Prevalence of Post-operative Surgical site infection in a district Hospital of western Rajasthan India

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Abstract— *Wound infection is the second commonest complication of wound healing. This study was carried out on 250 post-operative cases operated at a district hospital of western Rajasthan, India with the aim the aim to find out prevalence of post-operative surgical site infection and its causing organism. After taking personal information and detailed clinical, operative and post-operative history of these cases, swab from post-operative wound was taken and sent for culture and sensitivity test in Microbiology. Association was inferred with Chi-square test. Post operative surgical site infection rate was found 11.6 % which was found significantly more in intestinal surgeries than the other. Most common causative organism for infection was Staphylococci cases followed by Streptococci, E. Coli and Klebsella. Out of total 11.6% infected cases, majority (8.8%) of patients had infection with more than one organism only 2.8% were having single organism.*

Keywords— Post-operative surgical Site Infection (SSI), Micro-organism, SSI Infection Rate.

I. INTRODUCTION

Wound infection is the second commonest nosocomial infection[1] and causes patient discomfort, prolonged hospital stay, more days off work, increased cost of therapy and the cost of an operation increase by 300% to 400%.[2] An important requirement in the prevention of SSI is the availability of correct and recent data i.e. surgical audit and wound surveillance

The discovery of the antimicrobial agents also enables us to perform surgery in many conditions that were previously thought to be impossible in the pre-antibiotic era due to the risk of infection.[3] Infection in a wound is a manifestation of disturbed host-bacteria equilibrium that is in favour of bacteria. The absolute prevention of surgical wound infection seems to be an impossible goal.

A recent prevalence study found that SSIs were the most common healthcare-associated infection, accounting for 31% of all HAIs among hospitalized patients[4] . The CDC healthcare-associated infection (HAI) prevalence survey found that there were an estimated 157,500 surgical site infections associated with inpatient surgeries in 2011[5] .

While advances have been made in infection control practices, including improved operating room ventilation, sterilization methods, barriers, surgical technique, and availability of antimicrobial prophylaxis, SSIs remain a substantial cause of morbidity, prolonged hospitalization, and death. SSI is associated with a mortality rate of 3%, and 75% of SSI associated deaths are directly attributable to the SSI.[6].

Surveillance of SSI with feedback of appropriate data to surgeons has been shown to be an important component of strategies to reduce SSI risk[7-10]

A new CDC and Healthcare Infection Control Practices Advisory Committee guideline for the prevention of surgical site infection is scheduled for publication soon, and will replace the previous Guideline for Prevention of Surgical Site Infection, 1999[10]

This study was conducted in a District Hospital of western Rajasthan India to find out the prevalence of Post-operative wound infections (PSI) and its causative agents.

II. METHODOLOGY

A descriptive type of observational study was carried out on 250 post-operative cases operated at R. K. Joshi District Hospital, Dausa (Rajasthan) India.

Sample size was calculated[11] 225 subjects accepting assuming 4% of absolute allowable error at 95% confidence limit assuming 10% overall prevalence of post operative wound infections.[12]

Post-operative ssurgical site infection (SSI) was accepted as per CDC guidline[13] i.e. "Date of event for infection occurs within 30 days after any NHSN operative procedure (where day 1 = the procedure date) AND involves only skin and subcutaneous tissue of the incision AND patient has at least one of the following:

a) Purulent drainage from the superficial incision.

b) Organisms identified from an aseptically-obtained specimen from the superficial incision or subcutaneous tissue by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment (e.g., not Active Surveillance Culture/Testing (ASC/AST).

c) Superficial incision that is deliberately opened by a surgeon, attending physician** or other designee and culture or non-culture based testing is not performed. AND patient has at least one of the following signs or symptoms: pain or tenderness; localized swelling; erythema; or heat. d. diagnosis of a superficial incisional SSI by the surgeon or attending physician** or other designee.

