Original Research Article

Correlation between abscess volume and liver function test in liver abscess

Priyanka Kumari[1], Utsab Saha[2*], Abhishek Singh[3], Anil Kumar Kamal[4]

[1]Senior Resident, General Surgery, RIMS, Ranchi, Jharkhand, India

[2]Junior Resident Academic, General Surgery, RIMS, Ranchi, Jharkhand, India

[3]Senior Resident, Medinirai Medical College, Palamu, Jharkhand, India

[4]Associate Professor, General Surgery, RIMS, Ranchi, Jharkhand, India

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Abstract

Background: Liver abscess is highly prevalent in India due to poor sanitation, overcrowding, inadequate nutrition, chronic alcoholism and diabetes. The modern diagnostics like ultrasound and computed tomography to locate and drain the abscess have reduced the mortality to 2-12%. However, due to the complications of liver abscess especially the amebic ones the morbidity is still high. This study aims to study the correlation of various LFT parameters with abscess volume which can render the opportunity for early detection of high risk patients, start early treatment thus reducing the overall morbidity. Methods: The study was conducted over a period of 6 months on 50 patients of liver abscess. History and physical examination was done. All patients were subjected to complete hemogram, liver function test, coagulation profile (PT/INR) and USG abdomen. The data was recorded and compiled in excel sheets and analyzed using Pearsons correlation coefficient (R) method. **Results:** The mean age of the patients was 45 years with male preponderance. Amoebic liver abscess was predominant. Alcoholism, smoking and diabetes mellitus were the main predisposing factors. Fever, right upper quadrant pain, elevated ALP, low albumin, increased PT INR points towards the diagnosis of liver abscess. Complications seen were pleural effusion (26%), ascites (36%) and intraperitoneal rupture (6%). On analysis, liver abscess size is significantly positively correlated with INR, ALP, liver enzymes and negatively correlated with serum albumin level. **Conclusions**: An early diagnosis and a prompt management of liver abscess is necessary to hault its progression and avoid serious complications like intraperitoneal rupture which causes significant morbidity. Thus, LFT can be used to estimate the liver abscess size and predict the severity and prognosis of patient.

Keywords: ALP, INR, LFT, Liver abscess, SGOT, SGPT

Background

- Liver abscess is defined as collection of purulent material in liver parenchyma which can be due to bacterial, parasitic, fungal, or mixed infection. In developing countries liver abscesses are common; mostly due to parasitic infections, such as amoebic and less commonly other protozoal and helminthic organisms. In developed countries parasitic liver abscesses are rare. In the Western world, bacterial abscesses are more common, representing a complication of an infection elsewhere[1].
- The risk factors for high prevalence of liver abscess in India are poor sanitation, overcrowding and inadequate nutrition[2].
- Minimal surgical interventions like percutaneous aspiration and percutaneous drainage are better than conservative treatment for the management of liver abscesses of size >5 cm, in terms of duration to attain clinical relief and duration for which parenteral antibiotics are needed[1].
- This prospective study is an attempt to understand the correlation of various LFT parameters with abscess volume. These parameters can be associated with the disease severity and possible complications. This approach renders the opportunity for early detection of high risk patients and to start early treatmentthus reducing the overall morbidity.

Aims & objectives

- To study the correlation between abscess volume and various LFT parameters in liver abscess patients.
- To predict the disease severity clinically along with liver function tests before the imaging reports are available.

*Correspondence
Dr. Utsab Saha
Junior Resident Academic, General Surgery, RIMS, Ranchi, Jharkhand, India

Material & method

It was a hospital based, single centre, prospective, observational and cross-sectional study.

Study Population

Patients of liver abscess in Department of General Surgery, RIMS Ranchi.

Study Duration

January 2021 – June 2021

50 Patients who satisfied the inclusion criteria and those who gave written informed consent were selected for the study.

Inclusion Criteria

- All individuals above 18 years of age.
- Patients presenting with consistent signs & symptoms of liver abscess.
- Patients diagnosed with liver abscess radiologically (Ultrasonography &CT Scan).

Exclusion Criteria

- Patients not giving consent for the study.

Data was analysed for demographic characteristics, underlying medical conditions, initial clinical manifestations, laboratory findings, imaging and culture & sensitivity findings, treatment and overall morbidity and mortality. Data was recorded on excel sheets and analysed using Pearsons correlation coefficient (r) method.

Results

The common risk factors seen were alcohol 43%, smoking 35% and diabetes 38%.30% cases had mixed risk factors.

Out of 50 patients who fulfilled the inclusion criteria, 40 (80%) were males and 10 (20%) were females with the mean age of presentation being 45 years (range: 18-68 years). In our study, we observed that 78% had amoebic and 22% had pyogenic type of abscess. This was based on amoebic serology and pus culture analysis.

