

Study on Analysis of Organism Causing Liver Abscess and Its Antibiotic Sensitivity

DR. VIJAYALAKSHMI M.S (GENERAL SURGERY)

DR. A.V. KANCHANA M. D (MICROBIOLOGY)

Department Of General Surgery And Microbiology,
Government Medical College, Kallakurichi And Namakkal,
Tamilnadu

Corresponding Author - Dr. A. V. Kanchana M. D

Abstract

The patient profile, sociodemographic characteristics and management has changed substantially over the years for pyogenic liver abscesses. This study aimed to understand the various organisms causing liver abscess and evaluate their antibiotic sensitivity. From April 2021 to January 2022 a prospective study was done among fifty patients presenting with ultrasound confirmed liver abscess. The mean age of the participants is 51.5 years (S.D=10.4 years). The median age was 49.5 years ranging between 33-71 years. Majority of them were males (n=48, 96%) and the rest were females (n=2, 4%). Right lobe abscess was present in 62% (n=31), left lobe abscess was present in 20% (n=10) and multiple abscesses were present in 18% (n=9) cases. E.Coli was the common agent (58%) followed by Klebsiella (28%) and Pseudomonas (8%). Piperacillin/Tazobactam and Ciprofloxacin/Ofloxacin combinations were effective in 84% of the cases followed by Cefoperazone/Sulbactam in 80% of the cases. Gentamycin was effective in 66%, Imipenam/Meropenam in 64% and Amikacin in 58% of the cases. All cases in this study resolved through medical management using appropriate antibiotics. None of them required surgical management. Therefore, early diagnosis, identifying the organism and a well-directed antibiotic for the organism is the mainstay of the treatment. Surgical treatment is required when medical management doesn't resolve the illness.

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I. INTRODUCTION

Hippocrates reported the incidence of pyogenic liver abscess. Depending on the type of fluid from the abscess, he stated the prognosis of the illness¹. Surgical management as the primary treatment option was recommended by Ochsner and DeBakey in 1938². It was associated more with men who had acute appendicitis. It had a high incidence of mortality. However, in mid 1980s, percutaneous drainage was touted as a safer alternative³⁻⁶. The epidemiology of the disease has undergone changes since then. Older men are being affected due to biliary causes with a drastic reduction in mortality rates upto 30%⁷⁻¹⁰. Recent advances in microbiology and antibiotics has further augmented the fight against this illness. E.coli and Klebsiella are the most common agents reported in United States and Taiwan¹¹⁻¹³.

Studies from the Indian subcontinent are less. This study aimed to understand the various organisms causing liver abscess and evaluate their antibiotic sensitivity.

II. METHODS

From April 2021 to January 2022, a prospective study was done among fifty patients presenting with ultrasound confirmed liver abscess. Patients age less than 18 years, organized abscess, abscess in close proximity to large vasculature and those having pregnancy were excluded from the study. The study focused on the organism causing liver abscess and the Antibiotic sensitivity of the organism. All patients were discharged and followed up at regular intervals up to one year. Data was tabulated in excel and analyzed using IBM SPSS v23.

III. RESULTS

The mean age of the participants is 51.5 years (S.D=10.4 years). The median age was 49.5 years ranging between 33-71 years. Majority of them were males (n=48, 96%) and the rest were females (n=2, 4%). Right lobe abscess was present in 62% (n=31), left lobe abscess was present in 20% (n=10) and multiple abscesses were present in 18% (n=9) cases. E.Coli was the common agent (58%) followed by Klebsiella (28%)

and Pseudomonas (8%). Piperacillin/Tazobactam and Ciprofloxacin/Ofloxacin combinations were effective in 84% of the cases followed by Cefoperazone/Sulbactam in 80% of the cases. Gentamycin was effective in 66%, Imipenam/Meropenam in 64% and Amikacin in 58% of the cases.

S.No	Parameter	Frequency	Percentage	
1	Diagnosis	Right lobe Liver Abscess	31	62
		Left lobe Liver Abscess	10	20
		Multiple Liver Abscesses	9	18
2	Organism	E.Coli	29	58
		Klebsiella	14	28
		Pseudomonas	4	8
		No Growth	3	6

