ORIGINAL RESEARCH PAPER

Microbiology

KEY WORDS:

# MICROBIAL PROFILE AND ANTIBIOGRAM OF PUS ISOLATES IN A TERTIARY CARE HOSPITAL OF JLN MEDICAL COLLEGE,AJMER, CENTRAL RAJASTHAN, INDIA : A RETROSPECTIVE STUDY

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**ABSTRACT**

**INTRODUCTION & OBJECTIVE** : The aim of the study were to determine the commonly isolated aerobic micro organisms from pus samples and their antibiotic sensitivity pattern.

**MATERIALS & METHODS:** This study was conducted in JLN Medical college , Ajmer from July 2020 to December 2020. Pus samples received for diagnostic microbiology was processed and identified by standard protocols & antibiotic susceptibility testing was done by Kirby Bauer disc diffusion method as per CLSI guidelines.

**RESULT :** Out of 474 pus samples received for culture and sensitivity in the microbiology laboratory 223 (47.04 %) cases yielded positive culture while 251 (52.9 %) cases had no aerobic growth . Among the 223 culture positive cases 128 (57.3 %) were male and 95(42.6%) were females Pseudomonas sp. 60(26.9%) was the most common isolate followed by Klebsiella sp 46(20.6%), E.coli 30(13.4%) ,Staphylococus aureus 29(13%),Enterococcus sp 26(11.6%), Coagulase Negative Staphylococci 16(7.1 %),Acinetobacter sp 10(4.4 %) , Citrobacter sp 5(2.2 %) and proteus sp 1 (0.4 %).

Among the gram negative isolates, the most susceptible drugs were Piperacillin-Tazobactum and Meropenem. Among the Gram positive isolates Amoxiclav , clindamycin and linezolid were the most susceptible drugs.

**CONCLUSION :** Knowledge of local common pathogens and their antibiotic sensitivity pattern can guide clinician to choose appropriate antibiotic for empirical treatment of patients.

## INTRODUCTION :

Pyogenic infection are characterized by local and systemic inflammation usually with pus formation.. 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 defense mechanism include bringing immune cells into the area to fight against bacteria , eventually , accumulation of these cells produce pus which is a thick whitish liquid .

Different studies have been conducted across the world from time to time to assess the bacterial profile & their antibiogram in pus samples. This is useful for treating physician who needs to start empirical treatment of patient until the laboratory culture reports are awaited. For empirical treatment awareness of local antimicrobial susceptibility pattern and causative bacteria is essential. So, the present study was undertaken to evaluate the microbial profile along with their antibiogram from pus samples received in a tertiary care hospital of JLN Medical College, Ajmer.

## MATERIAL & METHODS:

This is a Retrospective study conducted in Department of Microbiology, JLN Medical College, Ajmer. In the present study the data was collected from the period July2020 to December 2020. The total number of 474 pus samples were collected from cases of pyogenic infection attending both OPD and indoor in the various Department of the hospital. Under strict aseptic condition sample were collected and transported to the department of microbiology for processing. First , samples were inoculated in 5% sheep Blood agar and Mac conkey agar culture media & BHI broth and then it was subjected to gram staining and was examined for the presence of pus cells and any bacteria. The inoculated media were incubated aerobically at 37° for 24hrs. If there was no growth, incubation time is extended upto 48 hrs to be considered sterile.

All the bacteria growing on Blood agar and MacConkey agar were examined to look for the colony character, Gram staining and motility. Identification of isolates were done based on biochemical test like catalase test, oxidase test , coagulase test , Triple sugar iron test , carbohydrate fermentation test , Phenyl Pyruvic acid , Methylred test, Nitrate reduction test , urease test , citrate utilization test , indole test , arginine dihydrolase production , lysine and ornithine decarboxylase test , and Hugh and leifson test . The antimicrobial susceptibility testing were done by Kirby Bauer's Disc Diffusion method and interpreted as per clinical laboratory standard institute (CLSI 2020) guidelines. For antimicrobial sensitivity testing Mueller Hinton agar was used . Escherichia coli ATCC 25922 , Pseudomonas aeruginosa ATCC 27853 and Staphylococcus aureus ATTC 25923 were used as quality control strains.

