

# Role of Prophylactic Antibiotics in Laparoscopic Cholecystectomy

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## Abstract

**Background:** Antibiotic prophylaxis is routinely administered in laparoscopic cholecystectomy but its role is debatable.

**Methods:** From January 2004 to August 2008, 417 patients were randomized into 208 in antibiotic group (AG) and 209 in non antibiotic group (NAG). AG received one dose each of injection ciprofloxacin (200 mg) and metronidazole (500mg) preoperatively. NAG was given only intravenous fluids. Besides routine care, all underwent abdominal sonography and liver function tests at least once during the 30 postoperative days.

**Result:** Age, sex and co-morbidity distribution were similar in both the groups. One patient who was on weekly 5mg methotrexate (NAG) had erythema around umbilical port. Other three having umbilical discharge recovered without antibiotics. Nine patients had subhepatic collection (5 AG and 4 NAG). One from NAG underwent re-laparoscopy and drainage. Ten patients had fever. Two from AG had basal lung collapse and were given antibiotics.

**Conclusion:** Antibiotic prophylaxis is not needed for laparoscopic cholecystectomy.

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**Key Words :** Laparoscopic cholecystectomy; Antibiotics

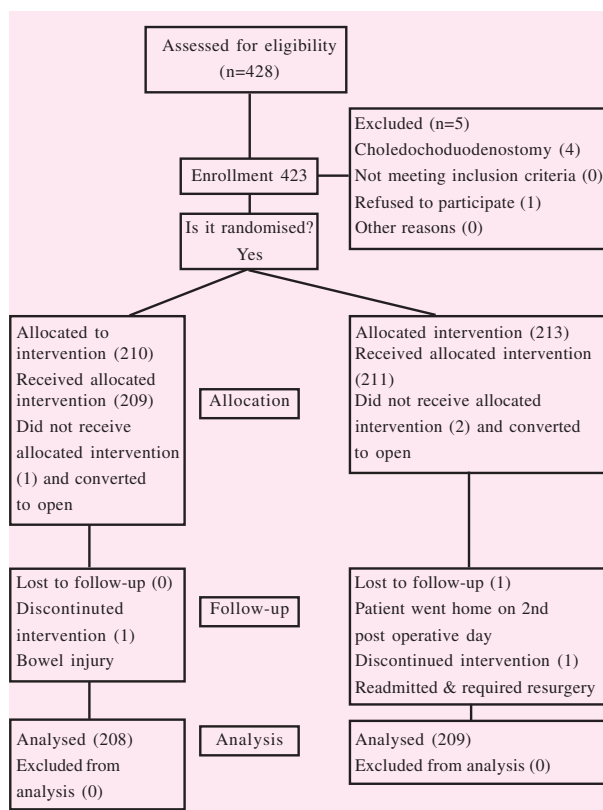
## Introduction

Laparoscopic cholecystectomy (LC) can now be considered the standard operation for gallstone disease [1]. Perioperative antimicrobial prophylaxis is generally recommended for laparoscopic as well as open cholecystectomy as it results in a shorter hospital stay and thus reduces overall cost of treatment [2]. Antibiotic prophylaxis in biliary surgery, when correctly used, has led to the reduction in postoperative infections [3]. From the available evidence, there appears to be no scientific basis for routine administration of antimicrobial prophylaxis to low-risk patients during LC [4,5]. Nonetheless, antibiotic prophylaxis continues to be administered routinely in elective LC [6].

## Material and Methods

This study was conducted at two large military hospitals from January 2004 to August 2008. The randomization was done by sealed envelope method. All the cases even with co-morbidity considered for elective LC were included in the study. A second clean surgery was not an exclusion criterion (tubectomy, appendectomy etc). Cases with bile duct (BD) procedure like laparoscopic trans-cystic BD stone extraction were not excluded but those with laparoscopic choledochoduodenostomy and conversion to open surgery were excluded from the study. Unwillingness to join the study was also an exclusion criterion (Table 1).

**Table 1**  
**Flow chart**



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After confirmation of the presence of gall stone using ultrasound (USG), all the patients were evaluated with haemogram, urea, creatinine, liver function test (LFT), blood sugar, electrocardiography (ECG) and chest radiography. Elective LC was done after overnight fasting in the hospital. Blood sugar was controlled with insulin/oral hypoglycemic agents in diabetics. All surgeries were done under general anaesthesia (GA). The antibiotics group (AG) received intravenous ciprofloxacin 200 mg and metronidazole 500 mg just after induction of anaesthesia. The non-antibiotic group (NAG) received intravenous fluids only. Carbon dioxide pneumoperitoneum and standard four ports were used. In resolving cholecystitis and mucocele cases, contents from the grossly distended gall bladder were aspirated to ease the LC.

The cystic duct and artery were clipped first and then the gall bladder was dissected from the liver bed. We considered bile spillage when there was leak from the puncture site, gallbladder side, cystic duct or gallbladder perforation during dissection. Any drop of stone to the peritoneal cavity was termed 'stone spill' wherein irrigation suction was done after retrieval of stones. Subhepatic drain was used only selectively in long and difficult surgery where the chance of missed injury was high. Protocol based post operative management in the form of intravenous fluids for six hours, injection diclofenac sodium, ondansetron and ranitidine were used for one day. Fluid diet was advised for one day followed by normal diet. Wound erythema, pus discharge, serous discharge with positive culture were considered as superficial infection. Intra-abdominal collection or abscesses and infections of the respiratory or urinary tract were considered deep sepsis. Postoperative fever above 38.5°C was evaluated to find any relation to the surgery. USG of abdomen was done in all symptomatic patients and at least once during the 30 days postoperative period of all other cases.

