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ORIGINAL ARTICLE

Effect of Prophylactic Antibiotics in Orthopaedic Surgery

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ABSTRACT

Background: Orthopaedic surgeries require sensitive protocol for prevention of infection pre and post-surgery. Antibiotic-prophylaxis has been reported for reducing risk of infection in orthopaedic surgeries such as removal of implants.
Aim: To assess the effect of prophylactic antibiotics in orthopaedic surgery.
Study design: Retrospective study
Place and duration of study: Dept. of Orthopaedics, Khyber Teaching Hospital, Peshawar from 1-1-2020 to 31-12- 2020.
Methodology: One hundred and ten patients within 18-75 years were divided into two groups. Each group had 55 patients. Group 1 were given prophylactic antibiotics pre-operative as a single dose while group 2 were given only saline. All patients were admitted for removal of orthopaedic implants in foot, ankle or leg. Patients 30 days record was observed for any surgical-site infection.
Results: The mean age of patient was 42.95±10.8 years. Group 1 and Group 2 had more males than females. There were 10.9% and 9.09% diabetic patients within group 1 and group 2. The 30 days assessment of post implant removal orthopaedic surgery showed a decrease of surgical-site infection in group 1. Surgical-site infection decreased by a rate of 5.4% among patients who were given cefazolin antibiotic.
Conclusion: The effect of prophylactic antibiotic reduces chance of surgical-site infection in orthopaedic surgery.
Keywords: Antibiotic-prophylaxis, Orthopaedic surgery, Implant-removal, Surgical-site infection

INTRODUCTION

Implants requiring metallic constitution are frequently required in fracture reduction and fixation. The use of prophylactic antibiotics has been reported to decrease surgical-site infection chances by 8.3-3.6% making its use as a routinely protocol before orthopaedic surgeries.[1]

The recommended protocol for majority of the patients is of keeping implants preserved until fracture completely heals. Still in many cases the removal is conducted on a global scale. Around 28-79% of implants from leg, foot or ankle surgery are reported to be removed due to various reasoning[2-8] with an incidence of surgical-site wound infection as zero to twenty percent in such cases.[9,10] A study reported surgical-site wound infection risk as 11.6% in cases where implants were removed.[3]

Within recent years due to consideration of implant as a clean procedure such as not involving any chance of dermal /local infection and having minimal risk of surgical-site infection the CDC has guided to cease the use of prophylactic antibiotics[11-14] However evidence based literature elaborated higher risk chances of surgical-site infection in orthopaedic surgeries especially related with implants[9,10,15]. Consequently there is a debate following requirement or cessation of prophylactic antibiotics[15].

Although annually a large frequency of orthopaedic surgeries involving implants are conducted in the world yet insufficient information regarding the use or disuse of prophylactic antibiotics is still prevailed[16].

The present study was designed to assess the efficacy of prophylactic antibiotics prior orthopaedic implant surgeries and its role in decreasing surgical-site infection.

MATERIALS AND METHODS

This retrospective study was conducted at Department of Orthopaedics, Khyber Teaching Hospital, Peshawar from 1st January 2020 to 31st December 2020 after permission from IRB.. There were total 110 cases and patients under the age of 18-75 years were divided into two groups. Group 1 (n=55) was given 1 gram cefazolin in saline (0.9% NaCl) bolus IV while only an identical bolus of saline (0.9% NaCl) was administered to group 2 (n=55). These patients were the one who were planned for orthopaedic implant removal of leg, ankle or foot. Patients already having a surgical-site infection, under antibiotic treatment, allergic to cephalosporin or immunosuppressant were excluded from the study. Each patient demographic, gender, clinical information was recorded. Patient's diabetic, smoking status as well as BMI measures were documented. The efficacy of the drug was calculated upto post 30 days of surgical removal of implant in context to surgical-site infection.

Superficial surgical-site infection was determined as: drainage from incision independent of lab findings, cultural identification of microbes in aseptically wound, pain/tenderness, swelling, heat or redness of wound. Data was entered and analyzed through SPSS 24.0

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RESULTS

The mean age of patients was 42.95±10.8 years. Group 1 and Group 2 had more males than females who underwent orthopaedic surgery for removal of the implant. The mean BMI of both groups suggested that majority of the patients were over-weight. There were 10.9% and 9.09% diabetic patients within group 1 and group 2 respectively (Table 1).

