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General Surgery

A CLINICAL STUDY OF SURGICAL SITE INFECTION

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ABSTRACT

Aim : Study of most common organisms encountered and their sensitivity and resistance to antibiotics in postoperative wound infection,operated in general surgery department RIMS, kadapa, with in the span of 2 years .

Study relation of emergency and elective surgery to postoperative wound infection.

Study of efficacy of different modes of preoperative preparation on postoperative wound infection.

Study of distribution of postoperative wound infection among different surgeries based on bacterial contamination such as clean, clean-contaminated, contaminated and dirty.

Methods: Seventy five cases of postoperative wound infection were analyzed. Appropriate history and examination was done. Culture and sensitivity reports were reviewed.

Results: Most common organism encountered is E. coli (32%) most sensitive antibiotic is amikacin (69.3%) and most resistant antibiotics are cephalexin (73.3%) and erythromycin (73.3%). Postoperative wound infection was commonly encountered in emergency cases (69.3%) and dirty type of cases (62.7%). Postoperative infection is most commonly found in patients prepared, by shaving (76%), in > 24 hours before surgery (64.0%) and patients not taken preoperative bath (77.3%).

KEYWORDS :

INTRODUCTION:

Surgical wound infections continue to consume a considerable portion of health care finance. Even though the complete elimination of wound infections is not possible, a reduction of the observed wound infection rate to a minimum level could have marked benefits in terms of both patient comfort and resources used1.

With the introduction of antibiotic therapy in the middle of the 20th century a new adjunctive method to treat and prevent surgical infections was fostered. However, not only have postoperative wound and hospital-acquired infections continued, but widespread antibiotic therapy has not often made prevention and control of surgical infections more difficult. The present generation of surgeons has seen increasing numbers of serious infections related to a complex combination of factors, including the performance of more complicated and longer operations; an increase in the number of geriatric patients with accompanying chronic or debilitating diseases; many new surgical procedures with implants of foreign materials; a rapidly expanding number of organ transplants requiring the use of immunosuppressive agents; and increased use of diagnostic and treatment modalities that cause greater bacterial exposures or the suppression of normal host resistance[2]

METHODOLOGY

Inclusion criteria:

- Only those cases which will be operated in general surgery department, GGH, kadapa

- **Exclusion criteria::**
- Wound site previously infected will be excluded
- Minor wound area infection / stitch abscess / surrounding inflammation without micro-organisms.
- Vaginal operations, burns and circumcision.

Patients with associated diseases such as diabetes, anaemia, HIV, steroid medications are excluded.

An elaborate study of these cases with regard to date of admission, history, clinical features of wound infection, special investigation, type of surgery, preoperative preparation and postoperative management is done till patient is discharged from hospital.

In history, presenting complaints, duration, associated diseases, personal history including diet, smoking, alcoholism were noted.

OBSERVATION AND RESULTS

Age wise distribution of study subjects

Table 1: Showing Age wise Distribution

Age	No. of Cases	Percentage
11 – 20	12	16.0
21 – 30	15	20.0
31 – 40	14	18.7

Sex wise distribution:

Out of 75 cases, 50 cases were male and 25 female cases. The percentage in present series is 66.7% for males and 33.3% for females.

Table 2: Showing Sex wise Distribution

Gender	No. of Cases	Percentage
Male	50	66.7
Female	25	33.3

No. of cases

Diagnosis wise distribution:

In present series, the most common diagnosis of affected cases was 'Duodenal ulcer perforation. The total number of cases are 22, giving percentage of 29.3%.

Table 3: Diagnosis wise distribution

Diagnosis	No. of Cases	Percentage
DUP	22	29.3
Int. Obstruction	14	18.7
AP	13	17.3
IP	11	14.7
Appendicitis	5	6.7
Hydrocele	3	4.0
Hernia	2	2.7
Meckel's diverticul	2	2.7
Traumatic perforation	2	2.7
DU	1	1.3
Total	**75**	**100**

Signs and symptoms:

The most common presentation in present series is discharge. Total 59 cases presented with discharge through the wound.