Table 1: Diagnosis and etiology of Liver abscess

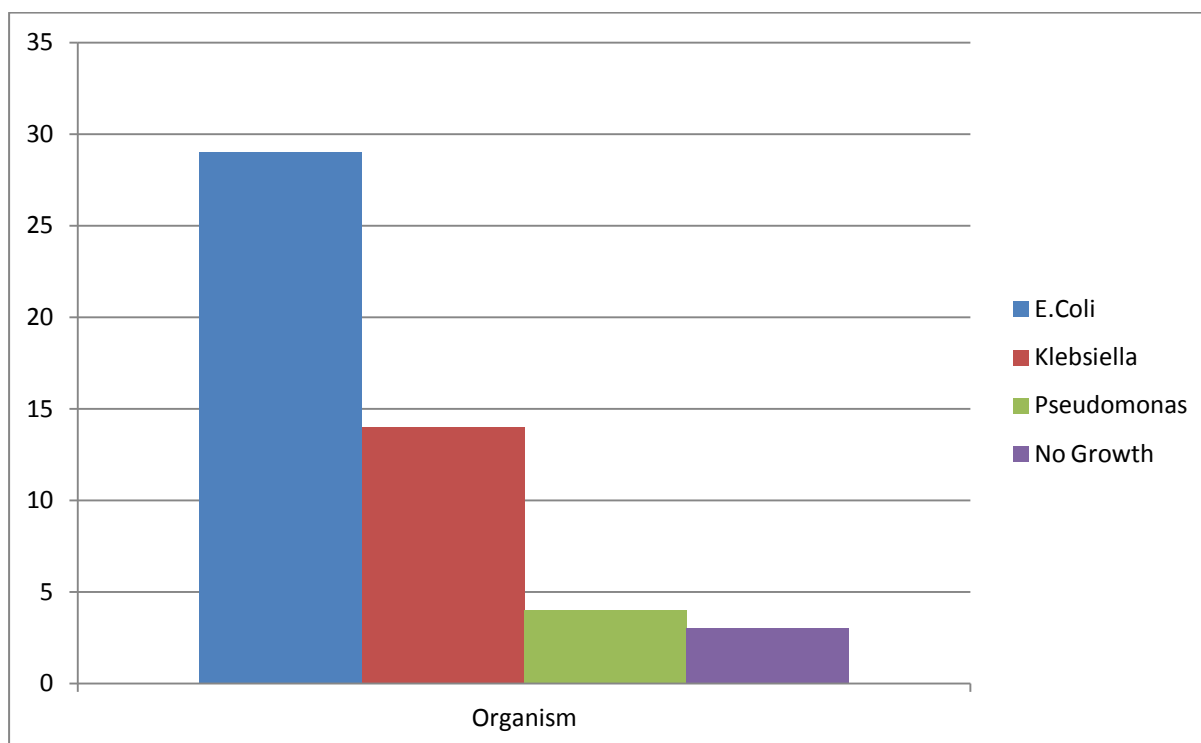


Figure 1: Diagnosis and etiology of Liver abscess

Antibiotic	Highly Sensitive	Intermediate Sensitive	Sensitive	Total
Penicillin/ Ampicillin	-	2	19	21
Amoxyclav	-	-	2	2
Ciprofloxacin/Ofloxacin	3	4	35	42
Cotrimoxazole	-	-	3	3
Doxycycline	1	1	2	4
Gentamycin	7	6	20	33
Amikacin	7	6	16	29
Cefotaxime/ Ceftriaxone	1	-	8	9
Cefoperazone+Sulbactam	16	2	22	40
Piperacillin+Tazobactam	14	2	26	42
Imipenam/ Meropenem	9	2	23	32
Cefazolin	2	-	2	4

