

# Diagnostic and Therapeutic Role of Ultrasonography (USG) Guided Fine Needle Aspiration and Cytology in Pyogenic Liver Abscess

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## ABSTRACT

**Introduction:** Pyogenic Liver abscess (PLA) is defined as collection of pus that forms in the Liver due to an infection. The aim of present study was to evaluate the role of Ultrasound guided fine needle aspiration and cytology in the diagnosis of Pyogenic liver abscess and know the etiopathogenesis, clinical characteristics, Radiological finding and management of pyogenic liver abscess.

**Material and Methods:** A total of 32 patients of different age groups of both sexes presenting Objective with complaints of right hypochondrial pain and fever were selected for the study. Prior to Fine Needle Aspiration Cytology all the relevant routine investigations were performed. After preparation of patients, Ultrasound guided Fine Needle Aspiration Cytology was done, material aspirated and placed on slide and fixed. Gram's staining, culture and sensitivity, Giemsa and Papanicolaou staining done and examined under oil immersion microscope.

**Results:** Out of 32 patients of Pyogenic Liver Abscess, 24 (75%) were male and 8 (25%) were female, ratio 3:1; Age 14-65 yrs. 30 (93.75%) presented with upper abdominal pain followed by fever with rigor in 19(59.38%) patients. After clinical examination tenderness was seen in right hypochondrium in 29(90.62%) patients. Most common organism isolated was klebsiella spp. in 15 (46.88%) cases and E.coli in 11 (34.38%) cases.

**Conclusion:** Early diagnosis and prompt treatment of pyogenic liver abscess saves the life of patient, because if not treated, may be fatal.

**Keywords:** Pyogenic Liver Abscess, Ultrasound guided FNAC

embolism, brain abscess and endophthalmitis.

Incidence of pyogenic liver abscess is estimate to be 8-15 cases per 100,000 persons; in US. In India, it is higher due to poor health care facilities. Male to female ratio is 2:1 and common in 4<sup>th</sup> to 6<sup>th</sup> decade of life

Liver abscess have been recognized since the age of Hippocrates. Amoebae as a cause of liver abscess was described by Koch's in 1883. Largest series of Pyogenic and amebic liver abscess was published by Ochshner and Debakey in 1938. The causative organism isolated most often from blood and abscess cultures are, E. coli in 33%, K. Pneumoniae in 18%, streptococcal species in 37%, and Microaerophilic streptococci in 12%, klebsiella pneumoniae has emerged as a common isolates in patients with diabetes.<sup>3</sup> Pyogenic liver abscess is a common problem of both developed and developing countries and are most often polymicrobial. It is a condition with significant mortality if not treated promptly. Here the aim of my study is to determine etiopathogenesis, clinical, radiological and bacteriological characteristics of patients of pyogenic liver abscess and its management, focusing on the drainage procedure. In the elderly, diabetic and immunosuppressed patients, there is increased incidence of this abscess.

The common presenting symptoms are upper abdominal pain, high grade fever, nausea, vomiting and loss of appetite. Jaundice and difficulty in breathing are less common. The common signs are tenderness in right hypochondrium, guarding and hepatomegaly. Jaundice, ascites and pleural effusion, mostly right sided may be present. Biliary tract disease is found to be the most common cause. Other causes are portal hypertension, ruptured appendix, hematogenous spread (septicemia), liver trauma etc.

Majority of abscesses are multiple and in right lobe of liver

## INTRODUCTION

Pus is a fluid composed of white blood cell, dead cells, and bacteria that forms when our body fights off infection. In the case of PLA, instead of draining from the infection site, the pus collected in the liver. Abscess shows signs of inflammation in the surrounding area.<sup>1</sup>

The most common cause of PLA is biliary disease; which includes conditions affecting liver, pancreas and gall bladder. An inflamed gallbladder is the most common cause for PLA out of all the biliary disease; other causes include bacteria from ruptured appendix that forms an abscess, pancreatic cancer, Ca colon, IBD, diverticulitis, perforated bowel, septicemia, liver injury.<sup>2</sup> People with Diabetes are at 3.6 times risk for PLA.

Main complication of PLA is sepsis; bacteria released and spread through the blood can cause septic pulmonary

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due to biliary disease and hematogenous cause. Solitary abscess is due to portal circulation, cryptogenic and trauma. Earlier studies by Ochsner et al recommended open surgical drainage as per the treatment of choice. But now due to availability of better imaging modality and ultrasound guided percutaneous drainage procedure there is dramatic changes in pattern of treatment of pyogenic liver abscess.<sup>4</sup> The aim of present study was to evaluate the role of Ultrasound guided fine needle aspiration and cytology in the diagnosis of Pyogenic liver abscess and know the etiopathogenesis, clinical characteristics, Radiological finding and management of pyogenic liver abscess.

## MATERIAL AND METHODS

The present study was carried out in the department of Radiology, Nalanda Medical College and Hospital, Patna during the period of January 2019 to December 2020 with the help of Department of Surgery, Microbiology and Pathology. A total of 32 patients with different presenting complain and with right hypochondrial lump were seen in surgical and Medical OPD were send for Ultrasound Guided F.N.A.C. in our department.