The most common type of discharge was 'purulent' type with

percentage of 41.3%. the least common type of discharge was serous. Only patient presented with serous discharge with percentage of 1.3%.

Table 4: Signs and Symptoms

Signs and symptoms	No. of Cases	Percentage
Fever	11	14.7
Erythema	33	44.0
Discharge	59	78.7
Type of discharge		
Purulent	31	41.3
Seropurulent	14	18.7
Serosanguinous	13	17.3
Serous	1	1.3

Frequency of change of dressing:
In present series the dressing was changed most commonly on alternate day.

Out of 75 cases, in 64 cases the dressing was changed on alternate day.

Table 5: Frequency of change of dressing

Frequency of change of Dressing	No. of Cases	Percentage
Alternate day	64	85.3
Daily	11	14.7

In present series, out of 75 cases, 52 cases were operated as emergency surgery with percentage of 69.3%

Type of surgery:
orty seven cases in the series have undergone surgery which is classified as dirty (preoperative perforation of colonized body giving percentage of 62.7% and 4 cases have undergone clean surgery (elective, primarily closed, no acute inflammations uncounted, no entrance of normally or frequently colonized body cavities and no break in sterile technique).

Table 6: Showing Type of Surgery

		Number of cases	Percentage
Surgery	Elective	23	30.7
	Emergency	52	69.3
Type of surgery	C	4	5.3
	CC	7	9.3
	CO	16	21.3
	D	47	62.7
Antibiotics given	Pre-op	10	13.3
	Peri-op	6	8.0
	Post-op	5	6.7

Antibiotics given:
Out of 75 cases 10 cases (13.3%) had received preoperative antibiotics. Whereas, 6 cases (8%) received perioperative antibiotics and 5 cases (6.7%) received postoperative
No. of Cases

Preoperative preparation:
In present series, 17 cases (22.7%) had taken preoperative bath. Maximum patient's hair removal was done by shaving 976%). Most of the affected cases were prepared >24 hrs before surgery i.e. 48 cases (64.0%).

Table 7: Showing Preoperative Preparation

Preparations	No. of cases	Percentage
Pre op bath	17	22.7
Pre op		
Shaving	57	76.0
Clipping	18	24.0
Skin preparation		
< 24	27	36.0
> 24	48	64.0

Microorganism:
Most common microorganism encountered in present series is E. Coli i.e. in 24 cases (32%). Least common micro organism is streptococci (4%). E.Coli is also encountered in mixed culture with Klebsiella, proteus, pseudomonas and staphylococcus.

Table 8: Showing Microorganisms

Microorganisms	No. of Cases	Percentage
E. Coli	24	32.0
Pseudomonas	12	16.0
Staphylococcus	9	12.0
Proteus	8	10.7
Acinetobacter	6	8.0
Klebsiella	6	8.0
Streptococci	4	5.3
Kleb.+E. Coli	2	2.7
Prot .+ E. Coli	2	2.7
Pseudo. + E.Coli	1	1.3
Staph. + E. Coli	1	1.3
Total	**75**	**100**

Antibiotics:
Most sensitive antibiotic in present series is Amikacin. Other common sensitive antibiotics are ceftriaxone, carbenicillin, cefotaxime, polymyxin-B, piperacillin, Ampicillin. Most resistant antibiotics are cephalexin and erythromycin other common resistant antibiotics are-amoxycillin, chlroamphenicol, ceftazidime, ciprofloxacin, Doxycycline, Gentamycin,

