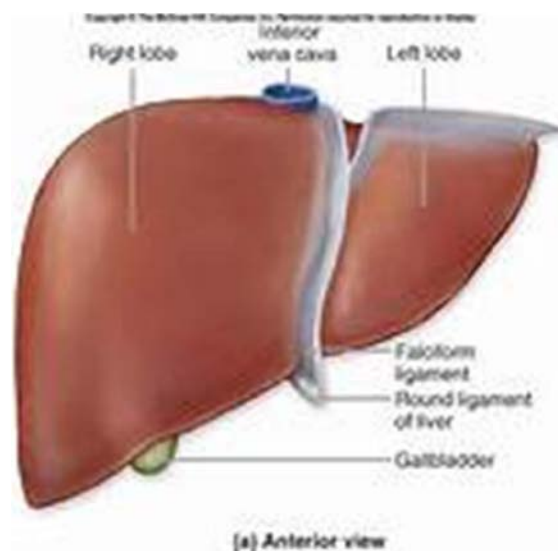


Figure 1

EXTERNAL FEATURES

The liver is wedge shaped. It resembles a four sided pyramid laid on one side.

Five surfaces These are

1. Anterior
2. Posterior
3. Superior
4. Inferior and
5. Right.

Out of these the inferior surface is well defined because it is demarcated by a sharp inferior border, anteriorly

The sharp anterior part is marked by

1. An interlobar notch or the notch for ligamentum teres.
2. A cystic notch for the fundus of the gall bladder.

In the epigastrium, the inferior border extends from the left 8 costal cartilage to the right 9th costal cartilage.

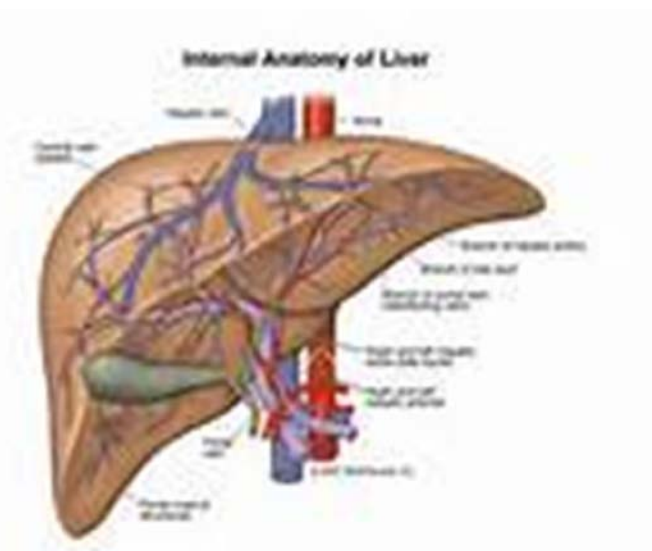


Figure 2

TWO LOBES

The liver is divided into right and left lobes by the attachment of the falciform ligament anteriorly and superiorly. By the fissure for ligamentum teres inferiorly; and by the fissure for the ligamentum venosum posteriorly.

The right lobe is larger than the left lobe. And forms five sixth of the liver. It contributes to all five surfaces of liver, and presents the caudate and the quadrate lobes.

The caudate lobe is situated on the posterior surface. It is bounded on the right by the groove for inferior vena cava, on the left by the fissure for the ligamentum venosum, and inferiorly by the porta hepatis.

The quadrate lobe is situated on the inferior surface, and is rectangular in shape. It is bounded anteriorly by the inferior border, posteriorly by the porta hepatis, on the right side by the fossa for the gall bladder, and on the left by the fissure for the ligamentum teres.

Inferior surface of the right lobe of the liver the portahepatis is situated. The portal vein, the hepatic artery, and the hepatic flexures of nerves enter the liver through the porta hepatis, while the right and the left hepatic ducts and a few lymphatic ducts leave it. The relations within the porta hepatis are from behind forwards the portal vein, the hepatic artery and the hepatic ducts. The lips of the porta hepatis prove attachment to the lesser omentum.

The right lobe of the liver is much larger than the left lobe and forms five-sixth of the liver.

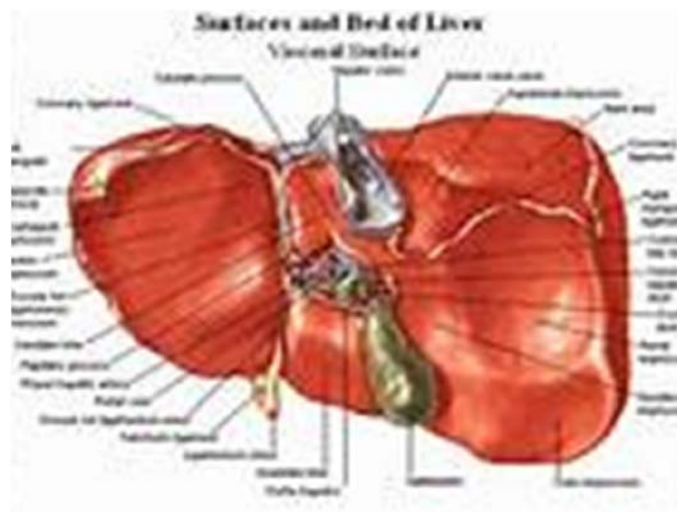


Figure 3

RELATIONS

Peritoneal Relations

Most of the liver is covered by peritoneum. The areas not covered by peritoneum are

1. The triangular area on the posterior surface of the right lobe, limited by the upper and lower layers of the coronary ligament and by the right triangular ligament.
2. The groove for inferior vena cava, on the posterior surface of the right lobe of the liver, between the caudate lobe and the bare area.
3. The fossa of the gall bladder which lies on the inferior surface of the right lobe to the right of the quadrate lobe.
4. The coronary ligament having superior and inferior layers, which enclose the bare area of the liver
5. The lesser omentum

Visceral Relations Anterior surface

The anterior surface is triangular and slightly convex. It is related to the xiphoid process and to the anterior abdominal wall in the median plane, And to diaphragm on each side. The diaphragm separates this surface from the pleura above the level of a line drawn from the xiphisternal joint to the 10th rib in the mid axillary line; and from the lung above the level of a line from the same joint to the 8th rib. The falciform ligament is attached to this surface a little to the right of the median plane.

Posterior surface

The posterior surface is triangular. Its middle part shows a deep concavity for the vertebral column. Other relations are

1. The bare area is related to the diaphragm: and to the right suprarenal gland near the lower end of the groove for the inferior vena cava.
2. The groove for the inferior vena cava lodges the upper part of the vessel, and its floor is pierced by the hepatic veins.
3. In the superior recess of the lesser sac, the caudate lobe is situated. It is related to the celiac trunk, crura of the diaphragm above the aortic opening, to the right inferior phrenic artery
4. Fissure for ligamentum venosum extends to the front of the caudate lobe. It has two layers of the caudate lobe and two layers of the lesser omentum. ligamentum venosum is a remnant of the ductus venosus of foetal life . It is connected below to the left branch of the portal vein, and above to the left hepatic vein near its entry into the inferior vena cava.
5. The left lobe posterior surface marked by the oesophageal impression.

Superior surface

The superior surface is quadrilateral and shows a concavity in the middle. This is the cardiac impression. On each side of the impression the surface is convex to fit the dome of the diaphragm. The diaphragm separates this surface from the pericardium and the heart in the middle; and from pleura and lung on each side.

Inferior Surface

The inferior surface is quadrilateral and is directed downwards, backwards and to the left. It is marked by impressions for neighbouring viscera as follows.

1. On the inferior surface of the left lobe there is a large concave gastric impression. The left lobe also bears a raised area that comes in contact with the lesser omentum; it is called the omental tuberosity
2. The fissure for ligamentum teres passes from the inferior border to the left end of the porta hepatis. The ligamentum teres represents the obliterated left umbilical vein
3. The quadrate lobe is related to the lesser omentum, the pylorus, and the first part of the duodenum and to a part of the transverse lobe.
4. The fossa of the gall bladder lies to the right of the quadrate lobe.
5. To the right of this fossa the inferior surface of the right lobe bears the colic impression for the hepatic flexure of the colon, the renal impression for the second part of the duodenum.

Right Surface

The right surface is quadrilateral and convex. It is related to the diaphragm opposite the 7th to 11th ribs in the midaxillary line. It is separated by the diaphragm from the pleura up to the 10th rib, and from the lung up to the 8th

rib. Thus, upper one-third of the surface related to the diaphragm, the pleura and the lung; the middle one-third, to the diaphragm and the costodiaphragmatic recess of the pleura; and the lower one-third to the diaphragm.

Blood Supply

Hepatic artery - 20% Portal vein - 80%

Both the portal vein and hepatic artery divides into right and left branches before entering into the liver. Within the liver they divide into segmental vessels which further divide into interlobular branches open into the hepatic sinusoids. The hepatic arterial blood mixes with the portal venous blood in the sinusoids.

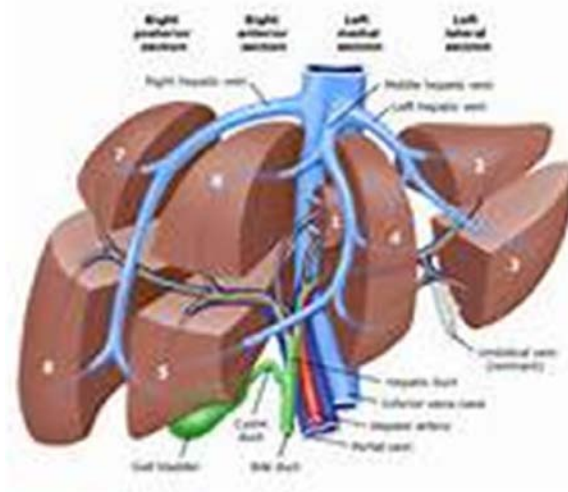


Figure 4

The right and left lobes divide into

1. Right anterior
2. Right posterior
3. Left medial
4. Left lateral

The hepatic veins tend to be inter segmental in their course.

