FREQUENCY OF COMMONLY ISOLATED BACTERIAL PATHOGENS AND THEIR ANTIBIOTIC SENSITIVITY IN PATIENTS ADMITTED AT GYNAE C WARD MTI HAYATABAD MEDICAL COMPLEX PESHAWAR

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ABSTRACT

Objective: To determine the frequency of commonly isolated pathogens and their antibiotics sensitivity in patients admitted at Gynae C ward MTI HMC Peshawar. The purpose of this study is to evaluate the frequency of commonly isolated pathogens, their antibiotics sensitivity and resistance pattern in patients.

Setting: Department of OBS and Gynecology MTI, HMC, Peshawar

Place and duration of study: This study was conducted from April 2022 to September 2022 at Gynae C Unit of Hayatabad Medical Complex, Peshawar

Study design: Descriptive cross sectional

Materials and Method: In this study a total of 136 samples from surgical site wound swabs and blood culture were collected by non-probability consecutive sampling technique using sterile cotton swabs and blood samples were processed for bacterial isolation and susceptibility testing to systemic antimicrobial agents.

Results: In this study total 5 types of bacterial isolates and 2 *Candida* species were isolated from 136 specimens. The predominant bacteria isolated from specimens were Gram negative *Pseudomonas auriginousa* (36.76%) followed by *S. Aureus* (35.29%), *E.Coli*(13.23%) *Coliform species* (1.47%), only 4 samples have 2 species isolated from their wounds i.e. *Klebsiella* species and *Candida.* Majority of isolates showed sensitivity for Imipenen and Amikacin and resistance to Co–amoxiclave and Ceftriaxone. Most of the isolates were resistant to multiple antibiotics.

Conclusion: Most of the isolated pathogens showed high rate of resistance to multiple commonly used antibiotics. Therefore, rational use of antibiotics should be practice.

Keywords: Bacterial isolates, Antimicrobial susceptibility pattern, Drug resistance, wound infection.

INTRODUCTION

An organism that causes disease to its hosts is called a pathogen and virulence is defined as the severity of symptoms of the disease. Pathogen causes harm resulting in illness to its host either directly damaging the tissue or cells during replication phase by production of toxins. These toxins help the pathogen to reach new tissue (1)

Wound infection is the major cause of delayed wound healing and chronicity. Wound infection is a global health problem and better management of wounds especially chronic wounds can have a global impact in the population health by reducing morbidity and mortality and thus resulting in improved function and quality of life. Various microorganisms that are part of the skin saprophytic micro flora causes contamination of the wounds and severity of the wounds depends on the type and quantity of that microorganism(2)

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Other factors such as duration of wound, its origin and site of the body are to be taken into account while managing any wound as they have a major impact on wound colorization and infection[3]

Among surgical patients about one third of nosocomial infections are due to wound infections and are responsible for 70 – 80% of morbidity in these patients. Diagnosis of wound infection is made by examining the wound; Detection of certain infection biomarkers and microbiological analysis[4]

Worldwide 11% of maternal mortality is due to maternal sepsis. It is the third most common direct cause of maternal deaths and a major contributor to other cause of maternal death such as Haemorrhage and thromboembolisim. Early administration of appropriate antibiotics has a crucial rule in the prompt management of maternal sepsis[5]

Sometimes antibiotics are administered empirically without microbiological analysis. As bacteria are a normal part of skin flora so a certain threshold is necessary for causing wound infection and thus 10^5 bacteria has been considered to be the delineation between colonisation and a clinically relevant infection that many interfere wound healing [6]

In a good healthy environment, wound heals by a normal physiological process with minimal scar formation and thus by keeping the wound clean sterilizing the damaging tissue from any microbial infection helps in normal wound healing process[7]

Many antibiotics resistant strains have been emerged because of continuous use of topical and systemic antimicrobial agents and thus a continued search is needed for new antimicrobial agents but unfortunately searching for new antimicrobial agents is cost effective and at the moment no new drug has been discovered[8]

Hence the present study is designed to update the profile of bacterial pathogens and their antibiotics sensitivity in patients admitted at Gynae ward Hayatabad Medical Complex Peshawar.

