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# BACTERIOLOGICAL PROFILE AND THEIR ANTIMICROBIAL SUSCEPTIBILITY PATTERN IN PUS SAMPLES OF VARIOUS WARDS IN A TERTIARY CARE HOSPITAL.

Microbiology

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## ABSTRACT

**Introduction:** Wound infection is one of the most common and serious complications among the hospital acquired infections Wound infection can increase the length of hospital stay and accounts for the mortality rate up to 70–80%.

**Aim & Objectives:** The objective of present study was to determine the Bacteriological profile and antimicrobial sensitivity pattern of organisms isolated from pus samples

**Materials & Methods:** 200 pus samples collected from March 2017-August 2017 were processed in the Microbiology service laboratory

**Results:** Out of 200 samples 50% had growth and were processed.AST performed by Kirby-Bauer disc diffusion method. GNB showed 70% and GPC 30% growth. E.coli among GNB and Staphylococcus among GPC were common

**Conclusion:** Early recognition of lesion and prompt initiation of antimicrobial therapy is essential. Antibiotic susceptibility test is a prerequisite for the management of infections which can help to make better therapeutic choices.

## KEYWORDS

AST-Antimicrobial susceptibility testing, GNB-Gramnegative bacilli ,GPC-Grampositive cocci. E.coli- Escherichia coli.

## INTRODUCTION:

Wound infection is one of the most common and serious complications among the hospital acquired infections Wound infection can increase the length of hospital stay and accounts for the mortality rate up to 70–80% . Pyogenic infections are characterized by local and systemic inflammation usually with pus formation[1]. These may be endogenous or exogenous. A break in the skin can provide entry to the surface bacteria which thereby start multiplying locally. The body's defence mechanism includes bringing immune cells into the area to fight against bacteria. Eventually, accumulation of these cells produces pus which is a thick whitish liquid[2]. Neutrophils have a multi lobed nucleus and a granulated cytoplasm. It constitutes 50-70% of circulating WBCs. Its level is greatly increased in infection .

If the infection is caused by resistant bacteria morbidity and mortality will increase which leads to great economic loss encompassing use of more expensive antibiotics to treat infection as well as threat of resistance to them[3]. In almost all cases, antimicrobial therapy is initiated empirically before the results of culture are available by keeping in mind that high mortality and morbidity are associated with septicaemia and right choice of empiric therapy is of less importance[4]. The infections caused by resistant organisms are more likely to prolong the hospital stay, increase the risk of death and require treatment with more expensive antibiotics. The increasing frequency of antimicrobial resistance among pathogens causing nosocomial and community acquired infections is making numerous classes of antimicrobial agents less effective resulting in emergence of antimicrobial resistance[5].Use of antimicrobial agents cause a "selective pressure" on microbial population[6].

In the case of antibiotics resistance, antibiotics causes a selective pressure by killing susceptible bacteria allowing antibiotics resistant bacteria to survive and multiply. Moreover, highly virulent strains and capacity to adapt quickly to changing environment worsens the situation and draws a matter of concern[3]. The current spread of multi drug resistant bacteria from clinical isolates has increased the need for regular updates in the knowledge of the bacteriological review of pus culture reports so as to avoid the unguided empirical treatment which appears to differ in various environments. For the treatment, the isolation of bacterium from pus is valuable, but there is also urgent need of antimicrobial therapy, so sample is taken and treatment is started and after pus culture result, patient should be treated as redirected by in vitro antibiotic sensitivity test[7,8].

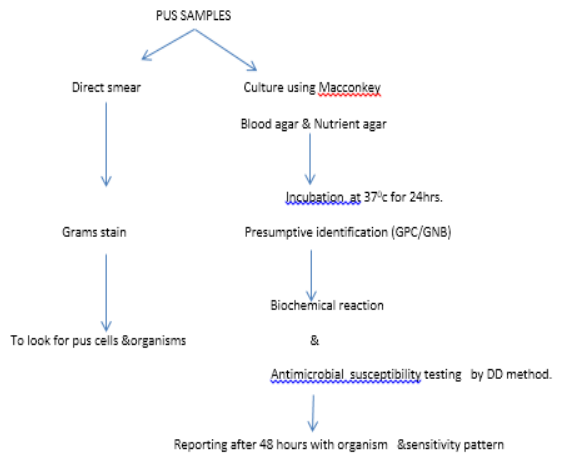
Early recognition of lesion and prompt initiation of antimicrobial therapy are essential for controlling the infection and preventing morbidity and improve the quality of life. Antibiotic susceptibility test is a prerequisite for the management of infections which can help to make better therapeutic choices. Hence this study was planned to evaluate the prevalence of microorganism in pus isolate and its sensitivity pattern at a tertiary care hospital.

