

Response of Microflora of Gall Bladder Bile to Antibiotics in Patients Undergoing Laproscopic Cholecystectomy

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How to cite this article:

Prabhu T., Chandan C.S., Sudarsan S.. Response of Microflora of Gall Bladder Bile to Antibiotics in Patients Undergoing Laproscopic Cholecystectomy. *New Indian J Surg.* 2018;9(5):611-15.

Abstract

Background: Cholelithiasis is a benign disease of the biliary tract is one of the most common indications for major abdominal surgery in India. The most prevalent complication of gallstone is chronic cholecystitis occurs in approximately 4% of cases. Cholelithiasis or gallstones are quite common in adults. Antibiotic prophylaxis in biliary surgery, when correctly used, has led to the reduction in postoperative infections. Cephalosporins are one of the most commonly prescribed agents for surgical prophylaxis because of their favourable pharmacokinetic profiles, low incidence of adverse effects and low costs **Methods:** Minimum of 50 Patients admitted under General Surgery, who are scheduled to undergo laparoscopic cholecystectomy. Five ml of bile will be aspirated from the gall bladder during laparoscopic cholecystectomy. The samples will be transferred onto a plain sterile container and then transferred at room temperature in an hour to the laboratory for antibiotic sensitivity pattern. **Results:** Our study revealed that amikacin being the most powerful as its sensitive to e.coli and klebsiella and enterococcus [100%]. Klebsiella shows complete sensitivity to ampicilin and ciprofloxacin and linezolid are moderately sensitive Ceftriaxone is 100 percent sensitive to klebsiella and 62.5 percent to e.coli Imipenem shows 100 percent sensitivity to enterococci, 33.3% to klebsiella and 50 percent to e. coli. **Conclusions:** Isolating bacteria and determining their susceptibility to different antibiotics may help physicians to manage cholecystitis and its associated complications. It helps

in reducing the costs associated with health care and help to reserve drugs for future use in case of need of newer microorganisms. Exhausting all available antibiotic options before antibiotic sensitivity will result in paving way for bacterial kingdom to develop a bug which will be resistant to all antibiotics.

Keywords: Gall Stones; Microflora; Culture and Sensitivity; Antibiotics.

Introduction

Cholelithiasis is a benign disease of the biliary tract is one of the most common indications for major abdominal surgery in India. The most prevalent complication of gallstone is chronic cholecystitis occurs in approximately 4% of cases [1]. Cholelithiasis or gallstones are quite common in adults. Antibiotic prophylaxis in biliary surgery, when correctly used, has led to the reduction in postoperative infections. Cephalosporins are one of the most commonly prescribed agents for surgical prophylaxis because of their favourable pharmacokinetic profiles, low incidence of adverse effects and low costs [2] cholecystectomy is one of the frequent causes for abdominal surgeries, where cefotaxime; a third generation cephalosporin is widely used as prophylaxis. Some studies from the western countries showed that surgical site infection (SSI) rates with cholecystectomy are 12%-15% without prophylaxis and 3%-6% with prophylaxis. In India, it is 12% without prophylaxis and 4.5% with prophylaxis [3].

The most prevalent complication of gallstone is chronic cholecystitis occurs in approximately 4% of cases. It affects subjects aged 30-40 years [4].

Surgical site infections result in an extended period of hospitalization and increase health care costs

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Received on 05.07.2018, Accepted on 17.09.2018

significantly. So choosing the appropriate antibiotic according to sensitivity pattern is more useful in reducing the post op complications and reduces the health care costs.

Materials and Methods

- *Study Design:* Cross sectional Study.
- *Setting:* The study will be carried out in the Dept. of Surgery, MVJ Medical College.
- *Study Duration:* 5 Months [January To May 2018]
- *Study Population:* Minimum of 50 Patients admitted under General Surgery, who are scheduled to undergo laparoscopic cholecystectomy and willing to give the consent, will be included in the study if they fulfil inclusion criteria.
- *Sampling Method:* Simple random sampling.
- *Method of collecting bile:* Five ml of bile will be aspirated from the gall bladder during laparoscopic cholecystectomy through 10mm port by using long aspirating needle, while the gall bladder is in situ, in all the selected patients. The samples will be transferred onto a plain sterile container and then transferred at room temperature in an hour to the laboratory for antibiotic sensitivity pattern.

Inclusion Criteria

1. Patients with chronic calculus cholecystitis.
2. Patients with uncomplicated symptomatic cholelithiasis.

Exclusion Criteria

1. Patients who receive antibiotics one week before operation.
2. Patients with diabetes mellitus.
3. Patients on regular corticosteroids.
4. Patients with elevated liver enzymes twice the reference level.
5. Patients with acute cholecystitis.
6. Patients not willing to participate in the study.

