



## Bacteriological Profile of Aerobic Isolates of Pus Samples -From May to July 2021 During Second Wave of Covid-19 at a Tertiary Care Hospital

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### ABSTRACT:

In spite of advances in control of infections, wound infections have not completely controlled due to many reasons, widespread use of antibiotics irrationally lead to the development of multidrug resistant bacteria which poses a serious threat to public health globally. This retrospective study has been conducted from May 2021 to July 2021 for a period of 3 months at Tertiary Care Hospital during the second wave of COVID-19. This study has got the approval from scientific committee. Pus samples sent to the laboratory were processed. Gram staining of the sample and further processing was done according to CLSI guidelines. A total of 261 samples were processed. Out of 261 samples, 186 (71%) showed growth. Among 186 positive samples, 63% were males and females were 37%. The following bacterial pathogens were isolated Staphylococcus aureus (20%), MRSA (18%), Klebsiella species (24%), E. coli (15%), Pseudomonas (11%), Streptococcus pneumoniae is least (0.5%). Gram negative isolates were sensitive to Imipenem, Piperacillin, Amikacin, Gentamycin, 3<sup>rd</sup> generation Cephalosporins, Cotrimoxazole. Gram positive isolates were susceptible to Vancomycin, gentamycin, ciprofloxacin, cefpodoxim e, azithromycin, ceftiofloxacin, ampicillin. Staphylococcus aureus and Klebsiella species were the most common bacteria isolated in this study. Observations in changing trends of antimicrobial susceptibility, bacterial isolates from pus samples can serve as a useful tool for physicians to start empirical treatment.

### I. INTRODUCTION:

Pyogenic infections refer to infection that causes pus formation and is characterized by severe local inflammations, usually due to multiplication of microorganisms<sup>[1]</sup>. Pus is a collection of thick, white or yellow fluid, formed at the site of

inflammation during infection. It is made up of dead tissue, white blood cells and damaged cells<sup>[2]</sup>. The occurrence of wound infections depend on various factors like condition of wound, microbial load and the host defence mechanisms<sup>[3]</sup>. The overall incidence of wound sepsis in India is from 10% to 33%<sup>[4]</sup>. It was observed among the study. Most common causative agent includes staphylococcus aureus which account for 20%, MRSA (18%), Klebsiella species 24%, Escherichia coli 15%, Pseudomonas 11% commonly associated with pyogenic infections<sup>[5]</sup>. Use of routine antibiotics may result in wide spread antibiotic resistance especially within the gram negative organisms<sup>[6]</sup>. Bacteria have the ability to acquire resistance and can transfer the resistance from one bacteria to another<sup>[7]</sup>. Earlier, such multidrug resistant organisms were common in immunosuppressed patients but now, reports are showing such infections in normal healthy individuals and, such drug resistant infections may complicate the emerging infectious diseases<sup>[8]</sup>. The emergence of high antimicrobial resistance among bacterial pathogens has made the management and treatment difficult<sup>[9]</sup> as such. Knowledge of the causative agents, wound infection and their antibiogram will be helpful in the selection of appropriate antimicrobial therapy and on the development of infection control.

### AIMS & OBJECTIVES:

To isolate and identify bacterial agents from pus samples

To perform Antibiotic susceptibility testing of bacterial isolate

### II. MATERIALS & METHODS:

This retrospective study has been conducted from May 2021 to July 2021 for a period of 3 months. Wound swabs and discharges were aseptically collected using sterile swab in a test tube and inoculated on to chocolate agar (incubated



