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STUDY OF SURGICAL SITE INFECTIONS AMONGST ORTHOPAEDIC PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: *Surgical site infections (SSIs) are one of the most devastating and commonest complications of surgery in orthopaedic wards. Proper identification is needed for their prevention and appropriate empirical antibiotic treatment.* ***Materials and methods:****Fifty swabs/pus specimens from various surgical sites after orthopedic surgery suspected to be infected were collected during June 2013 to December 2013 and processed, by standard methods. Antibiotic susceptibility testing of all the isolates was done by using Modified Kirby Baur disc diffusion technique.* ***Results****: Staphylococcus aureus was the commonest organism isolated 50% of which were found to be methicillin resistant. The resistance to third generation cephalosporins and the quinolone ciprofloxacin was also quite high in gram positive as well as gram negative organisms.* ***Conclusion:*** *SSIs infections are a serious threat to the surgical patients. There is an urgent need to adopt basic principles of asepsis and sterilisation and to make judicious use of prophylactic and therapeutic antibiotics. SSIs in orthopedic patients are most prevalent and show a higher incidence.*

KEY WORDS

Infection, orthopaedics, surgical site infection.

INTRODUCTION

Surgical site infections (SSIs) are one of the most common complications in orthopaedic surgeries that cause a threat to the patient as well as the health worker. They increase the mortality and morbidity adding to prolonged hospital stay and an increase in health care finances [1]. Most SSIs are believed to be acquired during surgery. They may be endogenous from patients own flora or exogenous from the environment [2]. CDC s defines surgical site infections as an infection which 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. The use of implants,improper pre operative preparation and longer time of surgery are important risk factors that accounts to higher infection rate in these surgeries [3]. SSIs result due to the impairement of the first line of host defenses between the microbes into the host tissue. These impaired host defenses thus pave way for the chain of events that produce wound infections. [4]

MATERIAL AND METHODS

This study was performed at the Department of Orthopedic Surgery, in a tertiary care hospital during the period from July 2013 to

December 2013. Diagnosis of the surgical site infection was made in concordance with the surgical team and fifty wound swabs / pus specimens were collected from these patients with the help of two sterile swabs under aseptic precautions. The data regarding patients age, sex, presence of, type of operation (elective or emergency), etc. were obtained.

One of the swabs was used for smear preparation and the other for culture. Most of our patients were in the age group of 15-65 years with young males (n=40) outnumbering as that of females (n=10. Pus swabs/specimens were collected from infected surgical sites by standard techniques using commercially available sterile swabs. The specimens were immediately transported to the microbiology laboratary. All the specimens were inoculated onto nutrient agar, blood agar and MacConkey 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 biochemical tests, based upon methods of CLSI guidelines. Antibiotic susceptibility pattern of the isolates was studied using Kirby Bauer method[9]. Mueller Hinton agar (Hi media) 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

Thirty five organisms were isolated from the fifty pus samples from various surgical patients .Procedures included fractures ,multiple fractures ,amputations , tendon, ligament injury and arthroscopy Thirty three specimens yielded growth of a single organism and only one showed the presence of two organisms . The most common pathogen isolated was, *Staphylococcus aureus* (51.4 %), followed by *Pseudomonas aeruginosa* (20.0 %), *Escherichia coli* (11.4 %), *Klebsiella pneumoniae* (8.6 %), *proteus mirabilis* (5.7 %) and *Enterococci*(2.9%).

Figure 1 Organisms isolated from Surgical site infection (SSIs) in Orthopaedic surgeries.