Majority of patients such as 52.7% in group 1 while 60% in group 2 had an implant removal for ankle which was followed by lower leg percentages as 27.3% and 23.63% in 1 and 2 groups respectively (Table 2).

The 30 days assessment of post implant removal orthopaedic surgery showed a decrease of surgical-site infection in group 1 which was given prophylactic antibiotic prior to surgical procedure in comparison to group 2. Moreover, there was no case reported with deep infection in Group 1 while 3.6% cases were seen in Group 2 to have deep wound infection (Table 3).

The present study reported that 56.36% patients out of total 110 underwent implant removal due to complain of pain in the implant. While the rest either had their personal reasons/consent for the removal or suffered an implant failure (Fig. 1).

Table 1: Distribution of demographic, BMI and diabetes in both groups

Variable	Group 1	Group 2
Males	33 (60%)	30 (54.5%)
Females	22 (40%)	25 (45.5%)
Age (years)	43.4±10.5	42.5±11.1
BMI (kg/m^2)	26.5±5.2	26.8±5.4
Diabetes	6 (10.9%)	5 (9.09%)
Smoker	12 (21.8%)	11 (20%)

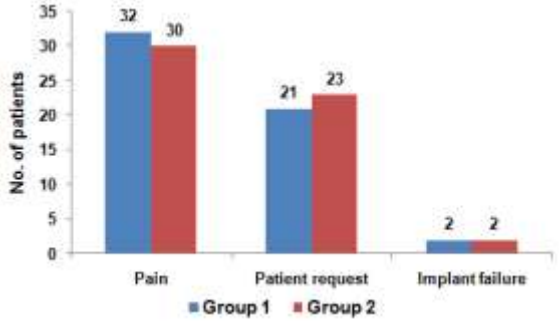
Table 2: Frequency of implant location in both groups

Removal of Implant	Group 1	Group 2
Tarsus	7 (12.7%)	6 (10.9%)
Ankle	29 (52.7%)	33 (60%)
Midfoot or Forefoot	4 (7.27%)	3 (5.45%)
Lower leg	15 (27.3%)	13 (23.63%)

Table 3: Frequency of infections in both groups

Variable	No.	%
Surgical-site infection	6 (10.9%)	9 (16.3%)
Superficial	6 (10.9%)	7 (12.7%)
Deep	-	2 (3.6%)

Fig 1: Reason for removal of orthopaedic implant



DISCUSSION

The current study was designed for assessing the efficacy of prophylactic antibiotics during orthopaedic surgery. There were more males in the study than females with middle age to be more frequent for implant removal.[16] It is reported that a single dose of cefazolin in preoperative protocol does reduce the chance of surgical-site infection.[16] The timeline of infection has been defined as up to thirty days post surgery. Similar protocol was adapted in current study and it was observed that surgical-site infection decreased by a rate of 5.4% among patients who were given cefazolin in a single dose prior to their implant removal surgery.

A retrospective study series have reported a higher rate of surgical-site infection in contrast to prospective studies where it becomes difficult to follow-up patient's post-surgical protocol.[2-7,15,17,18] It is important to note that 10.9% of patients who were receiving prophylactic antibiotic still developed surgical-site infection. Therefore antibiotic usage did not totally exclude the risk of infection as hypothesized. The reason could be the decrease in thrush hold of antibiotic which was administered pre-operation. Similar results have also been reported in a study from Netherlands as well as other part of the world.[16-19]

The wound was categorized on the basis iof CDC classification as prone for infection after surgical procedure. There were a large number of patients who were considered as infected without culture reports as suggested by the CDC criteria.[16] Patients having wound with necrosis at edge were also documented as surgical-site wound infected patients. These can be additional reasons for having an increased number of surgical-site infection cases in present study.

Cefazoline is a first-generation antibiotic having cephalosporin composition. It is a broad spectrum antibiotic having good efficacy against bone, tissue and muscle infections.[20] It has beneficial role in trauma surgical procedures related with orthoperdics.[1] A survey conducted at United States of America reported the use of cefazoline in almost 96 percent of orthopedic surgeries as a standard prophylaxis antibiotic.[21]

CONCLUSION

The prophylactic antibiotic in orthopaedic surgery reduces the chances of surgical-site infection.

Conflict of interest: Nil

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