Table 9: Antibiotic sensitivity and resistance

	Sensitive	Percentage	Resistance	Percentage	Effectiveness
A	+ 38	50.6	- 37	49.3	+ 1
AM	+ 37	49.3	- 38	50.6	- 1
AK	+ 52	69.3	- 23	30.6	+ 29
C	+ 32	42.6	- 43	57.3	- 11
CA	+ 28	37.3	- 47	62.6	- 19
CB	+ 44	58.6	- 31	41.3	+ 13
CE	+ 42	56	- 33	44	+ 9
CF	+ 28	37.3	- 47	62.6	- 19
CP	+ 20	26.6	- 55	73.3	- 35
CT	+ 41	54.6	- 34	45.3	+ 7
DO	+ 27	36	- 48	64	- 21
E	+ 20	26.6	- 55	73.3	- 35
G	+ 23	30.6	- 52	69.3	- 29
PB	+ 43	57.3	- 32	42.6	+ 11
PC	+ 46	61.3	- 29	38.6	+ 17

DISCUSSION

The present study was conducted in RIMS General Hospital, kadapa. This is cross sectional type of study.

Microorganism:
Most common organism encountered in postoperative wound infection in this study is E. Coli, in 24 cases accounting for 32.0%. the second common organism in this study is pseudomonas, in 12 cases accounting for 16.0%. The least common organism was Acinetobactor and Klebsiella. The reason for E.Coli being most common organism is that majority of patients getting postoperative wound infection, have undergone surgery for hollow viscus perforation and E. Coli being the most common organism found in intestinal flora, might have contaminated the wound

Author	Agarwal et al [1]	Knowly et a [2]	Tripathy and Roy [3]	Our study
Commonest	E. Coli	Staphylococcus	Proteus	E. Coli
Organism		aureus 45.6%	(10cases)	
			Pseudomonas	
			(6 cases)	

Antibiotics sensitivity and resistance

Author	Kowl et al [2]	Tripathy and Roy [3]	Our study
Antibiotic Sensitive	Cloxacillin Cotrimoxazole	Co-trimoxazole Chloramphenicol Gentamicin	Amikacin Carbenicillin Cefotaxime Polymyxin-B Piperacillin Ceftriaxone Ampicillin
	Chloramphenicol		
	Cephaloridine		
	Gentamicin		

	Kanamycin		
Antibiotic		Penicillin	Cephalexin
resistant	-	Tetracycline	Ciprofloxacin
	-	Ampicillin	Erythromycin
		Erythromycin	Gentamicin

Authors	Gil Egea et al4	Our study
No. of elective Cases operated	3842	23
Percentage of infected cases in elective surgeries	2.9%	30.7 %
No. of emergency cases operated percentage of infected cases in emergency surgeries	623 5.1%	52 69.3%

Surgery (emergency/elective):
Type of surgery

Type of operation	Cruse and foord[5]	Agarwal et al1	Tripathy and Roy[3]	Our study
Clean	1.8%	36.17%	30%	5.3%
Clean contaminated	8.9%	57.14%	25%	9.3%
Contaminated	21.5%	100%	-	21.3%
Dirty	38.3%	-	-	62.7%

CONCLUSION

In the study conducted in RIMS, Kadapa & my conclusion of study; Majority of patients belonged to age group of 41-50 years which account for 22.7%.

The wound infection was more common in males (66.7%) than females (33.3%).

Out of 75 cases, 22 cases were having duodenal ulcer perforation accounting for 29.3%.

Most of the patients presented with discharge through the wound.The most common type of discharge was 41.3%. total 59 cases presented with discharge.

Out of 75 cases, in 64 cases dressing was changed on alternate day accounting for 85.3%.

Out of 75 cases 52 cases were operated as emergency surgery accounting for 69.3%.

47 cases out of 75 have undergone surgery which is classified as dirty accounting for 62.7%.

Out of 75 cases 13.3% cases received preoperative antibiotics, 8% received perioperative antibiotics and 6.7% received postoperative antibiotics.

22.7% cases had preoperative bath. In 76% cases, hair removal was done by shaving 64% cases skin was prepared > 24 hrs before surgery. In 32% cases E. Coli was the micro-organism found on culture.

More sensitive antibiotics are amikacin, ceftriaxone, carbenicillin, cetotaxime, polymyxin-B, piperacillin. More resistant antibiotics are cephalexin and erythromycin.

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