International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Assessment of Clinical Manifestations and Bacteriological Study of Surgical Site Infections in Abdominal Surgery at Sir .T Hospital, Bhavnagar

Dr. Priyam P Chowdhary1, Dr. Rajan B Somani

[1]Third Year Resident, Department of General Surgery, Government Medical College and Government Medical College, Sir T Hospital, Bhavnagar and Sir T Hospital Bhavnagar, Gujarat, India
Contact no 9979125770
Email: *priyam6546[at]gmail.com*

[2]Associate Professor, Department of General Surgery, Government Medical College and Government Medical College, Sir T Hospital, Bhavnagar and Sir T Hospital Bhavnagar, Gujarat, India

Abstract: ***Background: This is a prospective observational study done amongst patients who are admitted and undergone abdominal surgery during the duration of 18 months and to examine them for surgical site infections and their culture and sensitivity. Objective: To assess the surgical site infections after abdominal surgery at Sir .T Hospital, Bhavnagar and to study the bacteriological spectrum and effective antibiotics in Surgical site infections in abdominal surgeries. Methods: All post-operative patients who are admitted in ward of department of general surgery, Sir T general hospital, Bhavnagar during the study duration of 18 months. We had applied aseptic dressings on all the post-operative patients and then examined for appearance of clinical signs of surgical site infections and the pus culture and sensitivity was evaluated for the same. Results: The surgical site infections in abdominal surgeries were seen in male(60%) and female (40%) with more in middle aged group and on 5th post-operative day (40%) and 7th post-operative day (34%). According to wounds Contaminated are (40%), Dirty (34%), Clean contaminated (19%) and Clean (7%). Bacteriological isolates shows E.coli (49%), Klebsiella spp (26%), S.Aureus (13%), Pseudomonas (3%), Beta-Hemolytic Streptococci and Proteus mirabilis (1%). According to Types of SSI Wound abscess are (38%), Localized cellulitis (24%), Wound dehiscence (22%) and spreading cellulitis (16%). Antibiotic sensitivity 100% for Piperacillin / Tazobactum, Cefoperazone / Salbactum and Meropenem in Gram negative bacilli and 100% sensitivity to Vancomycin and Linezolid in gram positive cocci.***

Keywords: Abdominal surgery, Surgical site infections, Antibiotic sensitivity, Bacteria

1. Introduction

1) Surgical site infections (SSIs) are known as most common causes of nosocomial infections in worldwide which are account for about 20% to 25% of all nosocomial infections.
2) SSI is the infection that occurs in the wound created by invasive surgicalprocedure.
3) Post operative infection are usually caused by exogenous and/ or endogenous micro organisms which enters the operative wound after the surgery or during the surgery which are usually appear within five to seven days of surgery.
4) The development of surgical infection depends on several factors like microbial pathogenicity, host defenses, local environmental factors and surgical techniques
5) SSI causes prolonged convalescence, prolonged postoperative hospital stay, need of another surgical procedure, increased economic burden and increased morbidity and mortality.
6) With this point of view, the present study is undertaken to study the problem of Surgical site infections and their clinical presentations in reference to bacteriological spectrum involved.

2. Aim & Objectives

Aim

To evaluate the clinical manifestations and bacteriological Antibioticprofile of Surgical site Infections in Abdominal surgeries at Sir T Hospital, Bhavnagar.

Objectives

1) To categorize the proportion of Surgical site infections among case of clean , clean contaminated , contaminated and dirty abdominal surgery.
2) To assess the onset of appearance of infection of Surgical site infections.
3) To Study the proportion of different types of organisms involved in types of Surgical site infections.
4) To study the most common antibiotic sensitive against different pathogens isolated.

Inclusion Criteria

Age > 18 years.

Exclusion Criteria

1) Patients who were already receiving antibiotics for >1 week Pre- operatively.
2) Patients with immunosuppressive diseases, immunosuppressive therapy (taken in last 2 months) and underlying neoplastic pathology.

3. Materials & Methodology

We carried out a prospective observational single center study of a total of 100 patients admitted in general surgery ward of Sir T. Hospital, Bhavnagar between June 2021 and December 2022.