Table 1: Clinical Features

Signs and symptoms	Cases
Fever	50 (100%)
Pain abdomen	44 (88%)
Vomiting	15 (30%)
Nausea	24(48%)
Jaundice	12(24%)
Cough	15(30%)
Abdominal tenderness	32(64%)
Hepatomegaly	42 (84%)
Anorexia	26 (52%)
Pleural effusion	13 (26%)
Ascites	18 (36%)
Intraperitoneal Rupture	3 (6%)

Table 2: LFT Profile

Biochemical Parameters	No. of Cases
ALP>100	47 (94%)
SGOT >45	34(68%)
SGPT >45	37 (74%)
Albumin <3.5	26 (52%)
INR >1.2	30 (60%)
Total Bilirubin >1.2 g/dl	12 (24%)

Table 3: USG Findings

Size	Cases
<200 cc	27(54%)
200-400 cc	7 (14%)
>400 cc	16 (32%)

Table 4: Statistical analysis of LFT parameters with abscess volume

Biochemical parameters	Correlation coefficient(r)	Inference
Total bilirubin	0.073	Positive correlation P value – 0.6144
Alkaline phosphatase	***0.40***	***Positive correlation P value – 0.004***
INR	***0.54***	***Positive correlation P value – 0.0001***
SGOT	***0.41***	***Positive correlation P value – 0.0031***
SGPT	***0.39***	***Positive correlation P value – 0.0051***
Albumin	***-0.28***	***Negative correlation P value – 0.04***

Discussion

- Liver abscess is more common in tropical countries[5,6].
- E. histolytica (amoebic) and bacteria (pyogenic) are most frequently observed microbiological organisms causing liver abscess. In our study, amoebic aetiologywas predominant which is in concordance with various other studies in developing countries.
- The mean age of presentation was 45 yearssimilar to other Indian studies. Ghosh et al, Sharma et al and Mukhopadhyay et al, reported it to be 41, 40.5 and 43.64 years, respectively[7-9]. In our study, pyogenic liver abscess was seen among all age groups whereas highest incidence of amoebic liver abscess was in fifth decade of life.
- In our study, alcohol was found to be a major risk factor as 43% cases were alcoholic. Ghosh et al had 72% alcoholic patients in their study[9].
- Alcohol has a multifactorial effect on development of liver abscess. It suppresses functions of Kupffer cells which help in clearing amoeba from the liver. Also, a high content of free iron is present in country liquor which predisposes to invasive amoebiasis[13].
- Apart from alcohol, diabetes mellitus was seen in 38% cases. This incidence was different in variousstudies. Ghosh et al reported it to be 9% whereas Das et al reported in 70% patients[9,14]. In a study by Thomsen et al, diabetic patients had a 3.6-fold increased risk of developing pyogenic liver abscess, when compared with non-diabetic subjects[15].
- In this study, the presenting feature was fever in 100%cases along with pain in abdomenin 88% cases. It is similar to the results seen in study conducted by Ghosh et al and various other studies[7-9]. Ghosh et al reported hepatomegaly in 89% cases which correlates with our study (84%). However, this result differs from Das et al who found hepatomegaly in only 40% cases[9,14].

Abnormally high ALP was seen in 94% cases. Thus, alkaline phosphatase level can be considered as the most reliable and consistent biochemical indicator. Similar findingswere reported by Shyama et al., Satish et al. and Kemparaj et al, in their studies[16-18]. There was significant positive correlation with abscess volume in this study (p value=0.004). Katzenstein et al. suggested that the value of alkaline phosphatase is correlated with duration of the disease. It was seen that rise in alkaline phosphatase was more common in patients

with a chronic disease as compared to patients presenting with an acute illness[19].

- An elevated INR was seen in 60% patients in this study. It showed maximum positive correlation with abscess volume (p value=0.0001) when compared with all other parameters.
- SGOT, SGPT were also mildly raised in 68% and 74% patients and their correlation coefficients are 0.41 and0.39 respectively. SGOT showed significant positive correlation (p value=0.0031) and SGPT (p value=0.0051) with the abscess volume. The abnormal values of SGOT, SGPT indicates the severity of the disease. Similar findings were reported in various other studies[16-18].
- A decline in serum albumin was a significant consistent factor in our study. There were 52% cases of hypoalbuminemia which had a significant negative correlation (p value= 0.04) with the abscess volume i.e. lower the serum albumin level greater will be the abscess volume.
- Serum bilirubin was mildly raised in our series with 24% incidence but showed non significant positive correlation with abscess volume. Kemparaj et al, reported 35% cases with hyperbilirubinemia[18]. Mechanism of hyperbilirubinemia in amoebic liver abscess has been studied previously in many studies. Various mechanisms were suggested like pressure on biliary ducts at the portahepatis especially by large abscess[20].
- In a prospective study, Sharma et al considered multiple factors like bilirubin level >3.5 mg/dL, encephalopathy, volume of abscess cavity, hypoalbuminemia (serum albumin level <2.0 g/dL), and the number of abscesses as the independent risk factors for mortality[21]. In the present study, we have seen that volume size is positively correlated with increase in INR, ALP, SGOT, SGPT and whereas it is negatively correlated with serum albumin.

