



A CLINICAL STUDY OF CULTURE AND SENSITIVITY OF INTRAOPERATIVE PERITONEAL IRRIGATION FLUID FOR PREDICTION OF POST OPERATIVE COMPLICATION IN ELECTIVE AND EMERGENCY ABDOMINAL SURGERIES

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ABSTRACT

Introduction: Surgical infection, particularly surgical site infection (SSI), has always been a major complication of surgery and trauma. For microbial culture and sensitivity of close cavities like blood cultures and sterile body fluids like CSF, peritoneal fluid BACTEC (Becton Dickinson Microbiology system) test is most appropriate for microbial culture and antibiotic sensitivity.

Aims And Objectives: Culture and sensitivity of intraoperative peritoneal irrigation fluid for prediction of post operative complication in elective and emergency abdominal surgeries.

Materials And Methods: This observational study was conducted for every elective and emergency abdominal surgeries for the patients attending KIMS and RF, Amalapuram, during the years from December 2016 to October 2018, For the prediction of post operative complications in elective and abdominal surgeries, the patients are divided into cases and controls, cases and controls are taken in the ratio of 1:1.

Results: In case group 18 had clean contaminated, 19 had contaminated and 13 had dirty type of surgery. 1 each in clean contaminated and contaminated and 4 had complications in dirty. 33 had emergency and 17 had elective surgical procedures.

Conclusion: the conclusion of this study states that there is a significant benefit in terms of prediction, prevention and timely management of post operative complications among those abdominal surgical cases.

KEYWORDS : Sensitivity, intraoperative peritoneal irrigation fluid, post-operative complication, elective surgeries, emergency abdominal surgeries.

INTRODUCTION:

Surgical infection, particularly surgical site infection (SSI), has always been a major complication of surgery and trauma and has been documented for 4000–5000 years. There are various elective and emergency procedures for many abdominal pathologies like peritonitis, intestinal obstruction, anastomotic surgeries, bowel gangrene, appendicitis, cholecystitis, etc., For the reduction of post-operative complications like discharge from wound site, wound dehiscence, fever, anastomotic leaks and sepsis, intraoperatively peritoneum was irrigated with fluid like normal saline and send for microbial culture and sensitivity in order to provide specified antibiotic coverage to which the microbe is sensitive [1]. For microbial culture and sensitivity of close cavities like blood cultures and sterile body fluids like CSF, peritoneal fluid BACTEC (Becton Dickinson Microbiology system) test is most appropriate for microbial culture and antibiotic sensitivity [2,3]. It measures the production of CO₂ by metabolizing organisms.

Reduced resistance to infection has several causes, particularly those that impair the inflammatory response. Host response is weakened by malnutrition, which can be recognised clinically, and most easily, as recent rapid weight loss that can be present even in the presence of obesity [4]. Metabolic diseases such as diabetes mellitus, uraemia and jaundice, disseminated malignancy and acquired immune deficiency syndrome (AIDS) are other contributors to infection and a poor healing response, as are iatrogenic causes including the immunosuppression caused by radiotherapy, chemotherapy or steroids. When enteral feeding is suspended during the perioperative period, and particularly with underlying disease such as cancer, immunosuppression, shock or sepsis, bacteria (particularly aerobic gram-negative bacilli) tend to colonise the normally sterile upper gastrointestinal tract.

A major SSI is defined as a wound that either discharges

significant quantities of pus spontaneously or needs a secondary procedure to drain it. The patient may have systemic signs, such as tachycardia, pyrexia and a raised white count. Minor wound infection may discharge pus or infected serous fluid but should not be associated with excessive discomfort, systemic signs or delay in return home [6]. The differentiation between major and minor and the definition of SSI is important in audit or trials of antibiotic prophylaxis.

