



## A STUDY OF POST OPERATIVE WOUND INFECTION AND MANAGEMENT

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**ABSTRACT** **OBJECTIVE:-**this study was designed to evaluate the postoperative wound Infection, common risk factors and the different organisms which were involved in cases of clean and clean-contaminated, contaminated and dirty surgeries. **METHOD AND MATERIALS:-** The study was conducted in the department of surgery, JA group of hospital, Gwalior in collaboration with departmental of microbiology. G.R.MEDICAL COLLEGE GWALIOR. For duration of one year. The bio data of the patients, together with their clinical features, diagnosis, the type of surgery which was performed and the development of any complications, which included wound infections, was noted and the data was analyzed. **RESULTS:-**out of 150 patients, we found that age of more than 60 years was to be more risk factor 20%(5 of out of 25) and less risk factor to be present in below 20 years age group 8.33%(1 out of 12). The incidence amongst the clean case was 2.7 % (1 out of 36), among the clean contaminated cases , it was 9.3% (6 out of 64), among the contaminated cases it was 17.6%(3 out of 17), among the dirty cases , it was 24.2%(8 out of 33). Positive cultures were obtained from the infected wounds. The commonest bacterial isolates were staph aureus(32%), S.epid, E.coli, Ps.aureginosa, Klebsella

**KEYWORDS :** Wound , SSI, Infection, Post-operative, Bacteria

## INTRODUCTION

The primitive man was the first surgeon in history, when how dared to chop off his limb, once it was entangled between the Hungary jaws of a wild animal. At that time primitive man practiced crude surgical maneuvers like amputations, foreign body removal, chopping of the umbilical cord etc. wound infection should have either a purulent discharge in, or exuding from, the wound or a painful, spreading erythema indicative of cellulitis. Bruising, hematoma formation, serous and lymph collections are complications which may predispose to the development of wound infection, and may lead to diagnostic difficulties. Infection should be considered to be present when there is fever, tenderness, edema and an extending margin of the erythema.<sup>[1]</sup> The discharge of clear fluid from a wound does not indicate an infection unless accompanied by cellulitis. The definition of wound infection should not be dependent on the results of bacteriological studies. False-negative cultures can occur and on other occasions organisms isolated from cultures may represent either secondary colonization or merely contamination.<sup>[2]</sup>

## SUPERFICIAL INCISIONAL SSI

Infection occurs within 30 days after the operation and infection involves only skin or subcutaneous tissue of the incision and at least one of the following:

1. Purulent drainage, with or without laboratory confirmation, from the superficial incision.
2. Organism isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
3. At least one of the following sign and symptoms of infection: pain or tenderness, localized swelling, redness, or heat and superficial incision are deliberately opened by surgeon, unless incision is culture negative.
4. Diagnosis of superficial incisional SSI by the surgeon or attending physician.

## DEEP INCISIONAL SSI

Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves deep soft tissue of the incision and at least one of following:

1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site.
2. A deep incision spontaneously dehisces or is deliberately opened

by a surgeon when the patient has at least one of the following signs and symptoms: fever >38° C, localized pain, tenderness, unless site is culture negative.

3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathology or radiologic examination.
4. Diagnosis of a deep incisional SSI by a surgeon or attending physician.

## ORGAN/SPACE SSI

Infection occurs within 30 days after the operation if no implant is left in place or within 1 year if implant is in place and the infection appears to be related to the operation and infection involves any part of the anatomy other than the incision, which was opened or manipulation during an operation and at least one of following:

1. Purulent drainage from drain that is placed through a stab wound into the organ/space.
2. Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space.
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathology or radiologic examination.
4. Diagnosis of a deep incisional SSI by a surgeon or attending physician. Post-operative wound infection or surgical site infection can also be differentiated as major or minor SSI. [3]

## MICROBIOLOGY

SSI is caused by microorganisms introduced into the surgical wound at the time of the operative procedure. Most of these microorganisms come from the patient's endogenous flora, but occasionally the pathogenic organisms are acquired from an exogenous source, such as the air in the operating room, surgical equipment, implants or gloves, or even medications administered during the operative procedure. When there is an unexplained local outbreak of SSI, investigations performed by infection control personnel may be useful in uncovering an exogenous source.<sup>[5]</sup> Large, cross-institutional surveys involving all surgical specialties have revealed that a small number of gram-positive cocci and gram-negative bacilli are responsible for most SSIs. The NNIS system categorized 17,671 isolates obtained from patients with SSI from 1986 to 1996. Over one half of the isolates were gram-positive cocci; Staphylococcus aureus was the most commonly isolated organism, followed by coagulase-negative staphylococci, and

Enterococcus spp. Approximately one third of the isolates were gram-negative bacilli, with *Escherichia coli*, *Pseudomonas aeruginosa*, and *Enterobacter* spp being the most frequently encountered gram-negative organisms. About 5% of the isolates were anaerobic bacteria. More recent surveys involving multiple or single institutions have corroborated these general findings, although the specific distribution of organisms differs somewhat, probably reflecting different types of surgical practices at individual institutions.<sup>[6]</sup> This general pattern masks significant variability in the microbiology of SSI according to the type of operative procedure. Nonetheless, organisms derived from the skin may still contribute to these infections. In a recent trial of prophylactic antibiotics for subjects undergoing colorectal procedures, 11% of all isolates obtained from subjects with SSI were staphylococci, most of which were *S. aureus*. With Class IV (dirty-infected) wounds, it is generally assumed that pathogenic organisms already present in the operative field will be responsible for a subsequent SSI. Finally, it should be noted that unique microbiological patterns may pertain to certain highly specialized procedures; for instance, enterococci are frequently found to be the pathogens causing SSI after liver transplantation.<sup>[7]</sup>

