ORIGINAL ARTICLE

Role of Antibiotics on Surgical Site Infection in Cases of Open and Laparoscopic Cholecystectomy: A Comparative Observational Study

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ABSTRACT

Introduction: Surgical site infection (SSI) comes as third most common healthcare related infection which produces morbidity and deaths at large. Still many authors believe that it is better not to use prophylactic antibiotics in simple and uncomplicated cases. Laparoscope, now-a-days is a much used instrument for abdominal surgeries. Even after new aseptic techniques SSI remains to be a major problem. **Aims and Objectives:** To study the effect of antibiotics on superficial SSI in the cases of open and laparoscopic cholecystectomy. **Observation and Results:** One hundred patients were enrolled for cholecystectomy. The patients were divided into two groups, A and B. Group A consisted of patients in whom laparoscopic cholecystectomy was done and group B in whom open cholecystectomy was done. The male female ratio was 1: 2.23. The mean age of patients in Group A was 46 years and in Group B was 44; Standard deviation (SD) for age was 14.8% and 13.8% in groups A and B respectively; t-value was 0.654 and *P* value was 0.515 and they were not significant. The number of males and females was 16 and 26 respectively in Group A and 11 and 31 in Group B. The Chi square X^2 = 1.36 and *P* value was 0.248 and both were insignificant. The rate of superficial surgical site infection was 2.63% in both the groups. **Conclusion:** Our study concludes that there is no difference in the outcome of patients in cases of open as well as laparoscopic cholecystectomy. There is no significant difference in the surgical site infection rate in cases of open as well as laparoscopic cholecystectomy.

Key words: Antibiotics, laparoscopic cholecystectomy, open cholecystectomy, surgical site infection

INTRODUCTION

Surgical site infection (SSI) comes as third most common healthcare related infection which produces morbidity and deaths at large.[1] There are evidence of postoperative morbidity due to SSI. So it is needed to improve the outcome of surgical procedures and hence advised to give antibiotic prophylaxis. The incidence of surgical site infection is approximately 3-4%.[2,3] Now-a-days laparoscopic cholecystectomy is a standard modality of treatment for cholelithiasis. Still many authors believe that it is better not to use prophylactic antibiotics in simple and uncomplicated cases.[4]

Laparoscope, now-a-days is much used instrument for abdominal surgeries, during disinfecting the instrument there are chances of small damages to it, which may harbor bacteria and they can act as a source of infection. Laparoscopic cholecystectomy is a widely performed surgery worldwide; indications may be acute cholecystitis, acalculous cholecystitis, chronic cholecystitis, cholecystectomy along with common bile duct exploration, and procedures like gastric bypass surgery. The bile which is present in the gall bladder harbors multiple bacteria which may be aerobic and anaerobic. Even after using the new aseptic techniques, SSI remains to be a major problem.[5-7]

Newer guidelines do not support the use of prophylactic antibiotics in routine laparoscopic cholecystectomy.[8] Second generation cephalosporins and fluoroquinolones are the preferred drugs for prophylaxis after surgery.[5,7]

Studies have shown beneficial effects of prophylaxis in cases of open cholecystectomy but their effect in laparoscopic surgery is not well established. So, outcomes of antibiotic

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prophylaxis; useful or not in cases of laparoscopic surgery is yet to be established.[9]

AIMS AND OBJECTIVES

To study the superficial SSI in the cases of open and laparoscopic cholecystectomy

According to CDC (Centers for Disease Control and Prevention) the definition is, Superficial Incisional Surgical Site Infection, infection within 30 days after the operation and only involves skin and subcutaneous tissue of the incision and at least one of the following: Purulent drainage with or without laboratory confirmation, from the superficial incision or organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision or at least one of the following signs or symptoms of infection: Pain or tenderness, localized swelling, redness, or heat and superficial incision is deliberately opened by surgeon, unless incision is culture-negative or diagnosis of superficial incisional surgical site infection made by a surgeon or attending physician.[10]

MATERIALS AND METHODS

This observational prospective study was done at JN Medical College in Central India. The study was conducted from April 2011 to November 2012. One hundred patients were registered and admitted in the department of surgery. Sixteen patients were excluded from study as they were not fulfilling the inclusion criteria. A comparative study was undertaken on patients attending the surgery outpatient department for upper abdominal pain with symptoms of cholelithiasis and operated as routine surgical procedures. Due permission was obtained from the institutional ethics committee for collecting the records. The study was done to assess the SSI in the cases of open and laparoscopic cholecystectomy.

The wound was assessed on seventh postoperative day at the time of stitch removal or if the patient came with the pain or discharge at the site of the wound closure and after 30 days of the surgery. The swab was sent for culture and sensitivity if there was incidence of SSI.

The groups were divided in two parts, Group A- In which laparoscopic cholecystectomy was done; Group B- In which open cholecystectomy was done. In both the groups preoperative dose of antibiotics (ceftriaxone + Sulbactam) were given just before the surgery and after the surgery it was continued two times a day for four days. Statistical significance was set as $P < 0.05$ level.