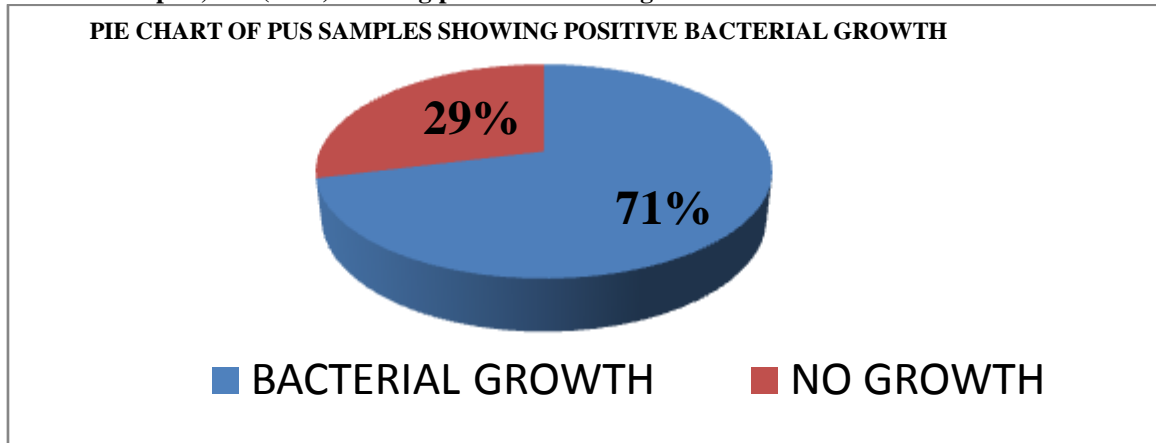
in CO<sub>2</sub> enriched environment), blood agar and MacConkey agar. Plates were incubated at 37°C of 24 hours. Once pure colonies identified series of biochemical tests were performed for the isolation of the species following CLSI guidelines<sup>[10]</sup>.The

antibiotic sensitivity testing of all isolates was performed by Kirby Bauer's disc diffusion method on Muller Hinton agar and interpreted as per CLSI guidelines and classified as sensitive and resistant.

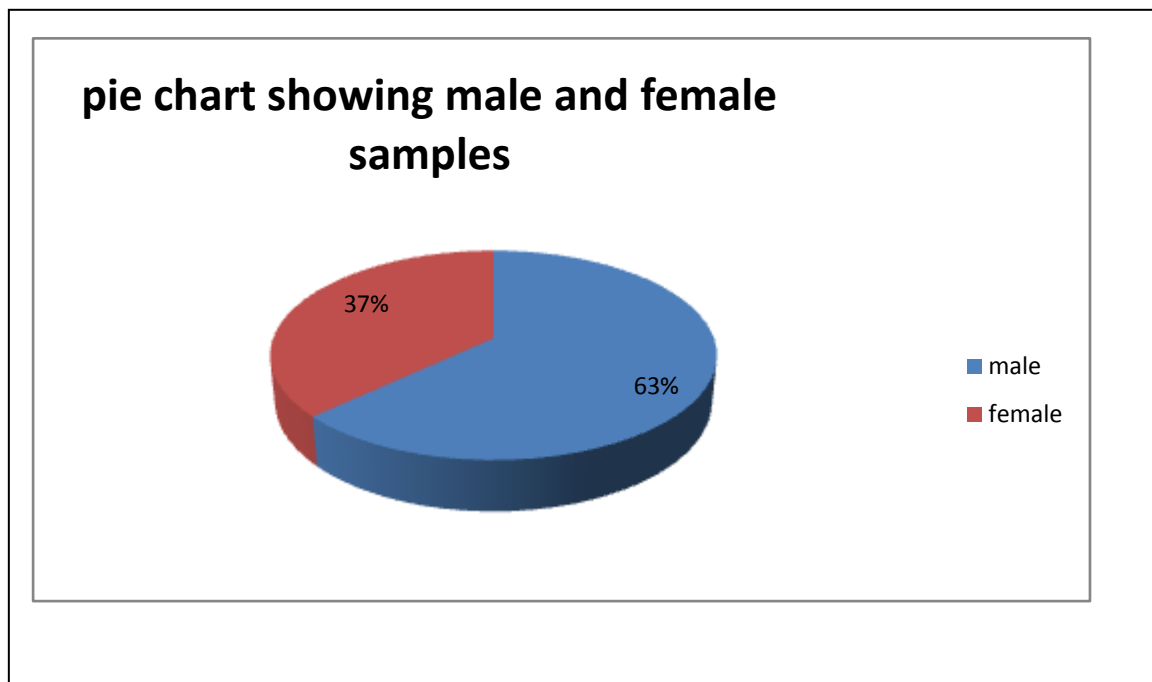
### III. RESULTS:

Total of 261 samples were processed.

