

**Original Research Article****Clinical Profile And Microbiological Analysis Of Bile Among Patients With Cholangitis****<sup>1</sup>Dr. Amit Soni , <sup>2</sup>Dr. Shavi Nagpal**<sup>1</sup>Associate Professor ,Department of Gastroenterology, MMIMSR (Maharishi Markandeshwar Institute of Medical Sciences and Research)<sup>2</sup>Assistant Professor , Department of Microbiology, Medical Sciences and Research) , MMDU (Maharishi Markandeshwar Deemed to be University)**Corresponding author:Dr. Amit Soni**

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**ABSTRACT**

**INTRODUCTION:** Acute cholangitis is considered as a serious problem specially if not treated promptly. The knowledge of common microorganism causing cholangitis and their local susceptibility profile is needed to ensure that empirical antibiotics are appropriate to take care of life threatening cholangitis. Aim of this study was to identify the common microorganism grown in bile culture and their antibiotic susceptibility pattern.

**MATERIAL AND METHODS:** This is a retrospective study performed in the gastroenterology department of a tertiary care centre in North India. All patients who underwent first ERCP for cholangitis from March 2020 to February 2021 were included in this study.

**RESULTS:** A total of 67 patients were included in the study. Females dominated in the study with male to female ratio of 1:1.48. The mean age of the patient was 41.92 (s.d. 11.43) years. The most common presenting symptom was abdominal pain followed by fever and jaundice. In our study the commonest cause for acute cholangitis in our patients was CBD stone. Mono microbial Gram-negative organism was seen in the majority. Gram positive organisms were rare in bile culture. 38.8% of bile culture showed positive growth with poly microbial growth seen in 26.9% of patients. Most common organisms were pseudomonas and klebsiella. Multi drug resistant bacteria were seen very commonly.

**CONCLUSION:** In cases of cholangitis, bile culture has high positivity rate and it provides valuable information with regards to antibiotic susceptibility pattern.

**Keywords :** bile culture , Cholangitis , ERCP , CBD Stone

**INTRODUCTION**

Bile is formed in liver and from liver it reaches gallbladder. Bile is stored in gallbladder and once the person takes food the gallbladder is stimulated. Concentrated bile passes through the common bile duct and enters the duodenum. Normally the bile in the biliary system is sterile. This bile can be contaminated in situations like common bile duct stones, previous intervention in biliary system and malignant obstruction etc [1]. In scenario with bile duct obstruction, bacteria proliferate within this stagnant Bile and systemic infection occurs once this bacteria translocates into the blood circulation. Acute cholangitis is considered as a serious problem specially if not treated. It has a broad spectrum of presentation ranging from local biliary symptoms to systemic infections and multi organ dysfunction. Few studies have reported mortality as high as 10% among cases of acute cholangitis [2,3]. Early and definite management of cholangitis includes effective empirical antibiotic and relief of bile stasis. More than 50% of cases of cholangitis, blood culture is found to be negative. Choice of empirical antibiotic should be based on multiple factors including local susceptibility pattern, biliary penetration of anti-microbial agent, recent history of anti-microbial therapy, presence or absence of renal and hepatic failure etc [4]. With the rapid development of multi drug resistance, the choice of appropriate empirical anti-microbial becomes very difficult. To avoid super infection and emergence of anti-microbial resistance, one should switch from empirical antibiotic to specific narrow spectrum organisms specific antibiotic once the culture reports are available [4]. Studies have shown that the yield of bile culture is much better than blood culture in a patient with cholangitis [5]. The knowledge of common microorganism causing cholangitis and their local susceptibility profile is needed to ensure that empirical antibiotics are appropriate to take care of life threatening cholangitis. Aim of this study was to identify the common microorganism grown in bile culture and their antibiotic susceptibility pattern.

