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Implementation of *Suction* Technique for Airway Cleaning Is Not Effective in Stroke Patients at Vita Insani Pematangsiantar Hospital

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ABSTRACT

Stroke is a disturbance in the function of the nervous system caused by a disturbance in blood circulation in the brain due to rupture of blood vessels or due to blockage of blood vessels in the brain. One of the nursing problems that arises in cases of hemorrhagic stroke is ineffective airway clearance. Efforts made to overcome airway clearance are the use of suction techniques. This research design is quantitative-descriptive using a case study approach. The research sample consisted of 2 respondents, namely hemorrhagic stroke sufferers. The sampling used in this research was purposive sampling. Data was collected using observation techniques, interviews, physical examination, supporting examinations, documentation carried out on May 22 2024 and June 21 2024 at Vita Insani Pematangsiantar Hospital. The results of this study show that after implementing suction for 3 days, it was found that both patients experienced a decrease in respiratory frequency, in patient 1 the first day from 22 x/minute to 20 x/minute, patient 2 respiratory frequency 23 x/minute to 21 x/minute minutes and mucus can be expelled, vesicular breath sounds, regular breathing rhythm and sonor lung percussion in both patients. Suction technique can improve airway clearance in haemorrhagic stroke patients, Researchers recommend that nurses be able to implement suction techniques in hemorrhagic stroke patients to overcome the problem of ineffective airway clearance.

INTRODUCTION

Stroke is one of the leading causes of death in the world. Hemorrhagic stroke is a stroke caused by a rupture of a blood vessel in the brain. The main nursing problem that often occurs in hemorrhagic stroke patients with decreased consciousness is ineffective airway clearance. One of the measures to overcome ineffective airway cleaning can be through suction (Dewi and Achwandi, 2023).

Hemorrhagic stroke is a stroke accompanied by bleeding in brain tissue or commonly referred to as intracerebral hemorrhage or intracerebral hematomyelit. Bleeding enters the subrachnoid space, where the space between the surface of the brain and the layer of tissue that covers the brain is narrow. Hemorrhagic stroke is the deadliest type of stroke which is a small fraction of the overall stroke i.e. 10-15% partial intracerebral hemorrhage and 5% subrachnoid hemorrhage. Hemorrhagic stroke usually occurs when the lesion of the subrachnoid space or directly into the brain tissue (Isrofah, et al., 2023).

According to the World Health Organization (2022), globally the number of stroke sufferers is 12.2 million people, or one in four people over the age of 25 will have a stroke. The number of ischemic stroke sufferers in the world is 63% (7,686,000 people) and the number of haemoragic stroke sufferers in the world is 37% (4,514,000 people) which is divided into stroke caused by intracerebral hemorrhage as many as 3,250,080 people and stroke caused by sub-arachnoid hemorrhage as many as 1,263,920 people.

Based on developing countries in the United States, there were 795,000 stroke sufferers in 2021, of which 87% were caused by ischemic stroke (691,650) and 13% were caused by haemoragic stroke (103,350). There are 610,000 people who have a first/new stroke and 185,000 people who have a

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recurrent stroke. Stroke results in serious long-term disability and reduces mobility in more than half of stroke sufferers aged 65 years and older (CDC, 2021).

Based on basic health research data in 2013 and 2018 has increased, where in 2013 the number of stroke patients in Indonesia was 7% (17,710,000 people) and the number of stroke patients in 2018 was 11% (29,370,000 people), men were more affected by stroke compared to women, this was due to bad habits such as smoking (Riskesdas, 2018). Stroke in Indonesia is the third leading cause of death after heart disease and cancer. The prevalence of stroke reached 8.3 per 1000 population, 60.7% (607 people) were caused by non-hemorrhagic stroke and 39.3% (393 people) were caused by hemorrhagic stroke (Ulfa, 2018).

Based on Riskesdas data (2018), in North Sumatra as many as 1.07% (45,972) the majority of the population affected by stroke is in the age range of 45-75 years, with 22,703 male and 23,269 female and 20,944 people living in rural areas, while the number of hemorrhagic stroke sufferers in North Sumatra represented by Haji Adam Malik General Hospital Medan North Sumatra Province in 2018 data was obtained as many as 70 patients (Hanum, 2018), while at Pirngadi Hospital Medan in 2018 the number of hemorrhagic stroke sufferers was obtained as many as 108 people (Clara, 2018).

