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**ORIGINAL ARTICLE**

# Analysis of Pyogenic Liver Abscesses in a Tertiary Care Hospital

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## ABSTRACT

PLA (Pyogenic Liver Abscess) is a fatal disease. It is quite difficult to diagnose this disease at the early stages. Huge changes were observed in the epidemiology and mortality of this disease in past years. For a more efficient diagnosis of this illness, there is a need to understand the pathological cycle of this disease.

**Objective:** Due to the lack of diagnostic methods for early detection of PLA (Pyogenic Liver Abscess), it is impossible to treat and control this illness; there is a need to understand the pathogenicity of the disease to find the most appropriate way of detection. To find a suitable detection method is necessary for the further treatment and eradication of the disease.

**Study Design:** It is a retrospective study with statistical approach, conducted in Medicine of Department of M. Islam Medical and Dental College Gujranwala for six months duration from July 2021 to December 2021.

**Methods:** To find an appropriate diagnostic method for the detection of Pyogenic liver abscess, samples of 118 patients were selected. The clinical data related to pathogenicity, symptoms of illness, demographic distribution, treatment history, and the mortality rate was carefully noted, Patients were non-amoebic illnesses were selected for this study. Leukocytes and C-reactive protein values of the patients were also estimated. Microbes involved in this disease were also identified

**Results:** The microbe involved in PLA was Klebsiella pneumonia. This disease was more prevalent in males in the age group 57 years. In more severe patients WBCs level was significantly high and CRP values were also aroused much. 67 % of patients have a high level of leukocytes. The mortality rate was about 6 % in these patients.

**Conclusion:** After complete demographic, clinical, C-reactive protein level, evaluation of leukocytes, imaging results by ultrasound might help to diagnose this disease at an early stage. For the treatment of illness, image guided catheter and proper usage of antibiotics is recommended.

**Keywords:** Pyogenic Liver Abscess, Biliary Pathology, Diagnosis of PLA, concomitant disease, catheter drainage

## INTRODUCTION

PLA (Pyogenic Liver Abscess) is a fatal disease. About 10 to 40 % of people die when they interact with this illness [1-2]. The mortality rate of the disease is mentioned in the literature. The literal meaning of Pyogenic means Pus producing sacs. In this disease sacs accumulated with pus form within the liver. The most common cause of this illness is infection through blood or some injury to the abdomen [3-4].

It is not particularly liver disease, in fact, it is a result of many pathological infections especially abdominal infections (that may occur during some surgical wound or unhygienic appendicitis surgery). If that disease is caused by some surgical drainage, there is somehow hope for treatment but in other cases, this disease proves to be fatal. A number of scientists are trying to find effective antibiotics to treat this disease as well as they are trying to know the exact pathological cycles of these anaerobic bacteria involved to cause this Liver Abscess [5-6]. Currently, there is no most authentic diagnostic method to diagnose this liver disease, but new strategies are employed for a more effective and accurate diagnosis of this disease. This Pyogenic Liver Abscess becomes challenging to be eradicated. Researchers are trying to find the appropriate therapeutic method for treatment as well as a diagnostic method to diagnose it, otherwise, further proceedings of treatment will not be possible without the detection of the disease[7].

It is reported in the literature, Hematogenous spreading of this disease is accompanied by distant foci. But in the recent research papers, it is inferred that the most prevailing etiology of the Liver abscess is biliary pathology. When the clinical illustration of the disease was observed it was revealed that its symptoms are abdominal pain, nausea, chills, temperature, and vomiting. But at the start of the infection cycle, diagnosis of this illness is not seem possible because the symptoms of this disease are not specific and related to many other ordinary diseases[8-9]. For the treatment of this disease, many therapeutic strategies are employed such as intravenous injections and drainage by catheter and rupturing of abscesses. To find a more specific and sensitive method for the diagnosis of pyogenic liver abscesses, our research group designed a retrospective method for the diagnostics of liver disorders [10-11].