Histology

- Liver is covered by Glisson's capsule.
- Each segment of liver is made up of portal lobule.
- Portal lobule is triangular in shape with three central veins at the centre.
- At the periphery of portal lobule, the portal canals are situated.

- The portal canal contains the hepatic artery, the portal vein and the interlobular bile duct. This is called portal triad.
- The liver acinus is defined as the liver parenchyma around a preterminal branch of hepatic arteriole between two adjacent central veins. The functional unit of the liver is liver acinus.

Development

An endodermal bud arises from the caudal end of the foregut, during the third week of development. The bud elongates cranially and give rise to small bud on right side called par cystica. The main part is called pars hepatica. The epithelial cells proliferate to form the parenchyma. These cells mix up with the umbilical and vitelline veins to form hepatic sinusoids.

The blood cells and kupffer's cells are formed from the mesoderm of septum transversum.

PHYSIOLOGY OF LIVER

Metabolic functions of liver

Glycogen storage Gluconeogenesis

Conversion of galactose and fructose to glucose Fat metabolism

Fatty acid oxidation

Synthesis of cholesterol, phospholipids Synthesis of lipoproteins

Synthesis of fat from proteins and carbohydrates. Protein metabolism

Deamination of amino acids Urea synthesis

Formation of plasma proteins Storage of vitamins A,D,B12 Iron storage as ferritin

Formation of coagulation factors V,VII,IX,X Excretes drugs, hormones and calcium **AMOEBIC LIVER ABSCESS**

Epidemiology

Defined as infection with *E.Histolytica* with or without clinical symptoms. worldwide 12% of the population are affected including tropical and subtropical regions.

E.Histolytica and *E.Dispar* are the organisms responsible for most infections. Ten fold increased incidence of *E.Dispar* than *E.Histolytica*.

High risk groups include migrants , low socioeconomic status, travelers from endemic area, mentally retarded and male promiscuous homosexuals.

The pathogenic *E. histolytica* occurs in trophozoite and cyst forms.

The trophozoite is single nucleus, 3-5mic diameter, contains peripheral chromatin as central nucleus. It is capable of cell division and contact lysis of cell.

Infective form is cyst measures 8-20mic in diameter, important for its virulent.

Feco-oral transmission of cyst occur via food, water and direct person to person contact. The primary source of infection is carriers.

The quadrinucleate cyst develop into metacystic stage and an nuclear division to form eight uninucleate trophozoites in the intestine. *E. histolytica* feed on the bacteria and cellular debris in the lumen of the small bowel without tissue invasion. Amoeba ingests red blood cells and grows, tissue invasion occurs.

Hematogenous amoeba in the stool is strong evidence the parasite is harming the host.

The incubation period is one to four weeks.

Cysts survive in the fecal material for forty five minutes and in the soil for one month in 10 degree C. Not killed by normal chlorination.

PATHOGENESIS

It reaches liver via portal route, from the colon agent- host interaction occur and leading development of an abscess due to enzyme hydrolysis, infarction and immunological reactions. Liver cells undergo liquefaction necrosis and produce 'Anchovy sauce' pus and it has no odour. Secondary infection will alter the colour and consistency, odour of pus. Alcohol consumption and nutrition influence the clinical pattern and prognosis.

It can occur at any age most common at the age of third to fifth decade. Extremes of age it is very rare.

More common in males than females with the ratio of 15:1 and invasive disease is more common in males. So incidence of liver abscess is high in men because intestinal amoebiasis is common in males.

PYOGENIC LIVER ABSCESS

Epidemiology

Ochsner and Debaquey, in 1938 described 47 cases in their classic paper of pyogenic liver abscess and reviewed world literature. In that era, pyogenic disease was largely disease of young, mostly result of acute appendicitis. With effective antibiotics, prompt effective management for acute inflammatory disorders, and an aging population, the spectrum of this disease has changed.

Pyogenic abscess mostly seen in patients in their 50s and 60s most often related to biliary tract disease or cryptogenic in nature.

There is no significance gender, ethnic, or geographic differences in disease frequency. The male : female ratio is approximately 1.5:1.

PATHOGENESIS

The liver can clear the bacterial load when it is exposed to portal venous blood without problems, when load of bacteria exceeds the liver's ability to clear, the development of hepatic abscess occurs. This leads to tissue invasion, neutrophil formation and formation of organized abscess. The biliary tree, portal vein, hepatic artery, direct extension of a nearby nidus of infection and trauma are the potential routes of bacterial exposure to liver.

Recent studies 20% -45% are cryptogenic abscesses associated without biliary tract pathology or intra abdominal sepsis. Ascending infection via biliary tract is the common cause of liver abscess.

Biliary surgeries following biliary enteric anastomosis also causes for hepatic abscess. Biliary stricture, stones, hepatic artery thrombosis or portal thrombosis are leading to hepatic abscesses.

Bacteria spread through the hepatic artery after Sub acute bacterial endocarditis, pneumonia, urinary sepsis following catheterization and drug abuse.

Infection involving the gall bladder, subphrenic space or from bowel perforation directly spread to liver.

PATHOLOGY

- The number, size and the location of abscess depends upon the etiology.
- The abscesses following trauma, cryptogenic and through portal vein are solitary.
- Biliary and arterial abscesses are small and multiple.
- The right lobe is involved in 65% of cases and solitary. The left lobe is involved in 12% and 23% are multiple.
- Preferential blood flow from superior mesenteric vein to right lobe, has high propensity to develop abscesses.
- Abscesses of fungal origin are multiple.

MICROBIOLOGY

E.coli is common in western countries and klebsiella in oriental series. Other organisms are proteus, citrobactor, enterobactor and pseudomonas aeruginosa.

The common anaerobe is bacterioides.

Microaerophilic streptococci is isolated in 86% and 81% of blood and pus cultures respectively in one series of study.

Staphylococci and group A streptococci are the gram positive organisms isolated. Staphylococcus is the most common organism causing abscess following trauma.

In childhood, hematological malignancy, granulomatous diseases or immunosuppression are the causes for liver abscess.

The reasons for negative anaerobic cultures can be poor technique or use of broad spectrum antibiotics.

Abscesses secondary to cholangitis or pyelophlebitis are polymicrobial usually caused by gram negative organisms and anaerobic bacteria.

Systemic infections usually caused by single organism usually staphylococcus, streptococci and other aerobic bacteria.

Patients with hematological malignancy fungal abscesses are common.

Mycobacterial abscesses are rare and almost always associated with immunosuppression.

CLINICAL FEATURES

The classical presenting complaints are fever, abdominal pain and jaundice. Variety of non specific symptoms also present and they are malaise, nausea, anorexia, vomiting and weight loss.

Cough or dyspnoea is present if the diaphragm is involved.

Rarely these may present with peritonitis due to intraperitoneal rupture. Rupture into the pericardium or pleura are very rare.

The signs include tenderness in the right upper quadrant and lower chest in 50-75% of the patients. Dull aching to sharp pain may radiate to right or left shoulder according to the lobe involved. The liver is palpable in most number of patients.

Leucocytosis without concomitant increase in polymorphonuclear leucocytes present.

Mild anemia is present in half of the cases.

Moderate elevation of alkaline phosphatase, direct bilirubin and transaminase levels are present.



Figure 5



Figure 6

IMAGING FINDINGS

Plain X ray Chest and Abdomen :

50% of patients presents with abnormal chest radiographs.

The features seen are

- Right sided elevated hemi diaphragm
- Right sided pleural effusion
- Right lower lobe atelectasis.
- If the left lobe is involved similar findings may be seen in left side also.
- Hepatomegaly is seen in plain x-ray of abdomen. Rarely portal vein gas if the biliary system is involved.



Figure 7

USG Abdomen

- Sensitivity is 80-95%.
- Round or oval hypoechoic area seen.
- No significant wall echoes.
- Contiguous to liver capsule.
- Distal sonic enhancement seen.

78-80% occurs as single and in right lobe, 10% in the left lobe. Caudate lobe involvement is seen in 6% of the cases.

70% of the patients the ultrasonic findings persists for six months or more. So when evaluating the treatment response serial scanning is unwarranted in patients showing clinical improvement.

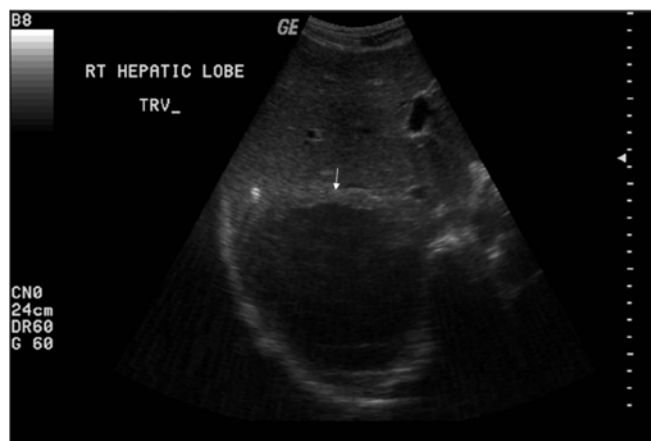


Figure 8

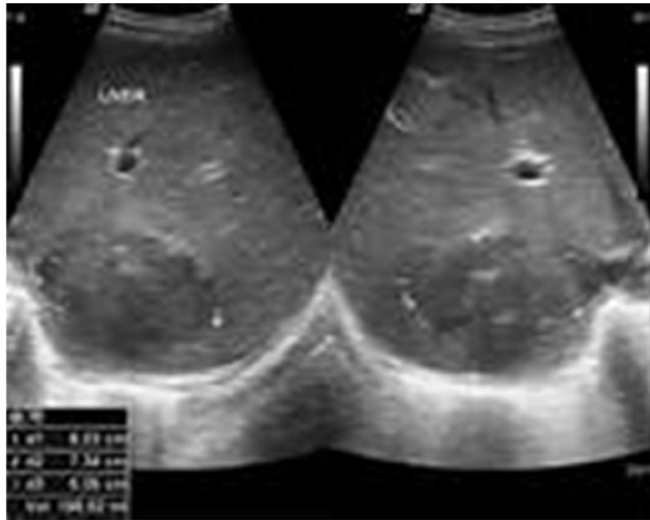


Figure 9



Figure 10

CECT Abdomen

- Intrahepatic collections less than 0.5cm can be detected.
- Accuracy is 90- 95%.
- Well defined hypodense lesions with wall enhancement seen.
- Internal septations and fluid debris may be seen.