In this Prospective Observational study, 100 patients undergoing abdominalsurgery were taken as a study group.

The incision site will be assessed during first dressing on the 2nd post- operative day or before it, if the patient complains of severe pain in the wound or if there is soakage of the dressing and after that on 5th, 7th and 10th Post Operative day.

In case of signs of surgical site infection the report of collected swab samples processed by microbiology department for culture and sensitivity will be evaluated.

Swabs; will be collected for culture and sensitivity if any one of the followingcriteria were fulfilled

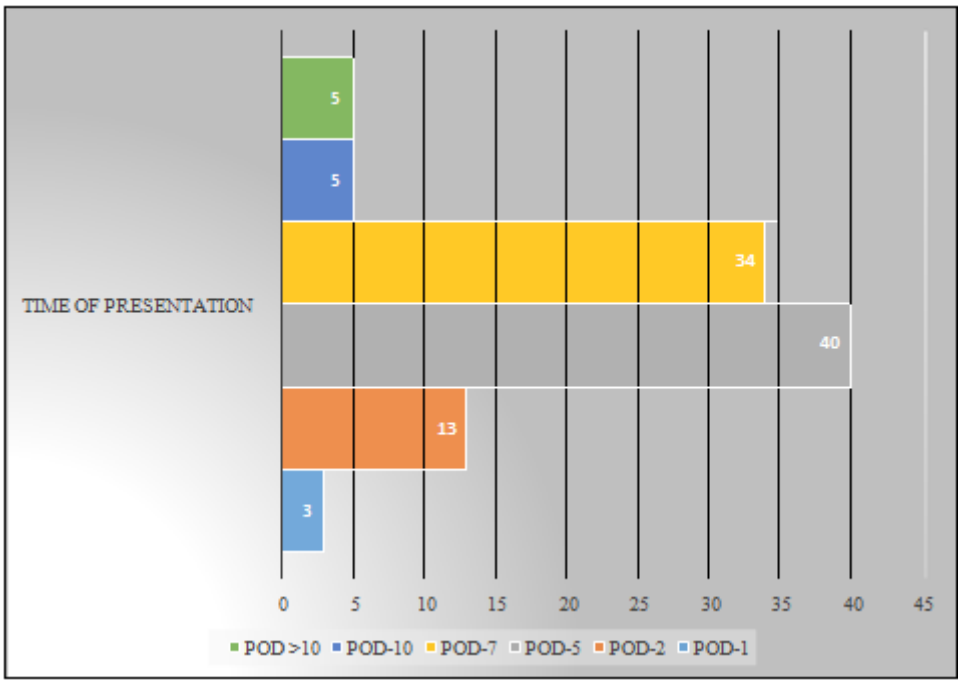
- Serous or non-purulent discharge from the wound
- Pus discharge from the wound
- Signs of inflammation: edema, redness, increased local temperature, fever,tenderness
- Incision deliberately opened by surgeon

The data was collected prospectively. Statistical analysis done.