MATERIALS AND METHOD:

This observational study was conducted for every elective and emergency abdominal surgeries for the patients attending KIMS and RF, Amalapuram, during the years from December 2016 to October 2018, For the prediction of post operative complications in elective and abdominal surgeries, the patients are divided into cases and controls, cases and controls are taken in the ratio of 1:1. For each of the case group intraoperatively the abdominal cavity is washed with saline, 10ml of peritoneal irrigation fluid aspirated under aseptic conditions and sent for microbial culture and antibiotic sensitivity. For each of the control group only surgery is done and the intraoperative peritoneal irrigation fluid is not sent for microbial culture and antibiotic sensitivity. Comparative study is done between case and control group for prediction postoperative complications in elective and emergency abdominal surgeries.

The patients with all laprotomies, appendicitis, intestinal obstruction, volvulus, peritonitis, perforation, intestinal resection, anastomosis, cholecystectomy and gangrenous bowel were included in the study. Patients with Hernia, Hydrocele, Head and neck, Thyroid surgeries and All laproscopic surgeries were excluded from the study.

Preoperative tests like complete blood picture, bleeding time, clotting time, blood grouping and typing, Rbs, Fbs, PPbs, blood urea, serum creatinine, ECG, Chest X-Ray, Viral

serology (HIV, HBV,HCV), USG abdomen and pelvis were performed. BACTEC test were performed postoperatively.

RESULTS:

In this study 50 patients received antibiotics based on BACTEC test and 50 empirically. A higher proportion of study subjects treated with antibiotics prescribed empirically developed more post operative complications (18) than those treated with antibiotics (8) prescribed based on culture and sensitivity report obtained by BACTEC test. $p = 0.004958$ ($p < 0.05$, significant). Number of patients with intraoperative irrigation fluid analysed through BACTEC test & e.coli organism obtained in most of the case group (23). (Table 1)

In case group 18 had clean contaminated, 19 had contaminated and 13 had dirty type of surgery. 1 each in clean contaminated and contaminated and 4 had complications in dirty. 33 had emergency and 17 had elective surgical procedures (Graph 1).

In control group, Surgical site infection was present in 13 patients postoperatively, 3 was dead, 1 had wound dehiscence, bile leak, pneumonia , peritonitis and 1 had perisplenic collection, bilateral pleural effusion, sepsis. 25 had clean contaminated, 13 had contaminated and 12 had dirty type of surgery. 8(32%) in clean contaminated and 5(13%) in contaminated and 5 (41.66%) had complications in dirty (Graph 2). 13 had emergency and 37 had elective surgical procedures.

DISCUSSION:

In this study, a total of 100 patients were included, they were subdivided into cases and control group in equal proportion of 50 patients in each group. In case group, the patients were treated with antibiotics based on culture and sensitivity of intraoperative peritoneal irrigation fluid through BACTEC test report.

In control group, patients were treated with antibiotics empirically based on the type of surgical procedure; post operative complications were analysed in both case group and control group. 17 elective surgeries and 33 emergency surgeries were included in the case group; 13 elective & 37 emergency surgeries were included in the control group. No clean surgical procedures were included in both groups.

In the case group, 18 were clean contaminated, 19 were contaminated and 13 were dirty type of surgical procedures; among them 1(5.5%) patient in clean contaminated; 1(5.2%) patient in contaminated and 4(30.7%) patients in dirty type of surgical procedure developed post operative complications. All 6 patients in the case group developed surgical site infection as a post operative complication with local wound site sent for culture sensitivity analysis revealing Escherichia.Coli in 2 patients, Klebsiella. Pneumoniae in 2 patients and sterile in 2 patients. Out of 50 patients who were analysed through BACTEC analysis revealed Escherichia. Coli in 28 patients, Klebsiella.pneumoniae in 4 patients. Pseudomonas aeruginosa, Enterobacter. Cloacae, Enterobacter. Aerogens, Staphylococcus. Lentus, Pasteurella. Pneumotropica, Acinetobacter. baumannii, Pseudomona s.luteola, Sphingomonas paucimobilis in 1 patient and sterile report was given in 10 patients.

In the control group, 25 were clean contaminated, 13 were contaminated & 12 were dirty type of surgical procedure. Among them 8 (32%) patients on clean contaminated, 5 (38.4%) patients in contaminated and 5 (38.4%) patients in dirty type of surgical procedure developed post operative complications. A total of 18 patients in the control group

developed post operative complications, among which 13 patients developed surgical site infection. 1 patient developed loculated perisplenic collection, bilateral pleural effusion, 1 patient developed bileleak, pneumonia, peritonitis & sepsis and 3 patients were dead.

