

THE APPLICATION OF CLOSE SUCTION TO HELP INEFFECTIVENESS OF AIRWAY CLEARANCE IN PATIENTS WITH VENTILATOR IN THE INTENSIVE CARE UNIT

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ABSTRACT

Introduction: Endotracheal tube in patients with ventilator is a foreign thing in respiratory tract secretions that can increase the production of the airway and cause airway clearance ineffectiveness problems that require suction action. The close suction technique is used in patients who are using ETT type. Close suction system is one of technique suction that applied without opening the ventilator connector in patients with ventilator in Intensive Care Unit. The purpose of this case study is to evaluate breath sounds, RR, SpO₂ before and after implementation of technique close suction in patients with ventilator in the Intensive Care Unit of Dr Mohammad Soewandhie Hospital Surabaya. **Method:** Research method was a case study in patients with early pulmonary edema eclampsia who use a ventilator. The instrument used is the observation sheet. **Result:** The results of the case study showed before the close suction action Ronchi breath sounds in the right lung field left, RR 27 x / min, and SpO₂ 90%. After applying technique close suction action on the first day with the results of SpO₂ 95%, RR 22 x / min, still no sound Ronchi in both lung fields, day 2 with the results of SpO₂ 97%, RR 20 x / min, there was the sound of a smooth Ronchi left lung, day 3 with the results of the oxygen saturation of 100%, RR 18 x / min and vesicular breath sounds. **Discussion:** Based on these results it can be concluded that the provision of closed suction system technique is effective in addressing the problem of ineffectiveness airway clearance. However, in patients with pulmonary infection that uses a ventilator with thick secretions should be given nebulizer prior to close suction action.

Key words: *closed suction system, ineffective airway clearance, ventilator, intensive care unit*

INTRODUCTION

Intensive Care Unit is a ward with staff and specialized equipment to treat patients with the disease, trauma, or life-threatening complications. Mechanical ventilation is an important part in the intensive care unit. Patients with the use of invasive mechanical ventilation before intubation. Intubation is a technique perform laryngoscopy and insert the endotracheal tube (ETT) through the mouth or nose. ETT is a foreign body in the airway can increase mucous secretion in patients. Mucous secretion is likely to increase due to the use of this equipment causes a cough reflex suppressed as well as the closure of the glottis is inhibited. The secretions tend to be more viscous due to the effects of warming and humidification of upper respiratory tract covered by ETT. This often creates problems ineffective airway clearance. Therefore, decreasing the body's mechanisms in the face of

foreign object suction action is needed to prevent aspiration of secretions into the lungs (Smeltzer, 2002).

Hospital medical records of Dr. Mohammad Soewandhie from January to March found the number of patients admitted to the ICU as many as 95 patients and there were 20 patients on a ventilator. Of the 20 patients using ventilators 90% experiencing crowded, no breath sounds Ronchi, RR increased, and SpO₂ decline after 2-3 hours post intubation. This resulted in impaired airway patency and if continued resulting in plugging the ETT that inhibit oxygenation to occur hypoxemia. Data obtained during the last 3 months of 8 patients with ventilators that use closed suction system and 12 patients using open-suction system. Two of these patients experienced a number of plugging on the third day after intubation, the patient's anxiety, spasms, increased RR and SpO₂ drops to 80%. From a preliminary survey

conducted closed suction system is more often used in patients with ventilator use high PEEP (more than 5), due to close suction performed without opening the ventilator tubing so it does not interfere with the process of oxygenation given ventilator.

Suction mucus procedure performed by inserting a hose suction catheter through the nose, mouth, and endotracheal tube. According Yudhiana 2010 in his study also reported that there was an effect on the effectiveness of suction action in cleaning the airway. Nevertheless endotracheal suctioning can cause adverse effects such as heart rhythm disorders, hypoxemia due to interruptions ventilator usage and decreased intrathoracic pressure. Another effect is also detrimental microbial contamination in the airway and development Associated Ventilator Pneumonia (VAP) if done in a way that is not true. To reduce the risk of complications due to the suction action is then necessary to apply suction effective technique to maintain the effectiveness of airway clearance with minimal complications. Technique suction is used there are two types: Closed Suction System (CSS) and Open Suction System (OSS). Open suction system in the implementation of which requires two nurses, disposable suction catheters / disposable, and requires detachment from the patient's ventilator (Masry, 2005). Closed suction system is used to prevent outside air contamination, contamination of personnel and patients, preventing a decrease in oxygen saturation during and after the suction, maintain positive pressure ventilation pressure or PEEP, especially patients who are sensitive when it separated from the ventilator as patients who require high PEEP. CSS is installed on the ventilator tubing fitted with a valve as its entrance suction catheter. A valve is opened when performing lenders and closed suction when suction is completed. Suction catheter is protected plastic material in order to keep sterile and suction connector is replaced every 24 hours. Sucking secret done by withdrawing the catheter CSS in a circle in a position to suck without opening the ventilator tubing so the oxygenation and pressure given ventilator remains constant. Suction catheter flushing process is done without removing the ventilator tubing. Therefore, technique closes suction need to be proved in overcoming the problem of ineffectiveness airway clearance in patients with ventilator.

