Online ISSN: 2581-3935
Print ISSN: 2589-7837

International Journal of Medical Science and Diagnosis Research (IJMSDR)

Available Online at www.ijmsdr.com

Volume 2, Issue 5; September-October: 2018; Page No. 120-123

The prevalence of *Klebsiella species* isolates from various clinical samples – A cross sectional study

Shalini.S.Shettar[1], Dr.S.Soumya[2]

[1]Department of Microbiology, Jawaharlal Nehru Medical College, KLES Dr. Prabhakar Kore

[2]Hospital and Medical Research Center, KAHER's, Belgaum, Karnataka, India.

ABSTRACT:

Introduction: *Klebsiella species* belongs to family Enterobacteriacae is a gram negative bacilli responsible for causing a number of infections. Among *Klebsiella species*, species *pneumoniae* and *oxytoca* are frequently isolated in cultures. These organisms are even responsible for nosocomial infection.

Aims & objectives: This study was carried out to know the prevalence of *Klebsiella species*

Material & methods: All the *Klebsiella species* isolated from various clinical samples received at Department of Microbiology, JNMC, KAHER's from January 2017 – December 2017 were included in the study. The isolates were identified by colony characters and standard biochemical tests.

Results: Out of total 16,290 clinical samples, 132 isolates were Klebsiella species giving the prevalence of 0.81%. Out of these 132 isolates 126(95%) isolates were *Klebsiella pneumoniae* and 6(5%) were *Klebsiella oxytoca*. The maximum numbers of isolates were isolated from sputum followed by urine, pus, etc.

Conclusion: As prevalence of Klebsiella species are next to Escherichia coli for causing bacteremia, knowledge of their local prevalence helps to reduce spread these organisms in the hospital settings.

Key words: *Klebsiella pneumoniae, Klebsiella oxytoca, Klebsiella sp.*

Introduction

Klebsiella species a non-motile Gram Negative Bacilli, belonging to Enterobacteriacae family is ubiquitous in the environment and is notorious to cause a wide range of human diseases, like urinary tract infections to pneumonia. In 1882, Karl Friedlander a pathologist identified *Klebsiella* as a cause of pneumonia for the first time. Virulence factors such as capsules or lipo-polysaccharides help them to escape phagocytosis macrophages[1]. The infections caused by *Klebsiella* are associated with hospitalization. *Klebsiella* spp. infects as an opportunistic pathogens in immune-compromised individuals and hospitalized patients. *Klebsiella pneumoniae* is the most important species of the genus to cause nosocomial infections. In the United States and in Europe it has been observed that *Klebsiella* spp. cause 7% - 14% of all nosocomial bacterial infections. *Klebsiella* is second only to *Escherichia coli* for causing nosocomial bacteremia[2, 3].

Material and Methods:

The study was undertaken at the Department of Microbiology, Jawaharlal Nehru Medical College, Belagavi between January 2017 to December 2017. Different clinical samples like sputum, urine, blood, wound, ear swabs and aspirates (of pleural, gastric fluids) etc received at the Department of Microbiology during the study period were included in the study. Preliminary examination i.e gram stain from samples like pus, wound swabs, sputum etc, and

Corresponding author: Dr.S.Soumya

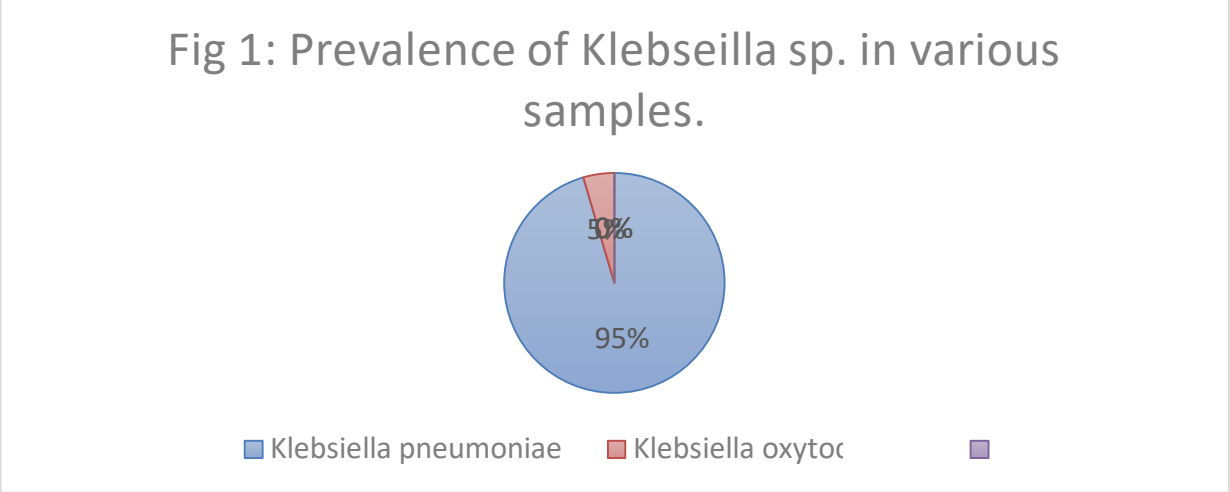
wet mount for urine was done. The samples were inoculated on Blood agar and MacConkey agar, followed by aerobic incubation at 37^0C for 24 hours. Morphological characters of the colonies, microscopic features and standard biochemical tests were used to identify the isolates[4]. Indole production helped to differentiate *K. oxytoca* from *K. pneumoniae*. Citrate utilization test was used to differentiate *K.pneumoniae* and *K. rhinoscleromatis*, latter being citrate utilizers. *K. ozanae and K. rhinoscleromatis* were identified based on MR-VP test.

