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Original Article

A study of effect of antibiotics after culture and sensitivity of surgical sites infection cases in a medical college

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ABSTRACT

Backround: The role of pre-operative antibiotics in wound sepsis is well established. The selection of drug, timing and duration of administration are very significant.Prolonged use of prophylactic antibiotics may lead to superinfection This study was conducted to find out the effect of antibiotics after culture and sensitivity of surgical sites infection cases and prevalence of surgical site infection among post surgical cases at Calicut Medical College. Methodology - The study was conducted in the Department of Microbiology, Medical College, Calicut for a period of one year from July 2007 to June 2008. One hundred and two cases of clinically suspected postoperative wound infection from the above cases was studied in detail. The study included 27 'clean', 32 'clean-contaminated' , 13 'contaminated' and 30 'dirty' cases. Two swabs were collected from each site. One swab was used for direct smear examination after Gram staining and second swab was subjected to culture and antibiotic sensitivity testing by standard microbiological techniques. Results - The incidence of postoperative wound infection was 5.36%. Among one hundred and two clinically suspected cases studied, bacteriologically proven surgical site infection was identified in thirty six patients. The prevalence of infection being 35% (36/102).Lowest infection rate was seen in clean(18.5%) surgery followed by clean-contaminated(37.5%), contaminated(38.5%) and dirty surgeries(47%). MRSA (Methicillin resistant Staphylococcus aureus) and multidrug resistant gram negative bacilli were predominant isolate. Change in antibiotic according to the culture and sensitivity report was made in ten cases.These ten cases had good response to treatment when put on appropriate antibiotics. Conclusion -. If the antibiotics given were sensitive to the isolate, infection was controlled without changing the antibiotic.But in ten cases a change to susceptible antibiotic after antibiotic sensitivity testing was made and infection was controlled completely in all these cases. culture and sensitivity from surgical site infection is mandatory in established infection.

1. Introduction

The role of pre-operative antibiotics in wound sepsis is well established. The selection of drug, timing and duration of administration are very significant.Prolonged use of prophylactic antibiotics may lead to superinfection. Decrease in protective flora with the overgrowth of other potentially infecting flora can occur[1]. Therefore the duration of antibiotic administration should be dealt with care. Metronidazole contributes to a low sepsis rate from anaerobes such as Bacteroides fragilis following surgery on colon and Benzyl penicillin plus Cloxacillin may be used to cover amputations and hip surgery, so that the chances of postoperative gangrene due to Clostridium perfringens infection are reduced.[2].Classen et al (1989) documented the lowest infection rate of 0.59% in patients who received prophylactic antibiotics[3]

2. Materials and Methods:

The study was conducted in the Department of Microbiology, Medical College, Calicut for a period of one year from July 2007 to June 2008.

The total number of elective and emergency surgeries done during the one year period in the three units was 1902 . One hundred and two cases of clinically suspected postoperative wound infection from the above cases was studied in detail. The study included twenty seven 'clean', thirty two 'clean-contaminated' , thirteen 'contaminated' and thirty 'dirty' cases.

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Two swabs were collected from each site. One swab was used for direct smear examination after Gram staining. The second swab was subjected to culture and antibiotic sensitivity testing by standard microbiological techniques.Identification of bacteria was carried out as described by Koneman.[4]Antibiotic sensitivity testing of the isolates was done by the Stokes method for *Staphylococcus* and Kirby Bauer method for Gram negative bacilli.

3. Results:

Out of the one hundred and two cases studied, thirty six cases showed infection . (table – 1)

The pathogenic organisms isolated from the thirty six cases of wound infection are given below. (Table2) Antibiotic sensitivity pattern of these isolates as shown in table-3.(table-3)

Change in antibiotic according to the culture and sensitivity report was made in ten cases. Details of which are shown in Table 4.These ten cases had good response to treatment when put on appropriate antibiotics.

For two cases, the microorganisms isolated were susceptible towards the initial postoperative antibiotics. Rest twenty four cases were continued on the same antibiotics which they were started on irrespective of the culture and sensitivity report .Infection control was attained in these cases without changing the original postoperative regimen.

Table 1 : Prevalence of infections in clean , clean-contaminated, contaminated and dirty surgeries

Category of surgery	No.of clinically suspected cases	No.of cases with infection	Prevalence of infection (%)
Clean	27	5	18.5
Clean-contaminated	32	12	37.5
Contaminated	13	5	38.5
Dirty	30	14	47
Total	102	36	35

Fig.1: Prevalence of postoperative wound infection in the study group

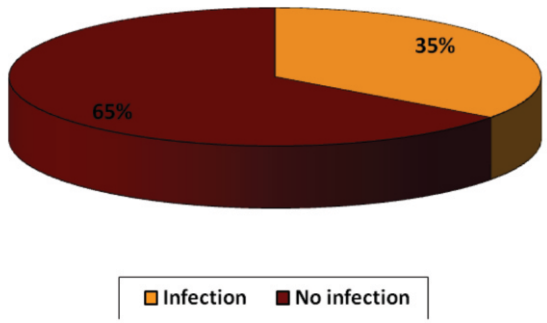

Table 2: Organisms isolated from infected wounds

Organisms	No.of isolates	% of isolation
Staphylococcus aureus	18	43
Escherichia Coli	15	36
Pseudomonas aeruginosa	4	9.5
Klebsiella Oxytoca	1	2.3
Enterobacter kobei	1	2.3
Enterobacter intermedius	1	2.3
Acinetobacter baumannii	1	2.3
Serratia marcescens	1	2.3
Total	42	100

