Comparison of microbial profile, antibiotic susceptibility and mortality of early and late-onset Ventilator associated pneumonia.

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OBJECTIVE:

To determine the microbial profile, antibiotic susceptibility and mortality rates of early vs late-onset ventilator-associated pneumonia (VAP).

Introduction

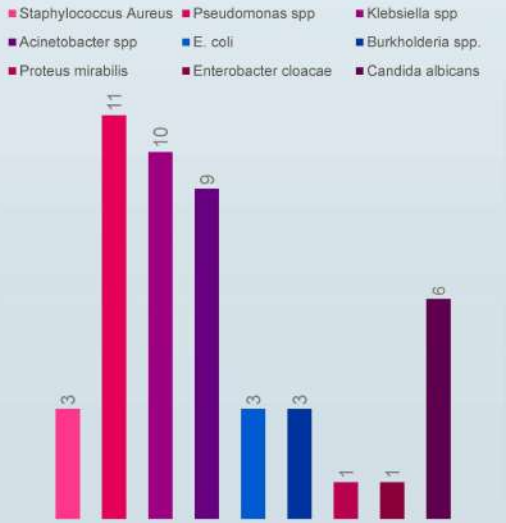
- Ventilator associated pneumonia (VAP) is a type of nosocomial infection that affects the lung parenchyma of patients who are on invasive mechanical ventilation for period longer than 48 hours.
- VAP is further classified as early onset for period between 48-96 hours and late onset for period greater than 96 hours.
- VAP is most common nosocomial infection among ICU patients with incidence rate of 13-51 patients per 1000 Ventilator days.
- The most common organisms were MRSA, Pseudomonas, Acinetobacter and B-lactamase producing gram negative bacilli.
- Male gender, underlying illness severity, and patients with a history of trauma are the independent risk factors for VAP.
- Gram negative bacteria account for 60% of the VAP cases.
- VAP is associated with a significant mortality rate, estimated to be around 27%.
- The risk of VAP is maximum between the fifth to ninth day of mechanical ventilation.
- Factors such as prior antibiotic use, the patient's immune status, and the local prevalence of resistant organisms might play more significant roles in determining the causative pathogens and their susceptibility patterns than the timing of onset alone.

Methodology

- Retrospective clinical audit.
- Done at Surgical ICU of Doctors Hospital and Medical Centre, Lahore, Pakistan.
- Data was analysed using the IBM SPSS 29.0 Software, and Excel Sheet was used to make a table of isolates and their sensitivity to antibiotics.
- **Exclusion criteria**: pneumonia on admission, died within 48hours of admission and patients having acute respiratory distress syndrome.
- **Inclusion criteria:** Patients of both genders with age >5 years, who were kept on mechanical ventilation for more than 48hours.
- Data was analyzed using SPSS 29.0 software version. P-value was set as <0.05 and confidence interval >95%.

Results

- 46 VAP cases out of 293 mechanically ventilated patients were recorded during the study period.
- Out of these, 13 (28.2%) were early-onset VAP and 33 (71.7%) were late-onset VAP.



	Meropenem	Imipenem	Tazobactam	Vancomycin	Ceftazidime	Amikacin	Amoxicillin	Colistin	Levofloxacin	Doxycycline	Minocycline	Gentamicin	Linezolid	Teicoplanin
Gram positive														
Staph aureus	-	-	-	100%	-	-	-	-	33.3%	100%	100%	66.6%	100%	100%
Gram negative														
K. pneumoniae	40%	40%	40%	-	10%	40%	30%	100%	40%	60%	60%	40%	-	-
P. aeruginosa	0%	0%	0%	-	18.1%	36.3%	-	100%	45.4%	-	-	-	-	-
Acinetobacter	0%	0%	0%	-	-	-	-	100%	0%	66.6%	100%	11.1%	-	-
E. Coli	50%	0%	0%	-	-	50%	-	50%	-	-	-	-	-	-
Burkholderia	66.6%	0%	0%	-	33.3%	-	-	N/A	66.6%	-	33.3%	-	-	-
P. mirabilis	100%	100%	100%	-	100%	100%	100%	0%	-	-	-	100%	-	-
E. cloacae	100%	100%	100%	-	-	100%	-	100%	100%	100%	100%	100%	-	-

- Out of 46 patients, 15 patients died due to VAP. The mortality rate was 32.6%. Mortality-rate for early onset VAP was 53.8% (7 patients) and 24.2% (8 patients) in late onset VAP.

Discussion

- The cumulative incidence of VAP came out to be 15.69% in this study.
- Multi-drug-resistant organisms were responsible mainly for both early and late onset VAP and there was no difference in isolates profiles of the 2 groups irrespective of duration of onset with the most common being *Pseudomonas aeruginosa, Klebsiella pneumoniae* and *Acinetobacter Baumanni.*
- The incidence of early-onset VAP is 28.26%, while that of late-onset VAP is 71.78%.
- This study showed that multi-drug-resistant organisms were responsible mainly for both early and late onset VAP and there was no difference in isolates profiles of the 2 groups.
- Among the organisms causing VAP, GNB (bacteria) constitute 80.3% while (GPB) gram positive bacteria constitute for about 6.5% and rest 13% is caused by *Candida albicans*. This trend correlates with study done by *ALI et al,* in which 74% organisms are gram negative and 20%-gram positive organisms.

Conclusion

- There is no significant difference in the prevalence and the resistance pattern of different bacteria depending upon the early and late onset classification.
- We suggest that broad spectrum MDR cover including colistin along with gram positive cover like vancomycin, linezolid or teicoplanin should be started as an empirical therapy to prevent the onset of early or late VAP.

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