Figure 11



Figure 12



Figure 13

MAGNETIC RESONANCE IMAGING

For diagnosis it is not significantly superior to CT. For follow up of treated cases and in differentiating from neoplasm it is useful. Hypo-intense on T1 and hyper-intense on T2 images. As soon as 4 days, reparative tissue changes indicate favourable response.

ANGIOGRAPHY

Rarely required for diagnosing liver abscess. Indicated in suspected cases of carcinoma.

GALLIUM SCANNING

Differentiation of amoebic and pyogenic abscess it is helpful. Pyogenic abscesses appear as hot spot and amoebic abscess, lacking neutrophils seen as cold spot.

The role is limited because of the time taken to perform the scan and relative safety and speed of diagnostic aspiration.

Amoebic serology

90-95% of the patients have amoebic serum antibodies, demonstrated by indirect haemagglutination test or counter immunoelectrophoresis.

The enzyme linked immunosorbent assay is also highly sensitive.

Antibody response is directly related to the duration of illness. First week after the illness it may be negative. Second and third months, titres reach a peak after that fall in titre.

Interpretation of serology in endemic areas is difficult because of widespread infection can result in high titres.

Management

The management of uncomplicated liver abscess include conservative, needle aspiration and pigtail catheter drainage and open drainage depending upon the condition of the patient. If left untreated it had high mortality rate. Improved amoebicidal agents, imaging techniques and guided aspiration and drainage of amoebic abscess the morbidity is less.

Metronidazole is administered after the diagnosis and patient is not responding emetine or dihydroemetine is added.

A luminal agent paramomycin or diloxanide furoate must be administered following metronidazole therapy.

When pyogenic liver abscess is suspected, broad spectrum intravenous antibiotics started.

The diagnosis is confirmed by aspiration of pus at time of ultrasound examination and sent for culture and sensitivity. In suspected cases, acid fast staining and culture for fungus also done. Effective coverage against gram

negative bacteria, streptococci and anaerobic bacteria. Effective combinations include ampicillin, aminoglycosides and metronidazole or third generation cephalosporin with metronidazole or imipenem or carbapenem may be used. Metronidazole will be therapeutic for amoebic liver abscess. The antibiotic penetration into the abscess cavity is poor, so two weeks intravenous antibiotics is recommended. The oral antibiotics for four weeks.

Wong et al (1986) published series of 21 cases treated by percutaneous drainage.

This was successful and the mortality rate is 10%.

1996 Seeto and Rockey reported a series of 143 patients percutaneous drainage which was successful in 90% of the patients.

Many authors confirmed the safety and efficacy of percutaneous aspiration or drainage, now become the standard treatment for patients with liver abscess.

Pathophysiology of percutaneous abscess drainage:

Abscess cavity forms initially de nova from an infectious nidus. A mature cavity then forms, which is encapsulated by a wall of fibrin, collagen, neovasculature and the leucocytes. This wall acts to confine the septic focus. As the contents of the abscess become more liquefactive under the influence of leucocyte action and enzymes, the pressure within the

abscess increases, and the cavity assumes a spherical or ovoid configuration. If the cavity becomes large enough, it can displace surrounding viscera sufficiently to facilitate a direct percutaneous approach.



Figure 14

Percutaneous aspiration drainage is done via transperitoneal approach with minimum risk of peritoneal contamination or organ injury. Large catheters are difficult to insert. Small bore catheters are better tolerated by the patient, easier to place percutaneously, and are effective for draining the pus. Like 8 -16 French diameter catheter is used. When the abscess is mature and unilocular, the abscess fluid is usually of low viscosity and can be evacuated quickly. Clinical improvement, with defervescence and drop in leukocytosis, is usually evident within 12 to 24 hours.

Pre procedural principles of Abscess Drainage

The abscess should be mature with a well defined wall. The cross sectional imaging to determine

1. He size and location of the abscess,
2. It is well formed or not.
3. Determine the safe route to the abscess
4. Intervening structure crossed or catheter is placed in position
5. Small abscesses aspiration is appropriate.
6. Multiple abscesses require more than one catheter drainage.
7. CBC and Coagulation studies obtained.
8. Prothrombin time should be less than three seconds.
9. Vitamin k should be administered.
10. Fresh frozen plasma if needed.
11. If the patient is on heparin it should be discontinued and allow appropriate time for normalization of coagulation parameters.
12. To minimize the bleeding complication the platelets should be more than 50,000/micL.
13. Platelet transfusion if needed.
14. Extremely toxic patients in the intensive care unit with sepsis due to an abscess will require emergency treatment instead of suboptimal laboratory values. The various benefits, potential complications, and alternatives should be explained.
15. Informed consent should be obtained.

Technique of Abscess Drainage

1. Determine the type of image guidance to be used
2. Technique for catheter insertion

The numerous advantages of USG guidance are

1. This is real time imaging. So the operator continuously reevaluate the procedure, until the abscess has been reached.
2. It has more flexibility to access routes due to the ability to easily change the orientation of probe and needle.
3. If the patient is sick, the machine can be taken to bedside.
4. Ionizing radiation is avoided, added benefit for both the patient and the operator.
5. Faster and more accurate.

Disadvantages

Highly operator dependent.

Technique for catheter insertion

The shortest and safest route to be chosen. The catheter tip should be ideally be positioned into the location most distal to the catheter entry site and most dependent position. If the cavity collapses, the catheter may be withdrawn to drain the remaining abscess without need for the another drain.

Placing the catheter into the collection over a sharp metal trocar and stiffening cannula. The catheter is then advanced forward from the trocar and

stiffener into the abscess. The cannula is removed and the catheter is placed. The aspirate is aspirated through the catheter. It is done under local anaesthesia. Sometimes mild sedation is needed. Pus sent for culture and sensitivity. The output was monitored daily and charting was done.

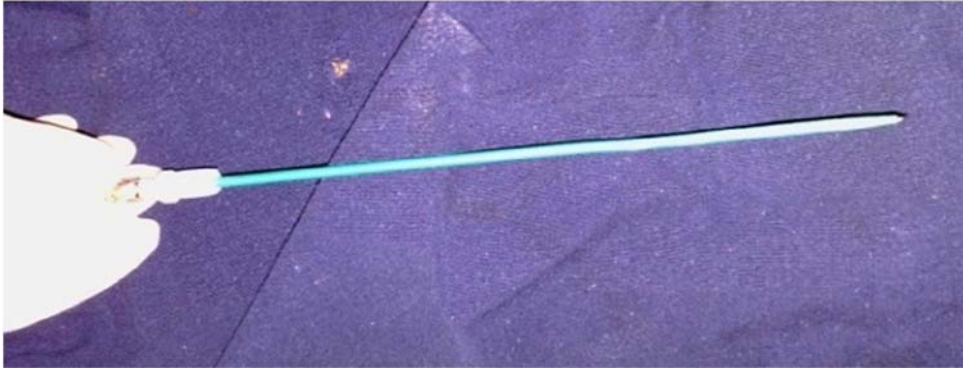


Figure 15



Figure 16



Figure 17

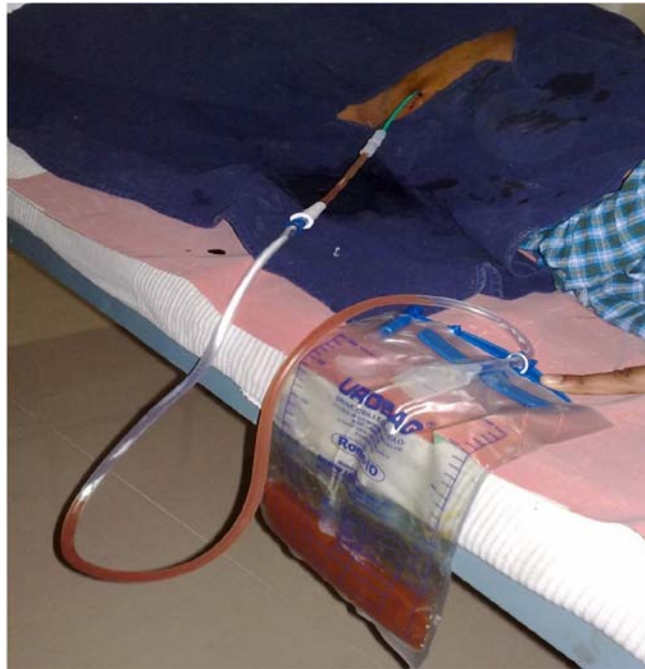


Figure 18



Figure 19

METHODOLOGY

MATERIAL AND METHODS SOURCE OF DATA

All patients of Liver Abscess presenting to the Surgery OPD or Casualty of Govt kilpauk Medical College and Hospital, referred from medical wards of GKMC or referred from outside diagnosed as case of liver abscess, with Clinical/ Sonological /CT/MRI features of Liver Abscess

METHOD OF COLLECTION OF DATA

Patient data collection and evaluation

- i. Patient data will be collected from all patients attending GRH General Surgery OPD, Casualty and Inpatient department, irrespective of their age/gender/ background /socio economic status. The patients will be evaluated and followed up according to protocol.
- ii. Detailed history of patient will be entered in proforma.
- iii. Complete haemogram, RFT, LFT, Prothrombin time, Stool for ova, cyst, blood culture.
- iv. Preliminary Ultrasound of Abdomen and Pelvis will be done on the same day of presentation.
- v. Patient will be put on conservative line of management.

