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ORIGINAL RESEARCH

A comparative study of no antibiotic vs. single dose prophylactic antibiotic administration in clean surgical cases

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ABSTRACT
Surgical wound site infection is one of the most commonly occurring complications in daily practice. Incidence of post-operative wound site infection has been lowest in clean surgical cases. Prophylactic antibiotics are routinely used in all surgical cases. But, this is not indicated in many such clean surgical cases. A comparative study of a total of 100 Patients undergoing elective clean surgeries. Data was collected by meticulous history taking, careful clinical examination appropriate hematological and microbiological investigations and follow up of the cases as planned according to the proforma prepared for the study intended. Among all the 100 cases, male patients were operated in large number with male to female ratio of 3:2 with majority of inguinal hernias (28%) and least with ear repairs (4%). Two cases (4%) in each group had post-operative infections noticed on the day 2 wound examination. All the four cases had culture positive with isolates being S aureus in three cases and E coli in single case.

Key words: Clean surgical cases, prophylactic antibiotic, post-operative wound infection

INTRODUCTION

Since time immemorial medicine is advancing from its infancy to the present stature in its development in skills, technology and other advancements. Surgery has been practiced in all the known civilizations on earth and procedures were known for many of the ailments.

Though they were painful, they have given the structural basis for the surgical skill development. Post-operative infections were common since the surgery is practiced though the rates have come down drastically after the invention of antibiotics.

Surgery is one of the streams where the patient is benefitted with the appropriate treatment to his ailment meantime, the complications associated with it. Both the surgeons as well as the patient are apprehensive regarding the outcome as well as the complications which would bring down the quality of life of the patient [1].

Surgical site infection is a type of healthcare-associated infection in which a wound infection occurs after an invasive (surgical) procedure. Other types of healthcare-associated infections that mainly affect surgical patients are postoperative respiratory and urinary tract infections, bacteremia and antibiotic-related diarrheas.

Surgical site infections can have a significant effect on quality of life for the patient. They are associated with considerable morbidity and extended hospital stay. In addition, surgical site infections result in a considerable financial burden to healthcare providers.

Advances in surgery and anesthesia have resulted in patients who are at greater risk of surgical site infections being considered for surgery. In addition, increased numbers of infections are now being seen in primary care because patients are allowed home earlier following day case and fast-track surgery.

Surgical wound site infection is one of the most commonly occurring complications in daily practice [1]. These wound site infections hinders the quality of life, extension in hospital stay, the cost incurred by the patient etc. Incidence of post-operative wound site infection has been lowest in clean surgical cases [2, 3].

Prophylactic antibiotics are routinely used in all surgical cases. But, this is not indicated in many such clean surgical cases [2, 3, 4, 5, 6]. The NICE guidelines emphasize on no administration of prophylactic antibiotics in clean cases [7].

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The European Hernia Society too has formulated the guidelines and it recommends in its Grades 1A and 1B that antibiotic prophylaxis does not significantly reduce wound site infections in non-mesh and with mesh repairs, respectively [8]. Due to undue fear of infections, still many practicing surgeons use antibiotics in clean surgical cases.

The proper usage of antibiotics in patients undergoing surgery is necessary, otherwise misuse of potent antimicrobials leads to drug toxicity, super infections, and colonization of wards by highly resistant microbes and high healthcare cost [9, 10].

So this comparative study is intended to assess the effect of no administration of pre- operative prophylactic antibiotics on wound site infections in clean surgical cases.

METHODOLOGY

STUDY SETTING: This study has been conducted at the Department of General Surgery.

TYPE OF STUDY: Comparative Study.

STUDY SUBJECTS: All cases of Clean Surgical cases presenting to Department of General Surgery.

INCLUSION CRITERIA

All patients undergoing elective clean procedures, that is, an uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered.

Surgeries included are thyroid surgeries, hernia repairs, varicose vein surgeries, soft tissue cysts excision, hydrocele surgeries, circumcision, Varicocele procedures, ear repairs etc.

Those patients who give valid consent for the study intended.

EXCLUSION CRITERIA

1. Age less than 18 and more than 65 years.
2. Patients with comorbid conditions like diabetes mellitus, hypertension, anemia, cardiac or renal disorders, jaundice, malignancy.
3. Malnourished and immunosuppressed patients.
4. Patients with infective focus in body.
5. Procedures more than 2 hour's duration.
6. Any break in aseptic measures.
7. Recent antibiotic therapy
8. Allergy to medications including cephalosporin.

STATISTICAL TESTS USED

Data was entered in Microsoft excel and was analyzed using SPSS software for descriptive and analytical statistics.

RESULTS

Inguinal hernias were considered for the study as it falls under clean cases. All the three kinds of hernias with laterality were considered in the study. Right sided formed the highest number with 8 cases in group A followed by 7 cases on the left side and single case of bilateral inguinal hernia.

In group B, left sided were more common with a total of 5 cases and 4 being bilateral followed by the right sided inguinal hernia with 3 cases.

Table 1: Varicose veins cases distribution

Varicose veins	Right	Left
Group A	3	3
Group B	4	3

Varicose veins with sapheno-femoral incompetence with multiple perforators were part of study where Trendenlenbergs procedure with stripping and perforator ligation was done according to the study design.

Among all the 13 cases, 6 cases were seen in Group A with equal number in both sides being 3 cases each.

In the Group B, 4 were operated on the right side and 3 on the left side with similar techniques under same conditions.

Table 2: Distribution of Cystic Lesions

Disease	Number
Lipoma	15
Sebaceous Cyst	10
Bakers cyst	3
Neurofibroma	4

Cystic lesions formed the major part of the study with highest number of 32 cases. Four types of lesions were seen in this study. Majority being lipomaaccounting to 15 cases followed by 10 cases as sebacorus cyst, four neurofibroma cases and three bakers cyst.

