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Bacteriology of Surgical Site Infections after Colorectal surgeries

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ABSTRACT

Surgical Site Infection (SSI) is the infection of the skin and subcutaneous tissues, organs or spaces exposed by surgeons during the performance of an invasive procedure. Appropriate antimicrobial therapy is mandatory not only to improve the prognosis of patients with SSIs but also to minimize the occurrence of antibiotic-resistant organisms. To use antibiotics appropriately, especially before the availability of culture sensitivity reports, information on the prevalent microbial flora isolated from SSIs is of particular value. The purpose of this study was to study the bacteriological spectrum of SSIs in colorectal surgical patients. This 2-year prospective study of 272 patients was conducted in the Department of Colorectal Surgery at a tertiary care hospital in Kashmir. Postoperatively surgical site infected cases were identified using CDC, USA definition for SSI. After discharge from the hospital, patients were followed for up to 30 days to check any signs of SSI. If there were no signs of SSI within 30 days of operation, the patient was regarded as having no SSI. After identifying a patient with SSI, puss culture swabs were sent to the microbiology laboratory of the institute. After collecting the reports of swab culture, data were analyzed statistically and inferences were drawn from there. Out of 272 patients, 36 patients developed SSI that is the SSI rate in our series was 13.2%. Incisional SSIs comprised about 89% while as organ/space infections comprise only about 11% of total SSIs in this study. Out of 36 SSI patients, only 24 had positive swab/puss culture reports that are swab/puss culture positivity rate was 66.67%. The most common organism found was Staph aureus followed by E.coli. Gram-positive organisms out-numbered the gram-negative ones in our study of SSI in colorectal patients. Swab/puss culture positivity rate in our study is 66.67%. The most common organism found in SSI after colorectal surgery is Staphylococcus aureus followed by E.coli. Also, the gram-positive organisms out-numbered the gram-negative ones in SSI in colorectal patients.

Keywords— *Surgical Site Infection, Colorectal, Bacteriology, Swab culture*

1. INTRODUCTION

Surgical site infection (SSI) is the infection of the skin and subcutaneous tissues, organs or spaces exposed by surgeons during the performance of an invasive procedure. The Centre of Disease Control (CDC), USA definition of SSI states that "an infection would be regarded as surgical site infection if it occurs within 30 days of procedure and has at least one of these characteristics like purulent drainage from the wound, pain or tenderness, localized swelling, redness, malodor, and fever". SSIs are the third most common nosocomial infections, accounting for 38% of nosocomial infections among surgical patients and 14% to 16% of overall nosocomial infections.[(1)] SSIs after any surgery especially after colorectal surgical procedures are associated with increased morbidity and mortality; increased hospital stay and cost of treatment increased re-admission rates and excess utilization of health care resources. SSIs increase hospital stays on average by 7 to 13 days and average cost by 2.6 to 3 times per case. [(2-4)] Even after discharge, patients with SSI experience impaired physical as well as mental well-being. [(5)]

Appropriate antimicrobial therapy is mandatory not only to improve the prognosis of patients with SSIs but also to minimize the occurrence of antibiotic-resistant organisms. To use antibiotics appropriately, especially before the availability of culture sensitivity reports, information on the prevalent microbial flora isolated from SSIs is of particular value. This information of the microbiological spectrum of SSIs also guides us about the use of proper prophylactic antibiotics empirically in the Peri-operative period. The purpose of this study was to study the bacteriological spectrum of SSIs in colorectal surgical patients.

2. METHODS

This prospective study of 272 patients was conducted in the Department of Colorectal Surgery at a tertiary care hospital in Kashmir. The study included all adult patients of both genders who underwent elective colorectal surgery from July 2015 to June 2017. Non-colorectal surgical patients, patients operated in emergency settings and age < 18 years were excluded from the study.

Postoperatively surgical site infected cases were identified using CDC, USA definition for SSI. After discharge patients were followed for up to 30 days to check any sign of SSI. If there were no signs of SSI within 30 days of operation, the patient was regarded as having no SSI. After identifying a patient with SSI, puss culture swabs were sent to the microbiology laboratory of the institute. After collecting the reports of swab culture, data were analyzed statistically and inferences were drawn from there.