Out of 261 samples, 186 (71%) showing positive bacterial growth.



Among 186 positive samples, 63% were males and females were 37% .



#### The following bacterial pathogens were isolated

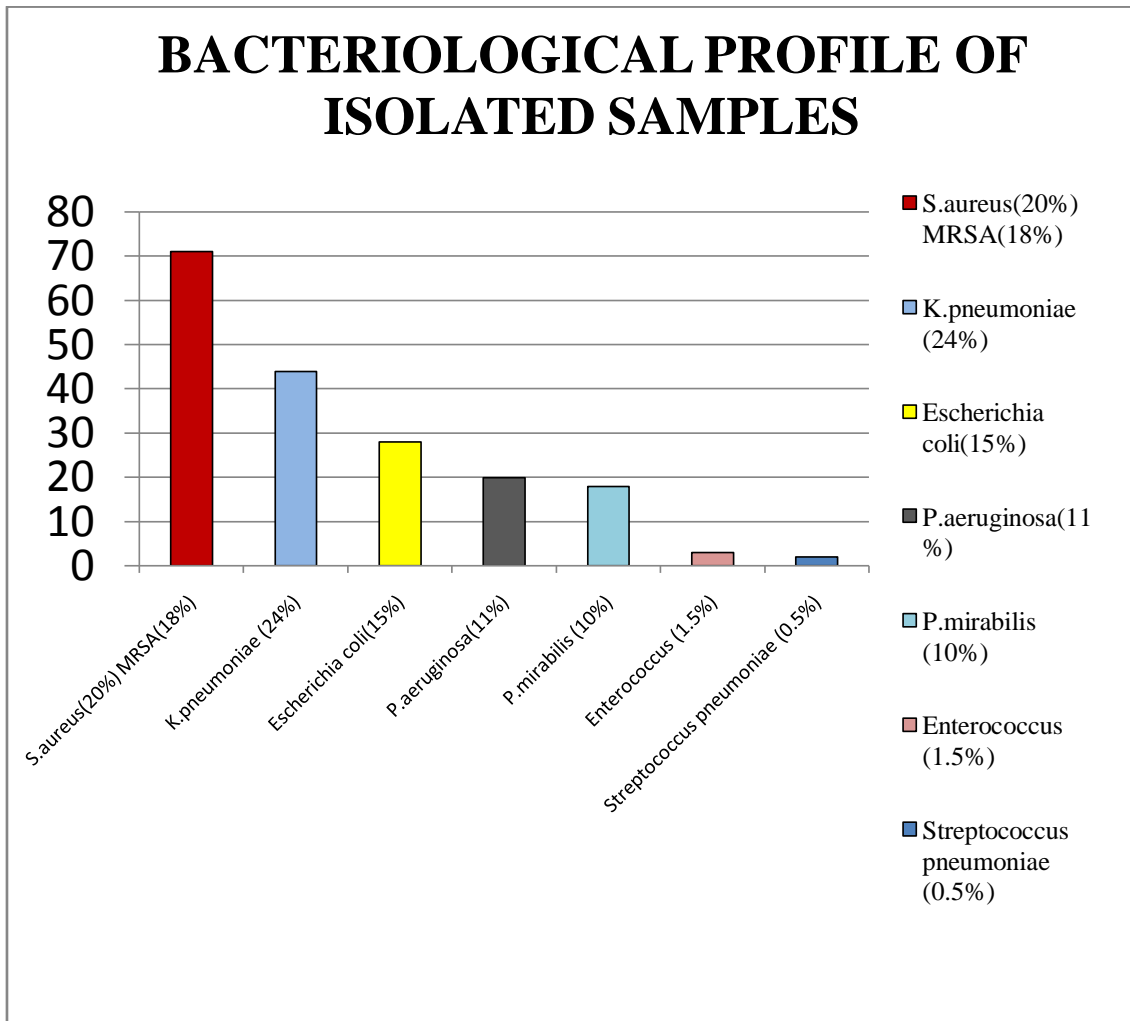
Staphylococcus aureus (20%),  
MRSA (18%),  
Klebsiella species (24%),  
E.coli (15%),