METHOD

In this study used a case study technique close suction to overcome the problem of the ineffectiveness of the clearance of the airway in patients with ventilator in the ICU Hospital Dr Mohammad Soewandhie Surabaya which is research by investigating intensively about individuals, and or social unit that is done in depth with find all the important variables on the development of individual or social unit studied, in this study made possible the discovery of things that are unexpected.

RESULTS

Based on the chart 1, day 1 showed before and after close suction breath sounds there are Ronchi in the lung fields right and left, on the second day at 08.00 until 20.00 hours before and after close suction breath sounds Ronchi in the lung fields right and left, starting at 23:00 before and after close suction ronchi breath sounds in the left lung field alone. On the third day of 02.00 and 05.00 before and after close suction Ronchi breath sounds in the left lung field, at 08.00 prior to close suction Ronchi breath sounds in the left lung field and after close suction showed vesicular breath sounds. 11.00 until 12.00 before and after close suction vesicular breath sounds.

Chart 1 the results of the evaluation of breathe sounds before and after applied closed suction technique in patients with ventilator in the ICU Hospital Dr. Mohammad Soewandhie Surabaya

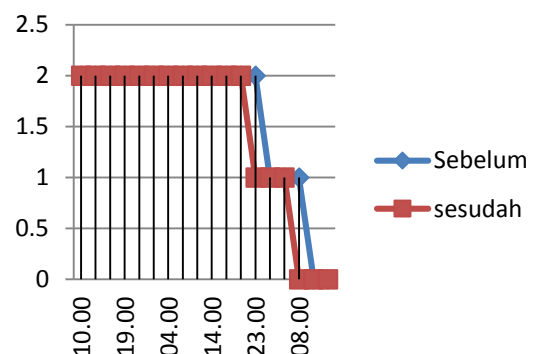
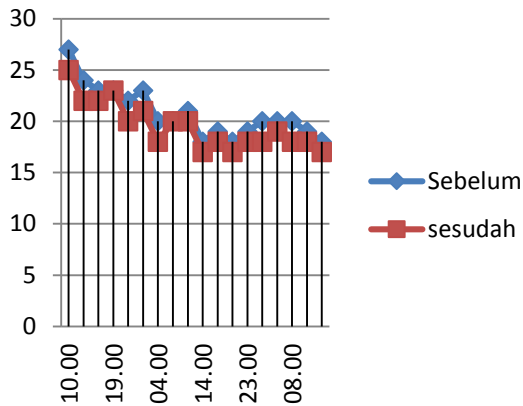
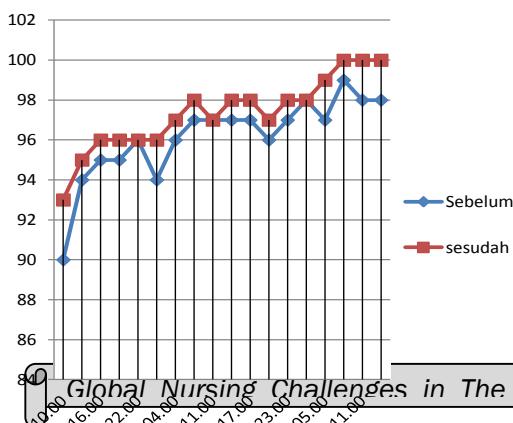


Chart 2 the evaluation results respiration rate before and after implementation of technique close suction in patients with ventilator in the ICU Hospital Dr. Mohammad Soewandhie Surabaya



Based on chart 2 days to 1 before the close suction highest RR 27 x/min and the lowest RR 22 x/min. After the application of suction, the respiratory rate was highest close to 25 x / min and the lowest RR 20 x / min. On the second day before the close of suction, the respiratory rate was highest RR 23 x / min and the lowest 18 x / min. After the action close suction was highest RR 21 x / min and the lowest 17 x / min. The third day before the close of suction obtained the highest RR 20 x / min and the lowest 19 x / min. After close suction highest RR 19 x / min and the lowest 18 x / min. Based on the chart 3, the implementation of closed suction lowest SpO2 90% and the highest 96%, after the application of suction close lowest SpO2 93% and the highest 96%. On the second day prior to close suction lowest SpO2 94% and the highest 97%, after the application of the highest SpO2 suction close 98% and the lowest 96%. On the third day before the application closed suction lowest SpO2 97% and the highest 99%, after the application of the highest SpO2 suction close 100% and the lowest 98%.