## RESULTS AND DISCUSSION :

out of 474 samples received for culture and sensitivity in the microbiology laboratory , 223 (47.04%)samples yielded positive culture and there was no growth in 251 (52.9%)samples .

Among the 223 culture positive cases 128 (57.3 %) were male and 95 (42.6 %) were female and the male : female ratio was 1.4 (Table -1).

**Table-1 Sexwise distribution of culture positive pus samples**

| Sex | Culture positive (n=223) |
|---|---|
| Male | 128 (57.3%) |
| Female | 95 (42.6%) |

Among the 223 culture positive samples Pseudomonas sp. was predominant bacterial isolate 60 (26.9 %) followed by Klebsiella sp 46 (20.6%) , E.coli 30 (13.4 %) , Staphyloccus aureus 29 (13%), Enterococcus sp 26 (11.6%) , CONS 16(7.1%) , Acinitobacter sp 10(4.4%) , citrobacter sp 5(2.2 %), and Proteus sp 1(0.4%).

Staphylocuccus aureus was most commonly isolated among the Gram positive cocci. Pseudomonas Sp was most commonly isolated among Gram. Negative bacilli followed by

Klebsiella sp , E.coli, Acinetobacter sp, citrobacter sp & Proteus species.(Table -2).

**Table-2 Aerobic bacteria(n223) isolated from pus samples**

| S.No. | Organism | Number (%) |
|---|---|---|
| 1 | Staphyloccus aureus | 29 (13%) |
| 2 | CON S | 16 (7.1%) |
| 3 | Enterococcus sp. | 26 (11.6%) |
| 4 | Pseudomonas sp. | 60 (26.9%) |
| 5 | E coli | 30 (13.4%) |
| 6 | Klebsiella sp. | 46 (20.6%) |
| 7 | Proteus sp. | 1 (0.4%) |
| 8 | Citrobacter sp. | 5 (2.2%) |
| 9 | Acinetobacter sp. | 10 (4.4%) |
| Total | | 223 |

*CON S – Coagulase Negative Staphylococci.*

The Antibiogram of Gram Negative bacilli (Table-3) revealed that the Piperacillin –Tazobactum and Meroperem were the most susceptible drugs. Gram positive cocci were mostly susceptible to Amoxiclav , Clindamycn & linezolid (Table-4).

**Table-3 Antibiotic susceptibility pattern of Gram Negative Bacilli (%Susceptible)**

| Name of Antibiotics | Klebsiellasp. (n=46) | E.coli (n=30) | Citrobactersp.(n=5) | Proteus (n=1) | Pseudomonas (n=60) | Acinetobacter (n=10) |
|---|---|---|---|---|---|---|
| Ampicillin | 7(15%) | 5 (16.6%) | 0(0%) | 0(0%) | ND | 1(10%) |
| Ampicillin sulbactum | 20 (43%) | 10 (33.3%) | 3(60%) | 1 (100%) | ND | 6(60%) |
| Amoxiclav | 20 (43%) | 9(30%) | 2(40%) | 1 (100%) | ND | ND |
| Ceftazidime | 15 (32.6%) | 10 (33.3%) | 0(0%) | 0(0%) | 24 (40%) | 3(30%) |
| Ceftriaxone | 15 (32.6%) | 9(30%) | 2(40%) | 0(0%) | ND | 2(20%) |
| Cefazolin | 10(21.7%) | 3(10%) | 0(0%) | 0(0%) | ND | ND |
| Ciprofloxacin | 18(39.1%) | 11(36.3%) | 2(40%) | 0(0%) | 18(30%) | 2(20%) |
| Piperacillin-Tazobactum | 30(65.2%) | 19(63.3%) | 3(60%) | 1(100%) | 49(81.6%) | 9(90%) |
| Amikalin | 24(52.1%) | 8(26.6%) | 2(40%) | 1(100%) | 34(56.6%) | 7(70%) |
| Tobramycin | 25(54.3%) | 9(30%) | 2(40%) | 1(100%) | 38(63.3%) | 8(80%) |
| Meropenem | 38(82.6%) | 27(90%) | 5(100%) | 1(100%) | 50(83.3%) | 10(100%) |

ND – Not Detected.