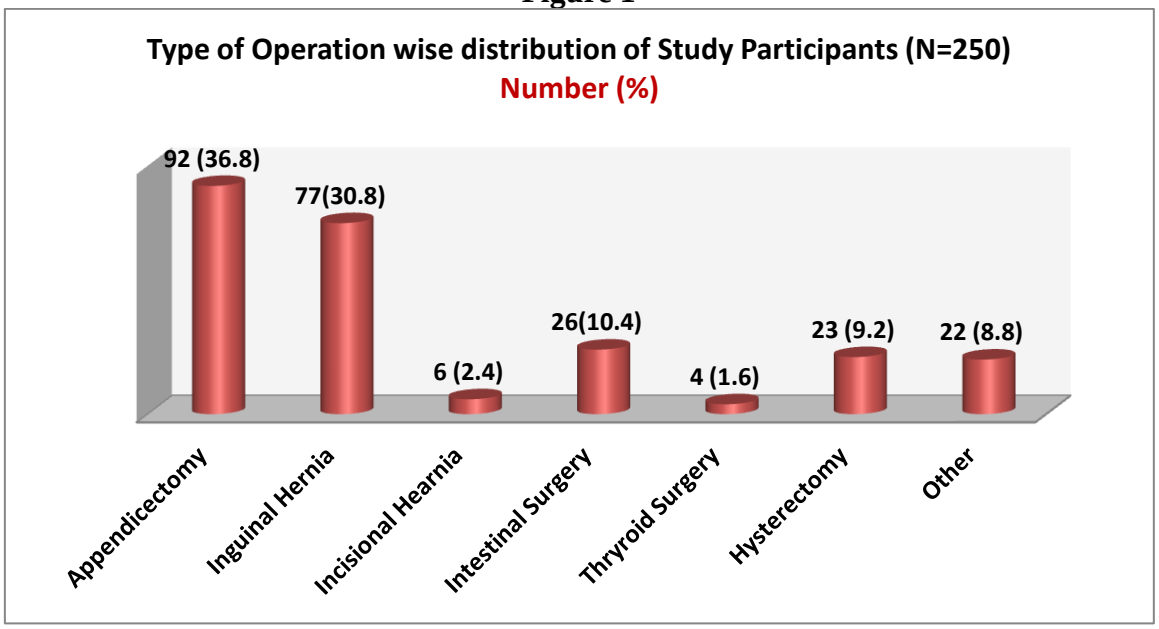
For this study, succeeding cases operated at district hospital Dausa were taken starting from 4th Jan 2013. Patients with extremes of ages (<20 and >60 years) and those who had other chronic illness were excluded from study. These patients were interrogated in details for their personal information with clinical, operative and post-operative history. Swab from post-operative wound was taken and sent for culture and sensitivity test in Microbiology department. Report of culture and sensitivity was also recorded.

Statistical Analysis: Data thus collected were entered in MS Excel worksheet 2007 as master chart. Qualitative data were expressed in proportions and percentage and quantitative data were expressed in mean ± SD. Chi-square was used to find out association between infection rate and type of surgeries.

III. RESULTS

Out of these 250 post operative participants, 92 (36.8%) had Appendicectomy followed by Inguinal hernia (77 i.e. 30.8%), Intestinal surgery (26 i.e. 10.4%), Hysterectomy (23 i.e. 9.2%), Incisional hearnia (6 i.e. 2.4%), Thyroid surgery (4 i.e. 1.6%) and others. (Figure 1)

Figure 1



Out of these 250 post-operative patients' participants, 29 (11.6%) cases were found infected with one or the other microorganism. Most common causative organism for infection was Staphylococci in 23 cases followed by Streptococci, E. Coli and Klebsella. Majority (22 i.e. 8.8%) of patients had infection with more than one organism only 7 (2.8%) were having single organism infection and overall infection rate was 11.6% (i.e. in 29 cases out of 250 participants. (Figure 2&3)

Figure 2

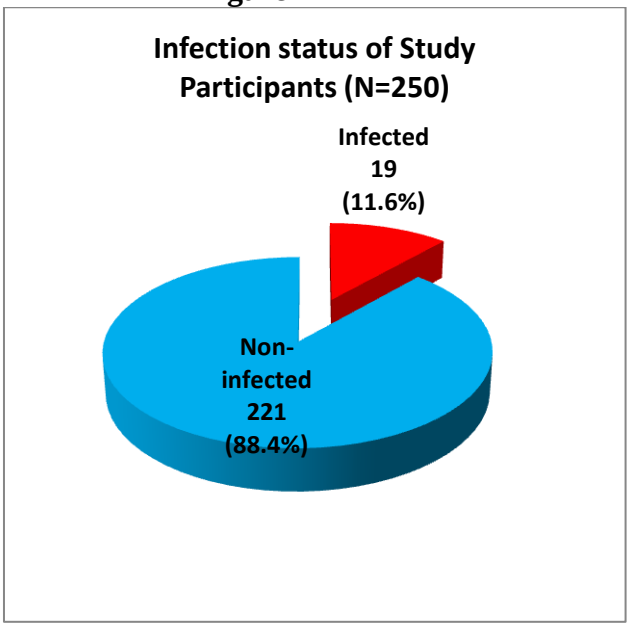
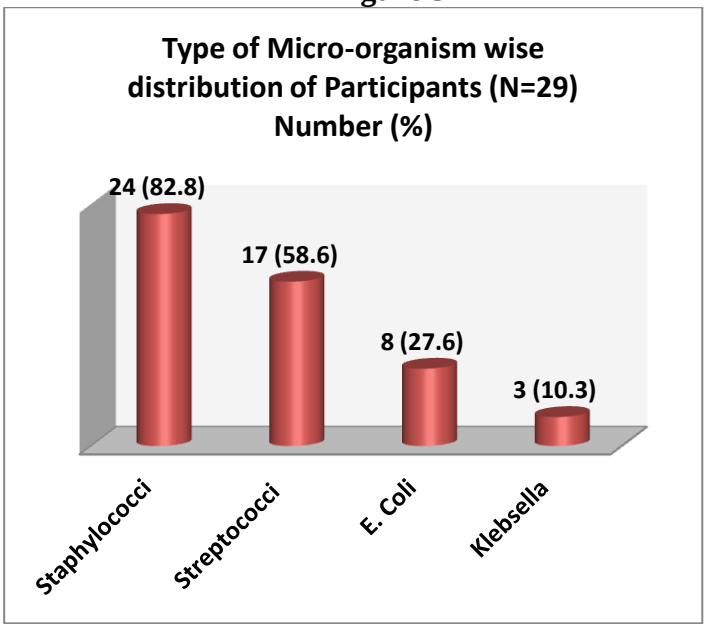