Study Variables

- Age (years)
- Sex
- Address
- Patients will be informed regarding the aims and objects of the study in their local language and a detailed informed written consent will be taken from the patient (in case of minor less than 18 years consent from the parent will be taken and assent

from the patient will be taken) prior to inclusion into the study

- During hospitalisation relevant history will be collected and appropriate investigations as deemed necessary will be done using standard procedures.

Results and Observations

In the present study 50 patients were evaluated for culture and gall bladder bile. Out of which maximum number of patients were clustered between 31-40 years of age (44%), followed by 41-50 years of age (26%) and remaining patients were in the age group of 51-60 years (6%).

In the present study out of 50 patients, 34 (68%) were females and 16 (32%) were males (Table 1).

In this study out of 50 bile samples, 13 (26%) were culture positive and 37 (74%) were culture negative (Table 2).

In the present study isolated organisms were most sensitive to Amikacin, Ceftazidime and Imipenem followed by Ceftriaxone Gentamicin, ciprofloxacin and Linezolid and least sensitive to Ampicillin and Cefotaxime.

Table 1: Showing number of patients according to age distribution

Age	Number	Percentage
21-30	12	24
31-40	22	44
41-50	13	26
51-60	3	6
Total	50	100

Table 2: Showing sex distribution

Sex	Number	Percentage
Male	16	32
Female	34	68

Table 3: Showing percentage of bile culture

Culture	Number	Percentage
Positive	13	26
Negative	37	74
Total	50	100

Table 4: Showing distribution of different type of stones and their association with culture

Colour	Culture		Total
	Positive	Negative	
Yellow	7(21.2%)	26(78.8%)	33
Black	4(30.8%)	9(69.2%)	13
Brown	2(50%)	2(50%)	4

Table 5: Showing organisms and their sensitivity to different antibiotics

Antibiotics	Organisms		
	E.Coli	Klebsiella	Enterococcus
Amikacin	87.5%	100%	100%
Ampicillin	50%	-	50%
Gentamicin	37.5%	100%	-
Ceftriaxone	62.5%	100%	-
Cefotaxime	37.5%	-	-
Ceftazidime	50%	66.7%	100%
Imipenem	50%	33.3%	100%
Linezolid	25%	33.3%	-
Ciprofloxacin	12.5%	66.7%	-

Here high sensitivity is observed to amikacin where ciprofloxacin is least sensitive. Ceftriaxone was found to have moderate sensitivity (Fig. 1).

Enterococcus in our study showed equal sensitivity to amikacin, ceftriaxone and ceftazidime compared to ampicillin which had least resistance (Fig. 2).

Klebsiella in our study showed equally sensitive pattern to amikacin, gentamicin and ceftriaxone and least to imipenem and linezolid.

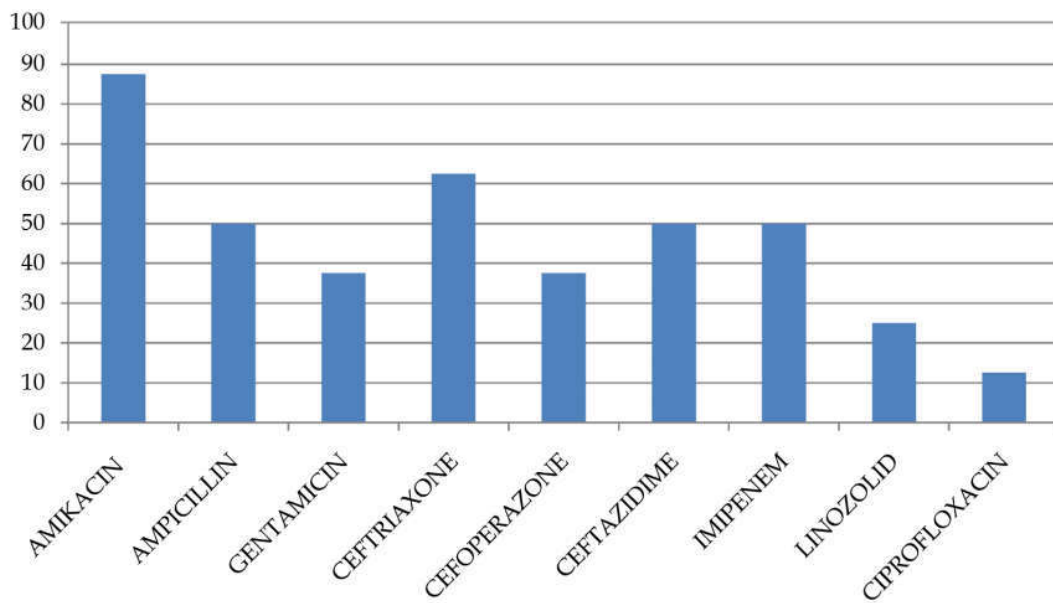


Fig. 1: Antibiotic sensitivity of E. coli.