**Table-4 Antibiotic suseceptibility pattern of Gram Positive Cocci (%Susceptible)**

| Name of antibiotics | Staphylococcus aureus (n=29) | CONS (n=16) | Enterococci (n=26) |
|---|---|---|---|
| Penicillin | 8 (27.5%) | 12(75%) | 20(76.9%) |
| Amoxiclav | 25(86.2%) | 13(81.2%) | ND |
| Cefoxitin | 20(68.9%) | 9(56.2%) | ND |
| Erythromycin | 15(51.7%) | 7(43.7%) | ND |
| Clindamycin | 23(79.3%) | 11(68.7%) | ND |
| Gentamicin | 16(55.1%) | 8(50%) | ND |
| Ciproflaxacin | 8(27.5%) | 3(18.7%) | 7(26.9%) |
| Trimethoprim-Sulphamethoxazole | 7(24.1%) | 3(18.7%) | ND |
| Linezolid | 29(100%) | 15(93.7%) | 26(100%) |
| Ampicillin | ND | ND | ND |
| Gentamicin high level | ND | ND | 21(80.76%) |
| Vancomycin | ND | ND | 26(100%) |

ND – Not Detected .

In this study about 10.5% of the isolates were ESBL producers .The incidence of ESBL. Isolates were high in Klebsiella Sp (15.2%) followed by E.coli(13.3%), Acinetobacter (10%) and Pseudomonas (6.6%).

## DISCUSSION :

This study shows male pre ponderance (57.3%) as compared to female (42.6%). It closely corroborates with the study by Raghav Rao etal, 2014 which shows high occurence in males(58.82%) .

Gram Negative bacteria were most predominantly isolated from pus culture samples compared to Gram Positive bacteria .This was similar to a study done by Rajeshwar Rao etal 2014.

Among Gram Negative bacilli Pseudomonas sp was the most commonly isolated organisms 60 (26.9%) as observed in a study by S.Rai etal 2017.

In contrast , Klebsiella sp was the most commonly isolated organism in a study done by Sharma Vetal 2015 .Whereas in other study by Rajeshwar Rao S. etal 2017, Staph aureus was isolated in increased frequency & other study by Ramesh Kannan etal 2014, E.coli was isolated most commonly.

In this study about 10.5% of the isolates were ESBL producers. While in India , the ESBL prevalence ranges from 60-70% (Dalela 2012)

In this study 31.03% of Methicillin Resistant Staphylococcus aureus were isolated which correlates with a study by Arora etal,2010 from North India where the prevalence of MRSA was 46%. The organisms most commonly isolated from the pus culture samples were Pseudomonas sp. followed by Klebsiella sp. , E.coli, Staphylococcus aureus & Enterococcus species. Among Gram Negative bacteria 10.5% of the isolates were ESBL producers. Among Gram Negative bacteria , all the organisms were highly sensitive to Piperacillin- Tazobactum and Meropenem . Gram Positive bacteria were all 100% sensitive to Linezolid. This study did not address the detection of AmpC prevalence in our set up which remains to be the limitation and gives a scope to focus in the future research.

## CONCLUSION:

This study give a outline of antibiotic susceptibility of clinical isolates which will help in formulating the local antibiotic policy for the hospital. Antibiotic sensitivity of micro organisms varies from place to place and time to time , hence regular monitoring of bacterial sensitivity to antibiotics is essential. Our study there by will guide the clinician in choosing appropriate antibiotics which not only contribute to better treatment but their judicious use will also help in preventing emergence of resistance to the drug which are still sensitive.

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