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STEP TOWARDS PREVENTION OF ANTIBIOTIC RESISTANCE – A PROSPECTIVE STUDY IN LAPAROSCOPIC CHOLECYSTECTOMY.

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Abstract

Introduction: Traditionally antibiotics have been advised pre and post operatively in surgery for gall bladder. The knowledge about usage of a single dose prophylactic preoperative antibiotic in comparison to conventional usage of perioperative antibiotics in laparoscopic Cholecystectomy is limited. Hence, this study focuses on comparing the efficacy of a single dose prophylactic antibiotic versus the usage of pre and postoperative antibiotics in laparoscopic Cholecystectomy.

Method: This is a prospective study conducted in the General Surgery department of Apollo Institute of Medical Sciences and Research. Over 192 consecutive patients subjected for laparoscopic Cholecystectomy were included in study. They were divided in two groups (A&B) after applying exclusion. 74 patients in group A were given single dose of preoperative prophylactic antibiotic. No further post-operative antibiotics were given. 78 patients in group B were given both pre and postoperative antibiotics. Infective complications and cost constraints were compared between both the groups. Statistical analysis was done using chi-square test wherever necessary.

Results: there is no significant difference in the rate of incidence of wound infection in both the groups. Age and gender had no significant association for SSI. The overall cost of Group B was found to be significantly higher than Group A.

Conclusion: Usage of single dose prophylactic preoperative antibiotics with no further post operative antibiotics would be sufficient to prevent surgical site infection in uncomplicated laparoscopic Cholecystectomy.

Keywords: Prevention, Antibiotic Resistance, Laparoscopic Cholecystectomy.

Introduction

Cholecystectomy is a clean surgical procedure performed to remove the Gall bladder. It canbe performed either by using a Laparoscope (gold standard procedure) or by an opensurgical method[1].Laparoscopic Cholecystectomy is the most common laparoscopic surgery performed throughout the world. Rate of wound infection in uncomplicated cholecystectomies is 1.1-5.4%. The incidence of wound infection is even lesser when laparoscopic cholecystectomy is performed.[2,3] Prophylactic antibiotics are recommended in laparoscopic cholecystectomy.[4,5]Some studies reported that post- operative antibiotics may not be required in cases of uncomplicated cholecystectomies.[6] But due to fear of post- operative skin infections antibiotics are being administered both pre- operatively and post- operatively even in uncomplicated cholecystectomies. This can increase financial burden and emergence of resistant microbes.[7,9,13,14]

Studies comparing role of prophylactic versus peri-operative antibiotics in laparoscopic cholecystectomies are limited. Hence, this study focusses on comparing the efficacy of single dose prophylactic pre- operative antibiotic versus the usage of pre- and post- operative antibiotics in laparoscopic cholecystectomy.

Methods

This was a prospective study conducted in the General Surgery Department of Apollo Institute of Medical Sciences& Research. 192 consecutive patients undergoing laparoscopic cholecystectomy were included in the study. Study was approved by institutional research committee. Informed consent was taken from the patients.

Exclusion criteria were patients with cholangitis, obstructive jaundice, empyema of gall bladder, gangrene of gall bladder, Mirrizzi syndrome, CA gall bladder, associated choledocholithiasis, age of the patient more than 70 years, comorbidities like heart, lung, renal and liver diseases, currently taking antibiotics for other ailments, drug allergies, on chemotherapy and steroid therapy, American society of Anesthesiologists (ASA) score 3 and more, patients who already received antibiotics for acute cholecystitis, duration of surgery more than 2 hrs, laparoscopy converted to open surgery and pregnancy.

Patients suspected of cholelithiasis based on history and examination was confirmed by ultrasound of the abdomen.

In some long-standing cases even CT abdomen was advised. Patients were suspected to have uncomplicated cholelithiasis when symptoms were not associated with fever, jaundice and continuous pain.

Uniform guidelines of all aseptic precautions were followed. Operative area was cleaned with 5% povidone-iodine and chlorhexidine solution.

All the patients were given a single dose of prophylactic preoperative antibiotic which includes intravenous Cefotaxime (1gm). Laparoscopic Cholecystectomy was performed using a 4-port technique.

Adhesiolysis and Calot's dissection were done in a standard way. Cystic artery and cystic duct were clipped and cut separately. Gall balder dissected from the gall bladder fossa with electrocautery and specimen was extracted through epigastric/ umbilical port. Skin closure was done with 3-0 ethilon after drain placement (24 hrs).

Patients of Group A were given only the preoperative dose of antibiotics whereas patients of Group B received postoperative antibiotics in addition to the preoperative prophylaxis. The postoperative antibiotic therapy included intravenous CEFAPERAZONE SULBACTAM 1.5 gm IV BD for 3 days with METRANIDAZOLE500mg IV TID for 3 days followed by Tab. CEFOTAXIME 200mg BD for 5 days.