**Aim &Objectives of the study: To determine the bacteriological profile and antibiotic sensitivity pattern of Pus samples**

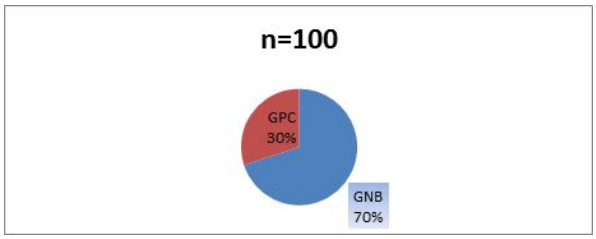
**Study design & Place of study**: Prospective study conducted in the department of Microbiology, Government Medical college &ESI Hospital a 300 bedded tertiary care hospital .

**Study period**: Study was conducted for a period of 6 months from March 2017 to August 2017

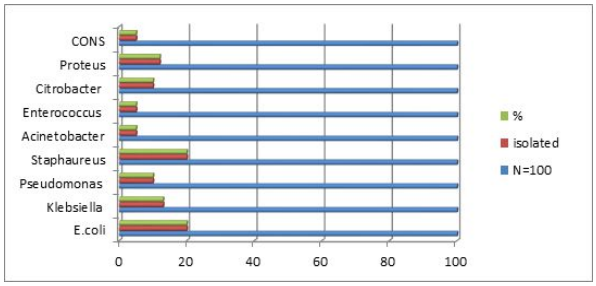
**Materials and Methods** : About 200 pus samples were collected aseptically after proper cleaning using 2 sterile swabs from deeper part of the wound in order to avoid contamination from skin flora. Samples were received and processed in Microbiology service lab .




**RESULTS: Out of 200 samples processed 100 samples had growth. 70% were Gram negative and 30% were Gram positive. They were further processed for Biochemical reactions and Antibiotic sensitivity by Kirby-Bauer method.**




| S.no | Organism identified | (n=100) | % isolation |
|---|---|---|---|
| 1. | E.coli | 20 | 20% |
| 2. | Klebsiella pneumonia | 13 | 13% |
| 3. | Pseudomonas aeruginosa | 10 | 10% |
| 4. | Staphylococcus aureus | 20 | 20% |
| 5. | Acinetobacter sp | 5 | 5% |
| 6. | Enterococcus sp | 5 | 5% |
| 7. | Citrobacter sp | 10 | 10% |
| 8. | Proteus sp | 12 | 12% |
| 9. | CONS | 5 | 5% |




**Antimicrobial susceptibility pattern of the above isolates**

| Organism | AK | Gen | Cot | Cip | Ctx | PIT | Cfs | Do | E | Mrp | CAZ | Amc | Van |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E.coli | 80% | 60% | 50% | 20% | 50% | 45% | 70% | 20% | - | 40% | 5% | | |
| Klebsiella pneumoniae | 80% | 50% | 50% | 50% | 40% | 50% | 70% | 20% | | 80% | - | 40% | |
| Pseudomonas aeruginosa | 75% | 63% | 13% | 63% | 50% | 75% | 50% | - | - | 75% | 75% | - | |
| Staphylococcus aureus | 50% | 40% | 40% | 50% | 10% | 20% | - | 90% | 50% | - | - | 50% | 100 |
| Acinetobacter sp | 100 | 50 | 50% | 50% | - | | 100 | 100 | - | - | 20% | - | |
| Enterococcus sp | | 100 | | | | 100 | 100 | 100 | | | | | 100 |
| Citrobacter sp | 100 | 67% | 33% | | 33% | 67% | 100% | | | 67% | | - | - |
| Proteus sp | 40% | 30% | - | - | - | 100% | 50% | 50% | - | - | - | - | - |
| CONS | 50% | 40% | 30% | 50% | 40% | 30% | - | 80% | 60% | - | - | 60% | 100 |

**Discussion**: The growth in our study was 50% The growth positivity reported by Bhatta and Lakhey 2008 (60%)[9] . A study by Shrestha and Basnet showed similar to our study (50%) [10]. In this study the most common organism isolated was E.coli among GNB followed by Klebsiella sp, Pseudomonas aeruginosa Acinetobacter, Citrobacter, Proteus

Staphylococcus aureus was the common organism among GPC followed by CONS & Enterococcus sp.