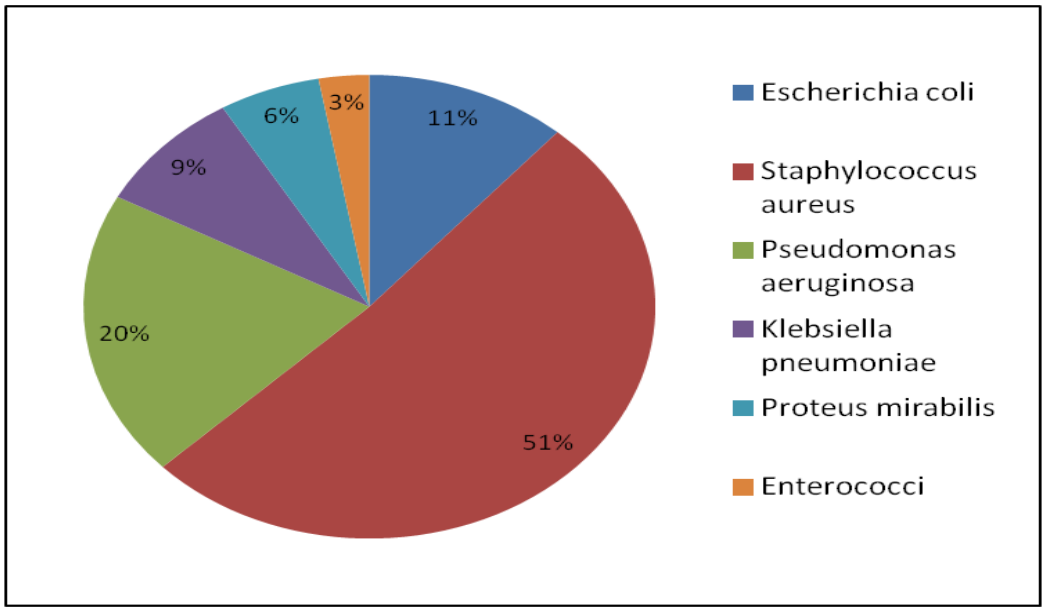

Figure 2: Antibiotic resistance pattern of Gram positive isolates

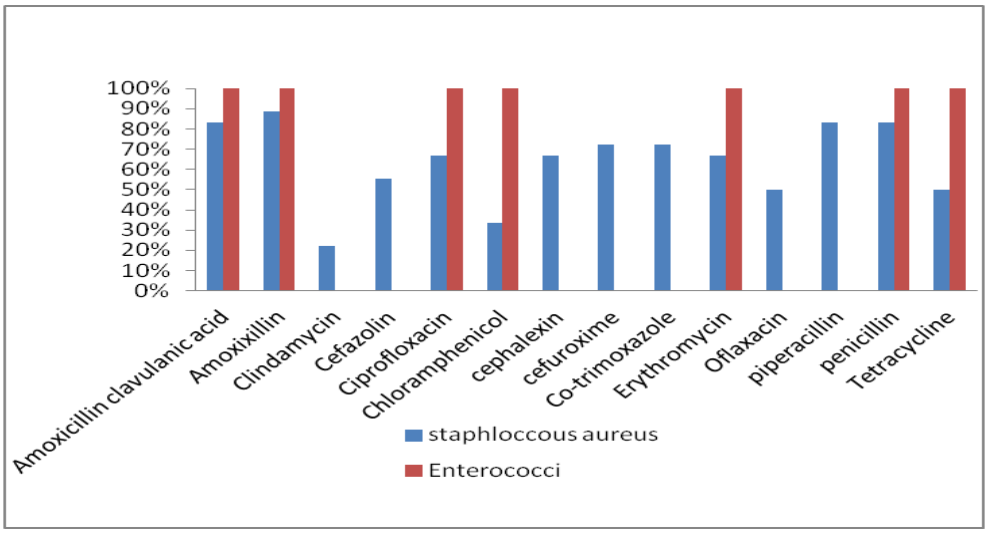

Figure 3 Antibiotic resistance pattern of Gram negative isolates

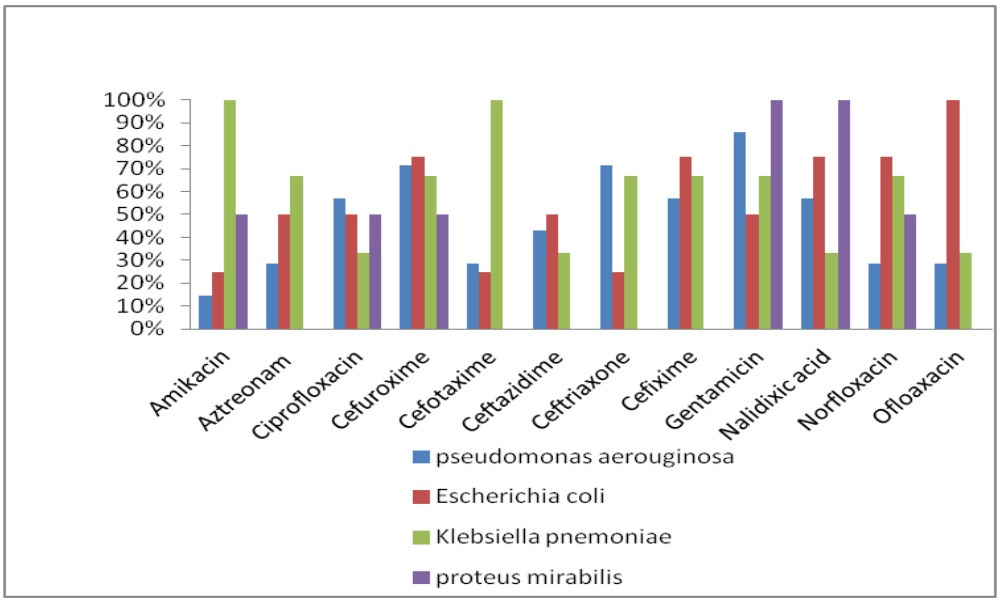

Table 4: Distribution of patients according to type of surgery Emergency Vs. Elective Surgery

Type of surgery	Culture positive cases	Culture negative cases	Total
Elective	21	9	30
Emergency	14	6	20

Out of 35 patients developing SSI, 14 were emergency surgeries and 21 were elective surgeries. Culture postive cases in elective surgeries were 21 and in case of emergency 14.

DISCUSSION

Surgical site infection (SSI) is a major complication in patients undergoing bone and joint surgeries. Its management is an important aspect of wound care which if not treated on time results in the removal of the implant,

prolonged hospital stay , expanded antibiotic therapy and a considerable increase in healthcare expenses[5].The various factors that predispose surgical site infections include immunosuppression , irradiation, corticosteroid therapy ,metabolic disorders like, diabetes mellitus and malnutrition. On the other hand the type and length of surgical procedure, advancing age, underlying medical conditions , surgeons skill and the type and timing of pre-operative antibiotic prophylaxis also play an important role .[6]

Most of the patients included in our study were young males with minimal predisposing factors except that five of these were diabetic. So most probably the surgical infections in our patients may be related to the surgical team or the operative environment or some other factor. In our study the rate of infection is more in patients having longer preoperative stay in the hospital wards and Long preoperative hospital stay leads to increased chances of bacterial colonization and inturn affects patients susceptibility to infection by lowering hosts immunity [7]

