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IDENTIFY PATHOGENIC BACTERIA ISOLATED FROM TISSUES, BONES INFECTIONS AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN

Dr Shehzina Saeed[1], Dr Ayesha Nawaz[2], Dr Fizza Khalid[3]

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Abstract:

Introduction: *Surgical site infections (SSIs) consists of both infected bones and infected tissues and are the microbial contamination of surgical or operative wounds that occur within 30 days of a surgery or within 1 year post-surgery. Infections associated with surgical incisions are called SSIs.* ***Objectives:*** *The main objective of the study is to find the pathogenic bacteria isolated from tissues, bones infections and their antibiotic susceptibility pattern.* ***Material and methods:*** *This descriptive study was conducted in health department Punjab during July 2019 to December 2019. The data was collected from 100 patients having SSI, Infected bones and tissues which associated with Austin Moore prosthesis, tibial plating and humerus plating. The collected SSIs samples were inoculated on different Media like; Blood agar, MacConkey agar and Mannitol Salt Agar (MSA) media. Growth was observed after 24-48 hours incubation at 37°C aerobically.* ***Results:*** *The data was collected from 100 patients having SSI. On culture of these specimens, 28 showed no growth, while 72 (87.17%) specimens were found to have microbial pathogens. A total of 437 microbial organisms (412 bacteria and 25 Candida species) were isolated in 272 specimens.* Escherichia coli *was the most frequent species, which isolated from tissue specimens (46:46.46%) specimens, followed by* Staphylococcus aureus *in (42:42.42%), and* Pseudomonas aeruginosa *was found in (37:37.37%).* ***Conclusion:*** *It is concluded that a high rate of infection in our study as compare to the previous studies in this regard which means that sophisticated preventive measures are not implemented.*

Corresponding author:
Dr. Shehzina Saeed,

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INTRODUCTION:

Surgical site infections (SSIs) consists of both infected bones and infected tissues and are the microbial contamination of surgical or operative wounds that occur within 30 days of a surgery or within 1 year post-surgery. Infections associated with surgical incisions are called SSIs. SSIs are one of the mostly occurring nosocomial (Hospital acquired) infections. SSIs are considered as a common surgical complication that may be a disaster for the patient because it can compel a patient to use more Antibiotics and to stay at hospital for long [1].

Postoperative wound infection is defined as an infection that take place within 30 days after a surgical procedure and affecting either a surgical cut made in skin or flesh or deep tissues at the surgical site. The infection may occur on the surface or can involve organs or body space or deep incisional infection [2].

Drug resistance developing due to misuse and mismanagement of antibiotics is a major threat. Another important dimension to the problem of surgical site infections is the recent spread of multi drug (MDR) resistant bacterial pathogens. Organisms such as Pseudomonas aeruginosa, Proteusvulgaris, Escherichia coli, Klebsiella spp, Staphylococcus aureus, Enterococcus spp, etc are the most common isolates in all types of wounds. Postoperative wound infections are responsible for increased death rate, disease rate, long hospital stay and improved economic expenses for patient care [3]. The risk of emerging postoperative wound infections is mostly determined by three factors: type of microbial contamination of the wound, the amount and susceptibility of host [4].

Antimicrobial resistance is a major public health concern in human medicine both in the community and in medical institutions. Antimicrobial resistance results in increased morbidity, mortality, and cost of health care. The rate of resistance varies in different studies. There was a high rate of nosocomial multi-drug resistant (MDR) organisms isolated from different specimen. Bacterial infections continue to be an important cause of morbidity and mortality in developing countries [5]. During the last decade, an increase in the rates of antimicrobial resistance has been recognized worldwide and an increased frequency of MDR isolates in the clinical setting has been demonstrated [6].

Objectives

The main objective of the study is to find the pathogenic bacteria isolated from tissues, bones infections and their antibiotic susceptibility pattern.

MATERIAL AND METHODS:

This descriptive study was conducted in health department Punjab during July 2019 to December 2019. The data was collected from 100 patients having SSI, Infected bones and tissues which associated with Austin Moore prosthesis, tibial plating and humerus plating. The collected SSIs samples were inoculated on different Media like; Blood agar, MacConkey agar and Mannitol Salt Agar (MSA) media. Growth was observed after 24-48 hours incubation at 37°C aerobically. Identification of growth was based on colony morphology, gram staining and appropriate biochemical tests.

