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ORIGINAL RESEARCH

Comparison Of The Efficacy Of Short-Term Perioperative Antibiotic Prophylaxis With Long-Term SSI Preventative Antibiotic Administration

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Abstract

Introduction: The excessive and uncontrolled use of antibiotics leads to the development of drug resistance. Therefore, this study was done to examine the efficacy of short course versus long course SSI preventative antibiotic therapy after surgery.

Material and method: A surgical wound with a clinical diagnosis underwent a thorough examination. Pus samples were collected and sent directly to the microbiology department in a transport medium for further processing of the specimens using customary microbiological techniques (culture, identification, and antimicrobial sensitivity). For result analysis, SPSS version 20.0 with a 95% confidence interval was employed.

Result: 200 patients in all were participated in the trial, of which 100 were in Group I from the ages of 10 to 70 and 100 were in Group II from the ages of 7 to 70. The statistical findings for demographic traits and other risk factors, such as drunkenness, smoking, and diabetes, were non-significant. 200 patients were treated, and 142 (71.0%), 51 (25.5%), and 7 (3.5%) got spinal, general, and epidural anaesthesia, respectively. Just 8 patients (4%) experienced surgery site infection.

Conclusion: An elective orthopaedic surgery's risk of developing antibiotic resistance is reduced by using a brief course of perioperative antimicrobial prophylaxis to prevent infections. This procedure also reduces postoperative morbidity, unnecessary long-term antibiotic use, and hospital stays.

Key words: Orthopedic, prophylaxis, surgical wound

Introduction

One of the most devastating complications associated with any surgical procedure is infection, which can result in prolonged morbidity, disability, and increased mortality.[1] Antimicrobial prophylaxis has been accepted as a universal protocol for reducing postoperative complications pertaining to infections in surgical practice.Hospital acquired infections are the third most common problem in hospitals, affecting about 20% of patients in affluent nations. The majority of these infections are surgical site infections (SSI), which affect 5.6% of patients admitted for surgical care.[2] SSI is an infection that happens during or around the surgical incision 30 days to a year after the procedure, affects both the incision

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and the deep tissues in the areas of the body where the surgery took place, and its effects are highly relevant.[3] Patients who acquired SSI were more likely to frequent ambulatory and emergency departments and to frequently use radiological screening.

Poor inocula for implant-associated foreign body infections, skin commensals pathogenicity, a potential haematogenic cause for certain infections, and the need for prolonged post-discharge follow-up for implant-associated surgery for a minimum of one year are some specialties of SSI prevention in orthopaedic surgery that are unknown to general surgery. [4-7]

There is disagreement over the sort of antibiotics used and how long they should be administered in many surgical procedures. Long-term antibiotic prophylaxis results in drug resistance due to the excessive and unregulated use of antibiotics, which also leads to super infections with resistant pathogens.[8-10] Therefore, this study was done to examine the efficacy of short course versus long course SSI preventative antibiotic therapy after surgery.

Material and method

This prospective study was conducted. Informed written consent were taken from the patients who underwent through elective orthopedic surgery and ethics committee approval was taken from the institute.

Patients were split into two groups in an equal number. Prior to surgery, Group I patients received three doses of 1 g of intravenous (IV) ceftriaxone combined with 15 mg/kg of amikacin every 12 hours (first dose of which was given 30 minutes before the start of the surgery). Both groups received an additional perioperative dose of antibiotic when the surgical procedure lasted 2 hours or longer or if the patient required more than 1000 ml of blood transfusion. Patients on immunisation received the standard course of 5 days of intravenous antibiotics (ceftriaxone 1 g twice daily in combination with amikacin [15 mg/kg twice daily], followed by oral cefuroxime, 500mg twice daily until stitches were removed.

Clinically diagnosed surgical wounds were thoroughly examined, and pus samples were immediately collected and transported in transport medium to the microbiology department for additional processing of specimens (culture, identification, and antimicrobial sensitivity) by standard microbiological methods.[11] SPSS version 20.0 with 95% confidence interval was used.

Result

200 patients in all were participated in the trial, of which 100 were in Group I and 100 were in Group II. The statistical findings for demographic traits and other risk factors, such as drunkenness, smoking, and diabetes, were non-significant.