## MATERIAL AND METHODS

It is a retrospective study with statistical approach, conducted in Medicine of Department of M. Islam Medical and Dental College Gujranwala for six months duration from July 2021 to December 2021. To find an efficient method, epidemiological distribution of disease, treatment methods, rate of mortality, pathogenicity, etiology of disease, clinical symptoms, and treatment methods for Pyogenic Liver abscess were carefully observed. Patients were registered for this research work from 2001 to 2003 at a health care center. About 23, 984 admissions were registered at that time for this study. From these patients, 118 patients were selected for this study on the basis of the severity of the disease. The diagnostics of this disease were totally dependent on the previous diagnostic methods and imaging results. For imaging results, ultrasonography of the abdomen or tomography method was used. In this study, those patients were not included, whose illness was due to amoebic predators. Only those patients were selected who have a pathogenic illness other than amoebic infection. Entamoeba histolytica causes the formation of pus sacs within the liver. The amount of pus was determined by the hemagglutination test (indirect method) [11]. Demographical distribution, clinical symptoms, number of pus-filled sacs, their clinical data, distribution of pus filled sacs, pathology, mortality rate, and all the related factors along with related disorders were carefully analyzed.

The laboratory data of the patients were collected and this data include the number of WBCs (white blood cells or leukocytes) per ml of sample and CRP (C-reactive protein) graphs. The average range of White blood cells in a healthy person is 4400 to 10880/ µl of sample and C-reactive protein concentration is bout less than 0.80 mg/dL. The value of C-reactive protein was estimated by the immune-turbidimetric method. The blood serum sample was collected from all 118 patients as well as pus samples were also obtained during the catheter drainage method. All the isolated pathogens were cultured and isolated, experts identified these microbes by using the sequencing method and identification

assays. After the withdrawal of samples, patients were given traditional antibiotics against this disease to prevent any kind of mishap. Then results were obtained by using a statistical approach [12].

## RESULTS

The general incidence rates were 446 positive results per 100,000 entries in the hospital. Among the 118 patients that were used for the study, 76 were men (63%) and 36% of them were female (36%). The age was distributed from 198 years to 90 years, and the mean of the age was 57.6. The clinical features are described in table1. The most common incidence of the symptoms started from fever (97%) to chills (63%), pain in the abdomen (57%), and vomiting (25%). The incidence of diabetes mellitus was 70 patients (59%). If we look at the biliary pathology, it came out to be the most common reason (27%). Other cases that could possibility be the cause were ruptured appendicitis (1%) and colon diverticulitis (1%). Some of the other linked disorders included adenocarcinoma of ampullovater (1%), hepatocellular carcinoma (3%). And the incidence of metastatic liver cancer is (1%).

The presence of leukocytes was almost 67% in all 118 patients. With 80 patients found to be suffering from it. The cases of leukopenia were 1 (0.9%) and 38 (32%) were normal. CRP examination was carried out in 44 from the total of 118 patients. The CRP values came to be high for all cases. The values exceeded 150 mg/d L in 36 (81%) and the CRP value was in between 51- 100 mg/ d L in case of 5 (11%) patients in table 2 are listed blood and abscess culture results. The blood cultures were carried out for all of patients. The blood cultures came out to be positive in 68 (57%). The pathogen that was most commonly causing disease was Klebsiella pneumonia for 93% of the cases. E.coli was also one of the pathogens (6%) causing the disease. 102 patients out of 118 carried out catheter drainage of their abscess. 80% of three 118 patients had a solitary abscess with presence of abscess in right hepatic lobe in (16%) of the cases.

Table 1: The clinical symptoms in all 118 patients with pyogenic liver abscess

| Signs and symptoms | No. of patients (%) |
|---|---|
| Fever | 115 (97%) |
| Chills | 75 (63%) |
| Abdominal pain | 68 (57%) |
| Nausea | 30 (25%) |
| Shock | 5 (4.2%) |
| Conscious disturbance | 4 (3.3%) |

Table 2: The microbiological findings in all 118 patients with positive ratio of culture

| Species | No. of positive cultures | |
|---|---|---|
| | Abscess n= 84 | Blood n= 61 |
| Monomicrobial | 78 (92%) | 66 (100%) |
| Klebsiella pneumonia (KP) | 69 (82%) | 61 (93%) |
| E.coli | 2 (2.3%) | 4 (6%) |
| Peptostreptococcus | 2 (2.3%) | |
| Klebsiella ozanae | 1 (1%) | |
| Viridans streptococci | 1 (1%) | |
| Vibrio cholera | 1 (1%) | |
| Morganella morganii | 1 (1%) | |
| Polymicrobial | 6 (7.1%) | 0 ( 0 ) |
| Moraxella Fusobacterium spp | 1 (1%) | |
| E. coli Aeromonas sobria | 1 (1%) | |
| KP and Enterococcus spp. | 1 (1%) | |
| KP and E. coli | 1 (1%) | |
| Viridans streptococcus and Bacteriodes spp. | 1 (1%) | |
| KP and Alcaligens xylosoxidans | 1 (1%) | |

