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Comparison of aerosolized (AS) Colistin as adjunctive treatment versus intravenous Colistin alone in treatment of ventilator-associated pneumonia caused by multidrug-resistant Gram-negative bacteria

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Background & Objective: One of the most common hospital-acquired infections in Intensive Care Unit (ICU) is Ventilator-associated Pneumonia (VAP). Development of VAP cases caused by multidrug-resistant (MDR) Gram-negative bacteria (GNB)—such as: *Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Klebsiella pneumonia* are increasing. Colistin (colistimethate sodium), is one of the most important polymyxins which has appropriate activity against MDR-GNB. Since the inhaled antibiotics deliver high concentrations of drug at the lung tissue without increasing systemic toxicity, inhaled Colistin as adjunctive treatment may be a valuable option for the treatment of critically ill patients with VAP due to MDR pathogens.

Materials & Methods: A randomized clinical trial was performed at the ICU of the Masih Daneshvari Hospital, Iran, from February 2016 through May 2017. Twenty-seven patients with VAP who were admitted to ICU ward who met the inclusion criteria were randomized into two groups. The first group of patients received Colistin based on glomerular filtration rate (GFR) two times daily intravenously (IV) and also aerosolized Colistin 2 million unit three times a day. The control group received only IV Colistin based on GFR. Measurement of procalcitonin (PCT) was conducted at days of 0, 3, 5 and 7 after antibiotic initiation. Sputum culture also was evaluated at days of 0, 4 and 7 after antibiotic initiation until receiving negative culture response.

Findings: Female to male ratio was 4:7 in AS-IV group and 5:11 in IV Colistin group. Mean±SD age was 64.64±21.39 years in AS-IV Colistin group and 66.25±18.59 years in IV Colistin group. The patient's baseline characteristics and distribution of pathogens VAP in both groups were similar. Eradication of the causative organism was significantly common in the AS-IV Colistin group (80% vs 12.5%, P=0.01). Evaluation of PCT was shown no difference between the intervention and control groups (p=0.211). No AS Colistin–related adverse events were recorded.

Conclusion: Our results suggest that AS Colistin might be a beneficial adjunct to IV Colistin in the management of VAP caused by MDR-GNB.

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