4. Results

Table 1: Time of Presentation of Surgical Site Infection

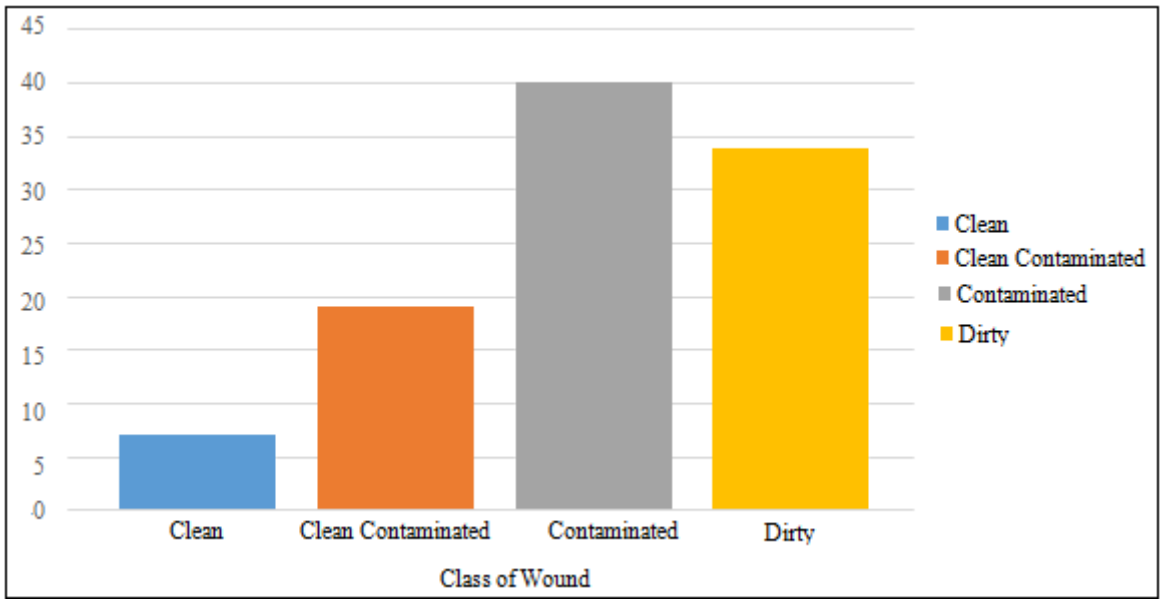
Day of Presentation of SSI	No. of Cases	%
1st Post Operative Day	3	3%
2nd Post Operative Day	13	13%
5th Post Operative Day	40	40%
7th Post Operative Day	34	34%
10th Post Operative Day	5	5%
>10th Post Operative Day	5	5%
Total Cases	100	100%



- Out of 100 cases, it was observed that Surgical site infection was most evident on 5th Post-operative day (40%) and 7th Post-operative day (34%) with comparatively low on 1st Post-operative day (3%), 2nd Post-operative day (13%) and later post-operative days 10th (5%) and >10th day(5%).

Table 2: Surgical Site Infections in Different Class of Wound

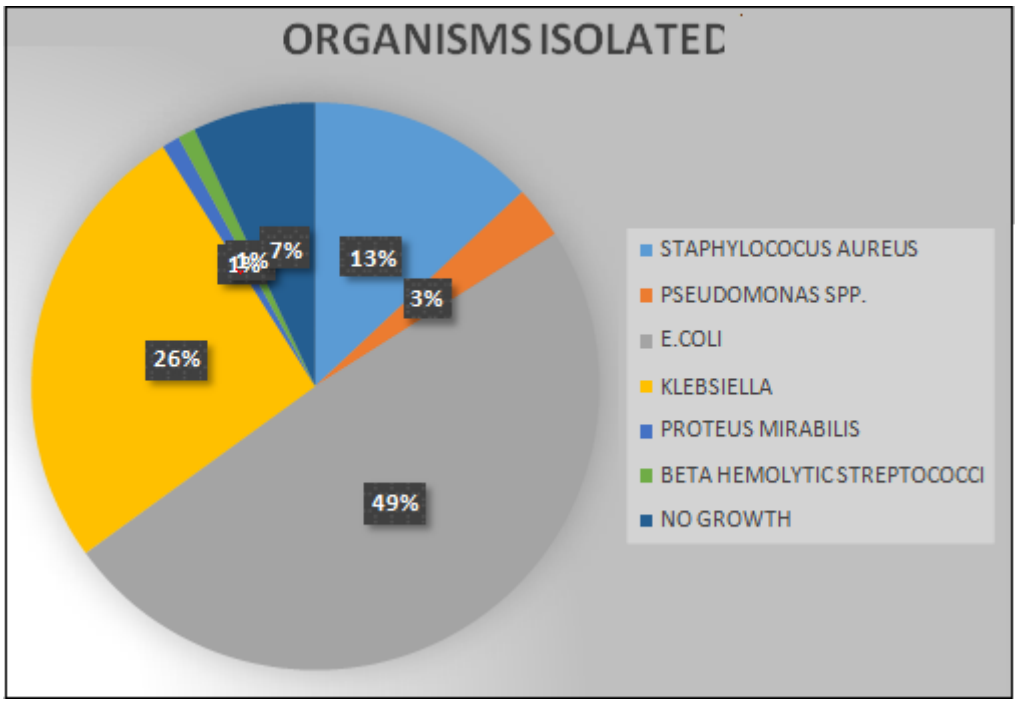
SR NO.	Class of Wounds	Total Number of SSI
1	Clean	7
2	Clean Contaminated	19
3	Contaminated	40
4	Dirty	34



- The surgical site infection were predominantly seen in contaminated and dirty wound accounting upto 40% and 34% of total cases respectively. As compared to them the clean contaminated wounds were comparatively less i.e, 19% and clean cases being minimal to 7%.