MATERIALS AND METHODOLOGY

A descriptive cross sectional study of bacterial pathogens was carried out on a total 136 patients admitted in Gynae C ward MTI Hayatabad Medical Complex Peshawar with surgical site wound infection and their blood cultures during 1st April 2022 to 30th September 2022 keeping in view the inclusion criteria including all patients admitted with infected wound and sepsis, having age between 18 to 60 years with duration of admission between 48 to 72 hours and exclusion criteria i.e patients with chronic disease such as chronic kidney disease, livercirrhosis, chronic heart disease, cancer patients confirmed on clinicle history and immune-compromised patients confirmed on clinical history.

All bacteria were identified by standard microbiologic methods and processed for susceptibility testing to systemic antimicrobial agents.

RESULTS

A total of 136 samples from wound swabs and blood samples along with the required data were collected from the patients who were admitted during the last 48 to 72 hours at the Gynae C Ward for wound infection and sepsis having an age between 18 to 60 years. The 98 respondents (72.05%) were residents of the urban region while 28 (27.94%) belongs to rural areas (Table 1). We further divided the participants into two age groups: a group with an age range between 18-25 years which includes 27 participants (20%) and a group whose age range is between 26-55 years which includes 109 participants (80%). As shown in Table 1, most of the participants (98/136; 72.05%) had secondary education or above as the highest level of education followed by primary education or above (29/136; 21.3%), and very few were illiterate (7/136; 5.1%).

Table 1: Socio-demography of the participants

Parameters	Frequency (N)	Percentage (%)
Residence		
Urban	98	72.05
Rural	38	27.94
Age		
18-25 Years Old	27	20.0
26-55 Years Old	109	80.0
Education Level		
Illiterate	98	72.05
Primary & Above	29	21.3
Secondary &Above	7	5.1

Table 2: Distribution of patients by clinical outcomes

Parameters	Frequency (n)	Percentage (%)
BMI (kg/m^2)		
Poor below 15 or over 30	22	16.17
Normal 15-18 or 25-39	36	26.47
Good 18-25	78	57.35
Smoking history		
Yes	0	0
No	136	100
Hypertension		
Yes	57	41.91
No	79	58.08
Diabetes mellitus		
Yes	14	10.29
No	122	89.70
Type of disease		
Wound Infection	127	93.38
Sepsis	9	6.61

Table 3: Antibiotic sensitivity and resistance of the isolated pathogens

Pathogens	Sensitive to antibiotics	Resistance to antibiotics	No. of samples	%
P. aeruginosa	Amikain, Ciprofaloxacin, Wlistin, Meropenem, Imipenem, PolymyxinB	Cefepime, Cefoperazone/ Sulbactom, Ceftriaxone, Co-Amoxiclave, Gentamicin, Pipracillin, Tazobactam	50	36.76
S. aureus	Linzolid, Gentamicin, Cefoperazone/ Sulbactom, Teicoplanin, Imipenam, Chloramphenicol	Cefipime, Fusidic Acid, Co-Amoxiclave, Cefoxitin, Doxycycline, Erthromycin,Dindamycin, Ciprofloxacin	48	35.29
Coliform species	Amikacin, Meropenem, Imipenem, Gentamicin, Ciprofloxacin, Colistin, PolymyxinB, Tigecyclin	Co-Amoxiclave, Ceftriaxone, PipracillinSalbactum	16	11.76
E. coli	Meropenem,Imipenem, Colistin, Cefoperazone/Salbactum, Gentamicin, Amikacin	Ceftrioxone, Ciprofloxacin, Cefipime, Co-Amoxiclave, Ceftazidim.	18	13.23
*Klebsiella*species	Amikacin, Cefoperazone/ Sulbactom, Colistin, Gentamicin, Imipenem	Cefipime, Ceftriaxone, Ceftazdime, Co-Amoziclave, Peperacllin+Tazobactam	2	1.47
Candida species	Ampicillin, Nitrofurantoin, Vancomyocin, Erythromycin	Cefexime, Amikacin, Amoxyclav, Gentamicin	2	1.47

