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Research Paper

STUDY OF SURGICAL SITE INFECTIONS AND ANTIBIOTIC SUSCEPTIBILITY PATTERN OF ISOLATES AT A TERTIARY CARE HOSPITAL IN AMRITSAR

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ABSTRACT **Surgical site infections are the third most frequently reported nosocomial infections accounting for 14-16% of all the infections in hospitalised patients. Methodology: Two**

s. Methodology: Two hundred swabs/pus specimens from the patients de*veloping surgical site infections at Guru Nanak Dev Hospital,GMC, Amritsar were processed in the Department of microbiology during JanNov2015, by standard methods and antibiotic susceptibility testing of all the isolates was done by using Kirby Bauer disc diffusion technique. Results: Of the 153 organisms isolated, the most common was Staphylococcus aureus (47.7%), followed by Pseudomonas aeruginosa (16.99%), Escherichia coli (14.37%), Klebsiella pneumoniae (9.15%), miscellaneous gram negative rods (9.14%) and Streptococcus pyogenes (2.61%). About 30% of the Staphylococcus aureus isolates were found to be methicillin resistant. Conclusion:We should clearly understand and identify this as a problem and devise a system to track, analyze and monitor these.*

KEYWORDS :Surgical site infections (SSI's), surgeries.

INTRODUCTION

Surgical site infections (SSI) are the third most frequently reported nosocomial infections accounting for 14-16% of all the infections in hospitalised patients. Among surgical patients SSI are the most common nosocomial infections1. These remain a complication of surgical procedures resulting in increased morbidity, mortality and cost2. The risk of developing a surgical site infection depends upon the balance between factors determining the number of bacteria contaminating the site and the factors determining the resistance of the site against infection3,4.One of the major problems faced by the surgeons these days is to deal with the post surgical infections, as most of these are being caused by multiple resistant bacteria.Gram positive cocci and Gram negative bacilli are being implicated in most of such cases5,6. The problem of infected surgical sites can only be tackled properly if all these are examined bateriologically and feed back given to the surgeons well in time, so that they can treat these with appropriate antibiotics7. Not only this but, the micro- biologist should provide them the guidance regarding proper use of prophylactic antibiotics. But, according to the cure". prevention of surgical rate infections by adopting basic principles of asepsis is the key to the solution of this problem8.

Material and Methods:

Two hundred wound swabs/pus specimens collected from patients developing surgical site infections during a period from January 2015 to November 2015, were included in the study. Most of our patients were young males (n=80). Rest were females (n=38) and children (n=11). The age range was between 4-65 years and had undergone different kinds of surgery including general surgery (n70), gynecological/obstetric surgery (n48) and orthopedic surgery (n11). Pus swabs/specimens were collected from infected surgical sites by standard technique using commercially available sterile stick swabs. The specimens were immediately transported to the Department of Microbiology, GMC,Amritsar for bacteriological study. All the specimens were inoculated onto blood and MacConkey's agar within two hours of collection. The agar plates were incubated at 37°C aerobically and were examined for the presence of any growth after 24 hours. Those plates showing no growth were incubated for another 24 hours. The isolates were identified by colonial morphology, Gram's stain and conventional biochemical tests.Antibiotic susceptibility pattern of the isolates was studied using Kirby Bauer method9. Mueller Hinton agar (Difco) was used for antibiotic susceptibility testing. Staphylococcus aureus ATCC 25932, Escherichia coli ATCC 25922 and Pseudomonas aeruginosa ATCC 27853 were included as control strains.

Results :

One hundred and fifty three organisms were isolated from the 200 specimens processed. One hundred and five specimens yielded growth of single organism while two isolates were present in rest of the twenty four cases. The most common pathogen isolate was, Staphylococcus aureus (47.71%), followed by Pseudomonas aeruginosa (16.99%), Escherichia coli (14.37%), Klebsiella pneumoniea (9.15%), Streptococcus pyogenes (2.61%) and miscellaneous gram negative rods (9.14%) including Acinetobacter baumannii, Proteus mirabilis and Citrobacter diversus (Table 1)

Table 1. Pathogens isolated from Surgical site infections

Organism	No.	Percent%
Staphylococcus aureus	73	47.71
Pseudomonas aeruginosa	26	16.99
Escherichia coli	22	14.37
K	1	9.

lebsiella pneumonia	5	
Acinetobacter baumanni	6	3.92
Proteus mirabilis	4	2.61
Citrobacter koseri	4	2.61
Streptococcus pyogenes	4	2.61
Total	153	

