|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2019: 79.34
Volume 5, Issue 3; March: 2021; Page No. 15-16

Original Research Article

TO DETERMINE THE ANTIBIOTIC SUSCEPTIBILITY PATTERNS IN VAP PATHOGENS IN ICU PATIENTS AT TERTIARY CARE HOSPITAL ATTACHED TO S. P. MEDICAL COLLEGE, BIKANER

Dr. Sangeeta Gahlot[1], Dr. Makkhan Lal Saini[2]

[1] Senior Resident Microbiology, [2] Assistant Professor General Medicine
Sardar Patel Medical College, Bikaner (Rajasthan)

Article Info: Received 15 January 2021; Accepted 25 February 2021
DOI: https://doi.org/10.32553/ijmbs.v5i3.1789
Corresponding author: Dr. Makkhan Lal Saini
Conflict of interest: No conflict of interest.

Abstract

Background: The present study aimed to find out the antimicrobial susceptibility pattern of the organisms isolated from cases of VAP

Methods: This study was carried out in the Department of Microbiology, by taking samples from clinically suspected cases of VAP from different ICU(Medical, Surgical, Neonatal and Pediatric ICU) at tertiary care hospital attached to S. P. Medical College, Bikaner.

Results: Out of 79 GNB, 63 (79.74%) isolates were found to be MDR, including 10 (66.67%)) isolates of MDR Pseudomonas.

Conclusion: Adherence to infection control protocols and short term use of invasive devices and judicious use of antibiotics are also important in preventing VAP caused by these MDR pathogens

Keywords: VAP, MDR, ICU

Introduction

Ventilator Associated Pneumonia (VAP) is defined as pneumonia occurring more than 48 hours of mechanical ventilation and not incubating at the time of intubation.VAP is the most frequent Intensive Care Unit (ICU) acquired infection occurring in 9–24% of patients intubated for longer than 48 hours.[1]

Due to increasing incidence of Multi Drug Resistant (MDR) organisms in ICUs, early and correct diagnosis of VAP is an urgent challenge for optimal antibiotic treatment.[2-4]

The present study aimed to find out the antimicrobial susceptibility pattern of the organisms isolated from cases of VAP

Material and Method

Study design:-This is haospital based cross-sectional study.

Study place:-This study was carried out in the Department of Microbiology, by taking samples from clinically suspected cases of VAP from different ICU (Medical, Surgical, Neonatal and Pediatric ICU) at tertiary care hospital attached to S. P. Medical College, Bikaner.

Study duration:-From April 2017 to November 2018.
Study population:-Clinicalcases
Sampling technique:-Random Sampling
Sample size:-100 or number of patients to be sampled within study duration (whichever is earlier).
Inclusion Criteria:
1. ICU patients who are intubated and on mechanical ventilation for more than 48 hours.
2. Patients in whom VAP is clinically suspected. Patients with Modified Clinical Pulmonary Infection Score (CPIS) of more than 6.[22]

Exclusion Criteria:
Patients who have developed pneumonia within 48 hours of mechanical ventilation was excluded.
Specimens collected:
Endotracheal aspirate

Observation

During study period 100 suspected VAP cases enrolled for the study according to inclusion criteria.

In this study following observations were made.

Table 1: Sample Distribution

Type of ICU	No. of Sample
Medicine ICU (MICU)	46
Surgery ICU (SICU)	24
Pediatric ICU (PICU)	16
Neonatal ICU (NICU)	14
Total	100

Out of 100 samples, 46 from MICU, 24 from SICU, 16 from PICU and 14 from NICU.

Table 2: Age and Sex Distribution of Total cases

Age Years	Total Cases (100)	
	Male	Female
0-15	12 (40%)	18 (60%)
16-30	14 (73.68%)	5 (26.32%)
31-45	19 (86.36%)	3 (13.64%)
46-60	10 (52.63%)	9 (47.37%)
>60	6 (60%)	4 (40%)

Out of total 100 cases included in this study, 61 (61%)

were male and 39 (39%) were female, hence male and female ratio was 1.56:1.

Majority of cases belongs to the age group 0-15 years (30%) followed by 31- 45 (22%) with mean age 30.746 years.

Table 3: Antibiotic Resistant Pattern of Gram negative isolates

Antibiotics	Acinetobacter	K.Pneumoniae	E.coli
AMPICILLIN	36(100%)	19(90.47%)	7(87.5%)
AMOXYCLAV	18(50%)	15(87.5%)	4(50%)
CEFTRIXONE	32(88.88%)	18(85.71%)	5(62.5%)
COTRIMOX	32(88.88%)	17(80.95%)	5(62.5%)
CIPROFLOXACIN	30(83.33%)	17(80.95%)	7(87.5%)
CEFOPERAZONE	30(83.33%)	16(76.19%)	5(62.5%)
GENTAMYCIN	9(25%)	13(61.90%)	5(62.5%)
MEROPENEM	9(25%)	3(14.28%)	2(25%)
COLISTIN	0	0	0

The resistance pattern in gram- negative bacteria isolated in this study. All the isolates of Acinetobacter species, nearly 90% of K.pneumoniae and 87.5% of E.coli isolates were resistant to ampicillin. While all gram-negative bacteria isolated in this study were 100% sensitive to colistin.