Pseudomonas(11%),and  
Streptococcus pneumoniae (0.5%).

Gram negative isolates were sensitive to Imipenem,Piperacillin,Amikacin ,Gentamicin ,3rd generation Cephalosporins,Cotrimoxazole.



Gram positive isolates were susceptible to e,azithromycin,cefoxitin and ampicillin  
Vancomycin,gentamycin,ciprofloxacin,cefepodoxim



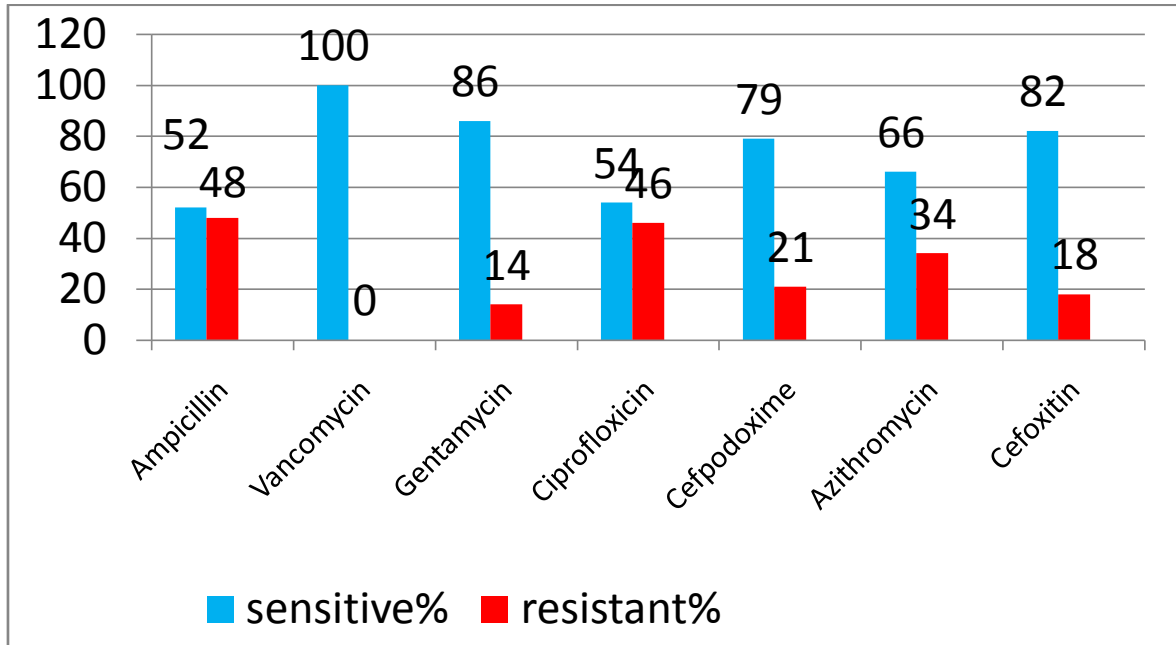
The Antibiogram of Staphylococcus aureus (Table-1) revealed that Vancomycin was the most susceptible drug, followed by Gentamycin (86%), Cefoxitin (82%).