- vi. Patient will be followed up daily, clinically and LFT & USG Abdomen will be repeated on the 3rd day if patient symptomatically not relieved.
- vii. Repeat Ultrasound / CT /MRI Abdomen & pelvis will be done immediately if patient condition does not improve/worsens or after 3-4 days as a routine as a prognostic factor.
- viii. If the patient develops any of the complications like ruptured liver abscess and patient condition is not improved, patient will be immediately taken up for surgery.
- ix. Patient will be informed about any surgical procedure and consent will be taken.

Patient data collected regarding

Age, gender, complaints, history of surgery in the past, past history of liver abscess, h/o diabetes, h/o intake of alcohol, any history of biliary tract disorder, h/o any immunodeficiency states, history of jaundice, h/o loose stools, will be taken. Patient will be examined in detail. If the patient is referred from outside the details of the same will be considered at the time of admission. Blood investigations and X rays and other radiological modalities performed will be added. Watch for the development of complications. Manage the cases and the follow up.

Management

All patients admitted into the hospital intravenous antibiotics are administered. Metronidazole 50mg/kg/day in divided doses administered an. Ultrasound guided pigtail drainage of liver abscess done if the size is more than 5cm irrespective of the etiological status and pus sent for culture and sensitivity. And the appropriate antibiotics are added according to culture sensitivity. The abscess cavity less than 5cm intravenous antibiotics are given and observed. If abscesses < 5cms, not responding to treatment percutaneous drainage should be considered. Following course of metronidazole, Tablet chloroquine 600mg for two days and 300mg for three weeks should be given.

The patients are followed up with clinically and sonologically. Mean duration of stay in hospital recorded.

In case of ruptured liver abscess with peritonitis, laparotomy was considered.

b. Inclusion Criteria

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

4. All cases of Diagnosed Liver Abscess being referred to Government
Kilpauk Medical College and Hospital.

c. Exclusion Criteria

Past history of liver abscess Bleeding tendency

Traumatic liver abscess

Investigations or interventions conducted on patients were

RFT, LFT,

Complete Blood Count,

Bleeding time and Clotting Time X rays Chest and Abdomen, USG

Abdomen

CT Abdomen if required Prothrombin time, Blood culture.

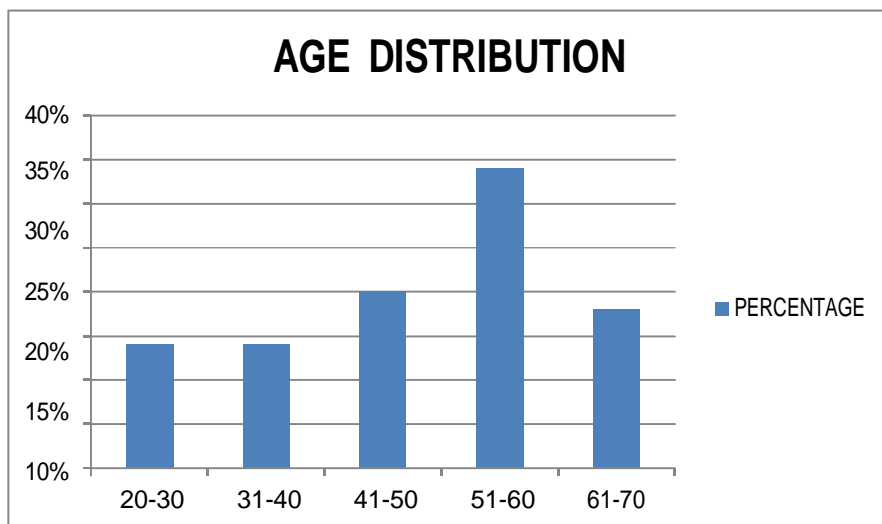
OBSERVATION AND RESULTS

1. Age distribution with sex

Table 1:

Age in years	Male	Female	Total	Percentage
20-30	7	-	7	14%
31-40	7	-	7	14%
41-50	10	-	10	20%
51-60	17	-	17	34%
60-70	9	-	9	18%

Chart 1



The most common age group affected in present study is 40-60 years.

The mean duration of age is 48.8 years.

2. Socio-economic status

Most of the patients admitted to this hospital came from low socio economic status, illiterate, anaemic and malnourished and very solely responsible for their family earning .

Because of this, the disease not only caused physical and mental problem but they also had serious repercussions on physiological as well as economical status of whole family.

3. Time interval between occurrence of symptoms and admission to the hospital

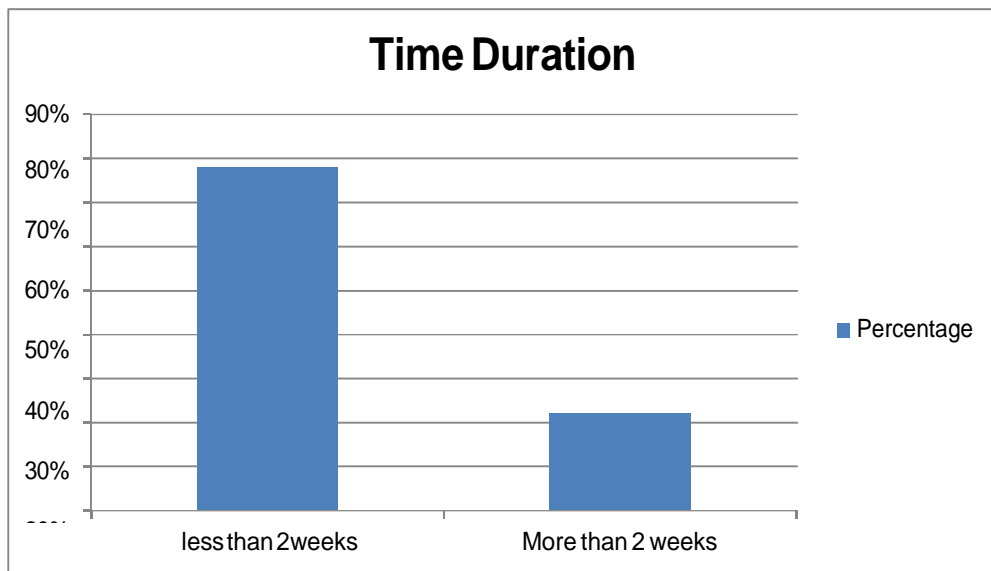
The following table shows time interval between occurrence of symptoms and admission to the hospital.

Table 2

Time	No of persons	Percentage
Less than 2weeks	39	78%
More than 2 weeks	11	22%

78% of the patients presented within ten days of presentation and 22% of the patients presented with more than two weeks of presentation.

Chart 2



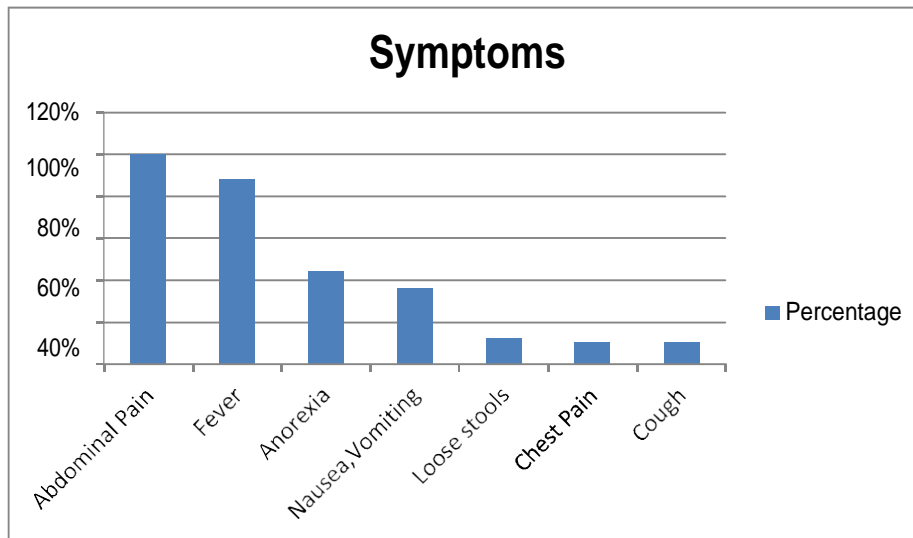
4. CLINICAL PRESENTATIONS

Table 3

symptoms	No of persons present	Percentage
Abdominal pain	50	100%
Fever	44	88%
Anorexia	22	44%
Nausea, vomiting	18	36%
Loose stools	6	12%
Chest pain	5	10%
Cough	5	10%

Chart 3

The clinical symptoms:



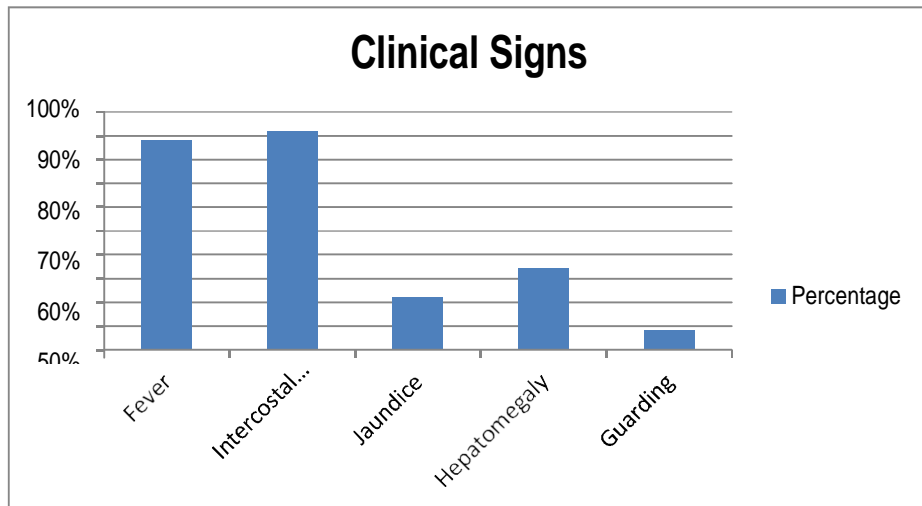
The common mode of presentations are abdominal pain(100%), high grade fever with chills (88%).