Inclusion criteria

Patients who had abdominal symptoms with cholelithiasis, confirmed by ultrasonography, were willing for operation and giving consent for the study.

Exclusion criteria

Patients with psychiatric symptoms with persistence of abdominal pain undergoing psychiatric management, peptic ulcer, any other causes of pain like perforation or obstruction in the abdomen, patients with diabetes, patients receiving corticosteroids, severe debilitating illness, patients less than 18 or more than 65 years of age, any co-morbid conditions, patients on nonsteroidal anti-inflammatory drugs and patients not willing to giving consent for the study; patients those were converted from laparoscopic to open cholecystectomy, the patients in which common bile duct exploration or endoscopic retrograde cholangiopancreatography was done and patients operated in emergency hours.

OBSERVATION AND RESULTS

One hundred patients were enrolled for cholecystectomy out of which 16 were excluded as they did not fit the inclusion criteria and at the end we had 84 patients in total. The patients were called on seventh day of the operation and 30th day or whenever there was a discharge, pain, fever or whenever the patients were not feeling comfortable at operative site, patients were advised to attend the hospital.

There were 42 patients in each group. Group A consisted of 16 males and 26 females in which laparoscopic cholecystectomy was performed while Group B had 11 males and 31 females in which open cholecystectomy was performed. The male female ratio for the total 84 patients was 1:2.23. The mean age in Group A was 46 years and in Group B was 44; with SD = 14.8% and SD = 13.83% in groups A and B, respectively. For age the t-value was 0.654 and *P* - value was 0.515, both were not significant. While for sex of the patients Chi square test value was $X^2 = 1.36$, *P* - value was 0.248 and both were significant.

We found total of two cases in Group A i.e., in which laparoscopic cholecystectomy was done and 2 cases in Group B i.e., in which open cholecystectomy was done. The patients reported with SSI were three female patients and one male patient. They had discharge from wound at third and fourth post operative day. The rate of infection was 2.63% in both the groups. In rest of the patients were there was no evidence of SSI.

DISCUSSION

Antibiotic prophylaxis has no role in SSI, even if you provide antibiotics for longer duration they do not assist in the prevention of infection.[11] One of the studies says that whether it is high risk or low risk procedures, antibiotic prophylaxis may not affect or control the surgical site infection.[12] A study by Yan C suggest that there is no significant risk reduction with prophylactic antibiotics.[13]

As far as surgical site infection is considered the bacteria responsible for the infection may be different in different patients whether prophylactic antibiotics are given or not.[14] Especially, in cases of cholecystectomy there is no role of antibiotic prophylaxis but when compared to other surgeries there is a definite risk of SSI.[15]

A different antibiotic regime also produces the same amount of infection in patients, so we can not say which one prevents the infection. The organisms cultured may be different with the same antibiotic prophylaxis or other.[16] The wound infection may be caused by *staphylococcus aureus*, mixed infections or anaerobes; still present in patients receiving prophylactic antibiotics.[17] Sometimes when the bile is negative for culture, even in that case there are chances of SSI.[18]

So, it is once again established that there is no role of antibiotic prophylaxis in SSI in the cases of gallbladder surgery.[4] There is no change in the complication rate irrespective of the positivity or negativity of the bile culture, whether you give prophylaxis or not.[19] It is not possible to assess the exact cause of SSI in the cases of cholecystectomy because there is no significant difference in the infection rate in the prophylactic and non prophylactic groups.[20]

By statistical data there is no difference in SSI rate in the cases with or without antibiotic prophylaxis.[21] The factors thought to be associated with surgical site infection when studied by logistic regression test do not yield much for the superiority of antibiotic prophylaxis.[22] Both the groups develop equal amount of infection so when we calculate the statistical data there is no significance in the values.[23]

This study concludes that there is no significance of prophylactic antibiotics even in the cases of laparoscopic cholecystectomy.[24] Only one study suggests that there is a wide difference in infection rates between laparoscopic and open cholecystectomy, and favors laparoscopic procedures for reduced infection rate.[25] There is incidence of reduced SSI in cases of laparoscopic surgeries as compared to open surgeries. The organisms responsible for SSI are always the same in both the approaches. So, we can conclude that endoscopic surgeries are associated with low SSI in gallbladder surgeries as compared to the open gallbladder surgeries.[1,26,27]

CONCLUSION

Our study concludes that there is no difference in outcome of patients in the cases of laparoscopic and open cholecystectomy whether you give antibiotics or not. The SSI rate remains the same. In low risk cases, it is better to avoid long term antibiotics and they must be cautiously used to prevent antibiotic resistance. The cause may be the entry site of port in the cases of laparoscopic surgery and the incision site in the cases of open surgery remains the common site for inoculation of bacteria. The exposure is same except the area of contact, which is more in open group when compared to laparoscopic group.

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