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Study of Single Dose of Antibiotic Prophylaxis in Clean Surgeries at a Tertiary Care Centre

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Abstract

Background: Pre-operative single dose antibiotic prophylaxis has shown to reduce the incidence of surgical site infections and thereby patient morbidity. **Aims:** To evaluate effectiveness of single dose antibiotic prophylaxis in clean surgeries at a tertiary care hospital. **Material and Methods:** A total of 72 patients undergoing clean surgeries were included after they satisfied the inclusion and exclusion criteria. **Results:** Single dose of an intravenous prophylaxis of ceftriaxone in clean surgeries excisional biopsy of lipoma, dermoid cyst, sebaceous cyst, enucleation of fibroadenoma, herniotomy, eversion of hydrocele etc. was efficacious in preventing surgical site infection. Surgical site infection was associated with patient's age, lower haemoglobin levels and longer hospital stay in 3 out of 72 patients. **Conclusion:** In the present study it was observed that prophylactic single shot of antibiotic is efficacious in averting surgical site infection and is economical for patients undergoing clean surgeries. Factors associated with surgical site infection were patient's age, haemoglobin and associated co-morbidity like diabetes.

Keywords: Antibiotic, Surgical Site Infection (SSI)

1. Introduction

Advances in infection control have been spectacular but infection is still the major limiter of surgical horizons. Postoperative wound infections leave a huge footprint on patient's quality of life and contribute substantially to patient's morbidity and economical burden of patient care[1].

Improper use of surgical antibiotic prophylaxis is common practice, for example, inaccurate timing, duration, doses and use of antibiotics. It is important to stress on the fact that surgical antibiotic prophylaxis is a supplement to, not a proxy for, good surgical technique[2,3].

Surgical Site Infections (SSI) are the infections of the tissues, organs, or spaces exposed by surgeons during performance of an invasive procedure. CDC definition states that only infections occurring within 30 days of surgery (or within a year in the case of implants) should be classified as SSIs[4].

The use of antibiotics during surgery has become a vital component of the standard of care in surgical procedures and has resulted in a decreased risk of post-operative infection when sound and apt principles of prophylaxis are applied[5].

But incorrect and overzealous use of antibiotics for this purpose leads to inflated hospital costs, counterproductive and/or a reduced susceptibility of bacteria to antibiotics. Therefore, a crucial quality measure of surgical care is the evaluation of proper antimicrobial prophylaxis[6].

By giving a single dose of antibiotic immediately before operation and keeping its blood level maintained only until the patient is back in bed and conscious,

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the well-known disadvantages of prolonged antibiotic prophylaxis could be avoided, since there would not be any time to suppress the normal bacteria[7-11].

The objective of this study was to evaluate the effectiveness of single dose antibiotic prophylaxis in clean surgeries at a tertiary care hospital and help in contributing to reducing incidence of SSI and reducing patient morbidity and financial burden and a more rational approach to appropriate antibiotic use to prevent antibiotic resistance.

2. Aims and Objectives

To evaluate effectiveness of single dose antibiotic prophylaxis clean surgeries at a tertiary care hospital.

3. Materials and Methods

Study Design: Observational study
Study Setting: Department of Surgery of Dr. Vasantrao Medical College Hospital and Research Centre, Nashik, Maharashtra
Study Duration: August 2018 to December 2020.
Study Participants: Sample Size: 72

3.1 Eligibility Criteria

Inclusion Criteria:

1. Age criteria (1 yr-65yr).
2. Patients who have given consent.

Exclusion Criteria:

1. Patients with co-morbid conditions / Immuno-compromised patients.
2. Patients allergic to Ceftriaxone.

3.2 Methodology

Patients coming to the OPD and admitted in the ward (IPD) for clean surgeries like excisional biopsy of lipoma, dermoid cyst, sebaceous cyst, enucleation of fibroadenoma, herniotomy, eversion of hydrocele etc. during the above mentioned period of evaluation were included. Written informed valid consent from each patient willing to be a part of this study was taken. Clinical history was taken, necessary investigations were done and details of surgery and post-operative course were recorded.

Antibiotic prophylaxis given was injection Ceftriaxone (1gm - 2gms I.V., children 50-100 mg/kg I.V.) at the time of induction of anaesthesia.

First check dressing was done after two days of surgery. In case of SSI was detected, wound swab or pus were collected for culture. Daily dressing was done according to standard aseptic practices. Patients were followed up at 48 hours, 7 days, 15 days, and 30 days. Any additional treatments (like antibiotics or debridement of wound) was noted down the primary outcome for the study was to observe the effectiveness of a single prophylactic dose of antibiotic in preventing surgical site infections as defined by CDC guidelines.

4. Results

In the present study, prevalence of surgical site infections was found to be 4.2% (Table 1).

Table 1. Distribution of study groups as per incidence of surgical site infections

SSI	Number	%
Non-Infected	69	95.8%
Infected	3	4.2%
Total	**72**	**100.0%**

It was found that the mean age of patients with SSI was significantly higher than those without SSI (Table 2).

Table 2. Mean age comparison among cases with and without SSI

Variables	SSI	Number	Mean	SD	p- value
Age (years)	Infected	3	61.20	0.84	<0.01
	Non-Infected	69	51.15	5.98	

Among the co-morbidities, diabetes was significantly associated with the occurrence of SSI (Table 3).

Patients with SSI had lesser mean Haemoglobin; however the association was not statistically significant (Table 4).

Patients with SSI had a significantly higher number of days of hospital stay than those without SSI (Table 5).