### Material and methods

This was a retrospective study performed in the gastroenterology department of a tertiary care center in North India. All patients who underwent first ERCP (endoscopic retrograde Cholangio Pancreatogram) for cholangitis from March 2020 to February 2021 were included in this study. Patients with age less than 18 years and those within completedata workex cludedfromthestudy. Patients details given in record sheets were included, including age, sex, presenting complaints, previous history of ERCP, recent antibiotic usage, associated commoditiesetc. Lab values including hemogram, liver function test, renal function test, blood sugar, bile culture and sensitivity pattern report, ERCP findings, imaging (ultrasound abdomen, CT abdomen, Magnetic resonance CholangioPancreatogram) reports were included. ERCP was performed using a duodenoscope and as per the guidelines, scope is disinfected after every procedure. All accessories used for ERCP are regularly sterilized using appropriate sterilizing methods. The culture is reported at 24 hours and 72 hours after inoculation for any growth. After achieving bile duct cannulation, bile was aspirated using a sphincterotome catheter. Approximately 5 ml of bile was collected and transferred in blood culture bottles. These blood culture bottles were then transported to microbiology department, where they were culture and identified according to standard protocol used in microbiology lab. Susceptibilities of the bacteria grown were identified using anti-microbial discs, chosen according to the initial gram stain of the positive bile cultures. Microorganisms in concentration more than 10000 per ml were considered as infections while lower concentration were accepted as contamination. Categorical data were presented as proportion. For qualitative data, frequency and percent distribution were calculated. Analysis was done using SPSS for Windows. P value of < 0.05 was considered significant.

### Results

A total of 67 patients were included in the study. Females dominated in the study with male to female ratio of 1:1.48. The mean age of the patient was 41.92 (s.d. 11.43) years. The most common presenting symptom was abdominal pain followed by fever and jaundice (Table 1). Benign etiology was the most common reason for acute cholangitis and common bile duct (CBD) stone was the most common reason (Table 2). Gram negative organisms were most commonly cultured from the bile. Out of 67 patients, 26 patients had growth in bile culture. 7 patients had growth of two microorganisms so a total of 33 microbial growths were obtained. The commonest organism found was Pseudomonas as shown in table 3. Out of 33 microbial growths obtained from 26 positive bile cultures in our study, 31 were gram negative bacterial growth and 2 patients had gram positive growth. In our study, polymyxins (colistin and polymyxin B) followed by meropenem / imipenem had the highest sensitivity to gram negative bacteria (Table 4).

SYMPTOMS	Number (%)
Abdominal pain	58 (86.5%)
Fever	42 (62.6%)
Jaundice	35 (52.2%)
Vomiting	22 (32.8%)
Anorexia	25 (37.3%)
Generalised weakness	20 (29.8%)

Table 1 – Various symptoms noted in patients with cholangitis

Etiology	Number(%)
CBD stone (incl mirizzi's syndrome)	42
CHRONIC PANCREATITIS	6
BILIARY STRICTURE - POST SURGERY	5
PERIAMPULLARY CARCINOMA	7
PANCREATIC HEAD CANCER	5
CHOLANGIOCARCINOMA	2
	67 (100)

Table 2 – Etiology of Biliary obstruction among patients who underwent ERCP

Organism	No of isolates (%)
<i>Pseudomonas</i>	17 (51.5)
<i>Klebsiella</i>	7 (21.2)
<i>Escherichia coli</i>	4 (12.1)
<i>Staph aureus</i>	2 (6)
<i>Enterococcus faecalis</i>	1 (3)
<i>Acinetobacter baumannii</i>	1 (3)
<i>Enterobacter aeruginosa</i>	1 (3)

TABLE :3 Various organisms grown in bile among patients with cholangitis

MEROPENAM	77.4
IMIPENAM	70.9
PIPERACILLIN -TAZOBACTEM	64.5
AMIKACIN	58.0
GENTAMICIN	51.6
LEVOFLOXACIN	48.3
CIPROFOXACIN	48.3
COTRIMOXAZOLE	60
AMPICILLIN	32.2
AMOXYCLAV	40
CEFTRIAZONE	40