Table 4: Antibiotic Resistant Pattern of P.aeruginosa

ANTIBIOTICS	P.aeruginosa (24 Isolates)
AMOXYCLAV	21(87.50%)
CEFTAZIDIME	17(70.83%)
LOMIFLOXACIN	15(62.50%)
TOBRAMYCIN	14(58.33%)
PIPERACILLIN/TEZOBACTUM	5(20.83%)
MEROPENEM	3(12.5%)
POLYMIXIN- B	0
COLISTIN	0

Out of 24 Pseudomonas aeruginosa 21(87.50%) were resistant to amoxyclav, however all the Pseudomonas aeruginosa were sensitive to polymyxin –B and colistin.

Table 5: Antibiotic Resistant Pattern of Gram Positive isolates

Antibiotics	COPS (n=8)	CONS (n=3)
AMIKACIN	3(37.50%)	1(33.33%)
AZITHROMYCIN	6(75%)	3(100%)
CEFTRIAXONE	2(25%)	1(33.33%)
COTRIMOX	5(62.50%)	2(66.66%)
CIPROFLOXACIN	3(37.50%)	1(33.33%)
CLINDAMYCIN	6(75%)	3(100%)
OXACILLIN	6(75%)	1(33.33%)
VANCOMYCIN	0	0

6 out of 8 Staphylococcus aureus were methicillin resistant. However all the Gram- positive cocci were sensitive to vancomycin.

Table 6: Multi Drug Resistant Isolates of VAP

Isolates	Total No.(%)	MDR (%)
Acinetobacter spp.	**36(35.29)**	**35(97.22)**
Pseudomonas aeruginosa	**24(23.53)**	**14(58.33)**
Klebsiellapneumoniae	**21(20.59)**	**20(95.24)**
GPC	**8(7.84)**	**6(75)**
Escherichia Coli	**8(7.84)**	**7(87.5)**

The MDR isolates, as per CLSI guideline for different microorganisms, 97.22% of Acinetobacter spp. followed by 95.24% of Klebsiella pneumoniae and 87.5% of Escherichia coli were found MDR. while 75% of GPC and 58.33% of Pseudomonas aeruginosa were MDR.

Discussion

Ventilator - associated pneumonia (VAP) is an important nosocomial infection among ICU patients receiving mechanical ventilation (MV). It is the second most common nosocomial infection in the intensive care unit (ICU) and the most common nosocomial infection in mechanically ventilated patients.

The higher incidence of MDR in the present study could be attributed to the associated co-morbid conditions. Some of the patients were seriously ill with conditions such as COPD, neonatal septicemia, cardiovascular and neuromuscular diseases etc. The health seeking behavior of our patients was different from that which was found in the developed country. Due to limited resources, the patients seek medical help only when it is absolutely inevitable. By the time the patient is referred to the tertiary care centre, his underlying condition becomes well advanced and it may become irreversible. This may necessitate a longer duration of mechanical ventilation which is directly proportional to the development of VAP and subsequently the MDR pathogens.

The care of bedridden patients also requires intensive contact with healthcare providers who serve as the vector of these MDR bacteria. Treatment with multiple antibiotic agents and broad - spectrum cephalosporins and aminoglycosides has emerged as important risk factors for development of MDR strains causing VAP.[5] We relate this effect to the eradication of competitive flora and to the selective advantage of MDR strains.

Conclusion

Adherence to infection control protocols and short term use of invasive devices and judicious use of antibiotics are also important in preventing VAP caused by these MDR pathogens. Routine hand washing before and between patient contact is simple, inexpensive and effective method for prevention of nosocomial infections.

References

1. Morehead RS, Pinto SJ. Ventilatorassociated pneumonia. Arch Intern Med 2000;160(13):1926-36.
2. Dey A, Bairy I. Incidence of multidrugresistant organisms causing ventilatorassociated pneumonia in a tertiary care hospital: A nine months' prospective study. Ann Thoracic Med2007;2:52-7.
3. Pugin J, Auckenthaler R, Mili N, Janssens JP, Lew PD, Suter PM. Diagnosis of ventilator-associated pneumonia by bacteriologic analysis of bronchoscopic and nonbronchoscopic 'blind' bronchoalveolar lavage fluid. Am Rev Respir Dis 1991;143:1121–29.
4. Collee JG, Miles RS, Watt B. Tests for the identification of bacteria. In: Mackie & McCartney"s Practical Medical Microbiology. 14th Ed. Eds. Collee JG, Fraser AG, Marmion BP, Simmons A. Churchill Livingstone, Elsevier imprint. 2006; pp 131-49.
5. Lalita at el, bacterial profile of VAP due to drug resistant pathogens using quantitative culture of endotracheal aspirate in a tertiary care hospital in jaipur, microcon 2014.