Inclusion Criteria: All the clinical samples with Klebsiella species isolated were included in the study

Exclusion Criteria: All the clinical samples with isolates other than Klebsiella species, No growth and Commensal growth were excluded from the study.

Results:

Out of total 16,290 clinical samples, 132 isolates were Klebsiella species. The prevalence of Klebsiella species was found to be 0.81%. Out of these 132 isolates 95% (126 isolates) were *Klebsiella pneumoniae* and 5% (6) were *Klebsiella oxytoca* as shown in figure 1.



The majority of *Klebsiella* isolates were from sputum followed by urine, pus, etc. as depicted in Table 1

Table 1: Distribution of *Klebsiella sp.* isolates from various clinical samples. n=132

Samples	*Klebsiella oxytoca*	*Klebsiella pneumoniae*
Blood	0	2
Bronchial secretion	0	1
Catheter tip	1	4
Ear swab	0	2
Pleural fluid	0	1
Pus	1	28
Sputum	1	42
Urine	3	35
Throat swab	0	2
Vaginal Swab	0	4
Wound swab	0	5
Total	**6**	**126**

Majority of the *Klebsiella* isolates were found to be from patients belonging to age group 45-60 as shown in table 2

Table 2: Frequency of age wise distribution of *Klebsiella sp* infection

Age in years	No (%) n=132
0-15	10 (7.57%)
16-30	21 (15.9%)
31-45	33 (25%)
45-60	48 (36.3%)
>60	20 (15%)

Discussion:

Klebsiella being responsible for severe morbidity and mortality is an important nosocomial pathogen. Due to the development of multidrug resistance in Klebsiella mainly *Klebsiella pneumoniae* species it is gaining lot of attention. It is a major threat mainly causing difficulty in health management in hospitals of especially in developing country like India.

In the present study the isolation rate of *Klebsiella species* is highest from sputum, followed by urine and pus. This finding was similar to the finding in the study done by Sumana P et al;[5]. But finding from study done by Namratha KG et al;[6] and Ali adbul Rahim KA et al;[7] found its prevalence to be high in pus followed by sputum and cathertip. This difference seen could be due to difference in type of patients referred as our hospital is a tertiary care hospital and environmental conditions to play a very important role.

In the current study, *Klebsiella pneumoniae* isolation rate is high compared to *Klebsiella oxytoca*. This finding is in comparision to that done by Namratha KG et al;[6] and Asmaa et al;[7]

The prevalence of *Klebsiella* as causative agent of infections depends on patients predisposing factors like hypertension, Diabetes mellitus, smoking, alcoholism, steroid therapy, immunocompromised status etc, and also on duration of hospital stay, in-dwelling catheters, age of the patient, type of surgery, prior antibiotic usage etc.

In our study the major predisposing factor was age as most of the isolates were from patients in age group 45-60 yrs with Diabetes mellitus followed by hypertension and alcoholism. These findings correlated to the study findings done by Namratha KG et al;[6]

Conclusion:

Nosocomial *Klebsiella* infection continues to be a rampant problem, not only it effects countries economy but also patients life expectancy. Therefore, the knowledge about their prevalence is required for the implementation of preventive and control measures of the same. Regular surveillance of these nosocomial isolates can help to reduce the spread of these.

Funding: No funding sources

Conflict of interest: None

References:

1. Lawlor M., Hsu J, Rick P, Miller V. Identification of Klebsiella pneumoniae virulence determinants using an intranasal infection model. *Molecular Microbiology*. 2005;58(4):1054-73.
2. Podschun R, Ullmann U. Klebsiella spp. As nosocomial pathogens: epidemiology, taxonomy, typing methods, and pathogenicity factors. Clinical Microbiology Reviews, 1998; 11(4): 589-603.
3. Namratha KG, Padiyath S, Subbannayya K, Dinesh PV, Hemachandra C. Characterization and Antibiogram of *Klebsiella* spp. Isolated from Clinical Specimen in a Rural Teaching Hospital. Sch. J. App. Med. Sci.2015; 3(2E):878-883
4. Feglo PK, Acheampong DO, Gbedema SY. Prevalence and antibiogram of *Klebsiella*

species recovered from clinical samples at the Komfo Anokye teaching hospital in Ghana.J Clin Research Letters;2010:1(2):4-8.

5. Sumana Prudhivi et al.2017, Bacteriological Profile And Antibiotic Susceptibility Pattern of Lactose-Fermenting Gram-Negative Bacilli In Various Clinical Specimens in A Tertiary Care Hospital. Int J Recent Sci Res. 8(10), pp. 20569-20572.

6. Namratha KG et al., Characterization and Antibiogram of Klebsiella spp. Isolated from Clinical Specimen in a Rural Teaching Hospital. Sch. J. App. Med. Sci., 2015; 3(2E):878-883.

7. Ali Abdel Rahim KA, Ali Mohamed AM; Prevalence of extended spectrum β-lactamase- producing Klebsiella pneumoniae in clinical isolates. Jundishapur Journal of Microbiology, 2014; 7(11): e17114.