Table 4 - Antibiotic Sensitivity Pattern among Gram Negative Organisms

### Discussion

This study is the retrospective analysis of microbiological profile of patients with acute cholangitis. The mean age of the patient was 41.92 (s.d. 11.43) years and male to female ratio was 1:1.48. The most common presentation was fever followed by pain abdomen in our study. Similar clinical presentation was seen in other studies too. The most common cause of cholangitis was CBD stone followed by malignant obstructive jaundice.

In study by K Sharma et al, bile culture positivity rate was 26.47% [6]. However this bile culture positivity rate was higher in our study that is 38.8%. The reason for high positivity rate in our bile culture could be that bile culture was collected for patients who had cholangitis. In the study by K Sharma et al, the commonest organism isolated was *E coli* followed by *pseudomonas* [6]. In their study gram Negative organisms predominated and only handful of Gram-Positive organisms were isolated. Our results differ as the commonest organism isolated was *pseudomonas* followed by *klebsiella*. *E coli* was the third commonest organism isolated. Our results match in a way to K Sharma et al study, as in our study also gram-negative organisms were much more common than Gram Positive organisms. In our study, 7 patients had more than one organism growth in bile culture. The enteric Gram-Negative aerobes are the most common cultured bacteria from bile in various studies. One plausible reason for these organisms causing bile duct infection that these organisms are commonly present in intestine also and in disease state, they are able to enter the bile and grow easily. In one study from Japan the

bacteriological findings indicated very high incidence of poly microbial infection that is 86.9% [7]. This percentage is very high as compared to our study. One difference with regards to our study is that we took treatment naïve (first ERCP) cases only. In the study by SM Shenoy et al, a total of 54% of bile samples were positive for Aerobic cultures [8]. This percentage of bile culture positivity nearly matches with our results. With regard to the polymicrobial infection, S M Shenoy et al, concluded 31.5 % positivity. This poly microbial positivity rate is very much similar to what we have seen in our study, that is 26.9%. Similar to our study, in study by S M Shenoy also, Pseudomonas was the commonest microorganism cultured from bile [8]. In the study by Philipp A Reuken, bile cultures were predominantly poly microbial and MDR bacteria were isolated from 29% patients [9]. They also concluded that empirical antibiotic therapy did not cover the full biliary pathogen spectrum in 78% of cases. Authors found that biliary stenting was the only independent risk factor according to multivariate analysis. The reason for poly Microbial growth study could be because they included patients with previous ERCP also. In our study patients with previous biliary stent were not included thereof probably poly microbial growth was not predominant. In a study by Dr Rakesh Neve et al, approximately one fourth of patients with malignant obstructive jaundice had positive bile culture at initial ERCP [10]. The most commonly found organisms in infected bile were gram negative aerobes like E coli, klebsiella, and proteus. In our study there was high resistance found to ampicillin, ceftriaxone, amoxicillin-clavunate and quinolones. In the study by Kaya M et al, high resistance was seen with gentamicin, ciprofloxacin, levofloxacin, ampicillin, cefotaxime and ampicillin/sulbactam [11]. The spectrum of resistance pattern nearly matches with our study. We did not study anaerobic culture / fungal culture in our study and a smaller size of patients were the limitations of our study. In our study the commonest cause for acute cholangitis in our patients was CBD stone. Mono microbial Gram-Negative organism was seen in the majority. Gram positive organisms were rare in bile culture. 38.8% of bile culture showed positive growth with poly microbial growth seen in 26.9% of patients. Most common organisms are pseudomonas and klebsiella. Multi drug resistant bacteria were seen very commonly.

### Conclusion

In cases of cholangitis, bile culture has high positivity rate and it provides valuable information with regards to antibiotic susceptibility pattern.

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