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Study of Surgical Site Infection In Post Operative Patients

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I. Background

Surgical site infections constitute a major financial problem in healthcare. Although, the complete elimination of infections is difficult, a reduction in the wound infection rate to a minimum level will benefit the patient in terms of both the patient comfort and the resources used.[1] These principles will help to prolong life successfully and alleviate fears of complications such as death when performed carefully. With the advent of antibiotic course in the middle of the 20th century, there came a whole new dimension to treat and prevent surgical infections. The present generation of surgeons have seen increasing numbers of serious infections related to a complex combination of factors such as prolonged duration of complicated surgeries; 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] The modern surgeon cannot escape the responsibility of dealing with infections and in dealing with them of having the knowledge for the appropriate use of aseptic and antiseptic technique, proper use of prophylactic and therapeutic antibiotics and adequate monitoring and support with novel surgical and pharmacologic as well as non-pharmacologic aids. Basic understanding of how the body defends itself against infection is essential to a rational application of surgical and other therapeutic principles to the control of infection.

II. Materials And Methods

The study of postoperative wound infection was conducted at Yenepoya Medical College and Hospital during the period of November 2016 to December 2016.

Inclusion Criteria

All the cases operated in Surgery and Orthpaedics Unit Age 15- 80

Exclusion Criteria

Patients who got infected previously
Patients who got operated at the same site previously

Materials And Methods

A detailed study was performed since the time of admission to discharge and all the datas were recorded. Relevant history was taken from all the patients in the same manner Preoperative findings included preoperative bath, type of skin preparation, time and type of preparation (24 hours) preparation of bowel, preoperative antibiotics used and steroids if used were noted. Operative findings such as wound irrigation drain and its type (open / closed) were noted. Postoperative findings included the day of dressing after surgery, the day in which infection was noticed, frequency of the dressings, use of antibiotics both topical and intravenous, constitutional symptoms such as fever and cough. Wound infection was diagnosed as per criteria defined in Oxford Textbook of Surgery.[3] Pus for culture and sensitivity was collected and sent to laboratory.[4] The reports of 70 cases were collected and documented into a chart. Each organism cultured was noted. This gave an idea about the most common organism in our hospital setup.

Most Sensitive And Resistant Antibiotics

After pus culture, sensitivity test was done at our laboratory by using blood agar plate and Mueller-Hinton plate. These plates were incubated overnight and the sensitivity of organism noted.The reports were documented and graph prepared showing the sensitivity and resistance of individual antibiotic. Another graph was charted by giving one point for each time antibiotic was sensitive and one point for each time antibiotic is resistant. This graph showed the most effective antibiotic, which had highest positive value.

Figure 1. Culture Plate

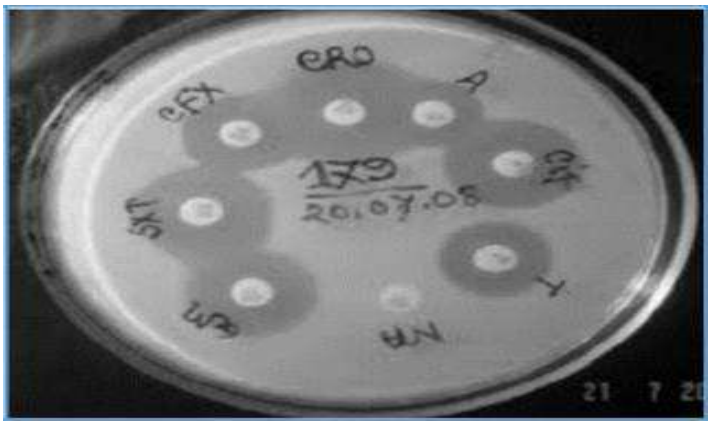


Figure 2. Antibiotic Sensitivity Test

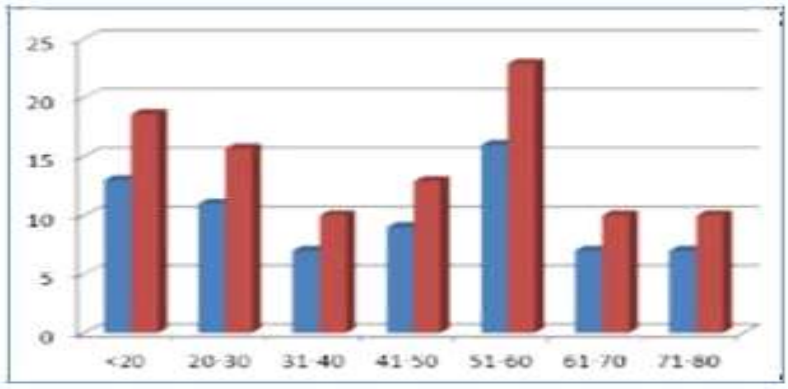
III. Observation And Results

Age Wise Distribution

In this study, majority of patients were in age group between 51-60 years. Youngest among them was 15 years old and the oldest was of 80 years. [5]