The high rates of infection in emergency surgeries may be sufferings of insufficient pre-operative preparation, the underlying conditions which predisposed to the emergency surgery and the more frequency of contaminated or dirty wounds in emergency surgeries[5,7] Dancer and A study in revealed sharply increase in the rate of SSIs in orthopedic patients with the contamination of sets containing surgical instruments that occurred after sterilization techniques had been done.[8]

Staphylococcus aureus remained the predominant pathogen in our study followed by *Pseudomonas aeruginosa* as showen by Linali *et al*.[9] Most of our isolates were found to be resistant to the commonly used antibiotics which is a matter of great concern The incidence of methicillin resistant Staphylococcus aureus (MRSA) in our study in about 50%.The treatment of MRSA is problematic and Vancomycin still remains the drug of choice. The reason for such a high resistant antibiotic pattern observed in the present study may be due to the widespread usage of broad spectrum antibiotics. Antibiotic therapy many factors must be considered, including previous antibiotic therapy, knowledge of the usual causative organisms in these infections and their antibiotic susceptibilities .Gentamicin was found to be effective against gram negative organisms. The developing resistance in these isolates limits the fundamental treatment opportunities and the only hope lies in their prevention.

CONCLUSION

Infections pose a threat in orthopedic surgeries in our set up. Active surveillance and identification of risk factors should be encouraged with taking extra care to address proper means of sterilization before and after the surgery. To achieve this goal we will have to return to the preventive measures including asepsis and peri-operative prophylactic antibiotics.

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