Table 3: Different Type of Bacteria Isolated

S. No.	ORGANISM	Total Case
1	STAPHYLOCOCCUS AUREUS	13
2	BETA HEMOLYTIC STREPTOCOCCI	1
3	ESCHERICHIA COLI	49
4	KLEBSIELLA SPP.	26
5	PSEUDOMONAS SPP.	3
6	PROTEUS MIRABILIS	1
7	No growth	7



- In this study the among the organisms isolated based on the pus culture collected from 100 cases clinically diagnosed with surgical site infection, most cases were seen to be showing Escherichia coli growth (49%), followed by 26% cases showing Klebsiella spp. , 13% cases of Staphylococcus Aureus, 3% cases of Pseudomonas Spp. and 1% of Proteus mirabilis and Beta hemolytic streptococci each. 7% of cases which showed signs of surgical site infections were found to be showing no growth for their Pus cultures.

Table 4: Type of SSI and Organisms

SSI	No. of Cases	Common Organism	%
Wound Abscess	38	E.COLI (n=19) (50%) KEBLSIELLA (n=15)(42%) PSEUDOMONAS SPP. (n=3) (8%)	38
Localised Cellulitis	24	S.AUREUS (n=10) (40%) E.COLI (n=7) (30%) NO GROWTH (n=5) (20%)	24
Sreading Cellultis	16	E.COLI (n=9) (60%) S.AUREUS (n=3) (24%) NO GROWTH (n=2) (16%)	16
Wound Dehisence	22	E. COLI (n=13) (60%) KLEBSIELLA (n=9) (40%)	22

In this study, when the cases were distributed according to types of surgical site infections the wound abscess were about 38% accounting for the highest with most common organism being E.coli (50%) > Klebsiella spp.(42%) > Pseudomonas spp.(8%). Localised cellulitis being the 2nd most common about 24% with S.Aureus (40%) being most common > E.coli (30%).

Wound Dehiscence was seen in 22 %; with most commn organismbeing E.coli (60%) > Klebsiella spp. (40%).

Spreading cellulitis seen the least of all about 16% with mostcommon organism as E.coli (60%)> S.aureus (24%).

Table 5: Antibiotic Sensitivity of Gram Positive Organisms

Antibiotic	Staphylococ Cus Aureus	Beta Hemolytic Streptococci
GENTAMYCIN	70%	40%
AMIKACIN	65%	70%
AMPICILLIN	10%	20%
DOXYCYCLIN	70%	70%
CEFOTAXIME	50%	20%
CIPROFLOXACIN	50%	40%
OFLOXACIN	30%	35%
LEVOFLOXACIN	60%	60%
VANCOMYCIN	100%	100%
ERYTHROMYCIN	80%	90%
LINEZOLID	100%	100%
COTRIMOXAZOLE	50%	40%
AMOXYCLAV	50%	70%

Table 6: Antibiotic Sensitivity of Gram Negative

Antibiotic	Echerichia Coli	Kelbsiella Spp.	Peudomonas Spp.	Proteus Mirabili
Gentamycin	100%	60%	60%	70%
Amikacin	100%	70%	75%	70%
Piptaz	100%	100%	100%	100%
Cefoaslbactum	100%	100%	100%	100%
Ceftriaxone	70%	70%	40%	65%
Cefotaxime	70%	65%	30%	65%
Cefoxitin	65%	65%	30%	55%
Ciprofloxacin	70%	60%	80%	60%
Ofloxacin	60%	45%	50%	40%
Levofloxacin	75%	60%	70%	50%
Vancomycin	-	-	-	-
ErythromyciN	-	-	-	-
Linezolid	65%	60%	50%	50%
Meropenuem	100%	100%	95%	100%
Amoxyclav	15%	20%	65%	20%
Penicillin -G	-	-	-	-
CotrimoxazoLe	10%	20%	10%	30%

5. Conclusion

It was seen that signs of surgical site infections were mostly seen on 5th and 7th post-operative day and more common in contaminated and dirty wounds with least in clean wounds, on the contrary all the cases presenting with signsof surgical site infection on 1st post-operative day belong to dirty wounds.

