



E-ISSN: 2616-3470
P-ISSN: 2616-3462
© Surgery Science
www.surgeryscience.com
2019; 3(4): 144-147
Received: 09-08-2019
Accepted: 13-09-2019

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Clinical analysis of intraoperative bile in shepatopancreatic and biliary surgeries

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DOI: <https://doi.org/10.33545/surgery.2019.v3.i4c.232>

Abstract

Introduction: Around the globe among the commonest performed surgeries the hepaticopancreatic and biliary surgeries are one of them. However these are still associated with serious infections. The presence of bacteria at the time of surgery predisposes to septic complications.

Materials and Methods: This study was a prospective study conducted in Department of Surgical Gastroenterology at Sher-i-Kashmir Institute of Medical Sciences from September 2016 to September 2018.

Results: The most common age group in our study included middle aged patients i.e 35-44 years of age, out of 50 patients 62% had positive intraoperative bile culture. The most common organism found in our study was: E coli and k. pneumonia in 33.9%, E coli and Enterococcus faecalis 21%, The monomicrobial infection was due to E coli 11.3%, Preoperative stented patients had 88% of bactibilia.

Conclusion: The preoperative biliary stenting is associated with increased risk of bactibilia and bactibilia leads to increase in postoperative morbidity in pancreatic biliary surgeries. E coli and kleibSELLA predominated in bile. Similar microorganisms predominate in wound cultures and intraabdominal collections. E coli were found to be resistant to most of the commonest drugs.

Keywords: bactibilia, hepatobiliary, *E. coli*

Introduction

Around the globe among the commonest performed surgeries the hepaticopancreatic and biliary surgeries are one of them. However these are still associated with serious infections. The presence of bacteria at the time of surgery predisposes to septic complications^[1]. The reported incidence of bacteria in bile is extremely variable 8% - 42%^[2]. Preventing postoperative infection is an essential factor in improving the results of surgical procedures and so several authors have been able to correlate the bacteria cultured from bile at operations with those subsequently causing wound infections and septicemia in postoperative period^[3]. In order to curtail the incidence of post-operative infections it's routine to put every hepatobiliary surgery for routine bile culture at the time of surgery^[4].

Materials and Methods

This study was a prospective study conducted in Department of Surgical Gastroenterology at Sher-i-Kashmir Institute of Medical Sciences from September 2016 to September 2018. A total of 50 patients were included in study. A thorough general physical examination was made. Baseline blood investigations and Radiological investigations were done.

Cultures: Intraoperative bile was taken from common bile duct before any surgical intervention using a sterile disposable syringe. About 5ml of bile was collected in sterile 10ml syringe and was sent to microbiology department immediately for aerobic and anaerobic cultures.

Aims and Objectives

To study the bile culture results in major hepatopancreatic and biliary surgeries and to look for microorganism involved and their antibiotic sensitivity pattern.

Inclusion criteria

- Patients undergoing major hepatopancreatic and biliary surgeries done electively with consent.

- Majority of patients included were periampullary carcinoma patients including carcinoma of head of pancreas, cholangiocarcinoma.
- Hepatic resection surgeries for oriental cholangiohepatitis, hepatocellular carcinoma, liver metastasis.
- Repair procedures related to bile duct injury.
- Surgeries related to biliary stone disease like cholidocholithiasis and cholidochal cyst.
- Any patient with previous stent placed qualifying other inclusion criteria were also included.

Exclusion criteria

- Emergency operation performed for cholangitis and sepsis syndrome.
- Simple cholecystectomy.
- Any Hepatopancreatic and biliary malignancy already on neoadjuvant treatment.
- Immunocompromised patients.

Results

Age distribution: The most common age group in our study included middle aged patients i.e. 35-44 years of age. The youngest being 15 years of age and eldest being 65 years of age

Table 1: Type of frequency

Age (Years)	Frequency
15-24	5
25-34	8
35-44	15
45-54	10
55-64	5
≥ 65	7
Total	50

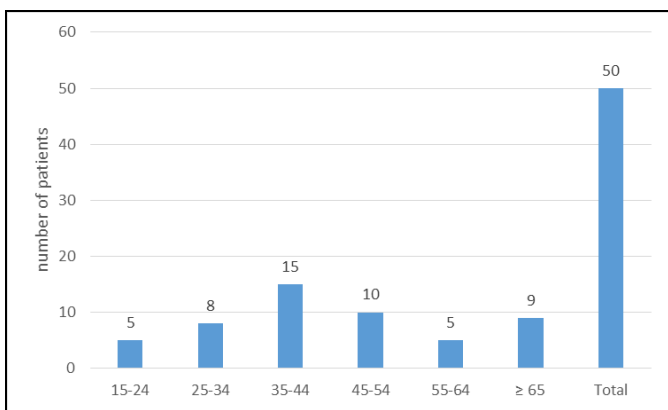


Fig 1: Showing age distribution

2. Gender distribution: The percentage of females was slightly more than males.

Table 2: Gender distribution

Gender	Frequency
Male	21
Female	29
Total	50

3. Clinical symptoms at presentation: The patients were evaluated and studied for various symptoms. The most common disease in study group was periampullary carcinoma, presented as jaundice and pain abdomen. 19% of patients were asymptomatic were diagnosed incidentally on imaging.