**E.coli** is the commonest organism among entero bacterieceae family. In this study E.coli was highly sensitive to Amikacin (80%), Cefaperazone sulbactum (70%) , Gentamicin(60%)followed by other drugs A study by Rama Bostole et al 2017[11] and Rajiv kumar et al 2017[12] showed similar sensitivity pattern of E,coli .

**Staphylococcus aureus** is the most common human bacterial pathogen and is an important cause of skin and soft tissue infections, endovascular infections, pneumonia, tonsillitis, pharyngitis, septic arthritis, endocarditis, enterocolitis, osteomyelitis, meningitis, toxic shock syndrome, sepsis, etc. In this study Staphylococcus showed high sensitivity for Vancomycin (100%), Doxycycline(90%) followed by Amikacin (50%), Amoxyclav(60%), Erythromycin (50%) , Ciprofloxacin (50%).

**Pseudomonas aeruginosa** is a ubiquitous and versatile human opportunistic pathogen that has implications on morbidity, mortality and healthcare costs both in hospitals and in the community.It is the most common gram negative bacteria causing nosocomial infections[10]. It was highly sensitive to Meropenem(75%), Ceftazidime (75%), Amikacin (60%), Piperacillin-tazobactum(60%)followed by Ciprofloxacin (63%),Gentamycin(63%), Cefaperazone – sulbactum (50%), Cefotaxime(50%). A study by Rajiv kumar et al 2017 [12] showed similar results.

**Klebsiella species** is an opportunistic pathogen and is a causative agent of several kinds of infection in human. It is one of the major pathogens in nurseries, ICU and hospital wards in spite of many effective antibioticsHighly sensitive to Meropenem(70%), Amikacin (60%), Cefaperozone sulbactum (60%). Cotrimoxazole (50%), Ciprofloxacin (50%),Gentamicin(50%). A study by Vijeta sharma et al 2015[13] showed similar result.

**Enterococcus sp** are important agents of human disease in hospitals because of their resistance to antibiotics. highly sensitive to Vancomycin (100%), Doxycycline(100%), Gentamicin(100%), Cefaperoazone sulbactum(100%) .

**Acinetobacter sp** are saprophytic bacilli able to develop multiple drug resistance. In this study it showed high sensitivity to Amikacin(100%), Doxycycline, Cefaperazone sulbactum(50%) ,Gentamicin(50%) , ciprofloxacin (50%).

**Proteus sp** are opportunistic pathogens commonly associated with urinary, wound and soft tissue infections ,septicaemia.They were highly sensitive to Piperacillin tazobactum(100%) followed by Cefaperazone sulbactum(50%), Amikacin(40%) ,Gentamicin(30%).

**CONS** are usually associated with Endocarditis, UTI in women Osteomyelitis, Pyogenic infections, etc. It swas highly sensitive to Vancomycin (100%), Doxycycline, Erythromycin Amoxyclav, Amikacin

**Citrobacter sp** cause UIT,gallbladder ,middle ear infections, neonatal meningitis. They were highly sensitive to Cefaperazone sulbactum (100%), Amikacin (100%), Piperacillin tazobactum(67%) Genatmicin (67%), Meropenem(67%).

## CONCLUSION:

In this study only limited numbers of drugs were studied for sensitivity pattern and culture was done for common pathogenic organisms. There is need for wide range and periodical study to know the changing sensitivity pattern of microorganisms. This study may be helpful in deciding empirical therapy of an infection considering other related factors before the actual culture and sensitivity report of a microorganism comes. Hence, Knowledge of the most common causative agents of infection and their antimicrobial susceptibility pattern is very essential for the judicious administration of empirical therapy before the culture results are available. Antimicrobial susceptibility of microorganisms varies from time to time and from place to place. Hence regular monitoring of bacterial susceptibility to antibiotics is essential. Antibiograms should be prepared regularly and made readily available to the clinicians to guide them in therapy

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