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Original Research Article

Clinical study of microbiological organisms causing liver abscess

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ABSTRACT

Background: Liver abscess is a disease reported commonly in developing countries like India. It can be amoebic or pyogenic liver abscesses, the diagnosis of which is challenging to treating physicians. This clinical study was conducted to identify the common microbiological organisms causing liver abscess so that proper treatment can be administered.
Methods: A prospective study was conducted in MGM Medical College and Hospital, Navi Mumbai for a period of 2 years in 50 patients diagnosed with liver abscess. Pus culture and blood culture were carried out in all patients and data recorded and analyzed for microbiological profile.
Results: The pus and blood cultures were showing growth in 90% of the liver abscess patients. Klebseilla was the most common organism identified in liver abscess followed by Staphylococcus aureus.
Conclusions: Most of the patients had polymicrobial organisms identified in the aspirate of which 29% were *Klebseilla pneumoniae*, the commonest organism.

Keywords: Liver abscess, Microbiology, Pyogenic, Amoebic

INTRODUCTION

Liver abscess is one of the most common pathology reported in hepatobiliary tract in India. It can be life threatening if left untreated. The sanitation issues, overcrowding and malnutrition are few reasons for the increased incidence of liver abscess in developing countries.[1,2] In endemic areas, the prevalence of infection is higher than 10% and has been reported to be as high as 55% in certain areas. India has 2nd highest incidence of liver abscess in the world.[3,4]

Liver is the common site of abscess formation in abdominal viscera. It can be amoebic, pyogenic or crypto-genic when the etiology is unknown. It can occur secondary to hematogenous spread of bacteria or from local spread from sites like appendix, colon, kidney or pelvic organs.[3]

A high index of suspicion is required for diagnosing liver abscess as it can mimic cholecystitis or lower respiratory infections. With the advent of non-invasive and effective investigations, it is possible to diagnose and treat liver abscesses early and effectively. The main aim is to diagnose and treat liver abscess early to reduce hospital stay, morbidity as well as mortality associated with the complications.

Hence attempt has been to made to study microbiological organism and the antibiotic sensitivity so that the patients with liver abscess can be treated effectively with proper antimicrobial therapy.

METHODS

A prospective study was done on 50 patients diagnosed with liver abscess and treated in our institute (Mahatma Gandhi Mission's Hospital and Medical College, Navi

Mumbai) for a period of 2 years. Institutes ethical commits approval was taken before starting the study. Period of study was from April 2016 to October 2017. As it was a time bound study all patients diagnosed with liver abscess were included in the study and a minimum target was kept of 50.

Inclusion criteria

All cases of liver abscess diagnosed clinically and radiologically and all patients in the age group of 18-70 years.

Exclusion criteria

Uncertain diagnosis, uncorrectable coagulopathy, abscess cavities less than 5 cm in their greatest dimension, concomitant biliary tract malignancy, ruptured liver abscess and prior intervention and treatment.

Patients fulfilling the criteria were subjected to detailed history, a detailed physical examination and blood investigations like complete hemogram, liver function test, kidney function test, coagulation profile (PT/INR) and ultrasonography of abdomen. Reference ranges of these investigations were defined by the reference ranges of hospital laboratory. Blood culture was done in all patients once the diagnosis of liver abscess is confirmed. Pus was aspirated from when the abscess was reported as liquefied and send for culture and sensitivity. Till then the patients were treated with broad spectrum antibiotics. All the patients were administered empirical treatment initially, which was modified based on the culture sensitivity reports. In case the pus culture was sterile, the same treatment was continued. Treatment given was as follows: Inj. Ceftriaxone 1gm I/V 12 hourly, Inj. Gentamicin 80 mg I/V 8 hourly, Inj. Metronidazole 750 mg I/V 8 hourly, Chloroquine 600 mg (in 2 divided doses) x 2 day, 300 mg (in 2 divided doses) x 19 days. The intravenous antibiotic treatments given for a minimum of 7 days (Metronidazole given for 14 days) and until fever had subsided for minimum of 2 days. The intravenous antibiotic therapy was followed by 4 weeks course of oral antibiotics. All the patients were assessed clinically and with laboratory tests until discharged from the hospital. The data was analyzed using the chi-square test and independent t-test. In this study only bacterial culture was done since facility for anaerobic culture was not available for *E. histolytica* in our institute.

RESULTS

Microbiology

Out of 50 patients studied, all patients had blood culture done on admission and all of them underwent aspiration of liver abscess once liquefied. The laboratory findings and demographic data of the patients is given in Table 1, 2 and 4. 45 samples showed growth of organism of which pus culture was positive in 29 cases, blood culture in 3 cases and both were positive in 12 patients as shown in Figure 1. Table 5 shows the type of abscesses identified. According to our study most of them had polymicrobial infections. *Klebsiella pneumoniae* was the most common organism grown in culture of patients with liver abscess accounting for 29%. The list of organisms is given in Table 3 as identified in our study.

Table 1: Age and sex distribution.