3. RESULTS

Our study included a total of 272 patients who underwent colorectal surgical procedures for 2 years duration. Out of 272 patients, 36 patients developed SSI i.e. the SSI rate in our series was 13.2%. Out of these 36 patients with SSIs, 32 (11.7%) had an incisional (superficial or deep) infections and 4 (1.5%) patients had organ/space infections i.e. incisional SSIs comprise about 89% while as organ/space infections comprise only about 11% of total SSIs in this study.

Out of 36 SSI patients, only 24 had positive swab/puss culture reports i.e. swab/puss culture positivity rate was 66.67%. The most common organism found was Staph aureus followed by E.coli and others as shown in the table (1) and figure (1).

Staph aureus, Enterococcus fecalis, Coagulase-negative staph are gram-positive while as klebsiella and E. coli are gram-negative organisms. Hence the gram-positive (14/24; 58.3%) organisms out-numbered the gram-negative ones (10/24; 41.6%) in our study of SSI in colorectal patients.

Table 1: Micro-organisms isolated from swab/puss cultures:

Organism	Number of patients	Percentage
Staph. Aureus	7	29.1
E.coli	6	25.2
E.Fecalis	5	20.8
Klebsella	4	16.6
Coagulase Negative Staph.	2	8.3
Total	24	100

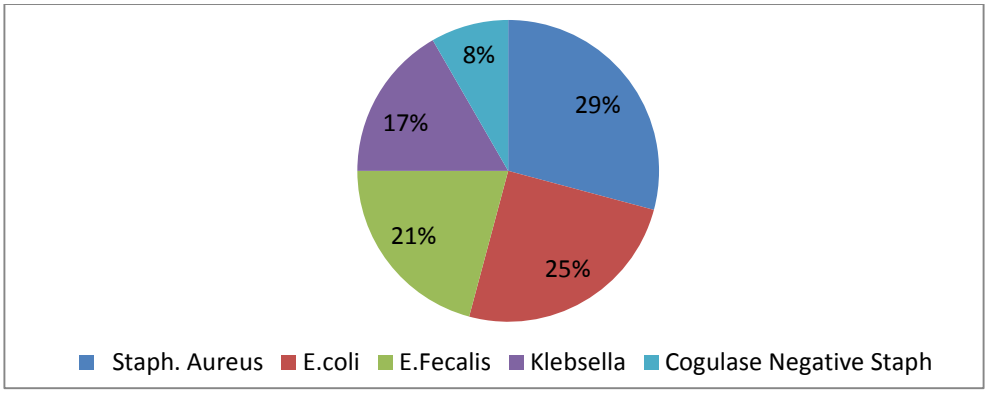

Fig. 1: Pie diagram showing Micro-organisms isolated from puss/swab cultures

Staph aureus, Enterococcus fecalis, Coagulase-negative staph are gram-positive while as klebsiella and E. coli are gram-negative organisms. Hence the gram-positive (14/24; 58.3%) organisms out-numbered the gram-negative ones (10/24; 41.6%) in our study of SSI in colorectal patients.

4. DISCUSSION

SSIs are the third most common nosocomial infections, accounting for 38% of nosocomial infections among surgical patients[(1)] SSIs lead to increased patient morbidity and mortality; increased hospital stay and cost of treatment. Appropriate antibiotic use, especially in the prophylactic setting and before the availability of culture sensitivity reports, information on the prevalent microbial flora isolated from SSIs is of particular value.

The SSI rate in our present series is 13.2%. This rate of SSI is comparable to that of Mudassir A Khan, et al[(6)]. In their study of 350 patients of colorectal surgical procedures, SSI was seen in 61 patients i.e. the overall incidence of SSI was 17.4%. Our SSI rate is also similar to the study of Mao Hagihara et al [(7)] in which 304 patients underwent elective colorectal resection from June 2006 to May 2009 and reported SSI rate of 15.1%. Also Daniel Brock Hewitt et al. reported in their 2 years study of 489 colorectal surgery cases that SSIs occurred in 68 patients (13.9% SSI rate). [(8)]

Swab/puss culture positivity rate in our study is 66.67%. Heidi Misteli et al. [9] in their study of 293 SSI patients reported a culture positivity rate of 44%.