Age		**%**
<20	13	18.6
20-30	11	15.7
31-40	7	10.0
41-50	9	12.9
51-60	16	22.9
61-70	7	10
71-80	7	10

Table 1. Age Wise Distribution



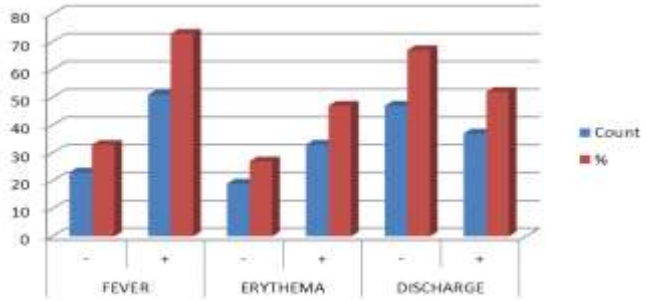
Graph 1. Age Wise Distribution

Signs and Symptoms

Fever was the common finding observed in this study, which accounted to be total of 51 patients.

		Count	Column N (%)
Fever	-	23	32.90%
	+	51	72.90%
Erythema	-	19	27.10%
	+	33	47.10%
Discharge	-	47	67.10%
	+	37	52.90%

Table 2. Signs and Symptoms



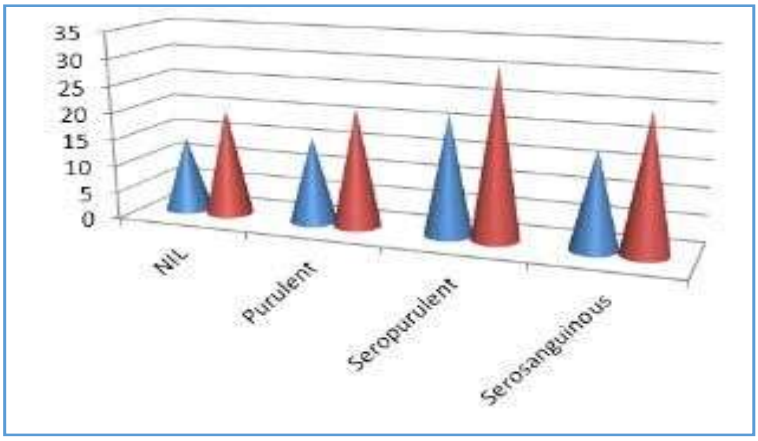
Graph 2. Signs and Symptoms

Type of Discharge

Seropurulent discharge was common, which accounted for 31.40%.

Discharge Type	Nil	14	20.00%
	Purulent	16	22.90%
	Seropurulent	22	31.40%
	Serosanguineous	18	25.70%

Table 3. Type of Discharge



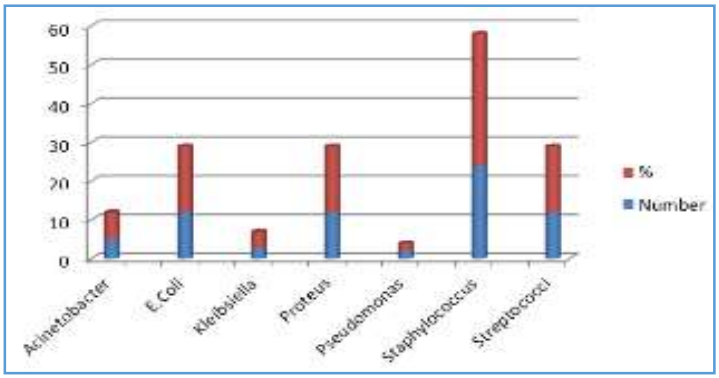
Graph 3 Type of discharge

Microorganism

The most common organism was found to be Staphylococcus. Least of all was Pseudomonas, i.e. 2 case (2.90%).

Microorganism	Acinetobacter	5	7.10%
	E. coli	12	17.10%
	Klebsiella	3	4.30%
	Proteus	12	17.10%
	Pseudomonas	2	2.90%
	Staphylococcus	24	34.30%
	Streptococci	12	17.10%

Table 4. Microorganism



Graph4. Microorganism

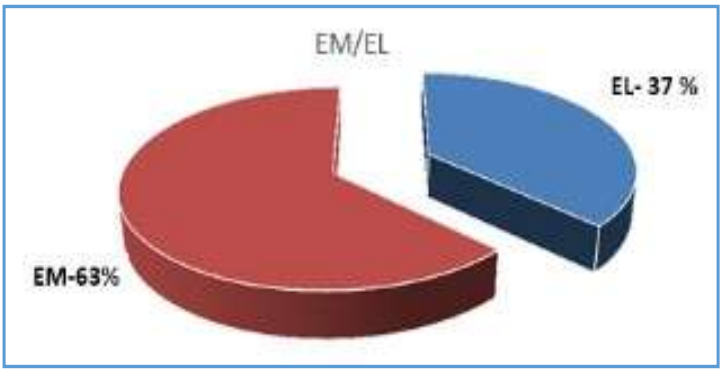
Type of Surgery-1

In our study, out of 70 cases, 44 cases were operated on emergency basis (62.9%)

	EM/EL	**Percent**
EL	26	37.1%
EM	44	62.9%
Total	**70**	**100%**

Table 5. Type of Surgery-1

EM: Emergency, **EL**: Elective.