Thorough present and past medical and surgical history was taken from all patients selected for study. Proper clinical examination was done. All the relevant routine investigation was performed in every case like Complete blood count, Erythrocyte sedimentation rate, Liver Function Test, Kidney Function Test, Bleeding Time, Clotting Time, Blood Sugar, Viral Markers and plain X-Ray abdomen. Prior to the FNAC, the procedure was explained to the patients and consent was taken in writing. F.N.A.C. was done by 10 ml. air tight disposable syringe with 23 gauze needles or spinal needles.

After proper preparation, the lump was palpated to determine its exact location and extent and then we did the USG examination of the lump.

Before inserting the needle, we visualize the lesion's site and size on the monitor screen. The direction of needle is kept more or less same as the direction of the beam. After that, the needle syringe was introduced into the lesion. Again we confirm the position of the needle. Then after the plunger was pulled back and maintaining constant negative pressure aspiration is done. At times a few forward and backward to and fro movements may be required in few cases within the lump. The needle was then withdrawn and the puncture site was pressed for 2 minutes with sterile gauge and then sealed. The needle containing the aspirated material was detached from the syringe and reattached after pulling the plunger back. The aspirated material was pushed out on a clean glass slide and spread it gently with the help of another slide to make a smear. 3 to 4 slides were prepared for each case. The smear was fixed with cytofix spray and dried and stained with Giemsa and Papanicolaou stain.

From aspirated samples Grams staining and culture and sensitivity was also done. After proper staining the entire slide were seen under oil Immersion lens and reported accordingly.

## RESULTS

Out of 32 patients of PLA, 24 patients (75%) were male and 8 patients (25%) were female, with male to female ratio was 3:1, patients age group was ranging from 14-65yrs, with mean age was 36 year. Majority of patients 30 (93.75%) present with upper abdominal pain followed by fever with rigor in 19(59.38%) patients, nausea and vomiting in 17 (53.12%) patients, diarrhea in 5 patients (15.62%) and anorexia in 15(46.88%) patients. On clinical examination tenderness was present in right hypochondrium in 29 patients (90.62%), guarding in 13 (40.62%) patients, hepatomegaly in 12(37.50%) patients, pallor in 18 (56.25%) patients, icterus in 3 patients (9.37%) and signs of toxemia in 10 (31.25%) cases.

Cryptogenic causes were found in 15(46.88%) patients, biliary tract related cause in 3(9.37%) patients, portal hypertension in 2(6.25%) and hematogenous cause in 12(37.50%) patients.

Intravenous antibiotics like cephalosporins, fluoroquinolones, Metronidazole and Aminoglycosides were used. About 37.5% patients improved completely by conservative treatment while in 62.5% surgical procedure was needed.

## DISCUSSION

In this study significant clinical features were upper abdominal pain, fever with rigor, generalized weakness, hepatomegaly, jaundice, vomiting, pallor, anorexia weight loss, pleural effusion, diarrhea etc. Incidence was maximum in middle aged patients. About 15(46.88%) were cryptogenic in origin followed by biliary disease, portal hypertension and hematogenous cause.

With the development of better diagnostic technique and treatment, mortality rate has been significantly reduced. Liver abscess is rare in children. Most of the abscesses were in right lobe of liver.<sup>5,6</sup>

USG guided percutaneous needle aspiration and drainage along with intravenous antibiotics is the first line treatment especially in multiple liver abscess as compared to solitary large liver abscess which is probably more suited for pigtail catheter placement.<sup>7,8</sup> Percutaneous Drainage without USG guidance is avoided because an empyema may occur.

In this study 78% patients were treated with percutaneous aspiration drainage along with antibiotics. The most common bacteria were Klebsiella followed by E. coli, Staphylococcus etc. The low mortality rate was due to early diagnosis and low sampling error because of USG guidance and proper management.

The clinical and imaging features of abscesses of liver are not specific. Necrotic neoplasms (primary or secondary) of liver, can mimic abscesses and vice versa. In addition we can have abscesses due to tuberculosis and amoebic abscesses. Cytological analysis shows that pyogenic abscesses contain heavy, neutrophilic and inflammatory exudate with nuclear debris. By comparison, amebic abscesses contained more necrotic debris, with degenerating hepatocytes and lesser inflammatory cells. Tuberculous abscesses may show Acid-fast bacilli, epithelioid cells with or without caseous

necrotic material. Cytological diagnosis of an inflammatory pseudotumor is a potential pitfall and therefore the diagnosis of an abscess of liver should be established by clinical and imaging findings in consideration with needle aspiration.<sup>12</sup>

## CONCLUSION

USG guided FNAC is simple, low cost, safe and relatively painless for the initial investigation and diagnosis of both superficial and deep lesion. The clinical value of USG guided F.N.A.C. is not limited to Neoplastic condition only but also valuable in the diagnosis of inflammatory, infectious, degenerative conditions and diagnosis and monitoring of graft rejection in transplantation surgery.<sup>9,10,11</sup>

USG guided percutaneous needle aspiration along with parenteral antibiotics is now the first line treatment for relatively small liver abscesses (<10 cm) which is not only effective but also cost effective. Patients recover faster with above treatment and duration of hospital stay is less.

Tube drainage was needed in abscesses of size more than 10cm and in such cases duration of hospital stay was longer. Surgical intervention was, only considered in special cases like rupture of abscesses and other associated intraabdominal condition.

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