The Statistical Package for the Social Sciences (SPSS 11.0)

**Table 2**  
Age and sex distribution

Group	AG	NAG	p value
Total	208	209	—
Age range (years)	09 - 80	08 - 79	—
Mean age	44.31 ± 13.79	44.52 ± 13.32	0.871
Male : Female	66 : 142	64 : 145	0.807

**Table 3**  
Distribution of comorbidities

Comorbidity	AG 208 (%)	NAG 209 (%)	p value
Diabetes Mellitus	17 (8.173)	9 (4.306)	0.102
Hypertension	10 (4.807)	13 (6.220)	0.528
Heart diseases	4 (1.923)	3 (1.435)	0.724
Respiratory diseases	5 (2.392)	6 (2.870)	0.915
Jaundice	2 (0.961)	3 (1.435)	0.892
Immunosuppression	0 (0.00)	1 (0.478)	1.000

and Systat 8.0 were used for the analysis of the data. Chi-square test was done for large size samples and Fisher's exact test used to test the frequency distribution of study parameters between AG and NAG. Student 't' test has been used to test the significance of mean values between AG and NAG in univariate analysis.

## Result

The results are given in Tables 2 to 5.

## Discussion

LC is associated with a lower risk of wound sepsis than open cholecystectomy [7]. Antibiotic prophylaxis in LC is not only unnecessary but also increases the overall cost of surgery and hospitalisation [2]. It is important to follow the guidelines for antibiotic prophylaxis for cholecystectomy in coordination with the hospital infection control policy. This will result in a more appropriate use of the prophylactic agents [8]. As in our study, others have also reported umbilicus as the commonest site for sepsis [9]. This may be because the deep umbilical depression is sometimes difficult to clean. In our study, one patient had erythema and three had umbilical discharge with two cultures positive. One grew coagulase negative *Staphylococcus*, a skin commensal and the other *Pseudomonas*. All healed before the

**Table 4**  
Procedure related events

Procedure related events	AG 208 (%)	NAG 209 (%)	p value
Bile spillage	12 (5.770)	11 (5.263)	*
Stone spillage	6 (2.885)	9 (4.306)	*
Gall bladder aspiration	58 (27.884)	66 (31.579)	*
Difficult Surgery (> 1 hr)	32 (15.384)	35 (16.746)	0.705
Acute attack (< 4 weeks)	17 (8.173)	14 (6.698)	0.566
Transcystic CBD exploration	1 (0.480)	2 (0.956)	1.000
Drain tube	5 (2.403)	3 (1.435)	0.503
CBD stents	1 (0.480)	1 (0.478)	1.000
Re surgery	1 (0.480)	0 (0.000)	1.000

\* Not significant

**Table 5**  
Postoperative follow up

Complication	AG (%)	NAG (%)	p value
n	208	209	-
Postoperative fever	7 (3.365)	6 (2.870)	0.771
Postoperative collection# * 3 (7 days)	1 (0.480)	2 (0.956)	0.683
Postoperative collection# (8-30days)	2 (0.961)	2 (0.956)	1.0

#Very small collection except one; \*laparoscopic drainage was done in this case.

availability of culture and antibiotic sensitivity report without any specific therapy. In one study the wound sepsis rate was 7.9%, equal in both groups and mostly caused by skin commensals [10]. In our study the wound sepsis rate of 0.7% is much less.

Positive bile culture is found in 25% of simple gall stone disease and it goes up to 47% after an acute attack [11]. In our study 58 (27.884%) cases in AG and 66 (31.579%) cases in NAG with resolving acute cholecystitis and mucocele with distended gall bladder were aspirated. However culture positivity was seen in only 21 (16.925%) cases, almost equally distributed in both the groups. Even though most studies have found no role of antibiotics in elective LC, they still recommend larger studies [5]. Antibiotic prophylaxis is justified only in high risk patients undergoing elective LC [12]. In the present study, without exclusion of co-morbidity, there is no significant difference in the results either in terms of postoperative fever or postoperative collection. Only one out of nine postoperative collection required relaparoscopy for drainage, which was found to be due to a missed bile duct stone.

In our study, fever was strictly monitored. Even one spike above 38.5°C was investigated. Both the groups had almost similar number of postoperative fever cases. In 10 cases fever subsided on the next day whereas two cases of AG had lung collapse. Both were given a course of antibiotics and chest physiotherapy. Out of the total of 13 postoperative fever cases, three were reported in the group whose surgery lasted less than one hour and 10 in the group whose surgery lasted more than one hour, significant in favour of long duration surgery group ( $p < 0.001$ ). This finding has not been reported so far.

It may be concluded that antibiotic prophylaxis is not recommended in all elective LC. However, the hospital infection control policy and merits of individual case may dictate otherwise. Larger trials will give further evidence and help formulate guidelines for universal acceptance.

### Conflicts of Interest

None identified

### Intellectual Contribution of Authors

*Study Concept* : Gp Capt AK Pujahari

*Drafting & Manuscript Revision* : Sqn Ldr A Gaur

*Statistical Analysis* : Gp Capt AK Pujahari, Sqn Ldr A Gaur

*Study Supervision* : Gp Capt AK Pujahari

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