Age group (years)	Male	Female	Total
21-30	10	1	**11**
31-40	16	2	**18**
41-50	12	1	**13**
51-60	6	-	**06**
61-70	2	-	**02**
Total	**46**	**04**	**50**

Table 2: Co-existing morbidities.

Co-morbidity	Total
Diabetes mellitus	12
Cholecystitis	08
Choledocholithiasis	01
Appendicitis	04
Tuberculosis	02

Table 3: Different micro-organisms identified.

Organisms Identified	N	%
E. coli	06	15
K. pneumoniae	12	29
S. aureus	07	17
P. aeruginosa	01	2
Str. milleri	05	12
Polymicrobial	10	24

Table 4: Laboratory result analysis.

Laboratory parameter	Total patients
Fever	
$<37.5^0$ C	13
$>37.5^0$ C with chills	37
Leucocyte counts	
$<11000/mm^3$	10
$11000–15000/mm^3$	31

Continued.

Laboratory parameter	Total patients
>15000 / mm^3	09
Serum bilirubin (mgm%)	
< 1	33
1-3	08
3-5	08
>5	01
Prothrombin time	
0.9-1	45
1-2	04
>2	01
Alkaline phosphatase	
<50	7
51-100	01
101-150	08
151-200	06
201-250	3
251-300	14
>300	11

Table 5: Type of abscess.

Aetiology	Total
Pyogenic	39
Amoebic	05
Mixed	00
Cryptogenic	06
Total	50

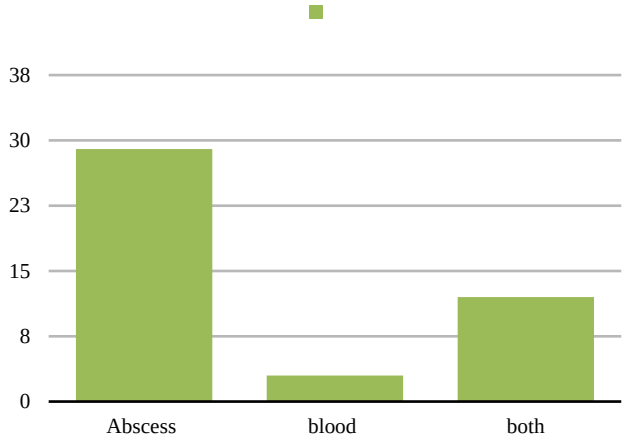

Figure 1: different types of abscess and their number.

DISCUSSION

The aetiological organism in liver abscess can be bacterial or protozoal. There are different routes by which the micro-organism reaches liver and cause infections. It include portal route from gastro intestinal tract, biliary tract infections or direct invasion by penetrating trauma or secondary to lung infections.[2-5]

Klebsiella species are routinely found in human nose, mouth and gastrointestinal tract as normal flora, however they sometimes behave as opportunistic pathogens. *Klebsiella* organisms can lead to wide range of diseases notably pneumonia, urinary tract infections, septicemia, meningitis and also liver abscess.5 The majority of human *Klebsiella* infections are caused by *Klebsiella pneumoniae*. During the last 2 decades, distinct invasive syndrome that causes liver abscesses has been increasingly reported in South East Asia and this is emerging as global disease[6]. In their study the *Klebsiella* species were positive in 73% of the cases. Several groups of patients are particularly susceptible to infection including patients with diabetes mellitus and those with pre-existing hepatobiliary diseases. Once thought to be common in South east Asia, *Klebsiella pneumonia* causing liver abscess is now a common in United States also.[6]

In our study conducted in 50 patients, the commonest organism isolated was *Klebsiella* accounting to 29% and it was comparable to other studies like; in the study by Zerem and Hadzic, cultures were positive in 75% patients, with *Klebsiella pneumoniae* as the commonest organism (32%). Similarly, Tsai et al in a study at Taiwan found that 80% of the cases showed positive results for *Klebsiella* spp. A study by Wang, Liu, Lee, et al. out of the 182 cases the 160 cases showed liver abscess due to *K. pneumonia*.[7-9]

The spectrum of microorganism in liver abscess was broad from aerobic to anaerobic, may be gram positive or gram negative. The study done by Kaplan et al suggest that *Str. milleri* was most common organism accounting for 44% but he also stated that the *Str. milleri* was reported less from the Asian centers. In our study the Str. millers was present in 12% of the patients.[10]

There were also some rare organisms identified in the study like *Pseudomonas aeruginosa* which was isolated

in only 2% patients which was comparable to study by Chen et al on the liver abscess by *P aeruginosa*.[11]

Limitations

Anaerobic culture was not done in our patients due to lack of facility for the same

CONCLUSION

Liver abscess is a common disease in developing countries like India, with diversity in etiology and microbiology. The diagnosis and treatment have been evolved over centuries since the time of hippocrates. There has been marked reduction in mortality and morbidity due to improved diagnostic techniques, better antibiotics and effective treatment. In our study we found that commonest microbe isolated in patients with liver abscess is *Klebsiella pneumonia* followed by *E. coli* although 24% was showing polymicrobial growth.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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