The antimicrobial discs used for susceptibility testing were penicillin (10 µg), ampicillin (10 µg), amoxicillin (10 µg), clavulanic acid (30 µg), piperacillin/tazobactam (110 µg), oxacillin (1 µg), cephradine (30 µg), cefotaxime (30 µg), tobramycin (10 µg), erythromycin (15 µg), clarithromycin (15 µg), clindamycin (2 µg), ciprofloxacin (5 µg), chloramphenicol (30 µg), sulphamethoxazole (25 µg), fosfomycin (50 µg) and fusidic acid (10 µg).

Statistical analysis

The data was collected and analysed using SPSS version 19. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 100 patients having SSI. On culture of these specimens, 28 showed no growth, while 72 (87.17%) specimens were found to have microbial pathogens. A total of 437 microbial organisms (412 bacteria and 25 Candida species) were isolated in 272 specimens. *Escherichia coli* was the most frequent species, which isolated from tissue specimens (46:46.46%) specimens, followed by *Staphylococcus aureus* in (42:42.42%), and *Pseudomonas aeruginosa* was found in (37:37.37%).

Table 01: Pattern of microbial isolates in culture specimen

Specimen (n)	*E coli (%)*	*S aureus (%)*	*P aeruginosa (%)*	*K pneumoniae (%)*	*Candida spp (%)*	*Enterobacter spp (%)*	*Enterococcus spp (%)*	*Streptococcus spp (%)*
Tissue	46.46%	42.42%	37.3%	16.1%	4.0%	4.0%	2.0%	1.0%
Pus (98)	36.73%	48.98%	25.5%	7.1%	9.1%	2.0%	-----	5.1%
Urine (55)	38.18%	10.90%		3.6%	10.9%	-----	-----	
Bone (34)	38.24%	47.06%	38.2%	14.7%	2.9%	2.9%	-----	8.8%
Blood (17)	5.88%	5.88%	5.8%	-----	-----	-----	-----	-----
Fluid(6)	-----	-----	-----	-----	-----	-----	-----	-----
Stool (1)	-----	-----	-----	-----				

Table 02: Frequency of multi-drug resistant (MDR) microbial isolates on culture

Organism	*n*	*MDR (%)*
Escherichia coli	11	34.19%
Staphylococcus aureus	11	11.50%
Pseudomonas aeruginosa	77	22.08%
Klebsiella pneumoniae	31	22.58%
Candida species	20	------
Proteus species	19	31.58%
Acinetobacter species	9	33.33%
Mixed Growth	9	------
Streptococcus species	9	------
Enterobacter species	7	28.57%
Coliform	6	16.67%
Proteus vulgaris	6	------
Candida albicans	5	------
Proteus mirabilis	4	------
Enterococcus species	2	50%

DISCUSSION:

In spite of the progress in surgery, surgical techniques and antibiotic prophylaxis, postoperative infections remain the commonest postoperative complications and one of the most frequently encountered nosocomial infections worldwide [7]. The incidence of these infections has been estimated to be 15.45% and 11.32% by the Center for Disease Control and Prevention (CDC) USA and the UK Nosocomial Infection Surveillance respectively. These infections lead to increase morbidity with the attendant increase in cost of therapy. The high incidence and prevalence of postoperative wound infections also result in increasing demand on the limited resources available to healthcare delivery eventually resulting in high degree of mortality [8].

Risk of wound infection varies with the type of surgery and surgical operations have been classified into, clean, clean-contaminated, contaminated and dirty. A clean wound is an incision through un-inflamed tissue in which the wound is primarily closed. In this wound type only closed drainage systems are used and there is no breach in aseptic technique and the viscus is not opened [9-10]. A clean-contaminated wound is one (that is otherwise clean) created at emergency surgery and in which the un-inflamed upper gastrointestinal tract, normal gall bladder and urinary bladder are opened but there is no spillage of contents and there is minor break in aseptic technique [11].

CONCLUSION:

It is concluded that a high rate of infection in our study as compare to the previous studies in this regard which means that sophisticated preventive measures are not implemented. High prevalence of multi-drug resistant bacteria was found in the present study. Emergence of antimicrobial resistance has become a major challenge in infectious disease medicine. Self and improper medication is a very serious and common issue is Pakistan which play an important role in antimicrobial resistance.

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