The most common organism found in our study was Staph aureus (29%) followed by E.coli (25%). Our results are consistent with the results of Heidi Misteli et al. [9] who studied 293 instances of SSI. Microbiological species were identified in 129 of 293 SSI (44%). Staphylococcus aureus (29.5%) was the most common pathogen causing SSI in trauma and vascular surgery, whereas Escherichia coli (20.9%) was more frequently responsible for SSI in visceral surgery. To investigate the trends of antimicrobial resistance in pathogens isolated from surgical site infections (SSI), Yoshio Takesue et al.[10] a Japanese surveillance committee conducted the first nationwide survey. A total of 702 isolates from 586 patients with SSI were included. They found that Staphylococcus aureus (20.4 %) and Enterococcus faecalis (19.5 %) were the most common isolates, followed by Pseudomonas aeruginosa (15.4 %) and Bacteroides fragilis group (15.4 %). However, Elena Múñez et al.[11] from Spain analyzed 2280 patients who were subjected to upper or lower abdominal tract surgery during 1999–2006 and were diagnosed with SSI. Operation of the upper abdominal tract comprised 37% and (63%) had lower abdominal tract surgery. The most frequent microorganisms isolated were, Escherichia coli (28%), Enterococcus spp. (15%), Streptococcus spp. (8%), Pseudomonas aeruginosa (7%), and Staphylococcus aureus (5%). They concluded that the microbiology of SSI produced after upper abdominal tract surgery did not show any significant differences compared to those of the lower tract. Our results are different from that of Elena Munez et al; firstly because they had a larger series than ours, secondly we had only colorectal surgical patients with SSI while as they took both upper GI and lower GI patients.

5. CONCLUSION

Swab/puss culture positivity rate in our study is 66.67%. The most common organism found in SSI after colorectal surgery is Staphylococcus aureus followed by E.coli. Also, the gram-positive organisms out-numbered the gram-negative ones in SSI in colorectal patients.

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6. REFERENCES

[1] Mangram AJ, Horan TC, Pearson ML, et al. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol 1999; 20: 250–78.

[2] Coello R, Charlett A, Wilson J, et al. Adverse impact of surgical site infections in English hospitals. J Hosp Infect 2005; 60: 93–103.

[3] Leaper DJ, van Goor H, Reilly J, et al. Surgical site infection—a European perspective of incidence and economic burden. Int Wound J 2004; 1: 247–73.

[4] Plowman R, Graves N, Griffin MA, et al. The rate and cost of hospital-acquired infections occurring in patients admitted to selected specialties of a district general hospital in England and the national burden imposed. J Hosp Infect 2001; 47: 198 – 209.

[5] Tanner J, Padley W, Davey S, et al. Patients' narratives of surgical site infection; implications for practice. J Hosp Infect 2013;83:41-5

[6] Khan, M. A. et al. (2018) Clinico-Surgical Factors Affecting Surgical Site Infection in Colorectal Surgical Procedures. International Journal of Clinical and Experimental Medicine Research, 2(4), 50-56.DOI: 10.26855/ijcemr.2018.04.002

[7] Mao Hagihara, Mieko SuwaYuki, Muramatsu Yukiko, Kato Yuka, Yamagishi Hiroshige and Mikamo YumiIto. Preventing surgical-site infections after colorectal surgery. Journal of Infection and Chemotherapy. Volume 18, Issue 1, 2012, Pages 83-89

[8] Daniel Brock Hewitt, M.D., M.P.H., Sami S. Tannouri, M.D.,Richard A. Burkhart, M.D., Randi Altmark, R.N., Scott D. Goldstein, M.D., Gerald A. Isenberg, M.D., Benjamin R. Phillips, M.D., Charles J. Yeo, M.D., Scott W. Cowan, M.D. Reducing colorectal surgical site infections: a novel, resident-driven, quality initiative. The American Journal of Surgery (2017) 213, 36-42.

[9] Heidi Misteli, Andreas F. Widmer, Rachel Rosenthal, Daniel Oertli, Walter R. Marti, Walter P. Weber. The spectrum of pathogens in surgical site infections at a Swiss university hospital. Swiss Med Wkly. 2011;140:w13146

[10] Yoshio Takesue et al. Nationwide surveillance of antimicrobial susceptibility patterns of pathogens isolated from surgical site infections (SSI) in Japan J Infect Chemother (2012) 18:816–826. DOI 10.1007/s10156-012-0509-1.

[11] Elena Múñez, Antonio Ramos, Teresa Álvarez de Espejo, Josep Vaqué, José Sánchez-Payá, Vicente Pastor, Ángel Asensio. Microbiology of Surgical Site Infections in Abdominal Tract Surgery Patients. Cirugía Española, Volume 89, Issue 9, November 2011, Pages 606-612

