INTRODUCTION

Wound infection has always been a major complication of surgery and trauma. It has been documented for at least 4000-5000 years. The concept of prophylaxis had also been known earlier by the Assyrians and later to the Greeks.1

In abdominal surgery, infectious complications are the main causes of postoperative morbidity and financial cost.2 Therefore, the World Health Organization has established antibiotic as a priority in its campaign for the rational use of medications.3

Gallstone is a worldwide problem; though remain asymptomatic in 40-60% of patients. Symptomatic cholelithiasis needs surgical intervention and prophylactic cholecystectomy is warranted in patients at high risk for gallbladder cancer e.g. Pima Indians, patients with porcelain (calcified) gallbladder and diabetic patients.4-6

The effectiveness of prophylactic antibiotics in elective cholecystectomy is well-established and the choice of antibiotic remains a concern.

ABSTRACT

Objective: To determine the postoperative infection result after use of a single and simple antibiotics for prophylaxis in open elective cholecystectomy.

Study Design: Descriptive (quasi-experimental) study.

Place and Duration of Study: This study was conducted in Military Hospital, Rawalpindi from December 2006 to January 2008.

Methodology: One hundred and sixteen patients requiring elective open cholecystectomy were included. Patients with acute cholecystitis, jaundice and choledocholithiasis were excluded. Only two doses of Gentamycin were used as prophylactic antibiotic for operation. Special precautions were taken for maintaining sterilization during surgery.

Results: Out of 116 cases, 111 (95.7%) patients had smooth postoperative recovery and only 5 (4.3%) patients developed surgical site infection. Culture sensitivity of these 5 patients revealed E. coli in 2 (40%) cases, 01 (20%) patient had Klebsiella, while 2 (40%) had mixed growth.

Conclusion: Single antibiotic prophylaxis for elective cholecystectomy is recommended provided strict aseptic measures are taken during surgery along with good surgical technique.

Key words: Cholecystectomy. Surgery. Prophylactic antibiotic. Gentamycin.
jaundice, and choledocholithiasis were excluded from the study. Pre-anaesthesia assessment was done and appointment for operation was given.

On operation day, patients were given pre-operative prophylactic dose of Gentamycin 80 mg, 20-30 minutes before incision. Abdomen was thoroughly washed with alcoholic solution of Povidone Iodine and allowed to dry up. Methylated spirit was then used to clean the operative area. Patients were draped with long-towels and then hole-towel sheet was placed. Transverse sub-costal incision was preferred.

Standard open cholecystectomy was performed by dividing the rectus muscles. Absorbable sutures were used to ligate the cystic duct and artery. No drains were placed as a matter of routine. Posterior rectus sheath was approximated with absorbable sutures and anterior by prolene. Skin was sutured with subcutaneous prolene 2/0. Patients were kept nil per oral till the passage of flatus. After 8 hours of operation, second dose of Gentamycin 80 mg intravenous was given. Patient’s mean hospital stay remained 38 hours. Inspection of the wound was done on discharge and any signs of inflammations were observed. Second look inspection was done on 8th postoperative day before removal of stitches.

Data was analyzed by using SPSS version 11 on computer. Relevant descriptive statistics; frequency, rate and percentage was computed for presentation of qualitative outcomes. Quantitative variables like age was presented as mean ± standard deviation.

RESULTS

A total number of 116 patients were included in the study from December 2006 to January 2008. Their age ranged from 22-65 years. Mean age was 46.17 years with Standard Deviation (SD) of ±4.69 and Standard Error Mean (SEM) of 0.46. There were 78 (67.2%) female and 38 (32.8%) male patients.

Majority, 111 (95.7%) patients had smooth post-operative recovery and did not develop any signs of surgical site infection. Only 5 (4.3%) patients developed surgical site infection.

Infection was in the subcutaneous planes. Culture sensitivity of these 5 patients revealed E. coli in 2 patients (40%), Klebsiella in one patient (20%) and mixed growth in 2 patients (40%) (Table I).

<table>
<thead>
<tr>
<th>Culture sensitivity</th>
<th>Number (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Klebsiella</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Mixed growth</td>
<td>2</td>
<td>40%</td>
</tr>
</tbody>
</table>

Table I: Bacteriology of postoperative infection.