6. CLINICAL SIGNS

Table 4 : Clinical signs

Fever	44	88%
Intercostal tenderness	48	92%
Jaundice	11	22%
Hepatomegaly	17	34%
Guarding	4	8%

Chart 4



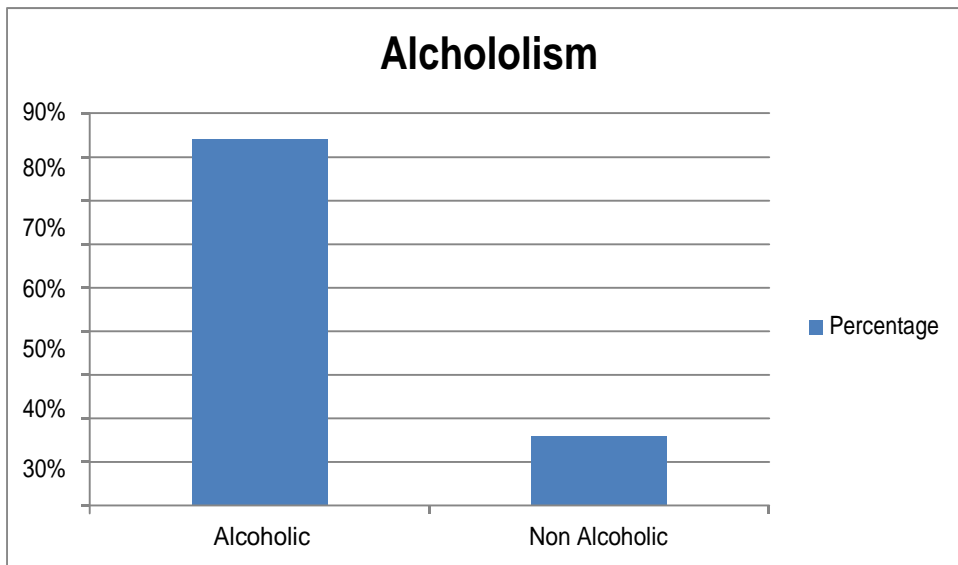
Fever(88%) and intercostal tenderness(92%) are the most common clinical signs present with this study. Jaundice seen in 22% of the patients and hepatomegaly in 36 % of the patients.

Alcoholism:

Table 5:

No of persons	Total	Percentage
Alcoholic	42	84%
Non alcoholic	8	16%

Chart 5



Alcoholism is associated with 84% of the cases.

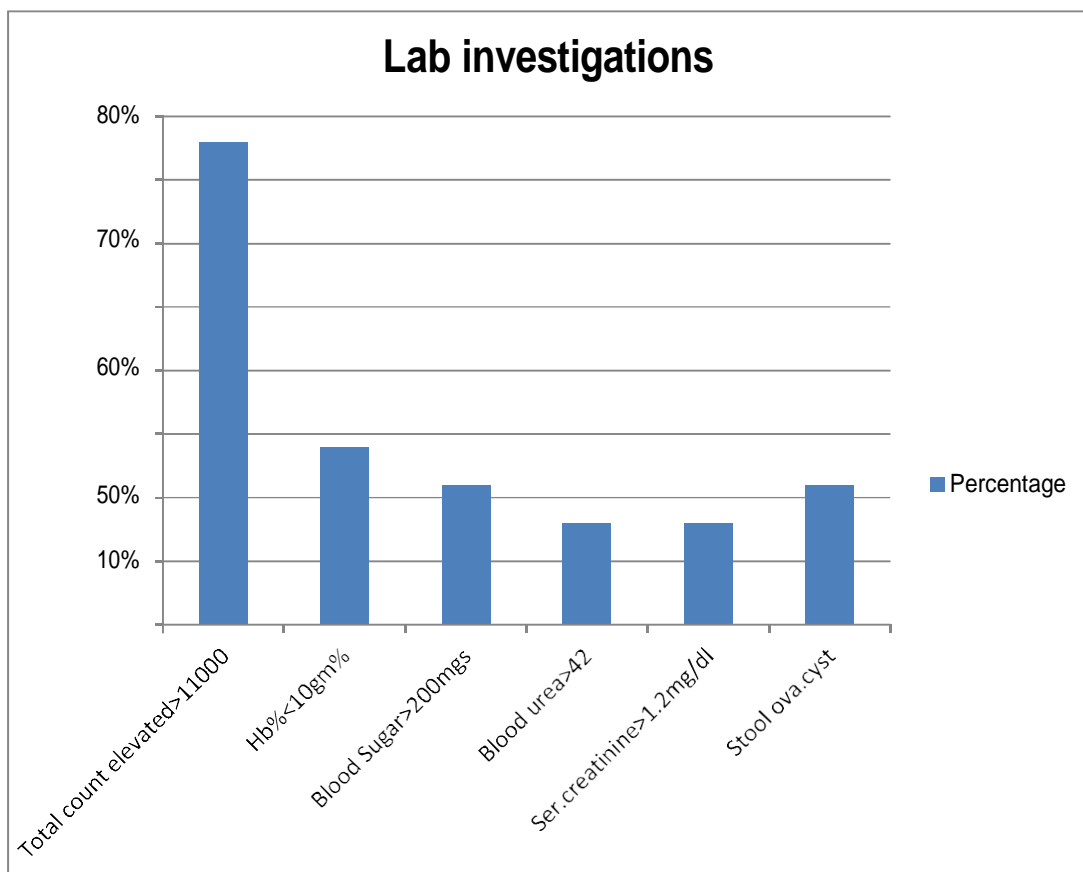
6. Laboratory investigations:

Table 6

Lab investigations	No of patients	Percentage
Total count elevated > 11000cells/Cumm	38	76%
Hb% <10gm%	14	28%
Blood Sugar >200mgs	11	22%
Blood urea >42mg/dl	8	16%
Serum creatinine >1.2mg/dl	8	16%
Stool ova,cyst	11	22%

Total count is elevated in 76%, Hemoglobin < 10gms% in 28% of cases, raised blood sugar >200mg/dl in 22% of cases, raised Blood. Urea >42mg/dl and serum creatinine>1.2mg/dl in 16% of cases. Stool for ova and cyst present in 22% of cases.

Chart 6

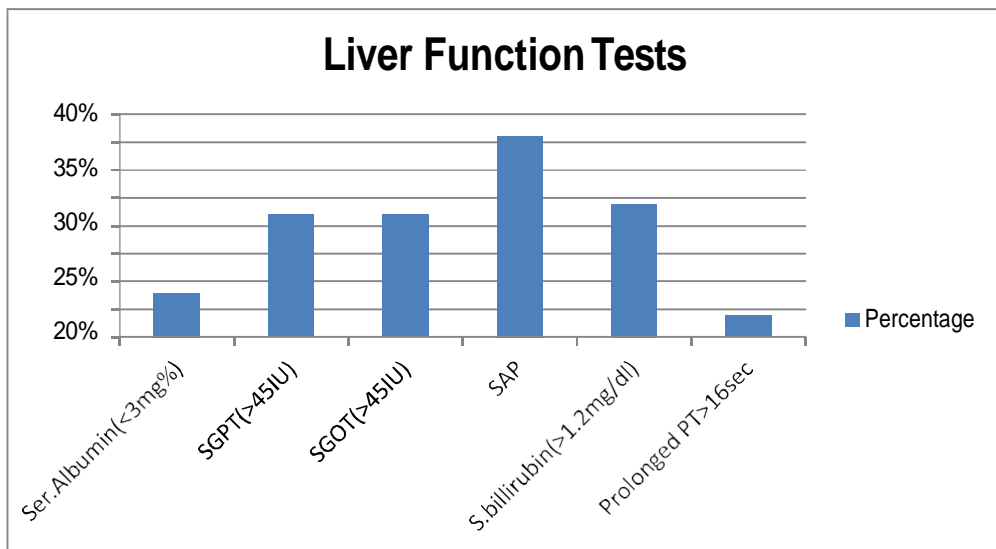


Liver Function Tests

Table 7

LFT	No of patients	Percentage
Ser. Albumin (<3mg%)	4	8%
SGPT(>45IU)	11	22%
SGOT(>45IU)	11	22%
SAP(115IU)	18	36%
S.billirubin(>1.2mg/dl)	12	24%
Prolonged PT > 16sec	2	4%

Chart 7



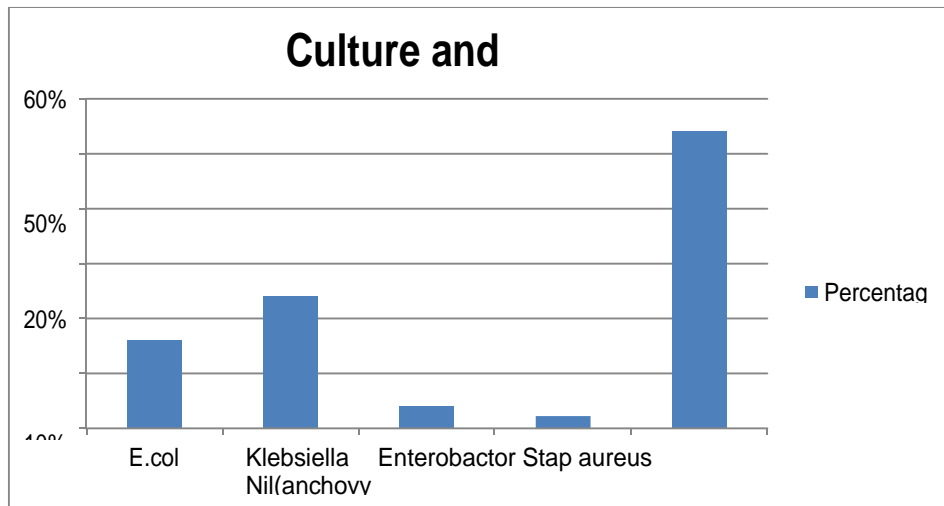
Serum Billirubin elevated in 36% of cases and SGOT >45IU in 22% of cases, SGPT>45IU in 22% cases. Serum Alkaline Phosphatase (>115IU) in 36% of cases. Prolonged prothrombin > 16sec seen in 24% of cases.