**Table-1: Antibiotic Susceptibility Patterns of Staphylococcus aureus**

| ANTIBIOTIC    | SENSITIVE % | RESISTANT % |
|---------------|-------------|-------------|
| Ampicillin    | 52          | 48          |
| Vancomycin    | 100         | -           |
| Gentamycin    | 86          | 14          |
| Ciprofloxacin | 54          | 46          |
| Cefpodoxime   | 79          | 21          |

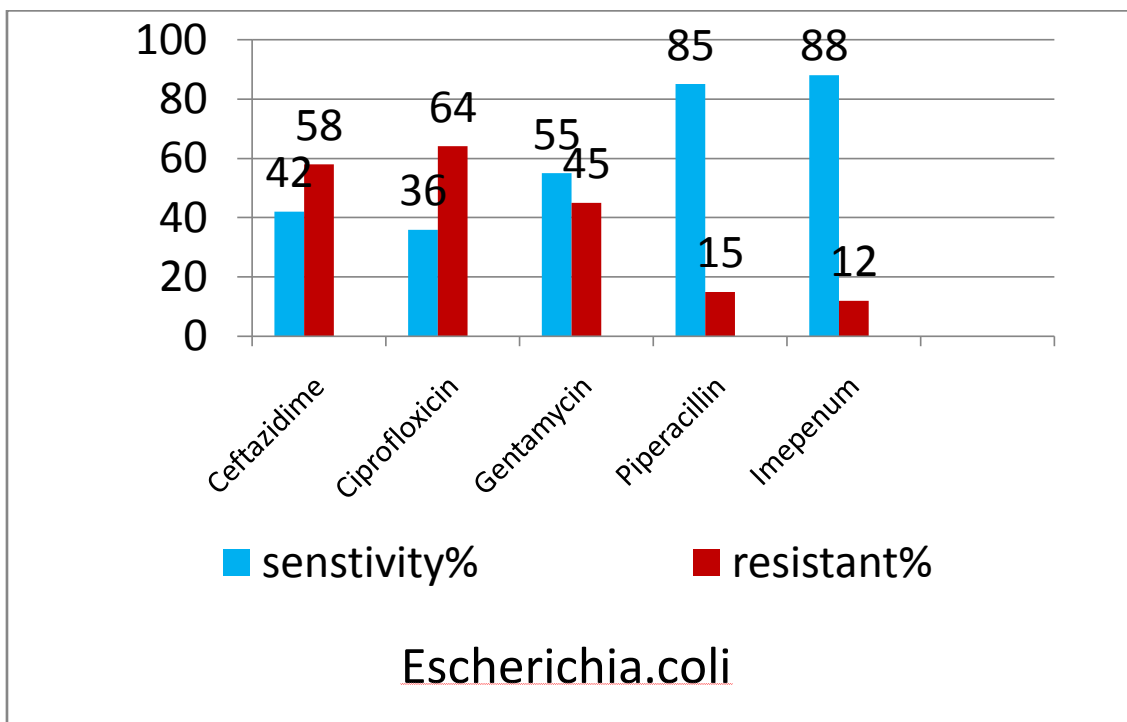
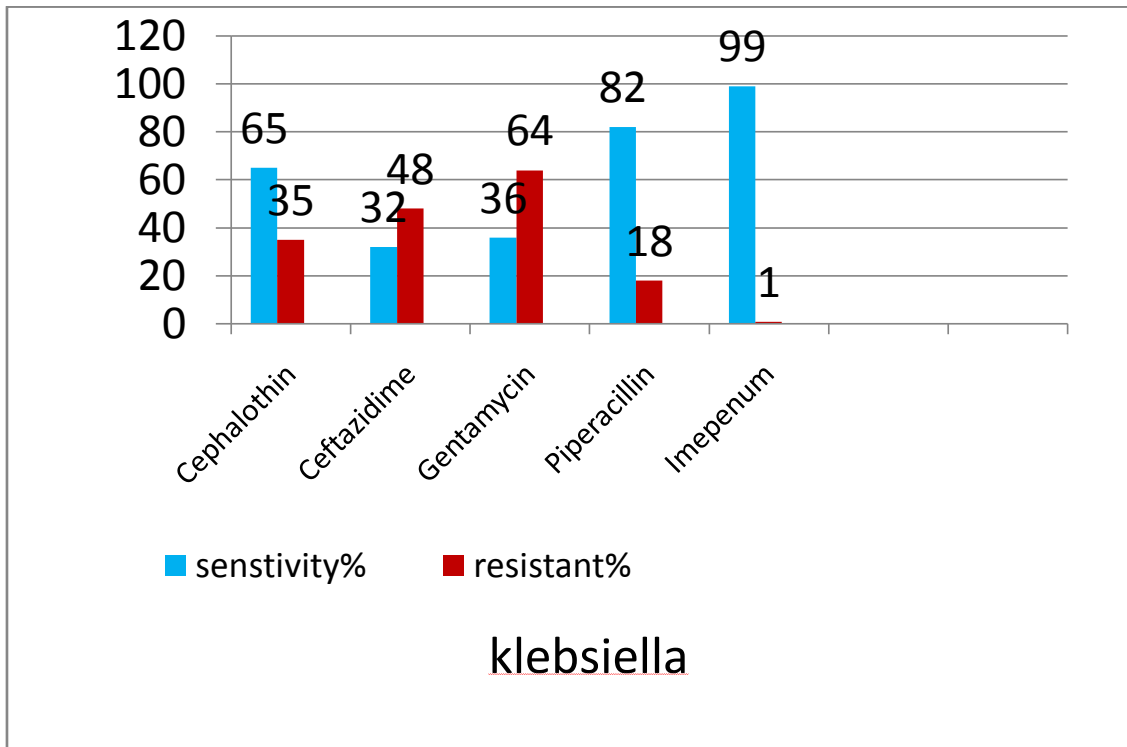


