Thesis Title Comparison the Effect of Different Oxygen Flow Rates in Nebulization with Bronchodilator Drug in Chronic Obstructive Pulmonary Disease Patients

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ABSTRACT

An administration of bronchodilator drug via nebulizer is a necessary therapeutic option for COPD patients .The gas-powered nebulizers are more commonly used and may be powered by oxygen to drive and produce small aerosal particles size and deposited at the appropriate site in the lung. The oxygen flow rates should be given about 4-10 LPM. The influence of different oxygen flow rates are not only on aerosal size and time of nebulization , but also on the rise of arterial carbondioxide tention that may lead to CO_2 retention and CO_2 narcosis in COPD patients. Therefore, the administration of bronchodilator drug via nebulizer powered by oxygen must be controlled by suitable oxygen flow rates to prevent the hazard of CO_2 retention.

The main purposes of this study were to compare the effect of different oxygen flow rates at 4 , 6 and 8 LPM on the physiological changes in COPD patients include arterial oxygen saturation(SaO_2),end-tidal CO_2($PetCO_2$),pulse rate(PR),respiration rate(RR),time of nebulization,peak expiratory flow rate (PEFR)

and dyspnea score in COPD patients. Quasi-experimental research was implemented. Twenty-one patients with COPD who attended the chest clinic at Siriraj hospital were enrolled in this study. Each subject was randomly assigned to the sequence of different oxygen flow rates and each subject was recieved all methods. In this study the researcher has controlled equal dose and volume solution of bronchodilator drug in each method. the parameters were recorded by the researcher ,including SaO_2 , $PetCO_2$, PR , RR ,PEFR and dyspnea score. These parameters were recorded before study (as the baseline value). At the begining of the administration of bronchodilator drug via Hudson nebulizer,the researcher recorded SaO_2, $PetCO_2$, PR and RR every one minute until the nebulization finished . The nebulization time was also recorded. SaO_2, $PetCO_2$, PR, RR, PEFR and dyspnea score were recorded at the end of nebulization. After nebulization SaO_2, $PetCO_2$, PR, and RR were recorded every 15 minute until 120 minute and PEFR and dyspnea Score were recorded every 30 minute until 120 minute ,as well.

Data were analyzed by analysis of variance for cross over design was utilized to compare the different in all parameters in each comparison period between three methods. Duncan' New Multiple Range Test was utilized to compare the pair different mean in the parameters that have significantly different.

The results were as followed:

1. The increase in mean arterial oxygen saturation between oxygen flow rates 4 LPM(3.2 %) ,6 LPM (3.4 %)and 8 LPM (4.1 %)were not significantly different ($p>.05$).

2. The increase in mean end-tidal CO_2 between oxygen flow rates 4 LPM(2.5 mmHg), 6 LPM (2.9 mmHg) and 8 LPM (4.6 mmHg) were significantly different ($p<.05$).In the method with oxygen

flow rates 8 LPM , the increase in mean end-tidal CO_2 was significantly greather than 4 and 6 LPM ($p<.05$ and .01 respectively). But in the method with oxygen flow rates 6 LPM, the increase in mean end-tidal CO_2 was not significantly greather than 4 LPM ($p>.05$).

3. The decrease in mean pulse rate between oxygen flow rates 4 LPM(2 bpm),6 LPM (3.1 bpm) and 8 LPM (3.3 bpm) were not significantly different($p>.05$).

4. The decrease in mean respiration rate between oxygen flow rates 4 LPM(1.9 bpm), 6 LPM(5.7 bpm) and 8 LPM (7.5 bpm) were significantly different($p<.001$). In the method with oxygen flow rates 8 LPM , the decrease in mean respiration rate was not significantly greather than 6 LPM($p>.05$), but 8 and 6 LPM the decrease in mean respiration rate were significantly greather than 4 LPM ($p<.01$ and .05 respectively).

5. The mean of nebulization time between oxygen flow rates 4 LPM (28.7 minute) , 6 LPM (12.2 minute) and 8 LPM (9.3 minute) were significantly different($p<.001$).In the method with oxygen flow rates 8 LPM, the mean of nebulization time was significantly shorter than 4 and 6 LPM($p<.01$).And the method with oxygen flow rates 6 LPM, the mean of nebulization time was significantly shorter than 4 LPM ($p<.01$),too.

6. The increase in mean peak expiratory flow rate between oxygen flow rates 4 LPM(35.7 LPM) ,6 LPM (32.9 LPM) and 8 LPM(34.3 LPM) were not significantly different ($p>.05$).

7. The decrease in mean dyspnea score between oxygen flow rates 4 LPM (0.2 cm.),6 LPM(0.2 cm.) and 8 LPM (0.5 cm.) were not significantly different ($p>.05$).

In conclusion ,the administration of bronchodilator drug via nebulizer powered by oxygen in COPD patients ,The oxygen flow rates 6 LPM is more suitable .And the oxygen flow rates should not be given more than 6 LPM. In this study the researcher recruited the COPD patients in stable stage ,in whom the risk of delivery oxygen induced CO_2 retention is less than in acute exacerbation stage. Thus in acute exacerbation stage of the COPD patients ,the rise of CO_2 retention should be higher. The researcher recommend that when the patients with COPD recieve bronchodilator drug via the nebulizer, especially in acute exacerbation stage , the oxygen flow rates should not given more than 6 LPM. The nurse must closely observe the clinical signs of the patients to prevent the hazard of CO_2 retention.