Table 3: Clinical symptoms at presentation

Clinical symptoms	Frequency
Pain abdomen	11
Jaundice and Pruritus	19
Pain abdomen, jaundice and pruritus	10
Asymptomatic	10
Total	50

4. Distribution of study patients as per diagnosis: The most common presenting disease was periampullary carcinoma in the study group present in 26 of patients. Cholidocholithiasis was diagnosed in 7 patients, oriental cholangiohepatitis (OCH) in 3of patients, cholidochal cyst (CDC) in 3 of patients, common bile duct injury (CBD) in 3, chronic calcific pancreatitis and extra hepatic biliary obstruction (CCP and EHBO) in 7 of patients and uncinete process mass in 1 of patients.

Table 4: Distribution of study patients as per diagnosis

Diagnosis		Frequency
Periampullary Carcinoma	Carcinoma head of pancreas	12
	Cholangiocarcinoma	14
Choledocholithiasis		7
OCH		3
CDC		3
CBD Injury		3
CCP and EHBO		7
Uncinate process mass		1
Total		50

5. Surgical procedure: The patients diagnosed as periampullary carcinoma underwent pylorus preserving pancreaticoduodenectomy. The patients diagnosed as cholidocholithiasis underwent cholecystectomy with common bile duct exploration. The patients diagnosed as oriental cholangiohepatitis underwent cholecystectomy with left lateral segmentectomy. The patients diagnosed as cholidochal cyst underwent excision of cyst with Roux-en-y hepaticojejunostomy. The patients diagnosed as common bile duct injury underwent Roux-en-y hepaticojejunostomy. The patients diagnosed as chronic calcific pancreatitis underwent Frey’s procedure.

Table 5: Surgical procedure

Surgical Procedure	Frequency
PPPD	25
Cholecystectomy with CBD exploration	8
Cholecystectomy with left lateral segmentectomy	3
Excision of cyst with Roux-en-y HJ	4
Roux-en-y HJ	3
Frey’s procedure	7
Total	50

6. Intraoperative bile culture: The intraoperative bile culture was found to be positive in 62% of patients in our study group

Table 6: Showing intraoperative bile culture in study patients

Bile Culture	Frequency	Percentage
Positive	31	62%
Negative	19	38%
Total	50	100%

7. Bile culture results: The patients with common bile duct stent had more of bactibilia. This is in concordance with previous studies.

Table 7: Showing bile culture results in patients with preoperative intervention

Type of intervention	Bile Culture Positive %age	Bile Culture Negative %age
ERCP	63.4	36.6
CBD Stent	88.0	12.0
PTBD	72.7	27.3

8-Microorganism involved in positive bile culture- The most common microorganisms found in bile were E coli and klebsiella, 33.9% of patients. The polymicrobial infection was commonest.

Table 8: Microorganism involved in positive bile culture

Organism Involved	Frequency
E coli and K. Pneumonia	21
E coli and Enterococcus faecalis	13
Enterococcus faecalis and K. oxytocia	16
<i>P. aerogenosa</i> and E coli	5
E coli	7

9-Microorganism cultured from stent in study patients- among was *E. Coli*. various organisms were isolated from stents the most common

Table 9: Microorganism cultured from stent in study patients

Organism Involved	Frequency	Percentage
E coli and K. Pneumonia	6	24.0
E coli and Enterococcus faecalis	7	28.0
K. Oxytocia and E coli	5	20.0
E coli	2	8.0
<i>P.aerogenosa</i> and E coli	5	25.0
Total	25	100

10. Antibiotic sensitivity pattern of microorganism

Table 10: Antibiotic sensitivity pattern of microorganism

Organism	Sensitivity	No.	%age
E coli	Polymixin B	55	88.7
	Amikacin	54	87.1
	Gentamycin	50	80.6
	Tigecycline	49	79.0
	Imipenem	43	69.4
K. Pneumonia	Piperacillin and Tazobactam	59	95.2
	Amikacin	56	90.3
	Ceftriaxone	55	88.7
	Imipenem	53	85.5
	Meropenem	54	87.1
Enterococcus faecalis	Ampicillin	59	95.2
	Ampicillin and sulbactam	60	96.8
	Piperacillin and Tazobactam	53	85.5
	Ticarcillin	57	91.9
	Vancomycin	53	85.5
<i>P.aerogenosa</i>	Polymixin B	62	100

11. Resistance pattern of microorganism

Table 11: Resistance pattern of microorganism:

Organism	Resistance	Frequency	Percentage
E coli	Piperacillin and Tazobactam	59	95.2
	Levofloxacin	55	88.7
	Cefoperazone	60	96.8
	Tetracycline	57	91.9
K. Pneumonia	Ciprofloxacin	53	85.5
	Ampicillin and sulbactam	60	96.8
	Tetracycline	53	85.5
Enterococcus faecalis	Levofloxacin	61	98.4
<i>P. aerogenosa</i>	All	-	-

Discussion

The study entitled Clinical Analysis of Intraoperative Bile in Hepatopancreatic and Biliary Surgeries was a prospective study conducted in Department of Surgical Gastroenterology at Sheri-Kashmir Institute of Medical Sciences. The study was conducted from September 2016 to September 2018. A total of 50 patients were included in study. Mean age of the patients was 39+10.3 [TABLE-1, FIGURE-1]. Most of the patients presented with more than one symptom. The most common being jaundice with pruritus in 38%, Pain abdomen in 22% of patients, pain abdomen, jaundice and pruritus 21%. 19% of patients were asymptomatic, detected incidentally [TABLE-3]. Out of 50 patients periampullary carcinoma in the study group present in 26 of patients. Cholidocholithiasis was diagnosed in 7 patients, oriental cholangiohepatitis (OCH) in 3 of patients, cholidochal cyst (CDC) in 3 of patients, common bile duct injury (CBD) in 3, chronic calcific pancreatitis and extra hepatic biliary obstruction (CCP and EHBO) in 7 of patients and uncinat process mass in 1 of patients [Table-4]. In our study out of 50 patients 62% had positive intraoperative bile culture. The most common organism found in our study was: E coli and k. pneumonia in 33.9%, E coli and Enterococcus faecalis 21%, The monomicrobial infection was due to E coli 11.3% [Table-8] Jethwa P, *et al* [5] conducted study on 331 patients undergoing hepato pancreatic and biliary surgery. The most common organism cultured in bile were Coliforms and Enterococcus. Saulius Grizas (2005) [6] studied etiology of bile infection and its association with postoperative complication following pancreaticoduodenectomy. They found 70% of patients had polymicrobial infection. The most common organism found was E coli that were found to be multidrug resistant [Table-10], showing resistance to most of the common antibiotics like Piperacillin, Tazobactam, levofloxacin, Cefoperazone, Tetracycline on the other hand pseudomonas aerogenosa was found to be resistant to all broad spectrum antibiotics and sensitive to Polymixin-B only. K pneumonia was found to be sensitive to Piperacillin and Tazobactam, Amikacin, Ceftriaxone. Enterococcus faecalis was found to be sensitive to Piperacillin and Tazobactam, Ticarcillin, Vancomycin. Preoperative intervention and bile culture results: The preoperative biliary drainage was done to relieve obstruction in periampullary carcinoma and endoscopic retrograde cholangiography as diagnostic tool. In 41% ERCP was done 25% had stent and 11% had PTBD in place. Preoperative stented patients had 88% of bactibilia. This is in concordance with the study of Jethwa P *et al* [5]. In his study he found stented patients had significantly increased rates of bactibilia i.e 85%. In our study we have found that intervention group [Table-7, 9] had increased risk of bactibilia compared to nonintervention group. Out of 50, 77% of patients had undergone preoperative intervention. 72.7% of patients had bactibilia in intervention group compared to nonintervention group where only 26.1 % had bactibilia. Thus showing intervention increases risk of bactibilia with significant difference p-value <0.001. The Preoperative biliary drainage significantly increases the rate of bactibilia are in accordance with the following studies: Povoski *et al* (1999) [7], studied association of preoperative biliary drainage with postoperative outcome following Pancreaticoduodenectomy. They retrospectively analyzed 161 patients undergoing pancreaticoduodenectomy in whom intraoperative bile cultures were performed. Microorganisms were isolated from 58% of these intraoperative bile cultures, with 70% of them being polymicrobial. Hochwald SN *et al* (1999) [8] studied association of preoperative biliary stenting with postoperative

complication. They found patients with stent had a significantly increased risk for bacterobilia (p=.001).

Conclusion

- In our study we have found middle aged females were mostly affected with hepatopancreatic and biliary diseases.
- The preoperative biliary stenting is associated with increased risk of bactibilia and bactibilia leads to increase in postoperative morbidity in pancreatic biliary surgeries. Thus preoperative biliary stenting should be done in selective patients.
- The preoperative intervention group should be considered potentially infected, requires careful operative technique to avoid spillage of bile on wound surfaces to decrease infection rates and morbidity.
- In intervention group judicious use of antibiotics may help to decrease postoperative morbidity. Patients with risk factors should receive prophylactic antibiotics covering endogenous gram negative organisms which should be modified in postoperative phase according to the results of antibiotic sensitivity patterns.
- Gram-negative bacilli predominate in biliary tree. The polymicrobial infection being the commonest. E coli and kleibella predominated in bile. Similar microorganisms predominate in wound cultures and intraabdominal collections. E coli were found to be resistant to most of the commonest drugs.

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