|              |    |    |
|--------------|----|----|
| Azithromycin | 66 | 34 |
| Cefoxitin    | 82 | 18 |



**Klebsiella and E.coli , sensitive to imipenem,by (99%) and (88%) respectively (table -2)**

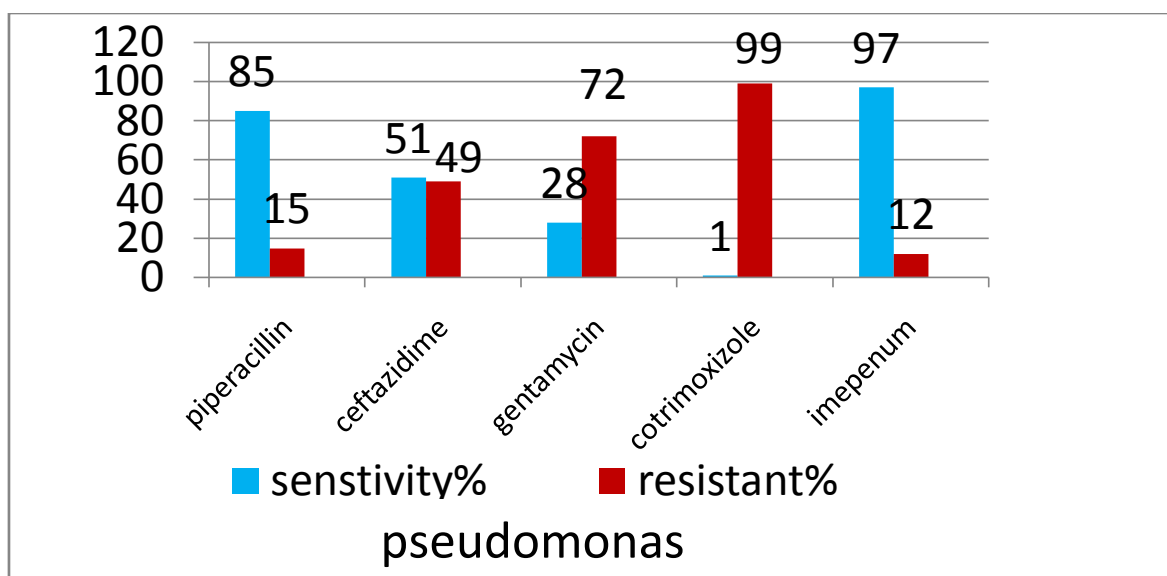
| ANTIBIOTIC   | Klebsiella |             | ANTIBIOTIC    | E.Coli      |             |
|--------------|------------|-------------|---------------|-------------|-------------|
|              | SENSITIVE% | RESISTANT % |               | SENSITIVE % | RESISTANT % |
| Cephalothin  | 65         | 35          | Ceftazidime   | 42          | 58          |
| Ceftazidime  | 32         | 48          | Ciprofloxacin | 55          | 45          |
| Gentamycin   | 36         | 64          | Gentamycin    | 36          | 64          |
| piparacillin | 82         | 18          | piparacillin  | 85          | 15          |
| Imipenum     | 99         | 01          | Imipenum      | 88          | 12          |





