

TRENDS OF SURGICAL INTERVENTIONS ALONG WITH THEIR SURGICAL SITE EFFICACY OF SINGLE DOSE ANTIBIOTIC PROPHYLAXIS IN CONTROL OF SURGICAL SITE INFECTION IN CLEAN WOUNDS

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Abstract

Background: Numerous guidelines for the correct use of prophylactic antibiotics have been published in the recent years. Those guidelines and publications show that single dose prophylactic antibiotic therapy is efficacious for most of the procedures.

Aims and objectives: To study the efficacy of single dose antibiotic prophylaxis in control of surgical site infection in clean wounds.

Material & methods: In total, 100 subjects were chosen randomly from those posted for clean surgeries during the study period of one year.

Results: The infection rate was high amongst patients in whom the surgery lasted for above 60 minutes (33%). The incidence of postoperative wound infection was more or less similar in surgeries lasted for 1 to 2 hours. The overall incidence of postoperative wound infection was 4%. The patients who developed infection were in age of 30 -50.

Conclusion: It was observed that patients who had longer postoperative stay, had higher rate of surgical site infection.

Keywords: single dose antibiotic prophylaxis, clean wounds, surgical site infection.

Introduction

The scientific knowledge has provided an opportunity to discover new methods of therapy, which has changed and improved surgical practice during the last century, but infection is still one of the most feared complications. Burke¹ in a classical experimental study demonstrated not only the efficacy of antibiotics in preventing the surgical site infection (SSI), but there is also a time frame during which antibiotics should be given to be effective, essentially having antibiotics levels in blood only prior and during surgical procedure itself. One of the important risk factors in developing a wound infection is bacterial colony count at the surgical site. The threshold above which the risk is thought to increase substantially is greater than 10⁵ colony counts per gram of tissue. In the presence of foreign bodies, however, much lower count may result in development of an infection^{2,3}. Increasing health care costs have led hospitals and clinics to review procedures to adjust their budgets. Also, concerns with antimicrobial resistance have pressurized the treating physicians and surgeons to decrease the antimicrobial use. Therefore, it was necessary to do study to cut down use of antibiotics by their rational use without sacrificing the quality of health care. A single dose antibiotic therapy given at right time could save the unnecessary expenditure as well as reduce the problem of drug resistance^{4,5}.

Aims and objectives: To study the efficacy of single dose antibiotic prophylaxis in control of surgical site infection in clean wounds.

Material and methods: The present study is hospital based and has been designed to study the role of preoperative single dose antibiotic prophylaxis in control of surgical site infection in clean surgeries by department of Surgery. Study was carried out on subjects who were chosen randomly from those posted for clean surgeries in one year in the department of General Surgery. This is prospective follow-up study where all the cases irrespective of their sex and age, posted for clean surgeries were included. Patients on steroids, HIV positive, Diabetes mellitus, Intensive care unit patient etc were excluded from the study.

Data collection: Patients who were admitted for clean surgeries and satisfying the inclusion and exclusion criteria were selected randomly and taken as study subjects. Written informed consent was taken from study subjects. They were explained about the procedure and it's pros and cons. Detailed clinical history along with the physical examination was carried out. Diagnosis was made accordingly and the appropriate procedure was planned. All the Standard precautions recommended by CDC for control of post-operative infections were followed during pre-operative, intra-operative and post-operative period. The selected patients were given single dose of preoperative antibiotic 30 minutes before giving the skin incision in the operation theatre. Choice of antibiotic was amoxicillin &

clavulanic acid 1.2 gm I.V. (dose was adjusted according to weight in children) Subjects were assessed for pain, fever and post-operative wound infection during the hospital stay and on outpatient basis till the day of suture removal. The condition of the wound was assessed on the following days after surgery- 0,3,7,15 and 30. The wound infections were assessed according to the CDC guidelines. Analysis was carried out using Statistical Software Epi Info version.

