

A Prospective Study of Single Dose Antibiotic Prophylaxis of Surgical Site Infections in Elective Surgery

Dr.Dibakar Hansda¹, Dr.Lakshman Hansda^{2*}

¹Professor, Department of Surgery, MGM Medical College, Jamshedpur.

²Assistant Professor, Department of Surgery, MGM Medical College, Jamshedpur.

Corresponding Author: Dr.Dibakar Hansda

Abstract:

Introduction: A surgical site infection (SSI) is defined as an infection that occurs at or near a surgical incision within 30 days of the procedure or within one year if an implant is left in place. In the twentieth century, the two key factors that have enabled surgical advances, such as open heart surgery and kidney transplants, to become routinely possible and safe are improved anesthesia and scientifically sound infection prevention practices.

Materials and Methods: This was a prospective study consisting of cases admitted to our hospital attached to MGM Medical College, Jamshedpur from January 2010 to June 2013 for a period of 3 years. During this period, 200 cases were selected for our study. The cases were grouped in to two categories; Group A and Group B of 100 cases each. Group A comprises patients who received a pre-operative single dose of ceftriaxone a broad spectrum cephalosporin. Group B received no such prophylactic antibiotic. The groups were split randomly into two groups taking into consideration the type of surgeries, the age of the patient, the presence or absence of risk factors for development of SSI, and associated medical conditions, all of which were represented in both the groups almost equal and a comparative clinical study was made. All were subjected to surgeries done under meticulous surgical technique.

Results: The incidence of age varied from 5 to 60 years but maximum number of patients belonged to 21 to 30 years age group. Six patients in group B were infected; one belonged to 41-50 years age group three belonged to the 51-60 years age group and other two in the 61-70 years age group.

Conclusion: From this study we can conclude that, in cases of clean surgeries there is no need for prophylactic antibiotics, as there is no statistical significance, whereas in clean contaminated cases antibiotic prophylaxis is recommended as it reduces SSI statistically significant.

Key words: Prophylactic, elective surgery, surgical site infection.

Date of Submission: 13-07-2018

Date Of Acceptance: 27-07-2018

I. Introduction

A surgical site infection (SSI) is defined as an infection that occurs at or near a surgical incision within 30 days of the procedure or within one year if an implant is left in place. In the twentieth century, the two key factors that have enabled surgical advances, such as open heart surgery and kidney transplants, to become routinely possible and safe are improved anesthesia and scientifically sound infection prevention practices.

Despite improvements in operating room practices, instrument sterilization methods, better surgical technique and the best efforts of infection prevention practitioners, SSI remain a major cause of nosocomial (hospital-acquired) Infections and rates are increasing globally.¹

The Centre for Disease Control and Prevention (CDC) estimates that approximately 500,000 SSI occur annually in the United States.² They are the leading cause of nosocomial infections after surgery, accounting for nearly 40 percent of nosocomial infections in surgical patients.³

Furthermore, patients who develop surgical site infections are five times more likely to be readmitted to the hospital, 60 percent more likely to spend time in the intensive care unit, and twice as likely to die compared with surgical patients without the infections.⁴ Cholecystectomy is one of the commonest operations performed by the surgeons worldwide. It being a clean contaminated surgery, use of prophylactic antibiotics (a brief course of an antimicrobial agent administered just before an operation) is mandatory to decrease the incidence of surgical site infections.³

In many trials worldwide it has been established that the single dose of prophylactic antibiotics is as effective as the multidose regimens. But still out of undue fear of surgical site infections the prophylactic antibiotics are being misused and continued for many days in post operative period adding to the cost burden to the patients as well as drug resistance in the microbes. To reduce the risk of nosocomial SSIs in developing countries, a systematic but realistic approach must be applied with awareness that this risk is influenced by

characteristics of the patient, the operation, the healthcare staff and the hospital. Our study aims to observe the surgical site infection rate in patients who are administered single dose prophylactic antibiotics.