Antibiotic Susceptibility Patterns of Pseudomonas ---Table-3

| Antibiotic    | Sensitive % | Resistant % |
|---------------|-------------|-------------|
| Piperacillin  | 55          | 45          |
| Ceftazidime   | 51          | 49          |
| Gentamycin    | 28          | 72          |
| Cotrimoxazole | 01          | 99          |
| Imepenum      | 97          | 03          |



#### IV. DISCUSSION:

Pyogenic infections are characterised by local and systemic inflammation usually with pus formation. It may be either monomicrobial or polymicrobial. Gram negative bacteria such as Pseudomonas, Escherichia coli, Klebsiella spp., Proteus spp., and Gram positive cocci such as Staphylococcus aureus and Enterococci are the common causative agents<sup>[11]</sup>. The current study implied that wound infection caused by different pathogens. The results of the present study are in accordance with other studies. As such, the incidence of wound infection was higher in males than in females and similar such observations were noted<sup>[12][13]</sup>. In the present study the most common organism isolated is Staph aureus<sup>[14][15]</sup>, and most common Gram negative organism isolated is klebsiella<sup>[15]</sup>. In this study Staph aureus highly

sensitive to Cefoxitin and Gentamycin<sup>[14]</sup>, among all isolates of staph aureus 18% isolates were MRSA. In present study Gram negative bacteria more sensitive to Imipenem followed by Piperacillin and tazobactam<sup>[16]</sup>. The Antibiogram of Gram Positive cocci revealed that the Vancomycin (100%) was the most susceptible drug.

#### V. CONCLUSION:

Pyogenic wound infections were found prevalent in tertiary care hospital and Staph. aureus isolates showed highest incidence followed by klebsiella species, E. coli, Pseudomonas and streptococcus pneumoniae. Bacterial isolates exhibited high to moderate levels of resistance against different classes of antibiotics. The susceptibility data from this study may be worth consideration while implementing empiric



treatment strategies for pyogenic infections. Strict adherence to antibiotic policies before drug prescription is necessary to effectively control wound infections.