Table 3: Disease Distribution related to scrotum and penis

Scrotum/Penis	Group A	Group B
Hydrocele	3	2
Phimosis	2	4
Varicocele	1	1

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Diseases related to the scrotum and penis was considered in the study involving varicocele, hydrocele and phimosis.

In group A, 3 cases of hydrocele two cases of phimosis and single case of varicocele were operated and studies.

In group B, only two cases of hydrocele, four cases of phimosis and single case of varicocele taken into study.

According to the criteria, none of the procedures extended beyond 120 minutes. Maximum number of cases had a length ranging in the group of 30 to 60 minutes with 51%. Less than 30 minutes group had 26% and 60 to 120 minutes group with remaining 23%.

Table 4: Frequency of post-operative wound infections

Infection	Present N(%)	Absent N(%)	Total N(%)
Group A	2(4)	48(96)	50(100)
Group B	2(4)	48(96)	50(100)

According to the study design, wound examination was conducted on regular basis. In both the groups, 4% cases were infected with two cases each in both the groups.

Table 5: Isolates from wound infections

Organism	No	Percentage
Staphylococcus aureus	3	75
E coli	1	25

Pus was sent for Culture and sensitivity in all the four cases that had infection. A 75% case that is 3 cases had Staphylococcus aureus was isolated and in other case Escherichia coli was the isolate obtained. Later according to the sensitivity report, the medications were given and patient was treated.

DISCUSSION

In our study many disease were considered to see the frequencies of wound infections after the surgery. Lichtenstein tension free hernioplasty was done for all the inguinal hernia cases irrespective of laterality and indirect or direct component using prolene mesh 6" * 3" size.

Trendenlenbergs procedure with stripping of the vein was done in all the cases with no group bias after confirmation of sapheno-femoral junction incompetence and symptomatic patients. When the perforators were noted, perforator ligation was carried in same setting.

Scrotal lesions like hydrocele were treated with Jaboulays technique and high ligation was performed for the varicocele and strict scrotal support. Phimosis, a penile lesion was a common disease encountered was successfully treated with circumcision.

Fibro adenoma was the single most disease in breast that was operated in the study. Excision was done in all the cases taking circum-areolar incision.

For all the cystic lesions, excision was done many under local anaesthesia except for the baker's cyst where spinal anaesthesia was used. For two cases of lipoma over the nape of neck, short general anaesthesia was used to complete the procedure.

Elderly females presented to OPD with widened ear lobes where traditionally a heavy ear ring is wore by them for long years. An ear repair was carried out in them by approximating the ear lobes and making the ears useful for the successful wearing of the ear rings in future.

All the multi nodular goitre which was confirmed by fine needle aspiration and ultrasound of the thyroid gland was operated with total thyroidectomy and histopathology report confirmed the diagnosis in all the cases with no malignancy features.

There are many factors which affect the post-operative infection11. Mainly four main sources are the reasons for the wound infection to develop. They are personnel, equipment related, the environment and lastly the patient factors.

Many of them were operated on day care surgery basis, those required spinal or general anaesthesia were admitted into hospital and procedure was done. All the cases admitted are discharged on day 2/day 3 except patients who had post-operative infections. Two were discharged from the hospital healthy and with clean wound on day 5 and other two on day 7 of the post-operative period. Thus, there is significant reduction in the hospital stay too.

The personnel that are the surgeon involving all the members in his team have to maintain absolute asepsis in all the stages of the course of patient. Care must be taken that, all the equipment used are well within the expiry period and autoclaved in the standard methodology.

A surgeon can either prevent or decrease the risk of postoperative wound infection by correcting the factors involved in the development of postoperative wound infection. Prophylactic antibiotics are no substitute for good surgical practice including strict aseptic technique. Infection in a clean operation is always due to exogenous bacteria e.g., exogenous contact from breaks in technique by the operating team.

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In this study we have excluded all those patients who had any of the risk factor involved in the development of wound infection so that these factors should not affect the results of our study.

Wound infection rate reported in literature for clean wound is between 1.5 and 4%. Our study shows a wound infection rate of 4% without prophylactic antibiotics and same amount of 4% with prophylactic antibiotics.

A study by Erickson *et al*. in Tanzania showed that S. aureus was the most common isolate, followed by E. coli and *Klebsiella* spp. where in our study too the organisms isolated are S. aureus followed by E coli. [12].

Wound infections noted on Day 2 with immediate starting of antibiotic treatment with Injection Cefotaxim 1 gram intravenously resolved on Day 4. While in two other cases, infection was present on Day 5 wound examination and medications were started bases on the Sensitivity report. Report suggested continuing with same antibiotic Injection Cefotaxim as it was sensitive to the organism isolated. In later two cases, infection subsided on Day 6.

Most of the patients included in our study were young males with no predisposing factors. So the factors most probably operative in causing slightly higher infection rate in our patients were related to the surgical team or surgical environment.

This study also shows that there is no statistically significant difference in developing postoperative wound infection between those who were given perioperative prophylactic antibiotics (group A) and those who were not given perioperative prophylactic antibiotics (Group B).

CONCLUSION

Is it concluded that, decision to use prophylactic antibiotic therapy must be based on balancing possible benefits against adverse effects. Indiscriminate use of antibiotics should be discouraged because it may lead to emergence of antibiotic resistant strains of organisms or serious hypersensitivity reactions. Prolonged use of prophylactic antibiotics may also mask the signs of established infections, making the diagnosis more difficult in detecting early. We do not recommend antibiotic prophylaxis routinely in clean elective general surgical procedures.

In conclusion, this study suggests that routine perioperative antibiotic prophylaxis does not significantly reduce the incidence of post-operative wound infections in clean surgical operations.

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