Conclusion

Liver abscess is a very important clinical entity especially for developing countries like India. An early diagnosis and a prompt management is necessary to hault its progression and avoid serious complications like intraperitoneal rupture which causes significant morbidity.

The size of abscess is one of the most important prognostic factor, others being site of the abscess (left versus right lobe of liver), distance from the capsule,comorbities like diabetes mellitus which make the patients more to prone bacterial dissemination with features of sepsis and multi organ dysfunction.

In this study, we observed a significant positive correlation between abscess size and INR, alkaline phosphatase, SGOT and SGPT. Study also found a significant negative correlation between abscess size and serum albumin levels. However, there was no significant correlation of abscess size with total bilirubin levels.

LFT which is a simple, cost effective and reliable test can help clinicians predict the size of abscess and hence the severity and prognosis of the patient.

References

1. Kemparaj T, Khan MR, Narayan S. Liver abscess presentation and management: a retrospective study. Int Surg J 2017;4:550-4.
2. Jain V, Manjavkar S, Rajput D, Jain A, Jyotsana, Kohli S. Correlation between abscess size and liver function tests in cases of liver abscess. Int J Res Med Sci 2017;5:3340-4.
3. Ribaudo JM, Ochsner A. Intrahepatic abscesses: amebic and pyogenic. Am J Surg. 1973;125:570-4.
4. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends in etiology and mortality. Clin Infect Dis. 2004;39:1654-9.
5. Channanna C, Rehman FU, Choudhuri B, Patil A. A clinical study, diagnosis and management of Liver Abscess at VIMS, Bellary. J Evidence Based Med Health Care. 2014;1:668-85.
6. Ochsner A, DeBakey M, Murray S. Pyogenic abscess of the liver: II. An analysis of forty-seven cases with review of the literature. Am J Surg. 1938;40(1):292-319.
7. Sharma N, Sharma A, Varma S, Lal A, Singh V. Amoebic liver abscess in the medical emergency of a North Indian hospital. BMC Res. 2010;3(1):21.
8. Mukhopadhyay M, Saha AK, Sarkar A, Mukherjee S. Amoebic liver abscess: presentation and complications. Indian J Surg. 2010;72(1):37-41.
9. Ghosh S, Sharma S, Gadpayle AK, Gupta HK, Mahajan RK, Sahoo R, et al. Clinical, laboratory, and management profile in patients of liver abscess from Northern India. J Trop Med. 2014;2014:1423- 82.
10. Pang TC, Fung T, Samra J, Hugh TJ, Smith RC. Pyogenic liver abscess: an audit of 10 years' experience. World J Gastroenterol. 2011;17:162230.
11. Heneghan HM, Healy NA, Martin ST, Ryan RS, Nolan N, Traynor O, et al. Modern management of pyogenic hepatic abscess: a case series and review of the literature. BMC Res Notes. 2011;4(1):80.
12. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: ten years experience in a UK centre. QJM. 2002;95(12):797-802.
13. Makkar RP, Sachdev GK, Malhotra V. Alcohol consumption, hepatic iron load and the risk of amoebic liver abscess: a case-control study. Intern Med. 2003;42(8):644-9.
14. Das AK, Moni Saikia A, Moyee Saikia A, Dutta N. Clinico-epidemiological profile of patients with liver abscess: a hospital based study. Indian J Basic Applied Med Res. 2015;5(1):17-25.
15. Thomsen RW, Jepsen P, Sørensen HT. Diabetes mellitus and pyogenic liver abscess: risk and prognosis. Clin Infect Dis. 2007;44(9):1194-201.
16. Satish KR, Sathyanarayana BA, Madhu SL. A study of predictors for identification of risk of complications in patients with liver abscess. Trop Gastroenterol. 2015;36:96-100.
17. Mathur S, Gehlot RS, Mehta A. Liver abscess. J Indian Academy Clin Med. 2002;3:78-9.
18. Kemparaj T, Khan MR, Narayan S. Liver abscess presentation and management: a retrospective study. Int Surg J. 2017;4:550-4.
19. Katzenstein D, Rickerson V, Abraham B. New concepts of amoebic liver abscess derived from hepatic imaging, serodiagnosis and hepatic enzymes in 67 consecutive cases in San Diego. Med. 1982;61:237-46.
20. Kumar AS, Mishra A, Malhotra N, Alpana M. Hyperbilirubinemia in patients with amoebic liver abscess: a study of 75 cases. J Gastroint Dig Syst. 2013;3:138.

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