Table 1: Demographical details of patients

S.N.	Demographic Data	Group I (n=100)	Group II (n=100)	P-value
1	Age in years	35	37	0.3
2	Sex			
	Male	66	62	0.7
	Female	34	38	

Table 2: Type of surgery and infection rate

Type	Group I		Group II	
	N (%)	Infected patients	N (%)	Infected patients
Dynamic hip screw	24 (24%)	3	29 (29%)	0
Total hip anthroplasty	5 (5%)	0	8 (8%)	0
Plating	30 (32%)	4	24 (24%)	5
Hemiarthroplasty	10 (10%)	0	10 (10%)	0

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K Wring	10 (10%)	0	9 (9%)	0
Nailing	10 (10%)	0	9 (9%)	0
Spinal canal stenosis	4 (4%)	0	6 (6%)	0

Table 3: classification of surgical site of infection

Classification of infection	Group I	Group II	p-value
	N=100 (%)	N=100 (%)	
Superficial	5 (5%)	2 (2%)	0.19
Deep	2 (2%)	3 (3%)	0.29
Total	7 (7%)	4 (4%)	0.71

Escherichia coli and staphylococcus aureus were more common than klebsiella spp. among them. Pseudomonas species, too. Vancomycin, clindamycin, cefoxitin, and azithromycin were all effective against Staphylococcus aureus, but they were all resistant to amikacin, amoxiclav, and co-trimoxazole. Amoxiclav, cefixime, and cefoperazone + sulbactam were effective against Escherichia coli, but they had no effect on amikacin and co-trimoxazole. Aztreonam and imipenem were effective against Pseudomonas, whereas amikacin, cefepime, and ceftazidime had little effect. While Klebsiella was resistant to amikacin, ceftriaxone, and co-trimoxazole, it was susceptible to cefixime, imipenem, and amoxiclav.

Discussion

Post-operative wound infections have resulted in prolonged hospital stays for patients, which raises healthcare costs, as well as significant physical limitations that lower quality of life.[12] The goal of both surgeons and patients is to lower the SSI. Prophylactic antibiotics are playing a vital role in the prevention of SSIs.[13-15] However, the choice of antibiotic and its duration of administration remains a matter of personal taste. SSI rates ranged from 2.5% to 41.9% in studies conducted worldwide and from hospital to hospital. It is only a matter of time before antibiotic use is restricted, particularly given their prolonged use in the perioperative prophylaxis of broad-spectrum antibiotics.

We discovered a surgical site infection rate of 4.0, which was comparable to the findings of the previous studies (table/fig 6) [16,17]

Escherichia coli and staphylococcus aureus were more common than klebsiella spp. among them. Pseudomonas species, too. Other authors made similar observations and discovered Staphylococcus aureus to be the primary pathogen behind SSI. However, there was no statistical distinction between the two groups in terms of SSI rates.[18]

In this study's first-day antibiotic prophylaxis group, which had surgical site infection comparable to the 10-15 days, no statistically significant differences were seen. In a related trial, Mathur et al.[9] observed that perioperative antibiotic prophylaxis administered for a brief period of time was both cost-effective and effective in reducing infections. Another study by Kim et al.[19] compared the efficacy of 48 hours of antimicrobial therapy to that of 72 hours of dosing and concluded that 48 hours of antimicrobial prophylaxis was just as effective as 72 hours. In order to reach a high level of antibiotics in the plasma and tissues during and right after surgery, when bacterial infection was at its peak, a fair approach in the management of antibiotics in prophylaxis patients should be recommended. This needs to be done using prophylactic antibiotics using the right dosage, timing, and length of time.[20,21]

In these nations, perioperative prophylaxis places a significant financial burden on hospitals. By using perioperative antibiotic prophylaxis in the near term, toxicity, cost, and the onset of drug tolerance are reduced over the long term.

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Conclusion

An elective orthopaedic surgery's risk of developing antibiotic resistance is reduced by using a brief course of perioperative antimicrobial prophylaxis to prevent infections. This procedure also reduces postoperative morbidity, unnecessary long-term antibiotic use, and hospital stays. There is a lack of data in many parts of the nation; further research is required to demonstrate the need for short-term prophylaxis in these areas.

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