Table 2: Antibiotic Sensitivity

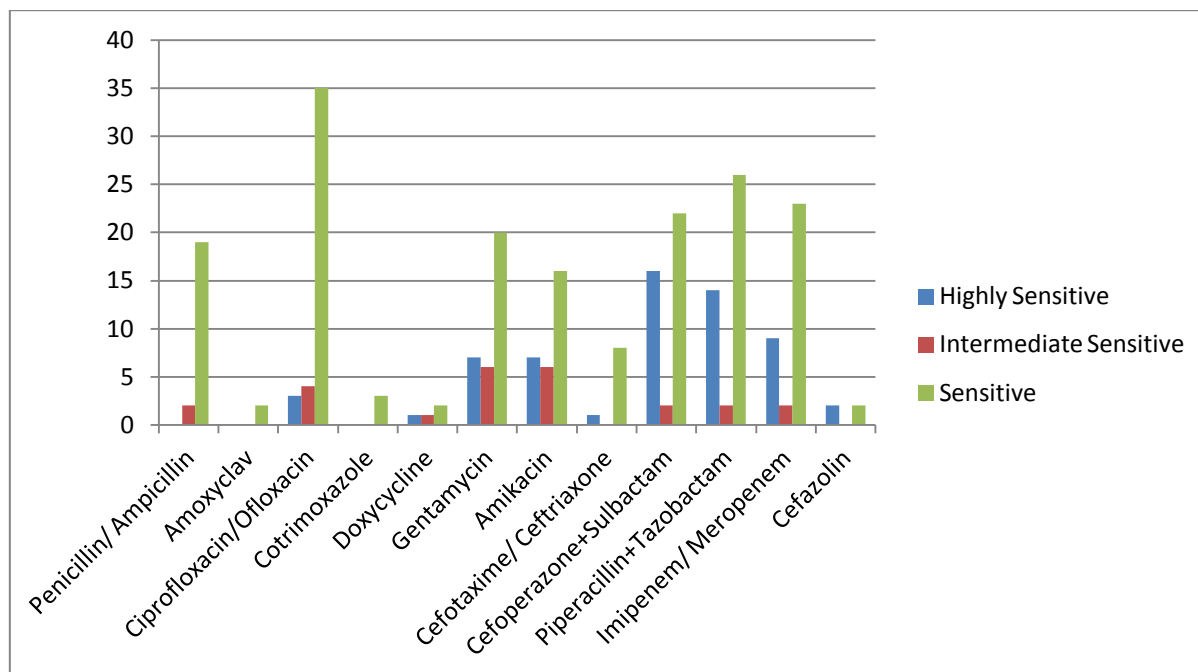


Figure 2: Antibiotic Sensitivity

Antibiotic	E.coli (n=29)	Klebsiella (n=14)	Pseudomonas (n=4)
Penicillin/ Ampicillin	15 (S)	4 (S) 2 (IS)	
Amoxyclav	2 (S)		
Ciprofloxacin/Ofloxacin	24 (S) 3 (IS) 1 (HS)	11 (S) 1 (IS) 2 (HS)	
Cotrimoxazole		3 (S)	
Doxycycline			2 (S) 1 (IS) 1 (HS)
Gentamycin	13 (S) 6 (IS)	7 (S) 7 (HS)	
Amikacin	10 (S) 6 (IS)	6 (S) 7 (HS)	
Cefotaxime/ Ceftriaxone	5 (S)		3(S) 1 (HS)
Cefoperazone+Sulbactam	13 (S) 1(IS) 14 (HS)	9 (S) 1 (IS) 2 (HS)	
Piperacillin+Tazobactam	14 (S) 1 (IS) 13 (HS)	12 (S) 1 (IS) 1 (HS)	
Imipenem/ Meropenem	16 (S) 2 (IS) 8 (HS)	4 (S)	3(S) 1 (HS)
Cefazolin			2 (S) 2 (HS)
	29	14	4

Table 3: Antibiotic sensitivity to different organisms

IV. Discussion

The patient profile, sociodemographic characteristics and management has changed substantially over the years for pyogenic liver abscesses. The median age is 49.5 years in the present study which is similar to the studies that are being reported worldwide⁵⁻¹⁷. Right side abscesses was more (62%) which is similar to the studies that reported right sided abscesses for 56%-71%^{5-9, 12,13,17}. Males were more in number (96%) which is similar to the existing literature⁵⁻¹⁷.

In this study, E.Coli was the common agent (58%) followed by Klebsiella (28%) and Pseudomonas (8%). This is different from the studies that report Klebsiella as the predominant agent¹⁸. Studies from Taiwan

and United States also report similar findings¹⁹⁻²⁰. The reason behind this difference is unknown and can be attributed to a number of factors.

Piperacillin/Tazobactam and Ciprofloxacin/Ofloxacin combinations were effective in 84% of the cases followed by Cefoperazone/Sulbactam in 80% of the cases. Gentamycin was effective in 66%, Imipenam/Meropenam in 64% and Amikacin in 58% of the cases.

V. Conclusion

All cases in this study resolved through medical management using appropriate antibiotics. None of them required surgical management. Therefore, early diagnosis, identifying the organism and a well-directed antibiotic for the organism is the mainstay of the treatment. Surgical treatment is required when medical management doesn't resolve the illness.