II. Materials and Methods

This was a prospective study consisting of cases admitted to our hospital attached to MGM Medical College, Jamshedpur from January 2010 to June 2013 for a period of 3 years. During this period, 200 cases were selected for our study. The cases were grouped in to two categories; Group A and Group B of 100 cases each. Group A comprises patients who received a pre-operative single dose of ceftriaxone a broad spectrum cephalosporin. Group B received no such prophylactic antibiotic. The groups were split randomly into two groups taking into consideration the type of surgeries, the age of the patient, the presence or absence of risk factors for development of SSI, and associated medical conditions, all of which were represented in both the groups almost equal and a comparative clinical study was made. All were subjected to surgeries done under meticulous surgical technique.

On admission to the hospital, a detailed proforma was filled with details like the diagnosis, preoperative investigations and meticulous pre-operative patient preparation. All the patients were followed up to thirty days post operatively. Data were entered in the proforma. Wound swabs were sent for culture and sensitivity and the patients were treated according to culture and sensitivity reports. Patients were categorized as clean or clean contaminated cases depending on their complaints, clinical examination and diagnosis. Patients with infections like respiratory tract infections or urinary tract infections were treated prior to admission on out-patient basis and taken up for surgery after 2 weeks. All patients were admitted 2 days prior to surgery. Preoperative hospital stay was minimized to prevent the patient from getting the access to hospital infections. Patients with diabetes mellitus were treated appropriately with injectable insulin under precaution.

Preoperative skin preparation was done meticulously. Patients allowed to take a through scrub bath after which parts were prepared with povidone iodine and was isolated from the surrounding by covering operative site by sterile gauze. Patients were brought to the waiting room next day morning and were given single dose of IV ceftriaxone 1 gm under aseptic precaution half an hour before the surgery. All the cases were done in the morning hours. Patients were anesthetized under aseptic precaution. Sterile gauze was removed and patient's skin was painted with povidone iodine solution and sprit. Then the surface was allowed to dry. Then it was covered with sterile towels and sheets. Surgery was performed by senior staff, use of cautery was minimized. Movement in the operating room was restricted. Whenever necessary closed suction drain was introduced and wound was closed with sterile dressings.

Patients were isolated in the postoperative ward for at least 3 days. Drains were removed on 3rd or 4th postoperative day depending upon the secretions. Wounds were inspected on third day for any signs of inflammation, infection was noted down and findings were entered in the proforma. In cases where soakage of dressing and abnormal smells suggestive of infection dressings were inspected earlier than 3 days. If infected, wound swab was taken and sent for culture and sensitivity and antibiotic was started immediately in all infected cases. Sutures were removed on the seventh postoperative day. Patients were followed up to thirtieth postoperative day on OPD basis after discharged from hospital. All the data were entered in the proforma. The available results and outcomes in both groups were studied and analyzed and then they were compared with the previous studies and final conclusion was drawn.

III. Results

The present study consists of 200 clean and clean contaminated elective surgical cases admitted to hospital attached to MGM Medical College, Jamshedpur from January 2010 to June 2013 for a period of 3 years, were divided equally into two groups, Group A included 100 cases who received single prophylactic dose of 1 gm of cefotriaxone given intravenously half an hour before surgery and Group B included 100 cases who did not receive any such antibiotic prior to surgery.

The incidence of age varied from 5 to 60 years but maximum number of patients belonged to 21 to 30 years age group. Six patients in group B were infected; one belonged to 41-50 years age group three belonged to the 51-60 years age group and other two in the 61-70 years age group.