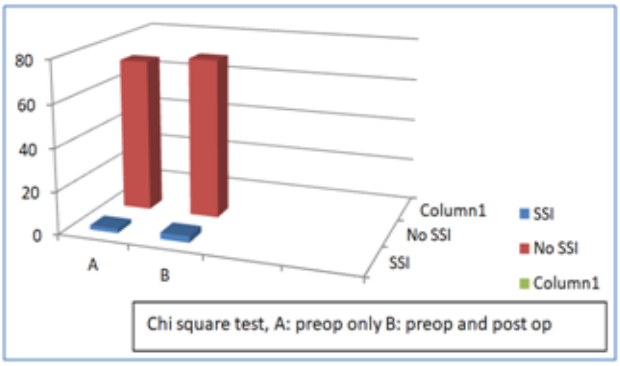
Gall bladder specimen was sent for histopathological examination. Primary outcome was surgical site infection for which temperature, wound dressing were monitored periodically in post- operative ward. Wounds were examined for signs of surgical site infection as defined by CDC parameters for features of fever, local erythema or pus discharge.[8]Patients were followed up on the 7thpost-operative for suture removal after getting good oral analgesia for pain relief. For infected wounds, swabs were taken for culture and sensitivity and treated accordingly. Secondary outcome was financial constraints. Statistical analysis was done using chi square test. P value of less than 0.05 was considered statistically significant.

Result

Table 1:

	No SSI	SSI	P value
Group A	72(71.57)	2(2.43)	0.693
Group B	75(75.43)	3(2.57)	0.6928

192 patients were included in our study 28 patients were excluded preoperatively due to exclusion criteria. Out of 164, again 12 were excluded due to empyema/ gangrenous gall bladder intraoperatively. 152 were finally involved in the study out of which 74 patients were in group A (preoperative antibiotic only) and 78 patients in group B (pre and post operative antibiotics). Patients were from all age group with either gender. The rate of surgical site infection in group A was 2.43% (2 patients) and group B was 2.57 and the difference was not statistically significant. (p = 0.693; chi square test).



5 patients who were found to have SSI were treated with antibiotics according to culture and sensitivity. Cost for Group A patients was ₹25000- ₹30000, whereas for Group B patients, it was ₹30000- ₹35000 and the difference was significant.

Discussion

Surgical site infection is a known complication after Cholecystectomy. The rate of wound infection in case of Cholecystectomy lies between 1.1% to 5.4%.[2,3] The incidence of wound infection is even lower when the laparoscopic procedure is performed compared to an open surgical procedure.[10,11]This is because laparoscopy is a clean surgery with minimal handling of the surgical site. Carbon dioxide is insufflated in the abdominal cavity to create a pneumoperitoneum combines with water to form carbonic acid creating a sterile environment. The immune system is better preserved in laparoscopy due to less tissue trauma.[12]Interleukin-6 (IL-6) is produced less in laparoscopy (compared to open procedure) hence, there is lower post-operative stress to the body and also lower production of other inflammatory cytokines.

Hence, attributed to the above listed advantages of laparoscopy in comparison to open surgery, a single dose of prophylactic preoperative antibiotics may suffice.[15] However due to the fear of development of infection, antibiotics are administered both pre- and postoperatively. This increases the financial burden and leads to emergence of resistant microbes.[7,9,13,14] The knowledge about usage of a single dose prophylactic preoperative antibiotic in comparison to conventional usage of preoperative and multiple doses of postoperative antibiotics in laparoscopic Cholecystectomy is limited. Hence, this study focuses on comparing the efficacy of a single dose prophylactic preoperative antibiotic versus pre- and postoperative antibiotics in laparoscopic Cholecystectomy. However, it must be noted that prophylactic antibiotics are no substitute to good surgical technique and established surgical procedures.

Many studies have been conducted in the past regarding the usage of peri-operative antibiotics but very few studies solely focused on laparoscopic Cholecystectomy. In this study, the effectiveness of prophylactic antibiotics in laparoscopic Cholecystectomy was assessed and it was observed that usage of peri-operative antibiotics has no added advantage in reducing the surgical site infections when compared to usage of single dose prophylactic pre-operative antibiotics with no further post-operative medication.

The results obtained in this study were consistent with those obtained from a randomized controlled trial conducted by Gaur and Pujahari where, they reported an overall infection rate of 2.2%.[16] Similar results were obtained in a study conducted by Dr.Vikram Singh Chauhan and associates which concluded that the usage of prophylactic antibiotics alone in laparoscopic Cholecystectomy is sufficient.[2]

However, it must be noted that this study has its limitations, the most important being a small sample size. Hence, further large-scale studies are necessary to establish the usage of only prophylactic antibiotics with no further post-operative antibiotics as a standard protocol for laparoscopic Cholecystectomy.

Conclusion

Based on the data obtained from this study, we can infer that the usage of prophylactic pre-operative antibiotics with no further post-operative antibiotics would be sufficient to prevent surgical site infection in uncomplicated laparoscopic Cholecystectomy.

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