Table3: ABST pattern of the isolates in (%)

ANTIBIOTIC	*S. aureus* 18	*E. Coli* 15	*Entero-bacter* 2	*Pyo* 4	*Kleb* 1	*Serratia* 1	*Acineto* 1
P	Nil	NT	NT	NT	NT	NT	NT
E	Nil	NT	NT	NT	NT	NT	NT
G	22.2	13.3	Nil	25	100	Nil	100
A	NT	Nil	Nil	NT	Nil	Nil	Nil
Va	100	NT	NT	NT	NT	NT	NT
Cf	22.2	Nil	Nil	Nil	Nil	Nil	100
Cefta	NT	NT	NT	25	NT	NT	NT
Ox	27.7	NT	NT	NT	NT	NT	NT
Pip	NT	NT	NT	25	NT	NT	NT
Ak	NT	73.3	100	25	100	Nil	100
Cip	NT	Nil	50	25	Nil	Nil	100
Ceftri	NT	Nil	Nil	NT	Nil	Nil	100

Abbreviations - P-Penicillin,E-Erythromycin,G-Gentamicin,Va-Vancomycin,Cf-Cefazolin.

A-Ampicillin,G-Gentamicin,Ceftri-Ceftriaxone,Ak-Amikacin,Cip-Ciprofloxacin,

Cefta- Ceftazidime , NT – Not tested , ABST - Antibiotic sensitivity testing

Table4 :Pre and Post operative Antibiotics given and change in antibiotic made according to culture and sensitivity

Name of surgery	Preop	Postop	Culture and sensitivity	Change
Tracheal resection	Amoxycillin	Ceftriaxone Cotrimoxazole	E.Coli Ak AGCip Cf Ceftri + -	Amikacin
Laparotomy	Cefpodoxime	Cefpodoxime	Staphylococcus aureus VaLz GPEOx + -	Linezolid
Laparotomy with hysterectomy	Cefotaxime Metronidazole	Amikacin Metronidazole	Pseudomonas aeruginosa GAkCippipcefta piptaz - +	Piptaz
Laparotomy for perforation peritonitis	Cefotaxime Metronidazole	Penicillin Metronidazole	E.Coli GAk ACfCipCeftri + -	Amikacin
Laparotomy for perforation peritonitis	Metronidazole cefotaxime	Ceftriaxone Metronidazole	E.Coli AkG ACf Cip Ceftri + -	Amikacin
Laparotomy for perforation peritonitis	Piptaz Metronidazole	Norfloxacin Metronidazole	E.Coli AkG CipAzCeftriCf Imi - +	Imipenem
Laparotomy for perforation peritonitis	Ceftriaxone	Ceftriaxone Metronidazole	E.Coli AkG ACf Cip Ceftri + -	Amikacin
Paraumbilical hernia with appendicular abscess	Penicillin Metronidazole Amikacin	Penicillin Metronidazole Amikacin	Staphylococcus aureus Va PGECfOx + -	Vancomycin
Laparotomy for irreducible obstructed hernia	Ceftriaxone Metronidazole	Ceftriaxone Metronidazole	E.Coli Ak AGCfCip Ceftr + -	Amikacin
Laparotomy for intestinal obstruction	Ceftriaxone Metronidazole	Cefotaxime Norfloxacin	E.Coli Ak AGCf Cip Ceftr + -	Amikacin

4. Discussion

The advancements in modern medicine has helped to control postoperative wound infection by the introduction of aseptic techniques and by improving the quality of operation theatres and surgical techniques. [5] But the indiscriminate use of antibiotics and lack of proper control measures have contributed to the high infection rates. [6]

The present study was done on 'clean', 'clean-contaminated', 'contaminated' and 'dirty' cases of surgical wounds.

In the present study the incidence of postoperative wound infection is 5.36%.of the one hundred and two clinically suspected cases of post operative wound infection studied. Prevalence of infection in the study group is 35%.

The prevalence of postoperative wound infection among 'clean' cases was 18.5%, 'clean-contaminated' 37.5%, 'contaminated' 38.5% and 'dirty' 47%.

According to a study the incidence of SSIs with regard to abdominal surgical sites and operating conditions is as follows: clean wounds (1.5-3.7%), clean – contaminated (3-4%), contaminated(8.5%) and dirty-infected wounds (28-40%).[7]

While the global estimates of SSI have varied from 0.5 – 15%, studies in India have consistently shown higher rates ranging from 23 – 38%. [8,9]A prospective study of surgical site infections in a teaching hospital in goa the overall SSI rate was estimated to be 30.7%. 5.4% for clean, 35.5% clean-contaminated and 78.8% for contaminated operations.[10] If the antibiotics given were sensitive to the isolate, infection was controlled without changing the antibiotic.But in ten cases a change to susceptible antibiotic after antibiotic sensitivity testing was made and infection was controlled completely in all these cases.

5. Conclusion

The study was selected to find out the pattern of postoperative wound infection and the role of antibiotics in these patients which is responsible for much morbidity and mortality to patients.The prevalence rate of post operative wound infection among study group was 35%.. If the antibiotics given were sensitive to the isolate, infection was controlled without changing the antibiotic.But in ten cases a change to susceptible antibiotic after antibiotic sensitivity testing was made and infection was controlled completely in all these cases. Antibiotics have a definite role in the treatment of established infections. Development of a suitable antibiotic policy is essential for our hospital to reduce the surgical site infection rates.

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