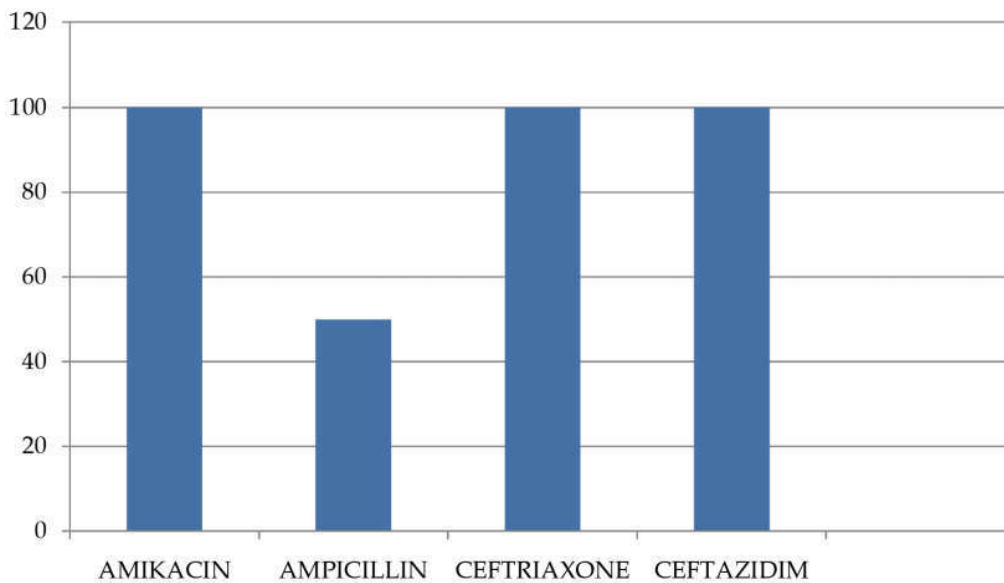


Fig. 2: Antibiotic Sensitivity of Enterococcus

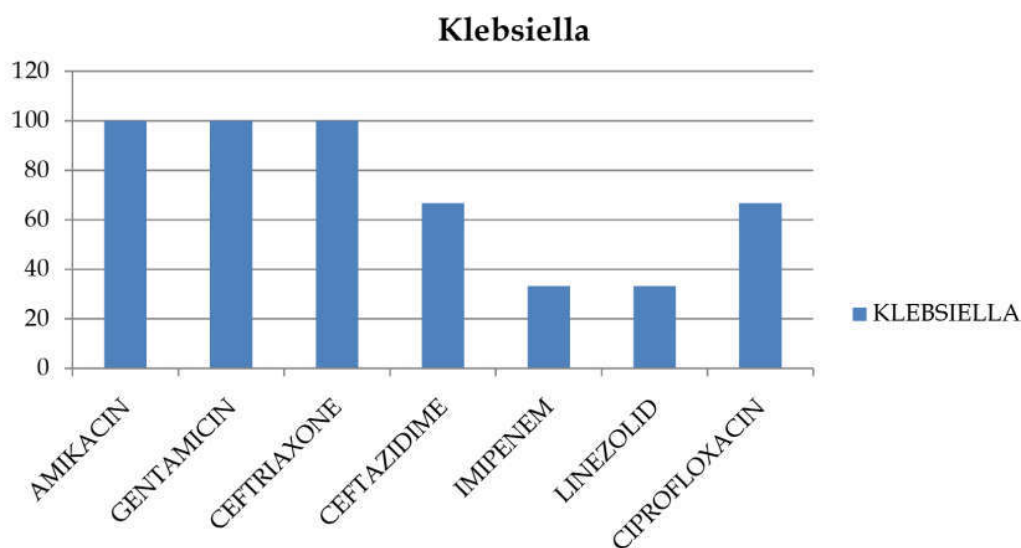


Fig. 3: Showing Antibiotic sensitivity of Klebsiella

Discussion

Age and Sex Prevalence

In the present study antibiotics sensitivity of gallbladder bile in 50 patients undergoing laproscopic cholecystectomy were evaluated.