## DISCUSSION

The crude occurrence rate of pyrogenic liver abscess was 446 patients in every 100,000 entries of patients in the hospital. This rate of occurrence is much higher as compared to western countries with 22 patients in 100,000 hospital entries. Although according to the studies the rate of disease is rare in western countries still the cases are reported and there is a high incidence reported in Taiwan as well [13]. The clinical parameters of the patients participated in the study were non-specific. The signs and symptoms were common, including fever, abdominal pain, nausea, and chills. The 57% of the patients reported abdominal pain. The degree of the abdominal pain varied in different cases of PLA. As compared to abdominal pain, fever was the symptom that was most common in all case of PLA with cases appearing in 97% of the cases. [14]

In order to look for the possible cause of pyrogenic liver abscess a number of studies were carried out. As per studies, the pathology biliary origin was one of the most prevalent cause of the disease, at the same time diabetes mellitus was one of the concomitant illness associated with the pyrogenic liver abscess [15]

Reports have shown that there are some evidences that link diabetes mellitus with pyrogenic liver abscess. Alvarez et al reported that according to their studies only 13% of the patients of PLA had diabetes mellitus among all patients they studied [16]. The pathogenic mechanisms of pyrogenic liver disease are complex. As per studies the disease interfere with the working of neutrophil chemotaxis later on causing phagocytosis. Therefore, further studies are needed to clarify the potential role of diabetes mellitus in the pyrogenic liver abscess occurrence [17]. WBC count is also one of the important aspect in this study. Leukocytosis was observed in almost two third of the patients of PLA. All the other patients had normal white blood count. These studies can be helpful while making decisions regarding either the patient had bacterial infection or not. This could prove to be effective especially in case where no prior infection was found during clinical examination. That's why CRP can be used as a possible marker in examination of patients having bacterial infection [18].

In the present study only 40% of the cases of patients had tested positive for CRP among all 118 patients. And the CRP values were very high greater than 150mg/ d L. Thus patients that had diabetes with fever and high level of CRP can be tested for abdominal imaging whether they have normal white blood cell count or not. This is important to rule out any chances of abdominal infection in liver patients[19]. The studies have revealed that K. pneumoniae is one of the most prevalent form of pathogen that is isolated from PLA. These results support the previous findings in this regard. The occurrence of E.coli was very low in the culture. These findings are no doubt different from the studies carried out in western population including studies carried out in United States as there the E. coli was one of the major pathogen involved in causing the disease and the cases reported by K pneumoniae were quite less. Solitary pyrogenic liver abscess was a prominent factor in this study and was observed in right hepatic lobe. In case of multiple hepatic abscess the cases were located in right and in some cases in both hepatic lobes. These findings are in accordance with the studies carried out by Alvarez et al and Wong et al. the image guided drainage by catheter was also carried out after PLA diagnosis. In these studies, the catheter drainage was carried out in 87% of the patients[20].

The mortality rate came out to be 7% in this study which was less than the mortality rate reported in previous studies. However, the limitations in this retrospective study include the incomplete collection of medical records, neglecting some of the clinical parameters, like weight loss, malaise, nausea etc. Moreover, no doubt CRP analysis was carried out in this study but the analysis was not done on all patients. This can also be one of the limitations of this study. The elevated awareness among general population, early diagnosis and proper screening can prove to be effective for the treatment of PLA[21-22].

## CONCLUSION

Pyrogenic liver abscess is a life threatening illness therefore an early diagnosis is very important for its proper treatment. If a proper history, WBC count analysis, abdominal scan, CRP levels

will be carried out on time it can prove to be effective for its early prognosis and treatment. The decrease of mortality rate linked with PLA can be carried out by use of antibiotics and image guided catheter drainage of the abscess.

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