In case of Staphylococcus aureus 30% of the isolates were found resistant to methicillin. Antibiotic susceptibility pattern of gram positive cocci (Staphylococcus aureus and Streptococcus pyogenes) to other antibiotics are shown in (Table 2)

Table2. Antibiotic susceptibility pattern(Percent sensitive) of Gram positive cocci

Antibiotic	Staphylococcus aureus %	Streptococcus pyogenes %
Amikacin	86.3	-
Gentamycin	45.2	-
Ciprofloxacin	65.75	-
Cotrimazole	49.31	0
Methicillin	30.1	-
Vancomycin	100	100
Cephalexin	54.79	100

In case of Pseudomonas aeruginosa only 8 isolates (30.7%) were gentamicin sensitive. Quite a few strains were also found resistant to piperacillin tazobactum, ciprofloxacin and ceftazidime. Antibiotic susceptibility pattern of all the Gram negative rods (GNRs) studied is shown in (Table 3).

Table 3. Antibiotic susceptibility pattern (Percent sensitive)of Gram negative rods (GNRs)

Antibiotic	Pseu- domonas aeruginosa	Escherichia coli	Klebsiella pneumo-niae	Miscel-laneous GNRs
Amikacin	50	54.5	42.8	50
Gentamycin	30.7	36.3	50	57.1
Ciprofloxacin	53.8	40.9	50	28.6
Ceftazidime	50	50	50	71.42
Ceftriaxone	69.2	40.9	64.2	64.2
Sulbactum- ceftriaxone	73	63.6	42.8	71.42
Piperacillin – tazobactum	61.5	72.7	71.4	64.3
Imipenem	84.6	72.7	57.1	57.1

Discussion:

Surgical site infection can be defined as the presence of pus alongwith signs of inflammation in the surgical wound margins. Predisposing underlying conditions for surgical site infections include immune suppression, irradiation, steroid administration, diabetes mellitus and malnutrition10. The risk of infection after surgery depends upon the factors including the type and length of surgical procedure; age, underlying conditions and previous history of the patient: skill of the surgeon; diligence with which infection control procedures are applied and the type and timing of preoperative antibiotic prophylaxis11 Most of the patients included in the study were young males with minimal predisposing factors except that six of these were diabetic. So the factors most probably operative in causing infections in our patients were related to the surgical team or surgical environment. Staphylococcus aureus is considered to be the leading pathogen in such post surgical wound infections followed by the members of the enterobacteriaceae12. But in our study the Pseudomonas aerugi nosa was the second commonest isolate after Staphylococcus aureus. Otokunefor TV and DatuboBrown DD also have found similar isolates in most of the patients included in their study13.Most of our isolates were found resistant to the commonly used antibiotics. This is a matter of great concern because treatment of such infections warrants newer and costly antibiotics. The incidence of methicillin resistant Staphylococcus aureus (MRSA) in our study in about 30%. MRSA infections cannot be treated by beta lactarnase resistant penicillins and not even by the cepha losporins14 . Treatment of these infections is possible either by the Fluroquinolones (if the isolate is

found sensitive) or by the vancomycin only15. More than 50% were sensitive to ceftriaxone and ciprofloxacin which are thus the minimal choice to treat Pseudomonas aeruginosa infections. Maximum sensitivity of Pseudomonas was seen to Imepenem,sulbactum-ceftriaxone and piperacillin tazobactum.. But an empirical treatment to be really effective against such isolates will have to include either amikacin or one of the carbapenems alone or in combination. Even the Escherichia coli, Klebsiella pneumonia and the other Gram negative isolates in our study are showing fairly high antibiotic resistance. In view of such highly resistant organisms causing wound infections in our hospital. it will become very difficult to treat these cases. So the only hope lies with prevention of such surgical site infections. To achieve this goal we will have to return to the preventive measures including fundamental principles of asepsis. Individual patient risk factors must be identified and modified whenever possible. In addition to the skin asepsis and perioeprative prophylactic antibiotics, care and attention to the theatre environment is also very important16. Last but not the least, surgical expertise and theatre discipline are the essential components against surgical site infections.

CONCLUSION

We should clearly understand and identify the SSI as a problem and devise a system to track, analyze and monitor these. Hospital infection control committees should meet regularly and make recommendations at all levels for prevention of such incidents. Otherwise it will be impossible to overcome the serious issues of economic loss and high hospital morbidity and mortality caused by SSI.

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