Chart 3 the results of the evaluation of SpO2 before and after application of techniques close suction in patients with ventilator in the ICU Hospital Dr. Mohammad Soewandhie Surabaya



DISCUSSION

Results on the first day were obtained before the implementation of closed suction lowest SpO2 90% and the highest 96%, after the application of suction close lowest SpO2 93% and the highest 96%. Pulmonary edema non-cardiogenic arise mainly caused by damage to the capillary walls which can disrupt the permeability of endothelial pulmonary capillaries, causing the entry of fluid and protein into the alveoli which will result in spending secret dilute bubbly and pink froty if already advanced (Hudak & Gallo, 2010). because of the early complications of pulmonary edema in cases Ny.SF which interfere with the process of diffusion and O2 transport to tissues due to fluid in the alveoli that SpO2 has increased slowly over the reduction of pulmonary edema with the use of higher PEEP is PEEP 8. Since one of the factors that influence SpO2 their secret / fluid in the respiratory tract.

On the second day prior to close suction lowest SpO2 94% and the highest 97%, after the application of the highest SpO2 suction close 98% and the lowest 96%. Hiperoksigenasi can be done using manual resuscitation bag or through a ventilator and is done by increasing the flow of oxygen to 100% before imbibing and when the interval between each inhalation of secretions (Kozier & Erb, 2002). it is supported by excess tehnic close suction is performed without opening the ventilator tubing, giving preoxygenation done using a ventilator to provide an extra 100% oxygen for 3-5 times the inspiration without opening the ventilator connectors, oxygenation remained ongoing at the time of suction, and given PEEP remains constant so that alveoli do not collapse, especially in cases of pulmonary edema are very vulnerable decreased SpO2 especially at the time of suction mucus.

On the third day before the application closed suction lowest SpO2 97% and the highest 99%, after the application of the highest SpO2 suction close 100% and the lowest 98%. The test results obtained statistically significant difference in SpO2 values before and after intervention with closed endotracheal suction, the mean oxygen saturation values before suction 91.14% and the average value of SpO2 after the close action suction 92.14% (Sumarna, 2008). Day three in this case study SpO2 value increased to 100% after close suction action because the patient is

more cooperative and supported the use of appropriate suction cannula from the first day (size 12 Fr) at the close of suction. This is in line with research Muhamat Nofiyanto that size larger suction cannula (14Fr) can reduce levels of oxygen saturation more than the smaller size (12Fr). In the case of pulmonary edema when using open-suction tehnic will result in decreased SpO₂ fast and takes a long time to return to normal due to the pressure changes when the alveoli open ventilator connector. During this time held in the ICU Hospital Dr. Mohammad Soewandhie tehnic close suction is applied to patients who use high PEEP with secret diluted as in the case of pulmonary edema, the grounds based on observation when applied to patients with secretions tend purulent risk of plugging greater because the twist catheter close suction when suction is limited , Tehnic close suction on thick secretions will be effective if it is supported by adequate humidikasi and nebulized before suction.

CONCLUSION AND RECOMMENDATION

The results of the evaluation of the application of the suction technique close to the sound of breath on the third day vesicular sound obtained in patients with ventilator in the ICU Hospital Dr Mohammad Soewandhie Surabaya. The results of the evaluation of the application of suction tehnic close to the respiration rate on the third day come RR within normal limits 18 x / min in patients with ventilator in the ICU Hospital Dr Mohammad Soewandhie Surabaya. The results of the evaluation of the application of suction to the SpO₂ tehnic close on the third day SpO₂ obtained in the normal range of 100% in patients with ventilator in the ICU Hospital Dr Mohammad Soewandhie Surabaya.

Expected to be considered for budgetary expenditures consumables tool in the Intensive Care Unit. Improve the skills of ICU nurses in nursing action according to the standard of nursing especially ETT suction action with various suction tehnic accordance with the development of health technology.

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