Among 13 patients who developed surgical site infection, local wound swab was sent for culture and sensitivity which revealed Klebsiella pneumoniae in 4 patients, Pseudomonas aeruginosa in 2 patients, Escherichia.Coli in 2 patients and sterile in 5 patients.

In this study analysis revealed increased incidence of post operative complications in the control group rather than in the case group due to microbial organism specific antibiotic coverage, antibiotic selection on the basis of sensitivity index and minimum inhibitory concentrations, intraoperative peritoneal contamination has occurred or not can be ruled out and finally it is cost effective because of specific antibiotic coverage and shorter hospital stay

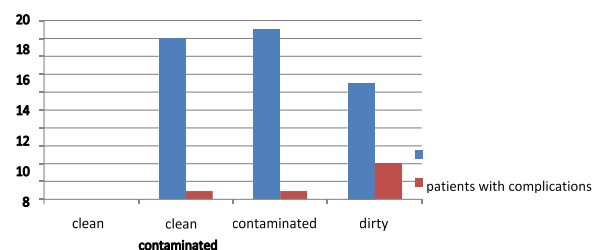
CONCLUSION:

The conclusion of this study states that there is a significant benefit in terms of prediction, prevention and timely management of post operative complications among those abdominal surgical cases in whom intraoperative peritoneal irrigation fluid was analysed through BACTEC test and prescribed antibiotics based on culture and sensitivity reports in comparison to control groups in whom intraoperative peritoneal irrigation fluid fluid was NOT analysed through BACTEC analysis and were prescribed antibiotics empirically. This study revealed increased incidence of post operative complications in the control group who were prescribed antibiotics empirically in comparison to case group who were prescribed antibiotics based on BACTEC analysis. So this BACTEC test can be used to determine and prevent postoperative complications in laprotomy patients with a good effect.

Tables And Figures:

Table 1: Number Of Patients With Intraoperative Irrigation Fluid Analysed Through Bactec Test & Specific Organism Obtained In Case Group

Organisms obtained by BACTEC test	Number of patients with specific organism
Escherichia. Coli	23
Klebsiella.Pneumoniae	4
Pseudomonas.Aueruginosa	1
Eneterobacter. Cloacae	1
Enterobacter. Aerogens	1
Staphylococcus. Lentus	1
Pasteurella. Pneumotropica	1
Acinetobacter. Baumannii	1
Pseudomonas.luteola	1
Sphingomonas paucimobilis	1
Sterile	10



Graph 1: Bar Diagram Depicting Total Number Of Patients With Complications In Case Group

REFERENCES:

1. Multicentre clinical comparison of resin- containing bottles with standard aerobic and anaerobic bottles for culture of micromigranism from blood. *Eur.J.Clin.Microbiol.Infect.Dis.*1997,16:669-674.
2. Pohlman JK, Kirkley BA, Easley KA, Basille, Washington JA, 1995. Controlled clinical evaluation of BACTEC plus aerobic/F and BACT/alert aerobic FAN bottles for detection of bloodstream infections. *J.Clin.Microbiol.* 33:2856-2858.
3. Roh KH, Kim JY, Kim HN, Lee HJ, Sohn JW, Kim MJ, Choy, Kim YK, Leeck, 2012, evaluation of Bactec plus aerobic and anaerobic blood culture bottles for detection of bacteremia in ICU patients, *Diagn microbial. Infect, Dis:* 73:239-242
4. Childs CE, Calder PC, Miles EA. Diet and Immune Function. *Nutrients.* 2019;11(8):1933.
5. Church D, Elsayed S, Reid O, Winston B, Lindsay R. Burn wound infections. *Clin Microbiol Rev.* 2006;19(2):403-434. doi:10.1128/CMR.19.2.403-434.2006
6. Christopher Bulstrode, B.V. Praveen MCQs and EMQs in Surgery: A Bailey & Love Companion Guide, 2010