Figure 3



When association of type of surgery with infection rate was assessed it was revealed that maximum post-operative infection rate was found in Intestinal surgery (34.6%) followed by in Appendicectomy (10.9%, Hysterectomy (8.7%), Inguinal hernia (7.8%) etc. None of case of Incisional hernia and Thyroid surgery was having any infection. This variation in distribution of infection rate as per type of surgery was found significant ($p<0.05$). (Table 1)

Table 1
Association of Infection Rate with Type of Operation

S. No.	Type of Operation	Total Cases	Infected Cases	Non-Infected Cases	Infection Rate
1	**Appendicectomy**	92	10	82	**10.9**
2	**Inguinal Hernia**	77	6	71	**7.8**
3	**Incisional Hearnia**	6	0	6	**0.0**
4	**Intestinal Surgery**	26	9	17	**34.6**
5	**Thryroid Surgery**	4	0	4	**0.0**
6	**Hysterectomy**	23	2	21	**8.7**
7	**Other**	22	2	20	**9.1**
	Total	250	29	221	**11.6**

Chi-square test=16.204 at 6 DF **P Value=0.013** **LS=S**

IV. DISCUSSION

In this present study, Infection rate was found 11.6% i.e. out of 250 post-operative patients participants, 29 cases were found infected. Similar observations were made by Damani etall[7] who found wound infection rate was 11% in their study. Other studies[14-16] showing variation of SSI infection rate ranging from 5-30% .

Most common causative organism for infection was Staphylococci in 23 cases followed by Streptococci, E. Coli and Klebsella. Majority (22 i.e. 8.8%) of patients had infection with more than one organism only 7 (2.8%) were having single organism infection and overall infection rate was 11.6% (i.e. in 29 cases out of 250 participants. Other authors like Masood etall[15] and Arora[16] also reported well comparable observations. Masood etall[15] also observed the common organisms involved in the SSI were Staphylococcus aureus, E. coli, Streptococcus pyogenes and Pseudomonas group. Arora etall[16] also have reported *Staphylococcus aureus* has been described as the most common single pathogen involved in postoperative wound infections.

When association of type of surgery with infection rate was assessed it was revealed that maximum post-operative infection rate was found in Intestinal surgery (34.6%) followed by in Appendicectomy, Hysterectomy, Inguinal hernia etc. None of case of Incisional hernia and Thyroid surgery was having any infection. This variation in distribution of infection rate as per type of surgery was found significant ($p<0.05$). Whereas Rajendra K etall[17] found that although all the cases of Prostatectomy cases had post-operative wound infection followed by Intestinal surgery (42.11%), Cholecystectomy (33.33%) but the difference distribution of proportion of these cases as per type of operation was not found significant ($p>0.05$). But many other authors[15, 18-20] found that Infection rate in post-operative infected wound depend upon the type of surgery which was in line of present study.

V. CONCLUSION

In this study, post-operative wound infection rate was found 11.6%. In majority of cases, causative agent found in post-operative infected wound was Staphylococci followed with Streptococci, E. Coli, and Klebsella. Maximum infection rate was found in Intestinal surgery followed by in Appendicectomy, Hysterectomy, Inguinal hernia etc. This variation in infection rate as per type of operation was found significant.

CONFLICT OF INTEREST

None declared till now.

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