Perioperative Single Dose Antibiotic Therapy in Elective Surgery

Pages with reference to book, From 112 To 115

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Abstract

A placebo controlled study was undertaken to evaluate the role of antimicrobials as a single 24 hours cover peri-operatively. Patients matching in proposed surgery, age, sex, diagnosis and built were divided into three groups. Group 'A' was on placebo, group 'B' received full dose of antibiotics by conventional method and group 'C' received antibiotics as a single 24 hour cover pèrioperatively. The post operative incidence of complications was 27% in placebo, 13% in group B and 7% in group 'C'. The comparatively more effective, safe and economical.perioperative use of antibiotics has been found to be (JPMA35: 112, 1985).

Introduction

Infection of a. surgical wound is always an undesirable problem, both for the patient and the doctor. Its effects may be particularly discouraging after major surgery where sometimes it may lead to fatality.[1] Operative treatment was regarded safe only after the introduction of strict aseptic techniques. However, there is always a possibility, inspite of great care, of either wound contamination or bacteraemia in certain patients which may lead to infection. Further safety is achieved towards uneventful recovery by antibiotic and chemotherapeutic agents. Whereas these antibiotics have their advantages, unfortunately they are not free from side effects. Their haphazard and extended use may cause serious disturbances of body mechanisms and they have other toxic adverse effects.[2]

The present study was conducted on 180 patients admitted to North Surgical Unit, Mayo Hospital, Lahore with the purpose of evaluating the role of antibiotics when given before operation and during first 24 hours. This regimen was compared with placebo and the conventional methods of use of antibiotics.

The trial was carried out with the aims to determine the role of antibiotics when used perioperatively in clean surgical procedures, to find out the advantages and disadvantages of antibiotics administered for an extended period in elective surgical procedures and to determine if their use for this length of time was judicious, to do culture and sensitivity in infected cases with a view to choose an ideal periopertive drug, to pin point the source of infection in a clean surgical procedure.

Material and Methods

One hundred and eighty patients undergoing elective surgical procedures were included in this study. The trial extended over a period of one year (January 1983 to April 1984). Patients with obvious infection both local and systemic, and other generalized debilitating conditions like diabetes, uraemia, C.C.F., and liver diseases were excluded from the trial. Patients were assigned at random to one of three groups. Group 'A' where no antibiotics were used, group 'B' where antibiotics were used by conventional method and group 'C' when antibiotics were used perioperatively. Each group matched in diagnosis, age sex and built. A retrospective matching between two consecutive operations lists was done to overcome the difficulty of matching cases in a single list.

All the cases were operated by the same surgeon, Similar type of anaesthesia, skin preparation and suture material were used, Postoperatively all wounds were covered with polyurethane membrane, to facilitate frequent wound examination[3]
A daily record of general and local signs of inflammation was kept. Patients were enquired about any malaise and anorexia: Temperature was recorded 6 hourly. Wound were inspected daily for any redness, oedema, induration and discharge upto a period of 7 days. The findings were recorded by independent observers who were uninformed about the grouping. Pyrexia 100°F or.above was investigated for evidence of local or systemic infection. In case of wound infection culture and sensitivity studies were done and appropriate antibiotic was given.

Discussion

The idea of prophylactic use of antibiotics is not a new. As early as in 1930, penicillin was used for prophylaxis in pulmonary surgery.[4] Since then there have been a number of reportes about antibiotic prophylaxis in different disciplines of surgery.[5] Recently interest in this field has risen again. In 1973 the beneficial effects of cephaoridine in different general surgical and abdominal operations were reported.[6] For patients in protective isolations, antibiotic prophylaxis was considered beneficial[7] and its value in vascular surgery was proved in 1980[8]. Single dose doxycycline as a prophylactic measure was found effective by peroperative bacteriological culture in elective colorectal surgery[9] A single dose of arnoxicillin, cotrimoxazole or trime. thoprim, controlled urinary tract infection in 87.5% ot 90% patients.[10] It was also observed that a change of antibiotic did not materially affect the results as long as the bacteria were sensitive.[10] Three doses of cotrimoxazole in acute urinary tract infections, improved the results to 94%[11] Its advantage in pulmonary surgery ortec[12] A single dose Tinidazole and ycycline dine was effective in controlling wound hfection in elective surgery of colon and rectum.[13]
The purpose f this study was to evaluate the following hypothesis: the presence of antimicrobial agents in blood and tissues at the t' when the tissues are challenged with patt micro-organisms and following 24 hreduce the frequency of infection".
In this study four antimicrobials of different groups were used by two different regimens.
An attempt was made to compare the results under similar standardized conditions.
The results of this study show a higher incidence (21%) of local infection at the operative site when no antibiotic was given necessitating the use of an antimicrobial for better results. Frequancy of wound infection in colorectal surgery when no antibiotic was used varies from 25-60%[14,15]
In other trials it was as high as 50%[1617] When antibiotics are combined in. the post operaüve management, the incidence of septic complications falls constderably.[18] In this study when antibiotics were started after the operation and continued till the time of removal of stitches, the incidence of septic complications fell to 1 2%. When the antibiotic was administered for the first 24 hours, the incidence was even lower ie 7% This clearly shows that perioperative use of antibiotics gives better results than their conventional and extended use.
The important reduction of chemotherapeutic consumption offered by 24 hours dose schedule can save, the patient from a number of untoward reactions associated with specific drugs[19]. Antimicrobial agents will also decrease the incidence of staphylococcal enterocoli tis, pseudomembranous enterocolitis and infection due to opportunistic organisms which are well documented complications of their prolonged use.[20] It will discourage the development of resistant strains as well[21]
It was therefore observed that the perioperative method of antibiotic administration is effective, economical and safe. Use of antibiotics in elective surgical procedures for an extended period of time is not judicious. The results of this trail show that any one of the broad spectrum antibiotics can be

