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A study to assess the bactibilia among patients with obstructive jaundice in tertiary care centre

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ABSTRACT

Aim

The present study intended to analyze and assess the bacterial growth in bile culture among patients with obstructive jaundice in tertiary health care hospital and to know its antibiotic sensitivity.

Materials and Methods

A retrospective study on a total of 30 patients with a case of obstructive jaundice. Bile samples collected from patients were cultured by standard microbiological methods and sensitivity to common antibiotics assessed as per national committee for clinical laboratory standards [NCCLS] guidelines. The bacterial growth in bile culture and its bacterial sensitivity were analyzed.

Results

Of the total 30 patients presenting to hospital and included in study retrospectively, 16 were male and 14 were female. Bacteria were isolated in 21 of 30 bile sample (B+) while 9/30 patients were bile culture negative (B-). Bactibilia is found more often in benign causes of obstructive jaundice than in malignant condition. Gram negative bacilli were isolated in 17 samples (81%) [E.coli 7(33%), Pseudomonas 1 (5%), k.pneumoniae 1(23%), Proteus 1(5%), Citrobacter 1(5%), Acinetobacter (5%), Providencia stuartii 1 (5%)]. And Gram positive cocci isolated in 4 samples (19%) [Enterococcus 3 (14%), streptococcus 1 (5%)]. Gram negative bacilli were sensitive to Amikacin, Piperacillin-tazobactam, Carbapenems like imipenem, ertapenem etc. but show resistance to third generation cephalosporins like ceftazidime, ceftizoxime, Cefotaxime and fourth generation cephalosporins like cefepime. Gram positive cocci were more sensitive to Amoxicillin, Vancomycin .

Conclusion

Bacteribilia is seen in 70% of bile samples. Gram negative bacteria like E.coli, k.pneumoniae, Pseudomonas, Proteus, Acinetobacter and Gram positive organism like Enterococcus and Streptococcus were commonly found in bile exudate. Gram negative bacteria showed resistance to third generation cephalosporins like ceftazidime, ceftizoxime, Cefotaxime and fourth generation cephalosporins like cefepime

INTRODUCTION

Bile is usually sterile in healthy individuals, however, in the presence of gallstones in the gallbladder or biliary ducts or any cause for obstructive jaundice, it could be colonized with bacteria (bactobilia). Bile duct obstruction leads to increase in intra biliary pressure, infection of bile, cholangiovenous and cholangiolymphatic reflux leading to bacteremia [1]. In addition the jaundice associated with biliary obstruction causes decreased kupffer cell. In the presence of gallstones within gallbladder or the biliary tree, the positive cultures are being increased. The bacteria commonly found in biliary tract infection include *Escherichia coli*, *klebsiella pneumonia*, *Pseudomonas*, *Enterococcus* [2]. The presence of bacteria in bile (bactobilia) in case of biliary obstruction can progress to cholangitis and septicaemia. Cholangitis is more common in partial biliary obstruction. The frequency of bactobilia, its chances of progressing to clinical cholangitis, the spectrum of bacteria that infect bile and their sensitivity to antibiotics are important for patient management. Bacterial spectrum and antibiotic sensitivity may vary in patients according to etiology of obstruction, concomitant or prior use of antibiotics and prior intervention of biliary system. In some studies, bactobilia has been shown to be a risk factor predisposing to postoperative infectious complications, which are one of the most important concerns of surgeons, especially in laparoscopic surgery [3]. Detecting bactobilia could be valuable for planning the antibiotic prophylaxis and treatment of postoperative infections. Therefore, the aim of this study was to determine the nature of

bacteria in bile and their antimicrobial susceptibility in patients with obstructive jaundice

MATERIAL AND METHODS

A retrospective study done between the year 2017 and 2018, 30 consecutive patients with obstructive jaundice admitted to the gastroenterology ward of saveetha medical college and hospital were included. Bacteria growing from subcultures were identified by using standard microbiological tests including gram staining and biochemical profiles. Antibacterial susceptibility was determined according to the standard disk diffusion (Kirby-Bauer) method, Antibacterial susceptibility pattern was interpreted, as recommended by clinical laboratory standards institute (CLSI). Patients were stratified in to bile culture positive (B+) and bile culture negative (B-) groups according to the presence and absence of bacteria in bile. Statistical analysis is done using MS Excel