Results:

Table I: age wise distribution:

Age group in yrs	Total
Less than 10	04
11-20	12
21-30	15
31-40	14
41-50	18
51-60	13
>60	24
Total	100

Table II: sex wise distribution

Sex	Number (n=100)
Female	23(23)
Male	77(77)
Total	100

Table III: Types of Surgery:

Sr. No.	Surgery	Number (n=100)(%)
1	Eversion of sac	24(24%)
2	Herniorrhaphy	17(17%)
3	Hernioplasty	20(20%)
4	Herniotomy	04(4%)
5	Excision of breast lump	15(15%)
6	Thyroidectomy	01(1%)
7	Orchidopexy	01(1%)
8	Circumcision	08(8%)
9	Testicular biopsy	01(1%)
10	Subcutaneous mastectomy	01(1%)
11	Excision of superficial swellings	08(8%)

Table IV: Duration of Surgery:

Duration of surgery	Number of patients (n=100)
Less than 1 hr	69(69)
1-2 hr	25(25)
More than 2 hr	06(6)

Table V: Rate of Surgical Site Infection:

Surgical site infection	Number of Patients (n=100)(%)
No	96(96)
Yes	04(4)

In present study, maximum number of patients were in age group 20 -50 (47), followed by patients in age group more than 60 yrs. Maximum number of operations performed were for hernia (41%), followed by hydrocele (24). In present study, time taken for surgery was less than 1 hr in 69 patients, while only 6 patients required more than 2 hrs for completion of their surgery. Surgical site infection was

seen in 4% patients and 96% were without surgical site infection.

Discussion

Wound infection has been a major problem for surgeons ever since the concept of surgery had begun and even today it remains a major source of postoperative morbidity. There are multiple factors that influence the development of infection like pre-existing disease, diabetes, type of surgery, duration of surgery etc. It is well established that antibiotics reduce the incidence of wound infections whether given prophylactically or therapeutically^{6,7}. The choice of antibiotic therapy requires periodic surveillance for prevalent organisms, identification of outbreaks of infections. The goal of prophylaxis is to ensure that satisfactory tissue concentration of drug is achieved and maintained during the surgery⁸. The aim is to prevent development of surgical infection rather than to treat the process after it is established. The antibiotic regimen used for prophylaxis should provide coverage for organisms that cause postoperative wound infections and the flora encountered during surgery and maintains adequate serum and tissue levels throughout the surgical procedure. To achieve this, prophylactic antibiotics are generally administered systemically prior to operation and need to repeat the doses depends upon the half-life of the agent used and duration of procedure. Antibiotic prophylaxis is not an option that permits low standards of antisepsis or sepsis. They are not substitute for careful technique, gentleness during surgery, ideal haemostasis and anatomical closure without tension and dead space. As it has been observed that as age advances, infection rate increases. In study by Cruse et al⁹ it has been observed that maximum number of patients who developed SSI were in older age group. However, in present study, this pattern was not seen. Lilani et al¹⁰ study found that hernia operation was most commonly performed clean surgery which is also similar to the present study. It has been reported by various authors that if preoperative stay is longer, the rate of SSI increases. This could be attributed to exposure of patients to hospital environment predisposing to nosocomial infections. Anvikar et al¹¹ reported an increase rate of infection when patients were in hospital for more than one week (5%) as compared to patients who stayed less than one day(1.76%). The duration of surgery increases, rate of surgical site infection also increases. Tripathy et al¹² in his study showed that longer duration of surgery predisposes patient to increase risk of surgical site infection. Anvikar et al found that similar results in one year study of 3280 surgical wounds. Various authors have used single dose perioperative antibiotic prophylaxis to prevent postoperative surgical site infection. In the present study, amoxicillin and clavulanic acid was given to all the patients for preoperative prophylaxis. Overall infection rate was 6.09% for clean and clean contaminated surgeries as reported by Anvikar et al and it was 4.04% in clean surgeries(n=3280). Similar were the observations in present study where overall infection rate is 4%(n=100).

Conclusions:

From the present study, it is apparent that the overall incidence of postoperative wound infection was 4%. Thus, it can be concluded that there is no significant rise in incidence of wound infection, even when single dose preoperative antibiotic prophylaxis was used. In clean operative procedures unless there are specific indications, routine use of postoperative use of antibiotic is not advisable. However, if the situation warrants multiple doses antibiotic prophylaxis may be considered. Hence in clean and simple surgeries where strict pre and postoperative asepsis is maintained, good surgical technique is used with minimal handling of tissues and the duration of surgery is less, single dose antibiotic prophylaxis is effective. Multi-dose antibiotics should be administered only after bacteriological study of the infected wound rather than routinely using them.

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