## METHODS AND MATERIALS

The study was conducted in the department of surgery, JA group of hospital, Gwalior in collaboration with departmental of microbiology. G.R.MEDICAL COLLEGE GWALIOR. From July 2009 to June 2010 with the aims and objectives:

1. To find out the incidence of postoperative wound infection rate in various classes of operative wound (clean, clean contaminated, contaminated and dirty).
2. To study of various risk factors for postoperative wound infection.
3. To find out type of bacterial flora causing postoperative wound infection.
4. To study the role of prophylactic antibiotic in the prevention of postoperative wound infection.

Patients for the study were selected from among those admitted in the surgical ward from OPD and emergency. An intraoperative swab from the subcutaneous/muscular tissue from the incision site at the end of the surgical procedure was taken from all the patients included in the study. Sterile swab stick was moistened with sterile nutrient broth following all aseptic technique. Sample collection was inoculated in the enrichment Medias for any growth of Gram +ve and Gram -ve bacteria. The inoculated enrichment Medias were sealed aseptically and transported to department of microbiology.

In the microbiology department Medias were incubated at 37°C overnight and then subculture were made on chocolate agar, blood agar and MacConkey agar.

The patient were followed up on a daily basis till the day of discharge from the hospital with reference to the following-General physical examination- pulse, temperature, blood pressure

Local examination- purulent discharge from wound, local swelling, redness Thereafter patients were followed up on an outpatient basis once week for 30 days from the day of surgery.

## RESULTS:-

Post-operative wound infection still remain one of the most common important cause of morbidity and most common nosocomial infection in surgically treated patients. The rate of SSI varies from 2.5% to 41.9% as per different studies. The incidence of SSI in present study is 12%. The incidence amongst the clean case was 2.7% (1 out of 36), among the clean contaminated cases, it was 9.3% (6 out of 64), among the contaminated cases it was 17.6% (3 out of 17), among the dirty cases, it was 24.2% (8 out of 33). Positive cultures were obtained from the infected wounds. The commonest bacterial isolates were staph aureus (32%), *S. epid.*, *E. coli*, *Ps. aeruginosa*, *Klebsiella*.

**TABLE NO 1**  
**Postoperative wound infection and age group**

Age group (in years)	Total no of cases	No of infected cases	%
0-19	12	1	8.33
29-39	61	6	9.8
40-59	52	6	11.5
>60	25	5	20

**TABLE NO 2**  
**Postoperative wound infections and different types of surgical wounds**

Types of wound	Total no. of cases	No. of infected cases	%
Clean	36	1	2.7
Clean contaminated	64	6	9.3
Contaminated	17	3	17.6
Dirty	33	8	24.2

**TABLE NO 3**  
**Surgical site infection and type of organism cultured from various swabs**

Organism	Surgical incision swab	Operating team swab group I	Operating equipment group II	Antiseptics and dressing materials swab group III	Post operative wound swab	Total
<i>S. aureus</i>	9	1	8	5	9	32
<i>S. epid.</i>	2	0	0	0	2	4
<i>E. coli</i>	6	0	3	0	4	13
<i>Ps. aureg</i>	3	0	3	3	3	12
<i>Klebsiella</i>	1	0	0	0	0	1

## CONCLUSION

Optimal management of surgical wounds is an important part of post-operative recovery and health care professionals should monitor the process of acute wound healing, prevent wound complications and treat appropriately if complications arise. The key elements of post-operative wound management include timely review of the wound, appropriate cleansing and dressing, and early recognition and intervention of wound complications.

The major part of the management of post-operative wound infection totally depends upon prevention and control of it. First the use of aseptic and antiseptic technique. Second the proper use of prophylactic antibiotics. A third milestone define that optimize and the patient's own ability to prevent infection.

## REFERENCES

1. Ljungqvist U. Wound sepsis after clean operation. *Lancet* 1964;1:1095-7.
2. Pollock AV, Leaper DB, Evans M. Single dose intra-incisional antibiotic prophylaxis of surgical wound sepsis: a controlled trial of cephaloridine and ampicillin. *Br J Surg* 1977;64:322-5.
3. Major or minor surgical site infection. In Bailey & Love's: short practice of surgery-ed 25. Edward Arnold (publishers) 2008;P35-36
4. Anonymous. National Nosocomial Infections Surveillance (NNIS) System Report, data summary from January 1992-June 2001, issued August 2001. *Am J Infect Control* 2001;29:404-21.
5. Haley RW, Culver DH, Morgan WM, et al. Identifying patients at high risk of surgical wound infection. A simple multivariate index of patient susceptibility and wound contamination. *Am J Epidemiol* 1985;121:206-15.
6. Anonymous. National Nosocomial Infections Surveillance (NNIS) report, data summary from October 1986-April 1996, issued May 1996. A report from the National Nosocomial Infections Surveillance (NNIS) System. *Am J Infect Control* 1996;24:380-8.
7. Culver DH, Horan TC, Gaynes RP, et al. Surgical wound infection rates by wound class, operative procedure, and patient risk index. *Am J Med* 1991;91(Suppl 3B):152S-7S.