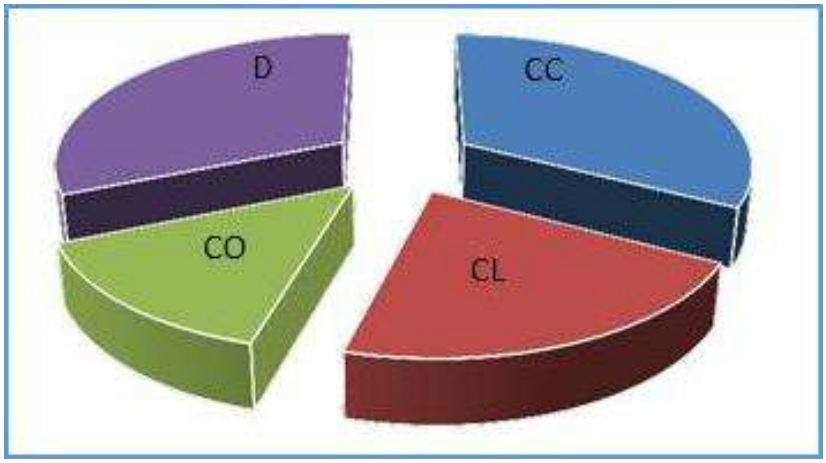
Graph 5. Type of surgery -1

Type of Surgery-2

23 cases in this study underwent surgery, which were divided accordingly as clean contaminated (32.9%) and 10 pateint contaminated surgery(14.3%).

Type of Surgery	Number of Cases	Percent
CC	23	32.9%
CL	15	21.4%
CO	10	14.3%
D	22	31.4%
Total	70	100%

Table 6. Type of Surgery-2



Graph 6 Type Of Surgery 2

IV. Discussion

This study is cross-sectional type, which was done at Yenepoya Medical College and Hospital, Deralakatte, Mangalore.

Microorganism

Most common organism was found to be Staphylococcus, 24 cases (34.30%).

Author	Bhirud et al	Anderson et al	Our Study
Common Organism	E. coli	Staphylococcus	Staphylococcus

Table 7

Anderson et al demonstrated that Pseudomonas was the common organism isolated in postoperative wound infection.[6] Our study doesn't match with this. According to Bhirud et al, E. coli was predominant microorganism isolated accounting for 40%.

Surgery (Emergency/Elective)

Authors	**Bhirud et al**	**Our Study**
Number of elective cases operated	23	26
Percentage of infected cases in elective surgeries	30.7%	37.1%
Number of emergency cases operated	52	44
Percentage of infected cases in emergency surgeries	69.3%	62.9%

Table 8. Emergency/Elective Surgeries

In our study, the number of cases with postoperative wound infection in elective surgeries were 26 (37.1%) and for emergency surgeries were 44 (62.9%). The reason of postoperative wound infection being most common in emergency surgery is most probably that the most patients being operated for emergency surgery had hollow viscous perforation with contamination of peritoneal cavity causing contamination of wound.Bhirud et al concluded that 52 patients were operated on emergency with wound infection rate of 69.3% as opposed to 23 patients operated as elective surgery with wound infection rate of 30.7%. So, his study matches with our study, which shows that postoperative wound infection rate is more in emergency surgery.

Type of Surgery

Type of Operation	**Bhirud et al**	**My Study**	**Percentage**
Clean	4	15	21.4%
Clean contaminated	7	23	32.9%
Contaminated	16	10	14.3%
Dirty	47	22	31.4%

Table 9

In our study, the rate of wound site infection for clean wound is 21.4%, clean contaminated was 32.9%, contaminated wound was 14.3% and dirty cases was 31.4%. The reason for this might be contamination during surgery.[7]

V. Conclusion

Most of the patients belonged to age of 51-60 years, which was estimated to be 22.9%.
In 70 cases, 44 cases were operated as emergency surgery, which accounted for 62.90%.
In 70 cases, 23 undergone surgery, which was classified under clean contaminated, accounting to be 32.90%.
In 34.30% cases, Staphylococcus was the organism grown on culture.
Postoperative wound infection was found more common in male patients and clean contaminated cases.
Disinfection technique and sterile precautions should be followed to prevent surgical site infection and also adequate antibiotic coverage should be given to patients undergoing surgery.

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