utilized as a perioperative drug. study also highlights the fact, that the most ent causative factor for operative site in-
on is the contamination at the time of uperation. If these micro-organisms are checked by a high (bactericidal) serum concentration before they start multiplying in the wound haernotorna, the incidence of septic complications will fall considerably.

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Results

Table 1. Age and Sex

Age in years	Male	Female
0 – 10 years	–	–
11 – 20 ”	2x3	1x3
21 – 30 ”	16x3	2x3
31 – 40 ”	14x3	3x3
41 – 50 ”	12x3	4x3
51 – 60 ”	3x3	2x3
61 – 62 ”	1x3	–
Total :	48x3	12x3
	144	36=180

Table 1 shows the age and sex of 180 cases, divided into three groups of 60 each.

Table II

Types of operations.

No.	Operations	Male	Female	Total
1.	Excision of cold nodule or partial thyroidectomy	8x3	5x3	13x3
2.	Inguinal herniorrhaphies	11x3	–	11x3
3.	Elective appendicectomies	5x3	3x3	8x3
4.	Cholecystectomies	5x3	2x3	7x3
5.	Elective laparatomies	4x3	–	4x3
6.	Pyelolithotomies	3x3	–	3x3
7.	Ligation of varicococlc	3x3	–	3x3
8.	Lord's operation for hydrocoele	3x3	–	3x3
9.	Haemorrhoidectomies	2x3	–	2x3
10.	Uretolithotomies	2x3	–	2x3
11.	Enucleation of fibroadenoma breast	–	2x3	2x3
12.	Mayo's Repair for Epig. Hernia	2x3	–	2x3
	Total	48x3 144	12x3 36	60x3 180

Table III shows details of the administration of different antibiotics used during operations.

Table III

Time duration and dose of antibiotics

No.	Antibiotic	Group B	Group C
1.	Cotrimoxazole	Injectable till the patient started orally then 2 tab. B.D.	One injection 2 hour before operation and one injecfion after 12 hours.
2.	Kefazolin	Injectable 500 mg 8 hourly till the patient was started orally then 500mg tab. 8 hourly.	500mg 2 hours before operation and repeated 8 hourly for first 24 hours.
3.	Ampicillin	500mg injection till the pateient was started orally then 500mg cap. for 7 days 6 hourly.	500mg injection 2 hours before operation and then repeated 6 hourly for 24 hours.
4.	Doxycycline	200mg injection stat then 100mg as single dose daily for 7 days.	200mg injection, 2 hours before operation as a single dose.

One hundred and fourty four were males and 36 females, their ages varied between 12 and 62 years. Twenty seven of 180 patients had varion local and general complications. They occurea m 21% and 7% in the treated groups B and C respectively (Table IV).

Table IV

Complications

A: General	Group A	Group B	Group C
1. Temperature 100°F or above	16 (27 %)	7 (12%)	4 (7 %)
2. Anorexia	14 (23 %)	3 (5%)	3 (5 %)
3. Malaise	10 (17 %)	2 (3%)	2 (3%)
B : Local (Wound Examination)			
1. Edema	16 (27 %)	7 (12%)	4 (7%)
2. Redness	16 (27%)	7 (12 %)	4 (7%)
3. Induration	16 (27%)	7 (12%)	4 (7%)
4. Discharge	16 (27%)	7 (12%)	4 (7%)
Uneventful recovery	16 (21%)	7 (12%)	4 (7%)

Culture and sensitivity was done in 54 cases (Table V).

Table V. Results of culture of micro-organisms.

	Group A	Group B	Group C	Total
No. of patients needing c/s studies	16	7	4	27
No growth obtained	3	2	1	6
Mixed infections	4	2	1	7
Staphylococcus aureus	3	1	1	5
E. coli	3	1	1	5
Streptococcus hemolyticus	2	1	–	3
Pseudomonas aerugenosa	1	–	–	1

In majority of cases the causative organisms were mixed staphlococci and E.coli, with a small percentage of streptococci and pseudomonas. in group A appropriate antibiotics controlled the infection and subsequent healing proceeded normally. in group B and C it was noted that the isolated micro-organisms were resistant to the antibiotics which were being administered, or had been chosen for perioperative use.

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