

ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF *KLEBSIELLA PNEUMONIAE* IN VARIOUS CLINICAL SAMPLES AT A TERTIARY CARE HOSPITAL, HIMACHAL PRADESH

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ABSTRACT

Introduction: *Klebsiella pneumoniae* is a common nosocomial pathogen. It is responsible for ICU infections, UTIs, bacteremia and difficult to treat if resistance mechanisms develops.

Objective: To study the antimicrobial sensitivity pattern of *Klebsiella pneumoniae* in various clinical samples.

Methods: The various clinical samples collected at department of Microbiology at DRPGMC, Kangra at Tanda, HP were identified for *Klebsiella pneumoniae* and further antibiotic sensitivity pattern was studied.

Exclusion criteria: complicated and upper UTI urine samples were not included in the study.

Results: Total 20, 228 samples were processed and 6,436 showed growth on culture plate. *Klebsiella pneumoniae* was obtained in 564 samples out of 6,436 and was processed for antimicrobial susceptibility testing. In urine, maximum sensitivity was observed in Nitrofurantoin followed by Gentamicin in both pus and sputum samples.

Conclusion: This study from 2019 to 2021 shows prevalence of *Klebsiella pneumoniae* and its sensitivity pattern to various drugs.

Keywords: *Klebsiella pneumoniae*, antimicrobial sensitivity.

1. INTRODUCTION

Klebsiella pneumoniae is a gram-negative, non-motile, aerobe which is rod-shaped and belongs to family Enterobacteriaceae¹. It is a common causative organism for hospital-acquired infections including respiratory tract infections, urinary tract infections and bloodstream infections².

Klebsiella have a tendency to harbour antibiotic resistant plasmids; thus, infections with multiple antibiotic-resistant strains can be anticipated³.

2. MATERIAL AND METHODS

This study was conducted at department of Microbiology, DRPGMC, Kangra at Tanda, H.P from period of October 2019 to November 2021. Various clinical samples (pus, sputum and urine) were received and inoculated on blood agar plate and MacConkey agar plate for overnight incubation at 37°C.

The identification of *Klebsiella pneumoniae* was done based on colony characters and biochemical reactions. The antimicrobial sensitivity of *K. pneumoniae* for drugs was inoculated on Muller Hinton agar for AST inoculation.

3. RESULTS

Total 20,228 samples were inoculated and 6,436 showed growth in culture media. Out of 6,436 culture positive media, *Klebsiella pneumoniae* growth was observed in 564 samples of urine, pus and sputum. Amongst these 130 were urine samples, 170 pus samples and 264 were sputum samples (figure 1 and 2).

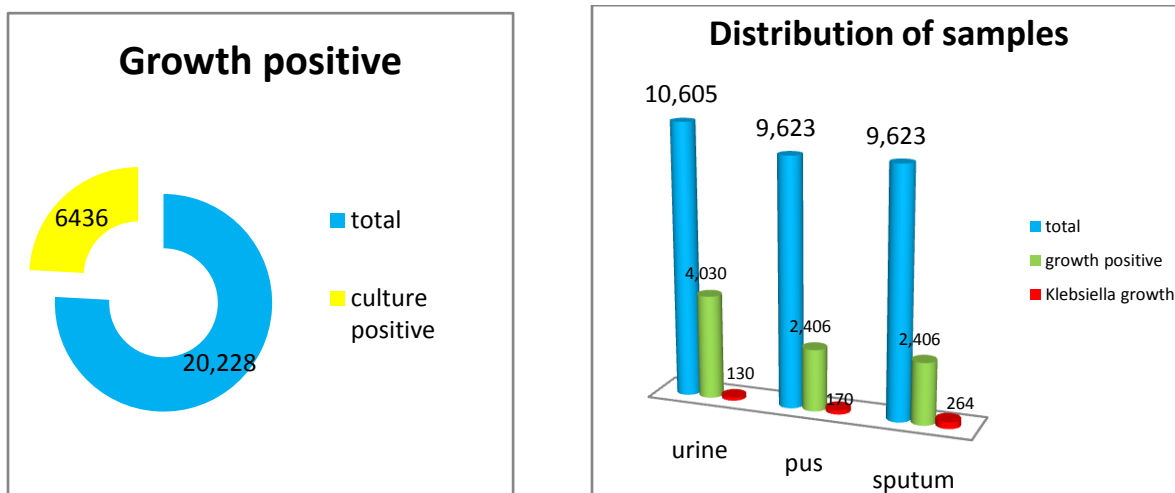


Figure 1 and 2: showing the cultures positive for growth and distribution of various samples in *Klebsiella pneumoniae* growth.

Antimicrobial sensitivity was done as per CLSI guidelines. The drug sensitivity was done for *Klebsiella pneumoniae* for Gentamicin, Doxycycline, Levofloxacin, Amoxy-Clavulanic, Piptaz (Nitrofurantoin was tested for urine samples only)(figure3).

AMA	Amoxy-Clavulanic 20/10 µg	Gentamicin 10 µg	Doxycycline 30 µg	Levofloxacin 5 µg	Piptaz 100/10 µg	Nitrofurantoin 300 µg
Urine (N=130)	2	62	-	2	30	96
Pus (N=170)	8	70	44	40	64	-
Sputum (N=264)	38	120	46	92	68	-

Figure 3: Number of samples sensitive to the antimicrobial drugs.

In this study, urine samples maximum sensitivity was seen in nitrofurantoin 73.84% (96/130) after overnight aerobic incubation.

In pus and sputum both maximum sensitivity was in Gentamicin as 41.18% (70/170) and 45.45% (120/264).

4. DISCUSSION

In present study, 564 cultures showed *Klebsiella pneumoniae* growth out of 6,436 culture positive samples. Amongst them, 130 were from urine samples, 170 from pus and 264 were from sputum samples.

The *Klebsiella pneumoniae* was tested for various antimicrobial agents. The antimicrobial discs used were amoxicillin-clavulanate 20/10µg, gentamicin 10 µg, doxycycline 30µg, levofloxacin 5µg, Piptaz 100/10µg, nitrofurantoin 300µg.

In urine samples maximum sensitivity was seen in nitrofurantoin 73.84% (96/130) which is concordance with study done by Rizwan M et al. which also shows the observation⁴.

In pus and sputum both maximum sensitivity was in Gentamicin as 41.18% (70/170) and 45.45% (120/264) which was similar to the study done by Patilaya P et al. which showed *Klebsiella* isolates sensitive to other fluoroquinolone, Amikacin⁵.

Klebsiella is intrinsically resistant to ampicillin, carbenicillin and ticarcillin. Penicillin resistance is due to the ability of *K. pneumoniae* to carry plasmids producing beta-lactamase variants⁶. *Klebsiella pneumoniae* can acquire resistance by various mechanisms which includes enzymatic inactivation, target site modification, efflux pump etc. These resistances are plasmid

coded and can be transferred to other bacteria also, which increases chance of resistance among other bacteria in health care settings⁷. Therefore timed surveillance should be done.

5. CONCLUSION

Multi drug resistant bacteria are emerging worldwide which causes major public health problems and challenges to healthcare. Therefore, sensitivity pattern should be under watch for better antimicrobial stewardship progress.

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