Bacteriological isolates in the cases was predominated by gram negative bacilli, with most common being Escherichia coli and Klebsiella spp. causing most of the wound abscess and in wound dehiscence. Gram positive isolates were comparatively low with most common being Staphylococcus Aureus seen in localized and spreading cellulitis and mainly seen in clean wounds.

Most of the Gram positive organisms were sensitive to Linezolid and Vancomycin and most of the Gram negative organisms were sensitive to Piperacillin /Tazobactam , Cefaperazone sulbactam and Meropenem.

In spite of the modern surgical and sterilization techniques and the use of prophylactic antibiotics, SSIs are still a real risk in surgeries and they represent a substantial burden of disease both for the patients and the healthcare services in terms of the morbidity, mortality and the economic costs.

Inappropriate and misuse of antibiotics can cause resistance to commonly used antibiotics. Thus usage of antibiotics should be based on local and current trends on prevalent pathogens and its sensitivity pattern. By studying the bacteriological profile and its sensitivity pattern we can guide the surgeons in treatment and prophylaxis of SSIs.

References

[1] Silom Jamulitrat, Ubonrate Ngo RN, Somchit Thongpiyapoom RN, Porpit Varindsathien MS. *Postoperative wound infections in a university hospital: J Infect Dis Antimicrob Agents* 1989;6(1): 1-3.

[2] Ojiegbe GC, Njoku Obi AN, Ojukwu JO. The incidence and the parametric determinants of postoperative wound infections in a university teaching hospital. *Cent Afr J Med* 1990 Mar; 36: 63-7. (Pubmed)

[3] Wilson AP, Weavill C, Burridge J, Kelsey MC. The use of the wound scoring method 'ASEPSIS' in the postop. Wound surveillance. *J Hosp Infect* 1990; 16(4): 309. (Pubmed)

[4] Akhtar S, Gondal KM, Ahmed M, Mohammad Y, Goraya AR, Karim K, Chaudhry AM. Surgical Wound Site Infections- Our experience. *Ann King Edward Med Coll* 2001 Sept; 7(3): 211-12

[5] Hernandez K, Ramos E, Seas C, Henostroza G, Got-Uzzo E. The incidence of and the risk factors for surgical site infections in a Peruvian hospital. *Infect Control Hosp Epidemiol* 2005 May; 26(5): 473-77. (Pubmed)

[6] Lizan-Garcia M, Garcia-Caballero J, Asensio-Vegas A. The risk factors for the surgical wound

infections in general surgery: A prospective study. *Infect Control Hosp Epidemiol* 1997 May; 18(5): 310-5. (Pubmed)

[7] Mark RM, Edwin AD. Nutrition and Infection. *Surg Clin North Am* 1994 June; 74: 659-664.

[8] Barber GR, Miransky J, Brown AE, Coit DG, Lewis FM, Thaler HT, Kiehn TE, Armstrong D. Direct observations of surgical wound infections at a com prehensive cancer center. *Arch Surg* 1995 Oct; 130 (10): 1042-7. (Pubmed)

[9] Ford CD, Van Moorleghem G, Menlove RL. Blood transfusion and postoperative wound infections. *Surgery* 1993 June; 113: 607.

[10] Twun DK, Grant G, Al-Suleiman SA. The microbiology of postoperative wound infections. A prospective study on 1770 wounds. *J Hosp Infect* 1992; 21: 29.

[11] Abbasi AA, Chaudhry IA. Prophylactic antibiotics in clean surgical wounds. *Rawal Med J* 2003 Jun; 28(1): 2-6.

[12] Eltahawy AT, Mokhtar AA, Khalaf RM, Bahnassy AA. Postoperative wound infections at a university hospital