9. Culture and sensitivity

Table 8

Organism	Present	Percentage
E.coli	8	16%
Klebsiella	12	24%
Enterobactor	2	4%
Staphylococcus aureus	1	2%
Nil (anchovy sauce)	27	54%

Chart 8

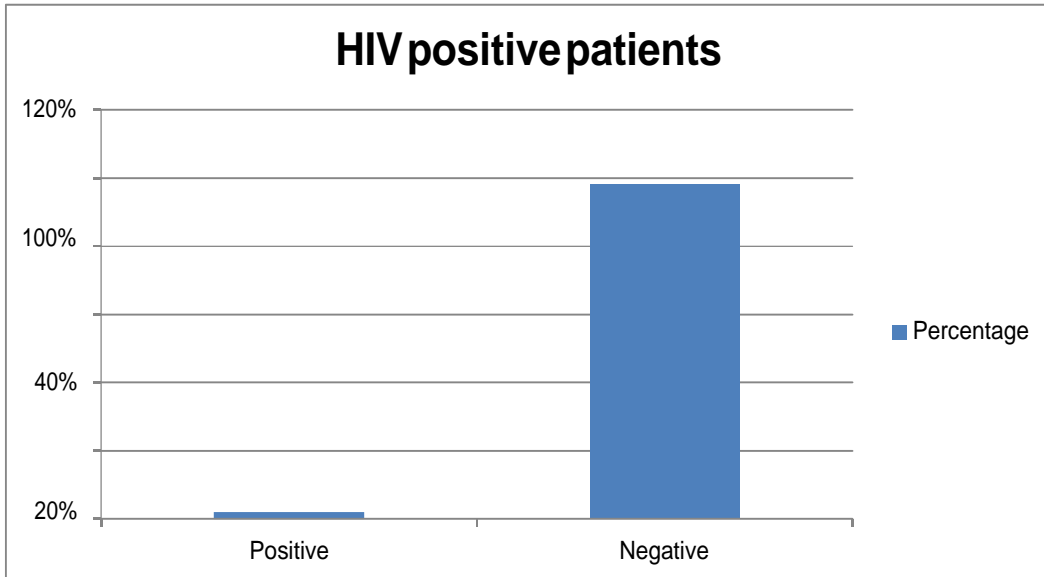


HIV Serology

Table 9

HIV	Total no of patients	Percentage
Positive	1	2%
Negative	49	98%

Chart 9



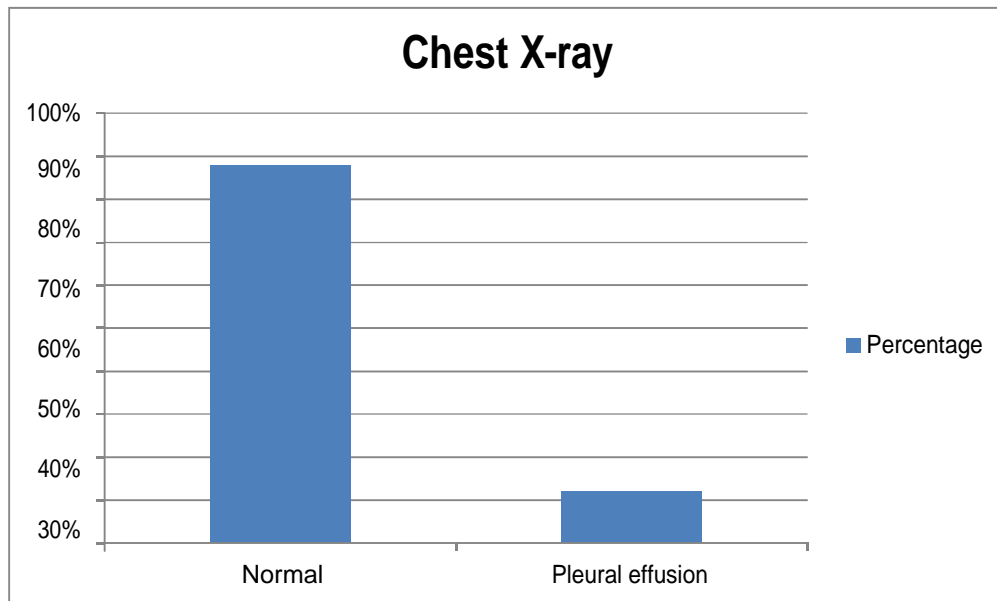
All patients are subjected to HIV serology. Only one patient showed positive and 49 patients were negative for HIV.

11. Chest X-ray findings

Table 10

Chest x-ray	No of patients	Percentage
Normal	44	88%
Pleural effusion	6	12%

Chart 10



Right sided pleural effusion was seen in 12% of cases and chest X- ray was normal in 88% of cases.

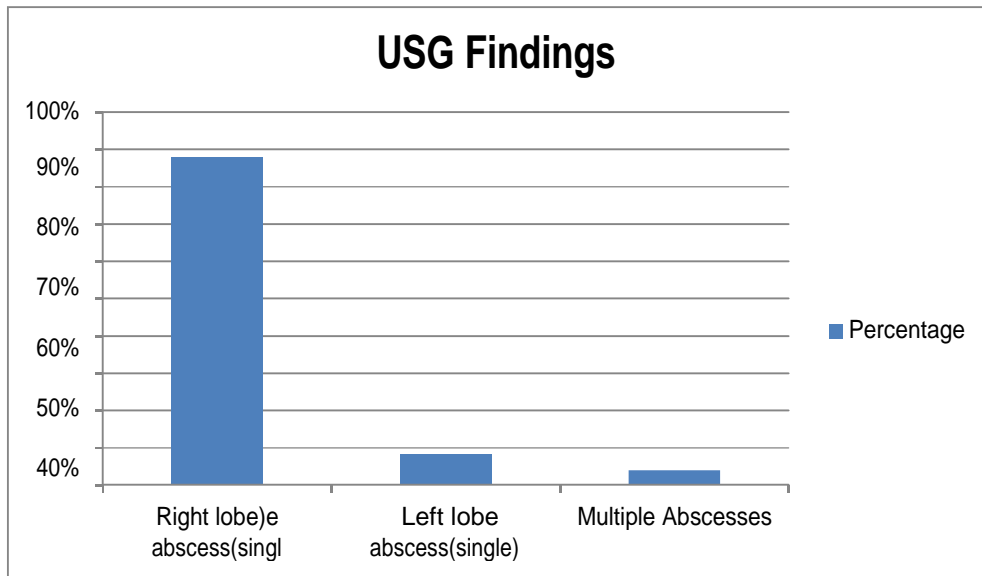
12. USG abdomen

USG Abdomen done in all patients.

Table 11

USG findings	No of patients	Percentage
Right lobe abscess(single)	44	88%
Left lobe abscess (single)	4	8%
Multiple Abscesses	2	4%

Chart 11

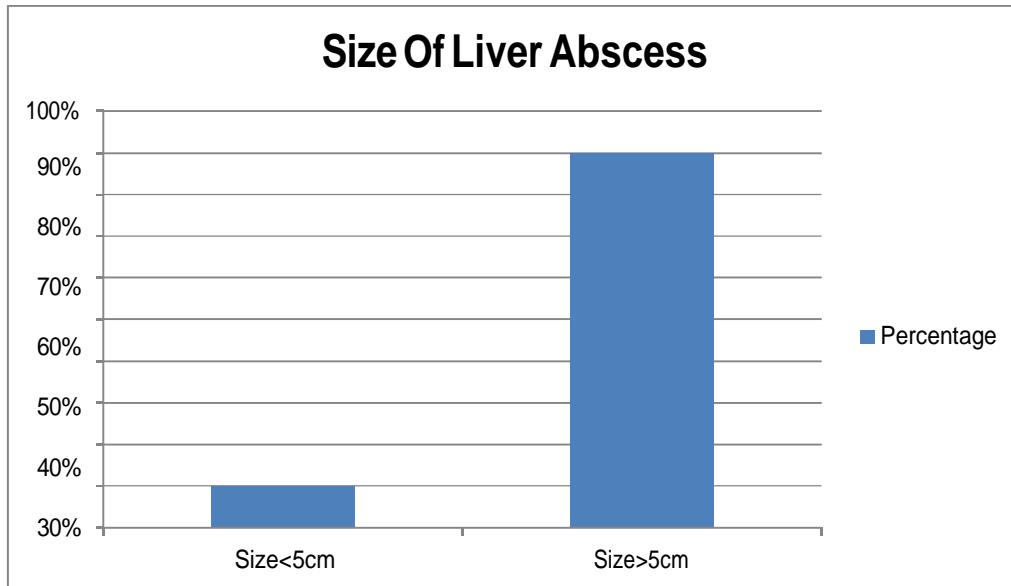


Solitary liver abscess was found in 48 patients around 96%. Multiple liver abscess were found in 4% of cases. The right lobe abscess (88%) is common than left lobe(8%).

