



ALARMING UPSURGE OF EXTENSIVE AND PAN DRUG RESISTANT KLEBSIELLA PNEUMONIAE ISOLATED FROM CRITICALLY ILL PATIENTS OF A TERTIARY CARE.

Microbiology

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ABSTRACT

Introduction: This study was conducted for analysing multidrug resistant, extensive drug resistant and pan drug resistant strains of Klebsiella pneumoniae and its antimicrobial susceptibility pattern from critical areas of a tertiary care centre.

Methods: Analysis of multi drug resistant Klebsiella pneumoniae was carried out using WHONET software. Data included all the clinical specimen tested in Microbiology laboratory for aerobic culture and susceptibility by Kirby Bauer's disc diffusion method and MIC method as per availability. The results were interpreted by CLSI guidelines 2016 - 2017

Results: Multi drug resistant Klebsiella strains from Critical areas of the hospital were 98 %, Extensive drug resistant strains were 57 % and Pan drug resistant strains were 9 %.

Conclusions: Continuous monitoring of multi drug resistant, extensive drug resistant and pan drug resistant Klebsiella pneumoniae among other organisms, should be done in intensive care units to form a rational antibiotic policy for better infection control management of severely ill patients.

KEYWORDS

Multi drug resistance, Extensive drug resistance, Pan drug resistance, Intensive care unit, Klebsiella pneumonia

INTRODUCTION:-

Enterobacteriaceae are known to cause severely fatal human infections, with a predominance towards Klebsiella pneumoniae. In recent years, strains of multidrug resistant organisms have quadrupled worldwide [1], compromising our ability to manage infections. Extensively resistant strains of Klebsiella pneumoniae have recently gained importance for causing community acquired and nosocomial infection, with corresponding rise in morbidity and mortality. Increasingly, many strains that are extended-spectrum B-lactamase (ESBL) producing as well as Carbapenem resistant are being reported as causing outbreaks in hospitals and particularly in intensive care units (ICUs) and New Born Units (NBUs). [2] During routine antibiogram analysis of Intensive care units, a recent surge was observed among the resistance of commonly used antimicrobials. Hence, this study was conducted for analysing multidrug resistant, extensive drug resistant and pan drug resistant strains of Klebsiella pneumoniae and its antimicrobial susceptibility pattern from critical areas of a tertiary care centre.

Amongst all the isolated strains of Klebsiella pneumoniae from various intensive care units, 98 % were multidrug resistant. Amongst which 57 % showed extensive drug resistant and 9 % showed pan drug resistance. Antibiogram analysis revealed a disturbingly high resistance rate for aminoglycosides, fluoroquinolones and higher antimicrobials including fourth generation cephalosporins and carbapenems amongst others.

METHOD:- The present study was conducted in a tertiary care for one year from September 2016 – August 2017, after obtaining institutional ethical approval. Analysis of multi drug resistant Klebsiella pneumoniae was carried out using WHONET software. Data included all the clinical specimen tested in Microbiology laboratory for aerobic culture and susceptibility by Kirby Bauer's disc diffusion method and MIC method as per availability. The results were interpreted by CLSI guidelines 2016 - 2017

RESULT:-

5008 samples coming from various clinical areas like Medicine, Surgery, Paediatrics, Obstetrics and Gynecology etc. were studied. Total 447 multi drug resistant Klebsiella pneumoniae could be isolated, amongst which 64 isolates were from critical area (Intensive care unit) of the hospital and were included in the study.

Multi drug resistant:- Multi Drug Resistance was considered as non-susceptible to ≥ 1 agent in ≥ 3 antimicrobial categories. Antimicrobials which were included for analysis of multidrug resistance included

Amoxycillin – clavulanate, Ampicillin-Sulbactam, Piperacillin-Tazobactam, Ticarcillin-clavulanate, Cefazolin, Ceftriaxone, Cefipime, Doripenem, Ertapenem, Meropenem and Imipenem.

Amongst 64 Klebsiella pneumoniae isolated from Intensive care unit, multi drug resistant Klebsiella pneumoniae was found to be 98 %. (63). Specimen wise analysis was performed which showed that predominant Klebsiella pneumoniae was isolated from blood culture with 43% (27) followed by Sputum at 14 % (9) and Swab specimen at 14 % (9) . While Urine specimen accounted for upto 5 % (3) . Least specimen were isolated from ascitic fluid at 2 % (1) as shown in below table.

Table 1 Distribution of Multi drug resistant Klebsiella pneumoniae isolates from various clinical specimen in critical areas

Area	Total number of specimen (%)	Type of Specimen						
		Ascitic Fluid	Blood culture	Urine	Swab	Pus	Sputum	Miscellaneous
SICU	5 (8%)	-	-	-	4	-	-	1
OBICU	3(5%)	1	-	-	-	-	-	2
NICU	27(43%)	-	18	-	1	1	1	6
MICU	28(44%)	-	9	3	4	-	8	4
Total	63	1 (2%)	27 (43%)	3 (5%)	9 (14%)	1 (2%)	9 (14%)	13 (20 %)

SICU – Surgical Intensive Care Unit
OBICU- Obstetric Intensive Care Unit
NICU- Neonatal Intensive Care Unit
MICU- Medical Intensive Care Unit

Area wise analysis was performed which showed that predominant Klebsiella pneumoniae were isolated from Medical Intensive Care Unit at 44% (28) , followed by Neonatal Intensive Care Unit at 43 % (27). Surgical Intensive Care Unit accounted for 8 % (5) of multidrug resistant Klebsiella pneumoniae while 5 % (3) were from Obstetric Intensive Care Unit.

Extensive drug resistance

Extensive drug resistant (XDR) was defined as non-susceptibility to at least one agent in all but two or fewer antimicrobial categories i.e. bacterial isolates remained susceptible to only one or two categories of