RESULTS

A total of 30 participants, 14 women and 16 men were included. In 30 bile samples collected, 21 samples (70%) were shown to have bacterial isolates and 9(30%) samples showed no bacterial growth. Of the 30 samples studied, 23 had benign disease (cholelithiasis 9, stricture 3, acute calculus cholecystitis 6, gall bladder empyema 4, choledochal cyst 1) and 7 had malignant disease (cholangiocarcinoma 4, gall bladder carcinoma 1, carcinoma of head of pancreas 1, hepatocellular carcinoma 1). Bactobilia is found more often in benign disease than in malignant disease. (Table 1)

Table 1

Patient characteristics	Bile culture + (n=21)	Bile culture - (n=9)
Sex(m/f)(16/14)	15/6	1/8
diagnosis		
Cholelithiasis	5	4
Bile duct stricture	3	0
Acute calculus cholecystitis	4	2
Gall bladder empyema	3	1
Choledochal cyst	0	1
Cholangiocarcinoma	4	0
Gall bladder carcinoma	1	0
Ca of head of pancreas	1	0
Hepatocellular ca	0	1

Bile culture was done in 30 samples and bacteribilia detected in 21 samples [70%]. Most frequently gram negative bacilli were seen (81%). Gram negative bacilli were isolated in 17 samples [81%] and gram positive cocci in 4 samples [19%]. The gram negative organism obtained are E.coli 7

(33%), Pseudomonas 1 (5%), k.pneumoniae 5 (23%), Citrobacter 1(5%), Proteus 1(5%), Acinetobacter 1(5%), Providencia stuartii 1 (5%). The Gram positive organism (19%) obtained are Enterococcus 3 (14%) And Streptococcus 1(5%) (Table 2)

Table 2: showing microorganism isolated from bile

ORGANISM	NUMBER OF ISOLATES	%
GRAM NEGATIVE BACILLI	17	81%
ESCHERICHIA COLI	7	33.3%
KLEBSIELLA SP	5	23.2%
PSEUDOMONAS	1	4.7%
CITROBACTER	1	4.7%
PROTEUS	1	4.7%
ACINETOBACTER	1	4.7%
ENTEROBACTER	0	
PROVIDENCIA SP	1	4.7%
SALMONELLA	0	
MORGNELLA	0	
GRAM POSITIVE COCCI	4	19%
ENTEROCOCCUS	3	14.2%
STREPTOCOCCUS	1	4.7%
STAPHYLOCOCCUS	0	

E.coli are commonly found in case of acute calculus cholecystitis, gall bladder empyema and

cholangiocarcinoma. K.pneumoniae is mostly found in cholelithiasis (table 3)

Table 3: Comparison of biliary bacterial spectrum in different group of patients

Group of patients	E.c oli	k.pneum oniae	Pseudom onas	Prot eus	Citroba cter	Provide ncia	Acinetob acter	Enteroco ccus	Streptoc occus
Cholelithiasis (n=9)	1	2		1				1	
Bile duct stricture(n=3)		1			1			1	
Acute calculus cholecystitis (n=6)	2	1	1						
Gall bladder empyema (n=4)	2							1	
Choledochal cyst (n=1)									
Cholangiocarci nomam (n=4)	2					1			1
Gall bladder ca(n=1)		1							
Ca of head of							1		

pancreas (n=1)
Hepatocellular
ca (n=1)

Bacteriological profile of bile culture showed that 4 strains of E.coli and 2 strains of k.pneumoniae were sensitive to Amikacin, Gentamicin. All strains of Gram positive organism were sensitive to Vancomycin. All strains of Pseudomonas and Acinetobacter were sensitive to Polymyxin B. 4 strain of E.coli, 3 strain of k.pneumoniae, all strain of Acinetobacter, Streptococcus were sensitive to piperazillin-tazobactam. Only 1 strain of E.coli and k.pneumoniae were sensitive to Cefepime and Tigecyclin. 4 strain of E.coli, 2 strain of

k.pneumoniae and all strains of Proteus, Providencia sp, and Streptococcus were sensitive to Cefotaxime. 2 strains of E.coli and k.pneumoniae were sensitive to Ciprofloxacin. Only 1 strain of k.pneumoniae was sensitive to Streptomycin, Imipenem, Ertapenem, Meropenem, Linezolid. 2 strain of E.coli and all strain of Citrobacter and Proteus were sensitive to Imipenem.. All strain of Streptococcus were sensitive to Ciprofloxacin, Imipenem, Cotrimoxazole, Meropenem, Amoxicillin. Also Only 2 strains of Enterococcus are sensitive to Penicillin (table 4).