Table 12

Size of liver abscess	No of patients	Percentage
Size< 5cm	5	10%
Size >5cm	45	90%

Chart 12

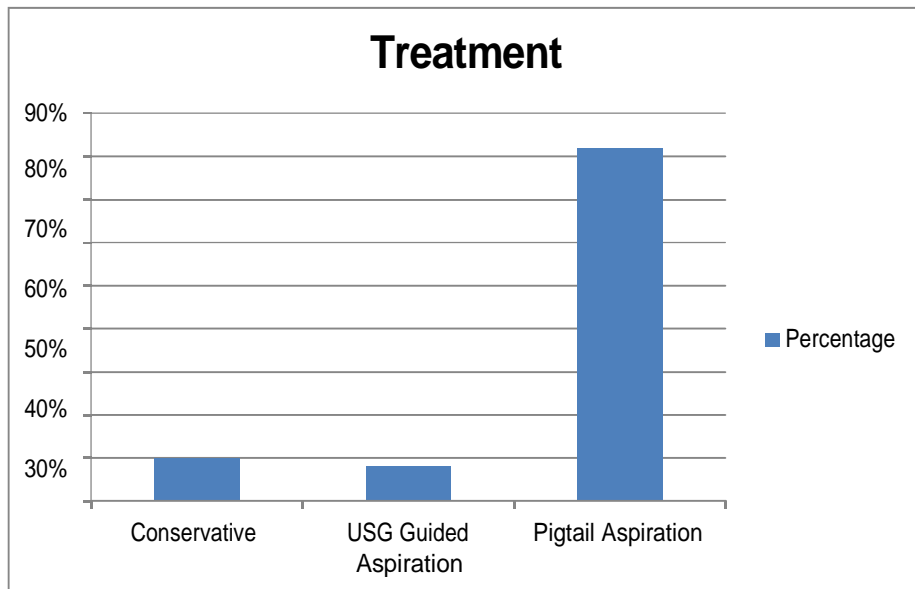


14. Treatment

Table 13

Treatment	No of patients	Percentage
Conservative	5	10%
USG guided aspiration	4	8%
Pigtail aspiration	41	82%

Chart 13



Among fifty cases studied, five cases(10%) less than 5cm size on conservative management.

Four (8%) cases are subjected to ultrasound guided aspiration and intravenous antibiotics. 41(82%) cases ultrasound guided pigtail catheter drainage of liver abscess done.

15. No of Aspirations Done

Two cases on conservative management showed hence no reduction in size and no improvement in clinical symptoms ultrasound guided aspiration was done in these patients.

Among four cases of ultrasound guided aspirations 2 patients required single aspiration. 1 patient underwent two aspirations and 1 patient required three aspirations.

16. Complications

Study showed Early diagnosis and intervention prevented the development of complications like intraperitoneal rupture, rupture into pleural or pericardial cavity, biliary leak. The pleural effusion seen in this study are only reactive that are subsided with conservative management.

DISCUSSION

In 1938, Oschner's classic review heralded surgical drainage as the definitive therapy. However, more aggressive treatment, the mortality rate remained 60-80%.

The development of modern imaging techniques, advancement of drainage techniques, improved microbiological identification and the nutritional care the mortality decreased to 5-30%. Yet, the prevalence of infection remains unchanged.

Untreated the infection remains unevenly fatal.

India being the tropical country, 400 million harboring *E. histolytica*, the causative organism of liver abscess, it is of immense importance for understanding the same.

The rising incidence in alcoholics, immunocompromised individuals has a matter of grave concern and the complication rates are high in these patients.

The changing pattern of incidence, diagnostic modalities, treatment and complications, rising incidence in alcoholics and immunocompromised individuals this is a current serious problem in our country. 70% of the people are in the rural area and therefore it mandates, appropriate and realistic guidelines to be drawn for early diagnosis and for the change in management strategies, to reduce the morbidity and mortality associated with it.

Age and sex distribution

Most patients in my study belongs to forty to sixty years and the mean age is 48.8 years which is comparable to other studies.

Table 14

Studies	Mean age in years
Shyam madhur	20-45(mean age 32.5)
Present study	48.8 years

Males are affected 90% in shyam madhur study. In present study all fifty cases are males.(100%).

Table 14a

Studies	Males
Shyam madhur	90%
Present study	100%

Symptoms and signs

Most patients are presented with pain in the right hypochondrium (100%) and fever(88%) of patients which are more significant.

Duration of onset

In present study most of the patients are presented within ten days of duration compared to other Indian studies which are subacute in onset.

Alcoholism and Liver abscess

Table 15

Study	Alcoholism
Shyam madhur	70%
Present study	84%

In shyam madhur study 70% were alcoholic and in present study 84% were alcoholics which concludes strong association with liver abscess.

Analysis of laboratory investigations

Table 16

LFT	Shyam madhur	Present study
Leucocytosis > 11000/C	78%	76%
Ser. Albumin(<3mg%)	4	8%
SAP	18	36%
Prolonged PT > 16sec	2	4%

Leucocytosis is seen in 76% and increased alkaline phosphatase in 36% of Patients which is significant in this study.

Pus culture analysis

Table 17

Studies	E.coli	Klebsiella	Enterobacter
Khee siang, chin ming et al	2.5%	82.3	-
Hiroshi okana et al	-	62%	-
Hyo min yoo et al	63%	28%	9%
Present series	16%	24%	4%

2Klebsiella (24%) most common organism causing liver abscess in this study.

Diabetes with pyogenic abscess

Table 18

Studies	Results
World J gastroenterol 2008 april 7:14(13):2089-2093	83%
Present study	22%

Association of diabetes with liver abscess is 22% in present study compare with 83% in World J gastroenterol 2008 april 7:14(13):2089-2093

Chest X ray findings

Table 19

Chest x ray	World J gastroenterol 2008 April 7:14(13):2089-2093	Present study
Normal	58.9%	88%
Abnormal	41.09%	12%

Chest x ray normal in 88% of the patients and abnormal in 12% of patients compare with 58.9% normal and 41.09% abnormal in World J gastroenterol 2008 April 7:14(13):2089-2093

Ultrasound findings

Table 20

USG finding	World J gastroenterol 2008 april 7:14(13):2089-2093	Present study
Solitary abscess	76.29%	92%
Right lobe abscess	74.12%	88%
Left lobe abscess	14.28%	8%
Multiple	23.7%	4%

Table 21: Size of the Liver Abscess

Size	Present series	World J gastroenterol 2008 april 7:14(13):2089-2093
<5cm	10%	34.16%
>5cm	90%	65.83%

Solitary abscess was found in 92% of patients compare to 76.29% in World J gastroenterol 2008 april 7:14(13):2089-2093.

Right lobe abscess was seen in 88% and left lobe abscess was seen in 8% when compare to World J gastroenterol 2008 april 7:14(13):2089-2093. Size of the abscess was seen in 90% of the patients whis significant when compared to World J gastroenterol 2008 april 7:14(13):2089-2093 study was 65.83%.

Treatment Analysis Table 22

Treatment	Present study	Hyo min yoo et al
Conservative	10%	26%
Ultrasound guided Aspiration	8%	46%
Pigtail drainage	82%	4%
Open drainage	21%	-

In present study 82% of the patients underwent pigtail drainage which was significant compare to hyo min yoo et al study.

In majority of the patients in present study, pigtail drainage was done. With antibiotics and pigtail drainage there was rapid improvement and significant reduction in size of the abscess with fifty percent reduction in size within five days.

Repeated aspirations not needed and relapse rate also very less.

Timely intervention and management open drainage was not done in present study.

Predictive factors in liver abscess

Hypoalbuminemia, raised WBC count, alkaline phosphatase level, diabetes, prolonged prothrombin time, Alcohol consumption, anaemia, jaundice, diabetes associated with longer duration of hospital stay

Complications

Table 23

Study	Percentage
Hyo min yoo et al	59%
Present study	-

The complications are peritoneal rupture, pericardial rupture, plural rupture and biliary leak was nil compared to hyo min yoo et al(59%) which is significant.

Recurrence and mortality

Table 24

Studies	Hyo min yoo et al	Present study
Recurrence	9%	-
Mortality	11%	-

Recurrence and mortality is nil in present study compare with hyo min yoo et al the recurrence was 9% and mortality was 11%.

HIV serology and liver abscess

No significant difference was found in HIV serology positive and HIV serology negative Patients.

CONCLUSION

- Liver abscess is a very common problem in India. Incidence is very high in India.
- Liver abscess commonly occur in the age group of 40-60 years. Males are most affected in my study.
- Most cases present with an acute onset.
- Pain abdomen was the most common present in 100% of the cases. The most consistently occurring symptom is fever.
- The single most important factor is alcohol consumption. Leucocytosis is seen in most of the cases.
- Hypoalbuminemia, raised WBC count, alkaline phosphatase level, diabetes,
- Prolonged prothrombin time were considered as predictive factors. These factors prolong the hospital stay in present study.
- Diabetes associated with liver abscess more frequently.
- Liver abscesses are mostly solitary and present in right lobe of liver.
- Klebsiella is the most common organism causing pyogenic liver abscess.

54% patients showed no growth in their culture.

Ultrasound guided pigtail drainage and aspiration is the less invasive, safe and Effective management of liver abscess.

Mean duration of hospital stay is 12.8 days.

No recurrence and no complications in present study. Nil mortality in this study.

SUMMARY

This is a retrospective study of 50 patients admitted in Govt. Kilpauk medical college Hospital with Liver abscess.

The most common age group affected are 40-60 years. The mean age of presentation is 48.18 years.

The common mode of presentation is acute (<10days).

Pain abdomen was the most common presenting symptom present in 100 percent of the cases. Fever was the most consistent symptom present in 88% of cases. Loose stools was present in 12% and anorexia was present in 44% of cases.

Hepatomegaly in 34% of the cases and jaundice in 22% of cases was found.

Pleural effusion was found in 12% cases. The 88% chest x ray were normal.

88% were alcoholic and duration alcohol intake more than one year. Alcoholism is the most consistent etiological factor for formation of liver abscess.

Laboratory investigations were analysed. Leucocytosis in 76%, anaemia in 28% , Blood sugar>200mgms in 22% of cases, raised urea and creatinine in 16% cases. Alkaline phosphatase is elevated in 36% of cases consistent finding in liver abscess.

Raise bilirubin in 24% and prolonged prothrombin in 4% of cases.

Raised blood glucose level is seen in 22% of patients. Diabetes is associated the pyogenic liver abscess in this study.

Among fifty cases 54% of patients had 'Anchovy sauce' appearance of pus and no growth in culture. E.coli in 16% and klebsiella in 24% of cases. Enterobacter in 4% seen. Klebsiella in the most common organism isolated in pyogenic liver abscess.

Ultrasonography done in all cases revealed 96 % are solitary and 4% are multiple.

Right lobe abscess in 88% cases and left lobe in 8% cases.

Out of fifty cases 10% conservative, 8% ultrasound guided aspiration and 82% pigtail aspiration done. Pigtail drainage is the safe and effective method and associated with less recurrence was seen.