References

- [1]. Adams F., *The genuine works of Hippocrates*, 1886 New York W. Wood
- [2]. OCHSNER, I. (1938). A., DEBAKEY, M. and MURRAY, S. Pyogenic abscess of the liver. *Am. J. Surg.*, 40, 292-319.
- [3]. Civardi, G., Filice, C., Caremani, M., & Giorgio, A. (1992). Hepatic abscesses in immunocompromised patients: ultrasonically guided percutaneous drainage. *Gastrointestinal radiology*, 17(1), 175-178.
- [4]. Giorgio, A., Tarantino, L., Mariniello, N., Francica, G., Scala, E., Amoroso, P., ... & Rizzatto, G. (1995). Pyogenic liver abscesses: 13 years of experience in percutaneous needle aspiration with US guidance. *Radiology*, 195(1), 122-124.
- [5]. Pérez, J. A. A., González, J. J., Baldonado, R. F., Sanz, L., Carreño, G., Junco, A., ... & Jorge, J. I. (2001). Clinical course, treatment, and multivariate analysis of risk factors for pyogenic liver abscess. *The American journal of surgery*, 181(2), 177-186.
- [6]. Seeto, R. K., & Rockey, D. C. (1996). Pyogenic liver abscess changes in etiology, management, and outcome. *Medicine*, 75(2), 99-113.
- [7]. Branum, G. D., Tyson, G. S., Branum, M. A., & Meyers, W. C. (1990). Hepatic abscess. Changes in etiology, diagnosis, and management. *Annals of surgery*, 212(6), 655.
- [8]. Huang, C. J., Pitt, H. A., Lipsett, P. A., Osterman Jr, F. A., Lillemo, K. D., Cameron, J. L., & Zuidema, G. D. (1996). Pyogenic hepatic abscess. Changing trends over 42 years. *Annals of surgery*, 223(5), 600.
- [9]. Bissada, A. A., & Bateman, J. (1991). Pyogenic liver abscess: a 7-year experience in a large community hospital. *Hepato-gastroenterology*, 38(4), 317-320.
- [10]. Bertel, C. K., van Heerden, J. A., & Sheedy, P. F. (1986). Treatment of pyogenic hepatic abscesses: surgical vs percutaneous drainage. *Archives of Surgery*, 121(5), 554-558.
- [11]. Greenstein, A. J., Lowenthal, D., Hammer, G. S., Schaffner, F., & Aufses Jr, A. H. (1984). Continuing changing patterns of disease in pyogenic liver abscess: a study of 38 patients. *American Journal of Gastroenterology*, 79(3).
- [12]. BARNES, P. F., DE COCK, K. M., REYNOLDS, T. N., & RALLS, P. W. (1987). A comparison of amebic and pyogenic abscess of the liver. *Medicine*, 66(6), 472-483.
- [13]. Yang, C. C., Chen, C. Y., Lin, X. Z., Chang, T. T., Shin, J. S., & Lin, C. Y. (1993). Pyogenic liver abscess in Taiwan: emphasis on gas-forming liver abscess in diabetics. *American Journal of Gastroenterology*, 88(11).
- [14]. Wang, J. H., Liu, Y. C., Lee, S. S. J., Yen, M. Y., Chen, Y. S., Wang, J. H., ... & Lin, H. H. (1998). Primary liver abscess due to *Klebsiella pneumoniae* in Taiwan. *Clinical Infectious Diseases*, 26(6), 1434-1438.
- [15]. Neoptolemos, J. P., Macpherson, D. S., Holm, J., & Fossard, D. P. (1982). Pyogenic liver abscess: a study of forty-four cases in two centres. *Acta Chirurgica Scandinavica*, 148(5), 415-421.
- [16]. Mølle, I., Thulstrup, A. M., Vilstrup, H., & Sørensen, H. T. (2001). Increased risk and case fatality rate of pyogenic liver abscess in patients with liver cirrhosis: a nationwide study in Denmark. *Gut*, 48(2), 260-263.
- [17]. Yinnon, A. M., Hadas-Halpern, I., Shapiro, M., & Hershko, C. (1994). The changing clinical spectrum of liver abscess: the Jerusalem experience. *Postgraduate medical journal*, 70(824), 436-439.
- [18]. Land, M. A., Moinuddin, M. O. H. A. M. M. E. D., & Bisno, A. L. (1985). Pyogenic liver abscess: changing epidemiology and prognosis. *Southern medical journal*, 78(12), 1426-1430.
- [19]. Chang, S. C., Fang, C. T., Hsueh, P. R., Chen, Y. C., & Luh, K. T. (2000). *Klebsiella pneumoniae* isolates causing liver abscess in Taiwan. *Diagnostic microbiology and infectious disease*, 37(4), 279-284.
- [20]. Lau, Y. J., Hu, B. S., Wu, W. L., Lin, Y. H., Chang, H. Y., & Shi, Z. Y. (2000). Identification of a major cluster of *Klebsiella pneumoniae* isolates from patients with liver abscess in Taiwan. *Journal of clinical microbiology*, 38(1), 412-414.

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