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**Effect of suction circuit flushing with Chlorhexidine on the occurrence of Ventilator Associated Pneumonia among mechanically ventilated patients: A quasi experimental study.**

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**Introduction:** Standard practice of flushing saline following endotracheal suctioning can create a medium for bacterial colonization and proliferation inside the suctioning circuit including the suction catheter, suction tube, and collecting jar. These organisms can possibly migrate to patient's lung during suctioning procedure causing ventilator associated pneumonia (VAP). Therefore, there is a need to flush the endotracheal suctioning circuit with an appropriate disinfectant to prevent bacterial colonization, and subsequently reducing VAP occurrence.

**Objectives:** To investigate the effect of suction circuit flushing with chlorhexidine on the occurrence of VAP among mechanically ventilated patients.

**Methods:** A quasi-experimental study with a randomized controlled trial design was adopted. Study participants (n = 136) were randomly assigned to either the intervention or control group. The intervention group received suction system flushing with 40 ml chlorhexidine gluconate 0.2%; the control group received normal saline for flushing the system. The primary outcome measure was VAP incidence at day 3 and day 6 of ICU admission corresponding to early onset and late onset VAP, respectively. The secondary outcome was the cost of flushing solution (the price of one Litre of chlorhexidine and saline is 9.80 and 40.00 EGP, respectively). Recruitment was between May and November 2020. Ethical approval was obtained from the Research Ethical Committee and the trial was registered at ClinicalTrials.gov (NCT05206721).

**Results:** No statistically significant differences were noted of the study participants between the intervention (n = 68) and standard care (n = 68) groups regarding age, gender, reason for ICU admission, past medical history, and mode and duration of mechanical ventilation. The incidence of VAP among patients in the intervention group was significantly lower than in the control group; 15 (22.1%) vs 29(42.6%), p = 0.010. The intervention was more effective in decreasing the incidence of late-onset VAP (26.2% vs 49%, p = 0.026) instead of early-onset VAP (13.2% vs 25%, p = 0.081). Chlorhexidine reduced the cost of suction system flushing by 75% compared to normal saline (median: 78.4 vs 300 EGP, p < 0.001).

**Conclusion:** Suction circuit flushing with chlorhexidine can significantly reduce the occurrence of VAP among mechanically ventilated patients and reduce the cost of flushing solutions. The results of our study recommends incorporating suction circuit flushing with chlorhexidine into the daily care of mechanically ventilated patients, along with other VAP bundle elements in order to achieve the maximum VAP reduction in ICU.000448How patients with C