#### REFERENCES:

- [1]. Kulanthaivel Murugesan Rekha Sivankutty Radha Hridhya Vijayan Study on Antibiotic Susceptibility Testing against Pyogenic Organisms from Wound Infections *Int J Pharm Sci Rev Res* 2017;45:12625
- [2]. D Bindu Chitralekhasaikumar M Kiran R Praveena V Illamani Bacterial Profile and Antibiotic Resistance Pattern of Aerobic Gram Positive Bacteria Isolated From Pus Sample *Res J Pharm, Biol Chem Sci* 2014;55:6436
- [3]. S. Nithya Gomatheswari T. Jeyamurugan Bacteriological Profile and the Antibiotic Susceptibility Pattern of Microorganisms Isolated from Pus/Wound Swab Isolates in Patients Attending a Tertiary Care Hospital in South India *Int J Curr Microbiol Appl Sci* 2017;61:0140513
- [4]. Hima Mantravadi Mallikarjuna Chinthaparthi V Shravani Aerobic isolates in pus and their antibiotic sensitivity pattern: a study conducted in a teaching hospital in Andhra Pradesh *Int J Med Sci Public Health* 2015;48:10769
- [5]. Namita A., Raytekar, Meghna R. Choudhari Sonali Das Antibiotic profiling of *Pseudomonas aeruginosa* isolates from pus sample of rural tertiary care hospital of Western Maharashtra, Loni, India *Int J Res Med Sci* 2017;57:307681
- [6]. Poonam Verma Antibiotic Sensitivity Treatment for Gram Positive Bacteria Isolated from Pus Sample *Bull. Environ. Pharmacol. Life Sci* 2012;11:0306
- [7]. S Krishnamurthy A C Sajjan G Swetha Shalini Characterization and resistance pattern of bacterial isolates from pus samples in a tertiary care hospital Karimnagar *J Path Micro* 2016;22:4954
- [8]. Rudrajit Paul Jayanti Ray Sourav Sinha Jayati Mondal Antibiotic resistance pattern of bacteria isolated from various clinical specimens: an eastern Indian study *Int J Community Med Public Health* 2017;44:136771
- [9]. Ananthi M Ramakumar V Kalpanadevi R. Sopia Abigail L. Karthiga H. Kalavathy Victor Aerobic Bacteriological Profile and Antimicrobial Susceptibility Pattern in Postoperative Wound Infections at a Tertiary Care Hospital *Int J Med Sci Clin Inventions* 2017;4:227026
- [10]. Vandepitte A, El-Nageh MM, Stelling JM, Tikhomirov E, Estrela A: WHO Regional Publications, Eastern Mediterranean Series. 1996, Alexandria, Egypt: WHO Regional Publications, Eastern Mediterranean Series, 15:
- [11]. Sundararajan Thangavel Gomathi Maniyan S Vijaya C Venkateswaran A study on aerobic bacteriological profile and antimicrobial susceptibility pattern of isolates from pus samples in a tertiary care hospital *Int J Bioassays* 2017;60:3531720
- [12]. Khan, I., Sarwar, N., Ahmad, B., Azam, S. and Rehman, N., 2017. Identification and Antimicrobial Susceptibility Profile of Bacterial Pathogens Isolated From Wound Infections in a Teaching Hospital, Peshawar, Pakistan. *Advancements in Life Sciences* 2007;5:08-12.
- [13]. Asha Konipparambil Pappu , Aprana Sinha , Aravind Johnson, Microbiological profile of Diabetic foot ulcer. *Calicut Medical Journal* 2011; 9(3):e2
- [14]. Rai, S., Yadav, U.N., Pant, N.D., Yakha, J.K., Tripathi, P.P., Poudel, A. and Lekhak, B., 2017. Bacteriological profile and antimicrobial susceptibility patterns of bacteria isolated from pus/wound swab samples from children attending a tertiary care hospital in Kathmandu, Nepal. *International journal of microbiology*, 2017.
- [15]. Chauhan, M., Manish, S. and Mohajan, S. Aerobic Bacterial Profile and antibiotic sensitivity pattern of pus isolates in a tertiary care hospital. *Int. J. Curr. Microbiol. App. Sci*, 2005;4(5).
- [16]. Rao, D.R., Basu, R. and Iiswas, D.R. Aerobic bacterial profile and antimicrobial susceptibility pattern of pus isolates in a South Indian tertiary care hospital. *Surg* 2014;36:35-29.