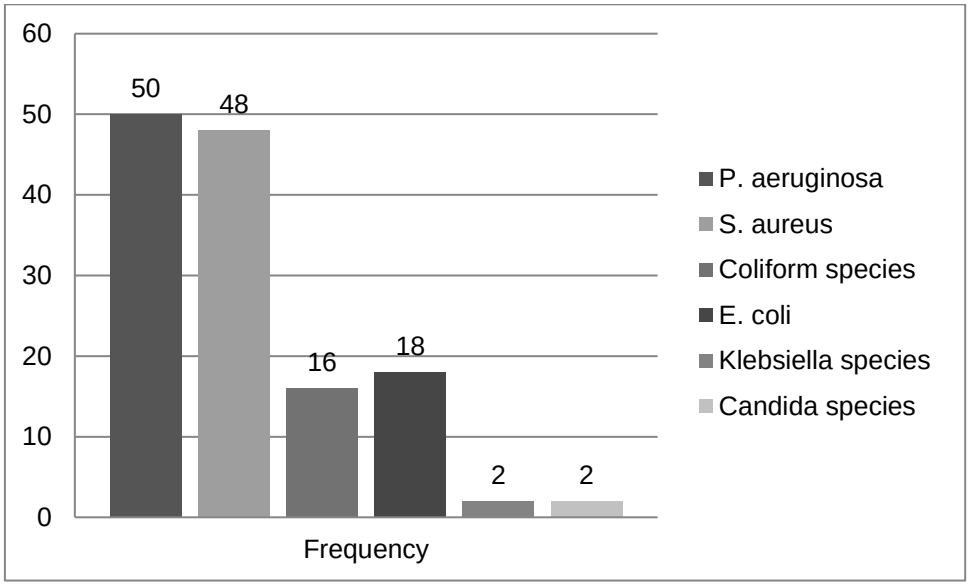

Figure 1: Frequency of commonly isolated bacterial pathogens

DISCUSSION

Infections are the most common cause of morbidity and mortality in patients. Our results shows the prevalence rate of P. Aeruginosa was 36.76% from the wound and blood samples. These findings are in line with those of previous studies in Palestine and India which shows prevalence of P. Aeruginosa (40.9%) and (32%) respectively[9, 10]

Work done in India shows that P. Aeruginosa wound infection is dependent on age, sex and duration of stay in hospital[9]

Another study done in Jordon shows an agreement with the result of our study, with most common organism isolated P. Aeruginosa 27.8 % [11]

Study done in Northwest Ethopia and Jordan shows that Gram positive bacteria S.Aureus was (35.29%) Followed by E.coli (13.23%) and Coliform species (11.76%) , previously demonstrated by other authors [11, 12]

Matter of concern is polymicrobial infections, most frequent associated microorganisms are *S. Aureus , P. Aerginosa* and *E.coli.* They commonly colonize wounds and exert a damaging effect on wound healing .[13-15]

Majority of isolates showed sensitivity for imipenem and Amikcacin, which agreed another study done in Zambia and Italy [4, 16]

In the current study most of the isolates were resistant to multiple antibiotics. This increase resistance pattern was due to over use of anti microbials in areas without prescription or due to prolonged use of antibiotics resulted in the development of more resistant strains of pathogens. Antibiotic resistance is likely attributed to the patient's history of prior medication usage before their hospitalization.

CONCLUSION

The predominated isolates were P. Aeruginosa, S.Aureus, E. coli, Coliform species , Klebsiella species.The present findings shows higher rates of isolation of P. Aeruginosa followed by S. Aureus and E.coli .Most of them are sensitive to Imipenem and Amikacin, Cefoperazone, salbactam and Gentamicin in Descending order while showed resistance to Co- amoxiclave, Ceftriaxone, Cefipime. Alarmingly high rate of MDR was noted to commonly used antibiotics, thus there is a need for developing local guide lines for antibiotics use based on local resistance patteren and infection control policies should be implemented to curb the spread of these MDROs and to reduce the economic burden and morbidity and mortality due these infections.

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