Among them maximum number of patients were clustered between 31-40 years of age (44%) and 41-50 years of age (26%) and females were 34 (68%) and males were 16 (32%). The female and male ratio is 2.1:

Hansbrough F J et al. studied concentrations of amikacin and kanamycin in the serum, gallbladder bile and gallbladder wall of 20 patients undergoing elective cholecystectomy. Of 20 patients, 14 received 500 mg of amikacin intramuscularly and 6 received 500 mg of kanamycin intramuscularly at various times before surgery. In patients receiving kanamycin, detectable levels appeared in bile within 90 min after drug administration and in five of six patients concentrations ranged from 1.9 to 23 $\mu\text{g}/\text{ml}$. Levels of kanamycin in gallbladder wall ranged from 8.0 to 14 $\mu\text{g}/\text{g}$. In patients receiving amikacin, detectable levels appeared in bile within 48 min after drug administration and ranged from 1.3 to 7.5 $\mu\text{g}/\text{ml}$ in 12 of 14 patients. Levels of amikacin in gallbladder wall ranged from 4.7 to 34 $\mu\text{g}/\text{g}$. The presence of an obstructed cystic duct did not preclude the entry of either antibiotic into gallbladder bile, and this may reflect passage of antibiotic through the gallbladder wall rather than accumulation via bile secretion [4].

Pushpalata H et al. have done a study to determine the prevalence of bacteria in bile samples of cholecystitis patients and to correlate bactibilia and post-operative wound infection. Bile samples collected intra-operatively were subjected to gram stain, culture and antibiotic sensitivity testing. Bactibilia was found in

27/50 (52%) of patients. Polymicrobial flora was found in 10% of bile samples. E. coli, klebsiella pneumonia and Enterococcus faecalis were the predominant organisms isolated. Combinations of Piperacillin – tazobactam and Amikacin was most effective in prophylaxis regimen [5,6]. This is in accordance to our study. Sattar I et al. done a descriptive study to determine the frequency of infection in cholelithiasis and find common infecting organisms with their antibiotic sensitivity, in 100 cases of cholelithiasis. Out of 100, 36 patients had positive bile culture [7]. The most common organism was E. coli (17 patients) followed by Klebsiella (9), Pseudomonas (6), Staphylococcus aureus(2), Salmonella (1) and Bacteroids fragalis (1) patient. In this study, most of the biliary organisms were highly sensitive to the 2nd generation cephalosporins and quinolones [8,9,10].

Our study revealed that amikacin being the most powerful as its sensitive to e.coli and klebsiella and enterococcus [100%]. Klebsiella shows complete sensitivity to ampicillin and ciprofloxacin and linezolid are moderately sensitive

Ceftriaxone is 100 percent sensitive to klebsiella and 62.5 percent to e.coli

Imipenem shows 100 percent sensitivity to enterococci, 33.3% to klebsiella and 50 percent to e.coli.

References

1. Brunicaardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Pollock RE et al. Gallbladder and the Extra hepatic Biliary system. Principles of Surgery. Ninth edition. The Mcgraw Hill companies, Inc; 2010. pp.1142-46.
2. Khan AB, Salati SA, Parihar BK, Bhat Na. Association between Intraoperative Bactibilia and Postoperative

- Septic Complication in Biliary Tract Surgery. *East and African Journal of Surgery*, 2010 Jul-Dec;15(2):113-121.
3. Dev AK, Paul S. Wound infection following cholecystectomy. *Indian J Surg* 1993;55:265-69.
 4. Hansbrough FJ, Clark EJ And Reimer LG . Concentrations of Kanamycin and Amikacin in Human Gallbladder Bile and Wall Antimicrobial Agents And Chemotherapy, 1981 Oct.pp.515-517 .
 5. Eslami G, Nowruzji J, Fllah F, Goudarzi H, Hakemivala M, Jahangiri S . Detection of bacteria responsible for gallbladder inflammation and gallstones. *Iranian Journal of Clinical Infectious Diseases* 2007;2(3):139-41.
 6. Pushpalata H, Shoorashetty RM. Bacteriological profile of cholecystitis and their implication in causing postoperative wound infection. *Arch Int Surg* 2012;2: 79-82.
 7. Sattar I, Aziz A, Rasul S, Mehmood Z and Khan A. Frequency of infection in cholelithiasis. *JCPSP* 2007;17(1):48-50.
 8. Ozturk A, Bozkurtoglu H , Kaya C ,Caskurlu H and Akinci FO. Bacteriologic Analysis of Bile in Cholecystectomy Patients. *The New Journal of Medicine* 2012;29(1):43-46
 9. Kanji S, Devlin JW. Antimicrobial prophylaxis in surgery. In: Dippiro, JT., Talbert, R.L, Yee, G.C., Matzke, G.R., Wells, B.G., Posey, L.M., (Eds) *Pharmacotherapy - A Pathophysiologic approach*, 6th ed. New York: Mc Graw Hill. 2005.pp.2217-29.
 9. Ronald Lee Nichols. Preventing Surgical Site Infections: A Surgeon's Perspective. *Emerg Infect Dis* 2001;7(2): 220-24.
 10. Nguyen D, McLeod, WB, Phung DC. Incidence and predictors of surgical site infections in Vietnam. *Infec control hosp epidemiology* 2001;22:485-92.
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