5. Discussion

In present hospital based study, we aimed to evaluate effectiveness of single dose antibiotic prophylaxis in clean surgeries at a tertiary care hospital. Study included 72 patients visiting the OPD and IPD for clean surgeries in

Table 3. Association of incidence of SSI with co-morbidities

Co-morbidities	SSI		Total	p-value
	Non-Infected	Infected		
Hypertension	16	1	17	0.41
	94.1%	5.9%	100.0%	
Diabetes	10	3	13	<0.05
	76.9%	23.1%	100.0%	
IHD	7	1	8	0.17
	87.5%	12.5%	100.0%	

Table 4. Mean haemoglobin comparison among cases with and without SSI

Variables	SSI	Number	Mean	SD	p- value
Haemoglobin Levels (gm %)	Infected	3	9.19	1.20	0.11
	Non-Infected	69	10.32	1.19	

Table 5. Mean post-op hospital stay comparison among cases with and without SSI

Variables	SSI	Number	Mean	SD	p- value
Post-op Stay (days)	Infected	3	5.91	2.56	<0.01
	Non-Infected	69	3.91	1.21	

our hospital. Antibiotic prophylaxis given was injection Ceftriaxone (1gm - 2gms I.V., children 50-100 mg/kg) at the time of induction of anaesthesia.

The prophylactic antibiotic was chosen to be Ceftriaxone considering its broad spectrum, long t1/2 and good efficacy.

The primary outcome was development of surgical site infection as defined by CDC guidelines. Surgical infection in present study was observed in 3 out of 72 cases i.e. an incidence rate of 4.2%. All the cases were of superficial infections.

Mean age of the cases with surgical site infections was significantly higher i.e. 61.2 years as compared to 51.15 years of cases without surgical site infections.

Out of the various co-morbidities present in the study subjects, presence of diabetes was significantly associated with development of surgical site infections

We observed that prolonged hospital stay (5.91 vs 3.91; $p<0.01$) to be significantly associated with incidence of SSI. No association of SSIs was observed with gender, obesity and duration of surgery.

Thus to summarize, we observed that single dose antibiotic prophylaxis was sufficient for clean surgeries with very low incidence of surgical site infections. Also, by using the single dose antibiotic prophylaxis the cost of the treatment can also be reduced. As the overuse of antibiotics may lead to higher hospital costs for patients and increase the emergence of antibiotic resistance in microorganisms.

6. Conclusion

In the present study it was observed that prophylactic single-dose antibiotic is efficacious in preventing surgical site infection and is economical in patients undergoing clean surgeries. Factors associated with surgical site infection were patient's age, haemoglobin and associated co-morbidity like diabetes. No association of SSIs was observed with gender, obesity and duration of surgery.

We thus conclude that, single dose pre-opprophylactic antibiotic should be preferred, especially in cases with clean surgeries.

7. Recommendations

Infection has been a major impediment to surgical progress throughout the history of surgery. Antibiotics have played a crucial role in reduction of infections in surgical patients. Bacterial resistance to antibiotics and surgical site infections have added significantly to patient morbidity and financial costs of patient care also

burdening the health care system. It is thus imperative to stress onappropriate use of antibiotics like single dose of antibiotic prophylaxis.

8. References

1. Hunt K Thomas. Surgical wound infections: An overview. The American Journal of Medicine. 1981 March; 70:712-718. https://doi.org/10.1016/0002-9343(81)90602-1.
2. Bailly P, Lallemand S, Thouverez M, Talon D. Mutlicentre study on the appropriateness of surgical antibiotic prophylaxis. Journal of Hospital Infection. 2001; 49:135-138. https://doi.org/10.1053/jhin.2001.1064. PMid:11567560.
3. Sanchez-Manuel FJ, Seco-Gil JL. Antibiotic prophylaxis for hernia repair. Cochrane Database Syst Rev. 2004. https://doi.org/10.1002/14651858.CD003769.pub2. PMid:15495064.
4. Arvind Diwaker, Ashirvad Datey, Dewesh Verma. A comparative study of Single dose versus multiple doses of antibiotic prophylaxis in open inguinal hernioplasty. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). May 2018; 17(5):28-32.
5. Borse H, Shelke R. Study of various organisms associated with surgical site infection and their sensitivity pattern. MVP Journal of Medical Science. 2015 Dec 1; 2(2):118-123. https://doi.org/10.18311/mvpjms/2015/v2/i2/785.
6. Suggested Recommendations and Guidelines for Surgical Prophylaxis. Available at http://www.intmed.mcw.edu/drug/surgproph.html.
7. Surahio AR, Khan AA, Farooq MU, Fatima I. Single versus 3-dose antibiotic prophylaxis in clean and clean contaminated operations. Journal of Ayub Medical College Abbottabad. 2010 Dec 1; 22(4):91-94.
8. Dutt CK, Shukla A, Dutt RD. Single dose antibiotic prophylaxis in planned surgical procedures in Gwalior. Int J Med Res Rev. 2015; 3(8):877-883. https://doi.org/10.17511/ijmrr.2015.i8.165.
9. Bendre M, Kshirsagar V, Male P, Rathod S, Khandalkar S. Role of single dose antibiotic prophylaxis in clean general surgery. JMSCR. 2016; 4(6):56-61. https://doi.org/10.18535/jmscr/v4i6.56.
10. Borade SV, Syed O. Single dose antibiotic prophylaxis for prevention of surgical site infection in elective surgery. Int Surg J. 2018; 5:27-33. https://doi.org/10.18203/2349-2902.isj20175494.
11. Madhu BS, Kumar SHB, Reddy NKM, Reddy AV, Kalabhairav S. Effect of single dose pre-operative antibiotic prophylaxis versus conventional antibiotic therapy in patients undergoing lichtenstein tension free mesh repair. Int Surg J. 2017; 4:738-742. https://doi.org/10.18203/2349-2902.isj20170224.

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