These patients were given oral ciprofloxacin or augmentin (amoxicillin with clavulanic acid) according to culture and sensitivity for 3-7 days. Daily aseptic dressing of the patients was done and all of them recovered with conservative treatment. None of the patients developed intra-abdominal infection or systemic signs of inflammation. Good control of blood sugar levels was obtained in all diabetic patients.

DISCUSSION

Approximately 10% of the adult population is affected by cholelithiasis in the United States. It has been well-demonstrated that the presence of gallstones increases with age.6

Currently, the most frequently performed operation is laparoscopic cholecystectomy. Open cholecystectomy involves major abdominal surgery and is used as the first line treatment where laparoscopic facilities are not available.7-8

The source of infection can be endogenous (infected bile/gallbladder wall) or exogenous. In certain trials, the frequency and type of bacteria in bile, the factors predicting the presence of bacteria in bile, and the relationship between bacteria in bile and subsequent wound sepsis have been evaluated.9-10 In one such study conducted on 148 patients, 23% had positive bile cultures. The overall wound infection rate was 15%, but 91% of all wound infections occurred in patients with positive bile cultures.9-12

Sattar conducted a study on 100 patients, out of whom 36 patients had positive bile culture. 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.13

The effectiveness of prophylactic antibiotics in elective cholecystectomy is well-established and choice of antibiotic remains a concern. There are various combinations used to prevent infection.

Roeterman conducted a single blind, controlled randomized trial on 105 patients. Fifty-six patients received prophylactic antibiotics and 49 patients entered the control group. Of the patients who received prophylactic antibiotics, 3.6% had wound infections, vs. 24.5% in the control group.14-15

A randomized open trial was conducted to evaluate claforan vs. combination treatment of cefapirin + gentamycin. The use of a single or three doses of claforan were more convenient and simple than the combination regimen.16-17

Zahid conducted a study in Pakistan Institute of Medical Sciences. He compared the results of single dose versus three-dose prophylaxis by cefotaxime sodium in patients undergoing elective cholecystectomy and recommended single dose antibiotic prophylaxis with cefotaxime.18
A single dose of ampicillin-sulbactam favoured better compared with cefuroxime for prevention of postoperative surgical site infections due to *Enterococcus* species after elective cholecystectomy.\(^\text{19}\) Whereas comparison of clavulenate-potentiated amoxycillin with cefotaxime as prophylactic agents for the prevention of sepsis following elective cholecystectomy resulted in no serious postoperative sepsis in either group.\(^\text{20-21}\)

Kufman conducted a double blind, controlled randomized trial to evaluate the effectiveness of a single dose of prophylactic antibiotic (gentamycin) for elective cholecystectomy. All patients recognized pre-operatively as being at risk were excluded. The treatment group comprised of 102 patients received a single dose of gentamycin and the 74 patients in the control group received a placebo. Of the patients who received gentamycin, wound infection developed in 4.9% vs. 13.5% in the control group.\(^\text{12}\)

In this study, we used only two doses of simple, cost-effective antibiotic for Gram-negative cover against endogenous source of infection. Exogenous infection from Gram-positive organisms was controlled with careful and meticulous cleaning of operative area, proper draping with wider towels and strict aseptic measures taken during surgery. Minimum use of diathermy, avoidance of dead space and good surgical technique also helped the cause. Special care was taken to avoid contact of gloves with the potentially infected bile and gallbladder. Gallbladder was removed with utmost care avoiding contact with the wound margins which were covered with gauze while delivering it out of wound.

The results obtained were remarkable as compared to above-mentioned trials with costly and broad-spectrum antibiotics. Out of 116 cases, 111 (95.7%) patients had smooth postoperative recovery and did not develop any signs of surgical site infection.

Only 5 (4.3%) patients developed infection in this study with 2 doses of gentamycin as compared to 4.9% infection rate in the study conducted by Kufman with single dose gentamycin; thereby suggesting preference for 2 dose prophylaxis with gentamycin.

Amino-glycosides have a very good Gram-negative cover and a reasonable cover of Gram-positive bacteria especially *Staph. aureus*. Gentamycin is the most cost-effective drug of all the available medicines in the group. The risk of nephrotoxicity is almost nil with 2 doses in otherwise fit patients.

**CONCLUSION**

The risk of surgical site infection from endogenous source (infected bile/gallbladder wall) can be readily controlled with a single antibiotic. We suggest further studies to augment our hypothesis on a wider base.

**REFERENCES**


