

## Ventilator Associated Pneumonia in a Medical Intensive Care Unit, Incidence and Risk Factors: A Case Control Study

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**Abstract :** Background: Ventilator-associated pneumonia (VAP) is currently recognized as one of the most relevant causes of morbidity and mortality among intensive care unit (ICU) patients worldwide. Identifying modifiable risk factors for VAP could be helpful for future controlled interventional studies aiming at improving prevention of VAP. The purposes of this study were to determine the incidence and risk factors for VAP in a Tunisian medical ICU. Materials / Methods: A retrospective case-control study design based on the prospective database collected over a 14-month period from September 15th, 2015 through November 15th, 2016 in an 8-bed medical ICU. Patients under ventilation for over 48 h were included. The number of cases was estimated by Epi-info Software with the power of statistical test equal to 90 %. Each case patient was successfully matched to two controls according to the length of mechanical ventilation (MV) before VAP for cases and the total length of MV in controls. VAP in the ICU was defined according to American Thoracic Society; Infectious Diseases Society of America guidelines. Early onset or late-onset VAP were defined whether the infectious process occurred within or after 96 h of ICU admission. Patients' risk factors, causes of admission, comorbidities and respiratory specimens collected were reviewed. Univariate and multivariate analyses were performed to determine variables associated with VAP with a p-value < 0.05. Results: During the period study, a total of 169 patients under mechanical ventilation were considered, 34 patients (20.11%) developed at least one episode of VAP in the ICU. The incidence rate for VAP was 14.88/1000 ventilation days. Among these cases, 9 (26.5 %) were early-onset VAP and 25 (73.5 %) were late-onset VAP. It was a certain diagnosis in 66.7% of cases. Tracheal aspiration was positive in 80% of cases. Multi-drug resistant *Acinetobacter baumannii* was the most common species detected in cases; 67.64% (n=23). The rate of mortality out of cases was 88.23% (n= 30). In univariate analysis, the patients with VAP were statistically more likely to suffer from cardiovascular diseases (p=0.035) and prolonged duration of sedation (p=0.009) and tracheostomy (p=0.001), they also had a higher number of re-intubation (p=0.017) and a longer total time of intubation (p=0.012). Multivariate analysis showed that cardiovascular diseases (OR= 4.44; 95% IC= [1.3 - 14]; p=0.016), tracheostomy (OR= 4.2; 95% IC= [1.16 -15.12]; p= 0.028) and prolonged duration of sedation (OR=1.21; 95% IC= [1.07, 1.36]; p=0.002) were independent risk factors for the development of VAP. Conclusion: VAP constitutes a therapeutic challenge in an ICU setting, therefore; strategies that effectively prevent VAP are needed. An infection control-training program intended to all professional health care in this unit insisting on bundles and elaboration of procedures are planned to reduce effectively incidence rate of VAP.

**Keywords :** case control study, intensive care unit, risk factors, ventilator associated pneumonia

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