Table 4

Antibiotics	E.coli (n=7)	K.pneumoniae (n=5)	Pseudomonas (n=1)	Citrobacter (n=1)	Proteus (n=1)	Acinetobacter (n=1)	Providencia (n=1)	Enterococcus (n=3)	Streptococcus (n=1)
Amikacin	57%	40%	-	-	-	-	-	-	100%
Vancomycin	-	-	-	-	-	-	-	100%	100%
Gentamicin	57%	40%	-	-	-	-	-	100%	-
Polymyxin B	-	-	100%	-	-	100%	-	-	-
piperazillin-tazobactam	57%	60%	-	-	-	100%	-	-	100%
Cefepime	14%	20%	-	-	-	-	-	-	-
cefotaxime	57%	40%	-	-	100%	-	100%	-	100%
Ciprofloxacin	28%	40%	-	-	-	-	-	-	100%
Streptomycin	-	20%	-	-	-	-	-	-	-
Imipenem	28%	20%	-	100%	100%	-	-	-	100%
Ertapenem	-	20%	-	-	-	-	-	-	-
Cotrimoxazole	57%	-	-	-	-	-	-	-	100%
Colistin	14%	60%	100%	-	-	100%	-	-	-
Linezolid	-	20%	-	-	-	-	-	66%	-

Meropenem	-	20%	-	-	-	-	-	-	100%
Tigecycline	14	20%	-	-	-	-	-	-	-
Penicillin Amoxicillin	-	-	-	-	-	-	-	66%	-
in	14	%						66%	100%

DISCUSSION

In the present study the bile of 30 consecutive patients were studied retrospectively for the presence of bactibilia, to know their antibacterial sensitivity and to know the bacterial growth in bile culture. In the study by Leung JW et al [4] The most common organism found in infected bile were Gram negative organism like E.coli, Pseudomonas, klebsiella, and Proteus, similar results were found in our study which revealed E.coli [33%], Pseudomonas [5%], Klebsiella [23%], Citrobacter [5%], Proteus [5%]. Gram positive isolates are increasing in frequency; our study revealed 17% isolates were GPC. In our study E.coli was isolated in maximum number [n=7] followed by k.pneumoniae [n=5], Enterococcus [n=3], Proteus [n=1], Pseudomonas [n=1]. Citrobacter [n=1], Streptococcus [n=1] and providencia sp [n=1]. One study from India has confirmed similar findings of bacterial spectrum and antibiotic sensitivity [4]

The better knowledge about the nature of bacteria in bile and their antimicrobial susceptibility patterns could play an important role in the proper selection of antibiotics for prophylaxis, especially in high-risk patients [3]. Bacteria can colonize bile easier in case of prolonged bile duct obstruction, thus, it is not surprising that gram-negative enteric bacteria, especially *E. coli*, are the most common bacteria causing bactobilia in many studies including ours [3]. In our study, imipenem and amino-glycosides, especially amikacin, were the most effective antibiotics. Third-generation cephalosporins such as cefotaxime, which have been reported to be effective in antibiotic prophylaxis, had good activity against 75% of the isolates in this study. Cefepime a 4th generation cephalosporins,, it had

lesser activity than 3rd generation cephalosporins in the present study. Oral gyrase inhibitor antibiotics such as Ciprofloxacin reported to be feasible and safe for perioperative antibiotic prophylaxis in LC in a randomized double-blinded clinical trial and had a moderate activity against isolated gram-negative bacteria in our study. Colistin was also effective; however, it should be reserved for the treatment of nosocomial infections caused by multi-resistant gram-negative bacteria [3]

Gram negative isolates were most sensitive to Amikacin, Carbapenems like Imipenem, Meropenem, Ertapenem and Piperacillin-tazobactam. And gram positive isolates were sensitive to vancomycin and amoxicillin. Bile culture was positive more often in benign disease than in malignant causes of obstructive jaundice. We found higher frequency of e.coli in acute calculus cholecystitis, gall bladder empyema and cholangiocarcinoma. Klebsiella was most often found in cholelithiasis. Enterococcus were seen in bile duct stricture.

CONCLUSION

Bacteribilia is seen in 70% of bile samples. It is more common in those with benign etiology. Gram negative bacilli are found more often than gram positive cocci

The gram negative organism like e.coli, klebsiella, proteus, pseudomonas and gram positive cocci like enterococcus and streptococci were commonly seen. Gram negative isolates were sensitive to amikacin, carbapenems, piperacillin-tazobactam. Gram positive cocci were more sensitive to amoxicillin and vancomycin

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