	Number of cases		Number cases which got infected		Rate of infection	
	clean	Clean contaminated	clean	Clean contaminated	clean	Clean contaminated
Group A	73	27	-	-	-	-
Group B	70	30	5	21	4%	34%
Total	143	57	5	21	1.98%	21.05%

Table 1: Infection rates in all cases

Risk factor	Group A	Group B	Total	Percentage
Anemia	12	17	28	29.67%
Diabetes mellitus	12	18	30	25.42%
Prolonged duration of surgery	0	21	21	17.79%
Old age	14	18	32	27.12%
Total	38	74	111	100%

Table 2: Distribution of risk factors in the affected group

Type of case	Group	Number of cases	Number of infected cases	Percentage
Clean	Group A	86	-	-
	Group B	79	5	1.65%
Clean contaminated	Group A	14	-	-
	Group B	21	17	18.67%

Table 3: Showing infection rate with and without prophylactic antibiotics in clean and clean contaminated cases.

IV. Discussion

Surgical site infection is well known thing. This has been documented since origin of surgery. Strict asepsis, meticulous surgical techniques, less handling of tissues, reducing the use cautary and use of prophylactic antibiotic have drastically reduced the incidence of SSI.

In the present study the use of third generation cephalosporin, single dose of IV ceftriaxone 1 gm is justified and having a prolonged half-life up to 8 to 12 hours which will take care of the wound in its initial crucial phase. It was administered half an hour before the incision under aseptic precaution to all the patients in group A and no patients in group A got infected when compared to the group B, where no such antibiotic was given and there was an incidence of infection rate of 8.33% (4 patients from clean surgeries and 20 from clean-contaminated surgeries were infected).

V. Conclusion

From this study we can conclude that, in cases of clean surgeries there is no need for prophylactic antibiotics, as there is no statistical significance, whereas in clean contaminated cases antibiotic prophylaxis is recommended as it reduces SSI statistically significant.

References

- [1]. Mohri Y, Tonouchi H, Kobayashi M, Nakai K, Kusunoki M. Randomised clinical trial of single-dose versus multiple dose anti-microbial prophylaxis in gastric cancer surgery. *Br J Surg* 2007; 94(6): 683-8.
- [2]. Fonseca SN, Kunzle SR, Junqueira MJ, Nascimento RT, de Andrade JI, Leven AS. Implementing 1-dose antibiotic prophylaxis for prevention of surgical site infection. *Arch Surg* 2006; 141(11): 1109-14.
- [3]. Scher KS, Wroczynski AF, Jones CW. Duration of antibiotic prophylaxis. An experimental study. *Am J Surg* 1986; 151(2): 209-12.
- [4]. Oostvogel HJ, van Vroonhoven TJ, van der Werken C, Lenderink AW. Single-dose versus short-term antibiotic therapy for prevention of wound infection in general surgery. A prospective, randomized double-blind trial. *ActaChirScand* 1987; 153(10): 571-5.
- [5]. Yousuf M, Hussain M. Need and duration of antibiotic therapy in clean and clean contaminated operations. *J Pak Med Assoc* 2002; 52(7): 284-7.
- [6]. Ali M, Raza A. Role of single dose antibiotic prophylaxis in clean orthopedic surgery. *J Coll Physicians Surg Pak* 2006; 16(1): 45-8.
- [7]. Zahid M A, Bakhsh R, Dar FS, Akhter N, Malik ZI. Comparison of single dose and three dose antibiotic prophylaxis with cefotaxime sodium in cholecystectomy. *J Ayub Med Coll Abbottabad* 2003; 15(1): 38-40.
- [8]. Yang Z. Short-term versus long-term anti-microbial prophylaxis in abdominal surgery: a multi-center open randomized comparative trial. *ZhonghuaWaiKeZhaZhi* 2001; 39(10): 770-2.
- [9]. Sabistons textbook of surgery 18th edition CHAPTER 14 surgical infections and choice of antibiotics (299-330) Daniel A, Anaya, E. Patchen.
- [10]. Bailey and Love's short practice of surgery 24th edition preparing patient for surgery (20-60) peter driscoll and christopherbulstrode.

Dr.Dibakar Hansda " A Prospective Study of Single Dose Antibiotic Prophylaxis of Surgical Site Infections in Elective Surgery."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 7, 2018, pp 52-54.