ANNEXURE I

Proforma for Thesis

Sl.No. :

IP No:

Ward/Bed No.:

1. Particulars of the Patient

Name : Age :

Sex : Religion :

Address : Occupation :

D.O.A : D.O.D :

Socio-Economic Status: High/middle/low

2. Symptomatology and History

i. Pain

a) Site :

b) Date and time of onset :

c) Duration since onset :

- d) Mode of onset : Gradual/Sudden
- e) Character of pain :
- f) Intensity of pain :
- ii) Fever
- iii) Rigor and chills :
- iv. H/o Jaundice :
- v. Abdominal Distension :
- vi. hamatemesis/malena :
- vii. Bowel habits :
- viii. Micturation habits :
- ix. History of alcoholism :
- x. Past history :
- xi. Personal history :

General physical examination

- i. Built
- ii. Nutritional Status :
- iii. Icterus :

- iv. Cyanosis :
 - v. Clubbing :
 - vi. Lymphadenopathy :
 - vii. Edema :
 - viii. Pulse :
 - ix. Blood Pressure :
 - x. Temperature :
 - xi. Respiratory Rate :
4. Abdominal examination:
- i. Distension of abdomen :
 - ii. Localisation of pain : present/absent
 - iii. Local rise of Temperature :
 - iv. Tenderness :
 - v. Guarding/rigidity :
 - iv. Palpable mass :
 - v. Percussion Findings :
 - vi. Bowel Sounds :
 - vii. Hernial Orifices :

viii.	P/R examination	:
5.	Respiratory System Examination	:
6.	Cardiovascular System Examination	:
7.	Central Nervous System Examination	:
8.	Laboratory Findings	:
i.	Hb%	:
ii.	TLC	:
iii.	DC	:
iv.	BT and CT	:
v.	Random Blood Sugar	:
vi.	Ser. Urea	:
vii.	Ser. Creatinine	:
viii.	Ser. Bilirubin	:
ix.	Liver Enzymes	:
x.	Urine	:
	Albumin	:
	Sugar	:
	Pus Cells	:

Urobilinogen	:	
XI. E.C.G.		
9. Radiological Findings	:	
i. X-Ray Chest	:	
ii. X- Ray Abdomen	:	
iii. USG Abdomen	:	
iv. CT Scan Abdomen	:	
v. Others	:	
10. Treatment	:	
i. Conservative	:	
ii. PAD	:	
iii. Open drainage	:	
Sepsis	:	Present /absent
11. Culture and Sensitivity	:	
12. Residual Abscess	:	
13. Duration of Hospital Stay	:	
14. Follow up for Three months	:	

CONSENT FORM

Statement to be made by a person willing to participate in the study.

I have read the consent form completely/ this consent form has been read out to me. I understand that I can withdraw my participation anytime, if I feel so. I have received and understood the information about my rights and have been promised that my personal information shall be kept confidential. All my doubts have been cleared.

I want to participate in this study myself by my own free will and am willing to accept the terms that are accepted.

1. Answer the questionnaire/interview form
2. Consult the study doctor.
3. Provide samples of blood, urine etc if needed

I have been offered a copy of my consent form/ I don't want a copy of my consent form. I understand that at anytime I can contact the investigator/s in case of any doubt. I have been promised to be supplied with any new information which has a bearing to this study.

Date :

Signature of participant:

Participant's name:

Signature of witness: Witness:

S.NO	NAME	AGE	SEX	IP	pain abdomen	fever	jaundice	DM	Alcohol	Pallor	Hepatomegaly
Hb%	leucocytosi	Billirubin	prologed PT	stool ova	chestXray	lobe	treatment	complicati	mortality		
1	sivalingam	60	M	M4712 2/1/2019	1	1	1	0	0	0	0
2	veeramani	24	M	M4722 6/1/2019	1	0	0	0	0	0	0
3	ganesan	40	M	M4753 8/1/2019	1	1	0	0	0	0	0
4	dharmalingam	65	m	m4758 15/1/2019	1	1	1	0	0	0	0
5	lakshmnanan	65	M	M4780 22/1/2019	1	1	0	0	0	0	0
6	kannan	50	M	M4811 29/1/2019	1	1	0	0	0	0	0
7	ravi	47	M	M4823 8/2/2019	1	1	1	0	0	0	0
8	narayanasamy	65	M	M4912 09/2/219	1	1	1	0	0	0	0
9	dhakshinamoorthy	65	M	M4963 17/2/2019	1	1	1	0	0	0	0
10	somasivam	52	M	M5033 19/2/2019	1	0	0	0	0	0	0
11	kadhar basha	48	M	M5094 25/2/2019	1	1	0	0	0	0	0
12	raja	40	m	m13689 28/2/2019	1	1	0	0	0	0	0
13	ahamad basha	66	M	M13248 1/3/2019	1	1	1	0	0	0	0
14	somadevan	52	M	M14040 7/3/2019	1	1	0	0	0	0	0
15	jernold	22	M	M13368 12/3/2019	1	1	1	0	0	0	0

16 boominathan	69 M10543 16/3/2019	1	1	0	0	0	0	0	10.2	0	0	0	1	0 right	pigtail	0	0
17 palani	56 M10819 18/3/2019	1	1	0	0	0	0	0	11.2	0	0	0	0	0 right	aspiration	0	0
18 krishnan	60 M10699 26/3/2019	1	1	0	0	0	0	0	11.4	1	0	0	0	0 left	pigtail	0	0
19 nagaraj	66 M8716 3/04/2019	1	0	0	0	0	0	0	12.3	0	0	0	1	0 right	pigtail	0	0
20 suresh	41 m8748 7/04/2019	1	1	0	0	0	0	0	10.9	1	0	0	0	0 right	pigtail	0	0
21 kumareasn	28 M1726 14/4/2019	1	1	1	0	0	0	1	9.2	1	1	0	0	0 left	pigtail	0	0
22 ganeasan	47 M8274 16/4/2019	1	1	0	0	0	0	0	13.2	1	0	0	0	0 right	conservative	0	0
23 ezhumalai	35 M7916 24/4/2019	1	1	0	0	0	0	0	12.5	0	0	0	0	0 right	pigtail	0	0
24 shakthi	55 M7199 29/4/2019	1	1	0	0	0	0	0	12	0	0	0	0	1 right	pigtail	0	0
25 mani	60 M7187 7/5/2019	1	1	1	0	0	0	1	9.5	1	1	0	0	0 right	pigtail	0	0
26 natesan	57 m4583 9/5/2019	1	0	1	0	0	0	1	9.9	1	0	0	1	0 right	aspiration	0	0
27 ramesh	41 m4334 11/5/2019	1	1	0	0	0	0	0	12.2	0	0	0	0	0 right	pigtail	0	0
28 kanthavel	43 m3421 23/05/2019	1	1	0	0	0	0	0	11.4	1	0	0	0	0 right	pigtail	0	0
29 palayam	58 m4395 25/05/2019	1	1	1	0	0	0	1	9.5	1	1	0	0	0 right	pigtail	0	0
30 devan	60 m4177 6/06/2019	1	1	0	0	0	0	0	12.4	0	0	0	1	1 left	pigtail	0	0
31 mani	55 m3712 11/06/2019	1	1	1	0	0	0	1	9.6	1	1	0	0	0 right	pigtail	0	0

32 sampath	42 m3852 19/06/2019	1	1	0	0	0	0	0	10.1	1	0	0	0	1	conservative	0	0
33 kathavaroyan	65 m2914 23/06/2019	1	1	0	0	0	0	0	11.2	1	0	0	0	0 right	pigtail	0	0
34 nazreem basha	31 m2443 27/06/2019	1	1	0	0	0	0	0	11.4	1	0	0	0	0 right	pigtail	0	0
35 muruganandham	42 m1962 5/072019	1	1	0	0	0	0	0	13.4	0	0	0	1	0 right	aspiration	0	0
36 madhanagopal	60 m1681 16/07/2019	1	1	0	0	0	0	0	12.3	1	0	0	0	0 right	pigtail	0	0
37 jayakumar	38 m7644 18/07/2019	1	0	0	0	0	0	0	11.3	1	0	0	0	0 right	pigtail	0	0
38 anbu	26 m10502 22/07/2019	1	1	0	0	0	0	0	10	1	0	0	0	0 right	pigtail	0	0
39 ramakrishnan	56 m13003 27/07/2019	1	1	0	0	0	0	0	11.6	1	0	0	1	0 left	pigtail	0	0
40 rafuqul	27 m13066 31/7/2019	1	1	0	0	0	0	0	13.2	0	0	0	0	1 right	pigtail	0	0
41 sundar	36 m14522 5/8/2019	1	1	0	0	0	0	0	12.1	1	0	0	0	0 right	conservative	0	0
42 shankar	51 m14425 9/8/2019	1	1	0	0	0	0	0	13.1	1	0	0	0	0 right	pigtail	0	0
43 james	43 m13675 16/8/2019	1	1	0	0	0	0	0	10.5	1	0	0	0	0 right	pigtail	0	0
44 chandru	28 m13269 25/8/2019	1	1	1	0	0	0	1	9.9	1	1	0	1	0 right	pigtail	0	0
45 kalai	53 m13321 29/08/2019	1	1	0	0	0	0	0	11.2	1	0	0	0	0 right	pigtail	0	0
46 balaji	30 m13622 03/09/2019	1	1	0	0	0	0	0	10.1	1	0	0	0	0 right	pigtail	0	0
47 dhanapal	53 m113063 13/09/2019	1	1	1	0	0	0	1	9.6	1	1	1	0	0 right	pigtail	0	0
48 kamaraj	35 m113259 25/09/2019	1	1	0	0	0	0	0	10.2	1	0	0	0	0 right	pigtail	0	0
49 kalai	53 M111923 26/09/2019	1	0	0	0	0	0	0	12.1	0	0	0	0	0	conservative	0	0
50 sekar	55 m112918 30/09/2019	1	1	0	0	0	0	0	10.6	1	0	0	1	0 right	pigtail	0	0

1 Present

0 Obsent