Based on data obtained from the *medical records* of Vita Insani Pematangsiantar Hospital from 2021 to 2023, the number of hemorrhagic stroke sufferers is 126 people. In 2021 there were 22 people with hemorrhagic stroke, in 2022 there was an increase of 53 people, and in 2023 there was a decrease of 41 people. In the last 3 months, the number of hemorrhagic stroke cases in October was 3 people, in November as many as 4 people, and in December 3 people (Medical Records of Vita Insani Pematangsiantar Hospital, 2024).

Stroke is divided into two, namely non-hemorrhagic stroke which is caused by reduced blood flow to the brain and hemorrhagic stroke which is caused by rupture of blood vessels in the brain (Basyir, 2021). Clinical manifestations that occur in systemic hemorrhagic stroke such as nausea, headache, seizures, hypertension, malaise, and decreased consciousness (Tamburian, Ratag & Nelwan, 2020). Hemorrhagic stroke can trigger respiratory failure. Apnea can occur as a direct result of stroke lesions on the brainstem that regulate the respiratory system, leading to the accumulation of excess sputum count which leads to the appearance of ineffective airway cleaning nursing problems. (Widhiantari.2019)

Ineffective airway clearance is the inability to clean secretions or airway obstructions to maintain a patented airway. Signs and symptoms of ineffective airway clearance include effective coughing, wheezing, wheezing, dyspnea and cyanosis (PPNI, 2017). One way to clean the airway can be done by suction (Megana, 2018). The act of suction or suction of mucus aims to remove secretions or fluids in the airway, smooth the airway and meet the need for oxygen so that the need for comfort can be met (Zega, W. P, 2017).

The same study was conducted by Karlina, Alfiyah, Nurcahyana, Budihartiningrum & Prihatinni (2023) with the title of a case study: suction action on airway clearance in *hemorrhagic intracerebral patients* that the results of the third day of the assessment after being given the intervention the situation became better with the results that there was no sound of ronkhi in the right and left upper lungs, sputum had decreased, shortness of breath in patients had decreased, The patient is no longer installed with drainage. The results of the initial survey conducted directly with nurses at the relevant hospital, nurses said that suction action was very effective in overcoming airway clearance in haemoragic stroke patients.

METHOD

The type of research used in this scientific paper proposal is quantitative research with a descriptive research design using a case study approach. Descriptive research is a research method aimed at describing existing phenomena - phenomena, which take place in the present or in the past (Widiyono, et al, 2023). This study aims to determine how the implementation of suction techniques for airway clearance is not effective in haemorrhagic stroke patients at Vita Insani Pematangsiantar

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Hospital. This research was conducted at Vita Insani Pematang Siantar Hospital. This research will be conducted on May 22, 2024 and June 21, 2024.

The population in this study is all hemorrhagic stroke patients who are treated in the ICU of Vita Insani Pematang Sianatar Hospital. The sample of this study was 2 respondents who experienced hemorrhagic stroke. The instruments used in this study consist of 3 parts, namely:

a. Emergency nursing review format
b. Standard operational procedures for suction action
c. Observation sheet. Before and after the suction action
d. 4. Respondent's approval format

RESULTS AND DISCUSSION

This case study was carried out at Vita Insani Pematangsiantar Hospital which is located in the center of the city, namely Jalan Merdeka No. 329 Pematangsiantar. Vita Insani Hospital was established in 1982, the available facilities include emergency services, outpatient care, hospitalization, medical support services (hemodialysis, radiology, laboratory, ultrasound (ultrasound), electrocardiogram (ECG), physiotherapy, laparoscopy, endoscopy, CSSD and administrative services.

Table 1. Current health

General Impression	Patient 1	Patient 2
Appearance	Clients appear weak and decreased consciousness	Clients appear weak and decreased consciousness
Main complaints	The client's family said the client had a history of hypertension. While in Rymah, the client fell into the bathroom fee and suddenly experienced a decrease in consciousness	Decreased consciousness, previously the client's family said the client experienced headaches, vomiting and restlessness

Table 2. Secondary Assessment

Anamnesa	Patient 1	Patient 2
Current Health History	The patient experienced decreased consciousness, lying in bed, asymmetrical lips, appeared weak with a ventilator attached, RL infusion attached next to the left hand exception, NGT attached, Catheter,	The patient experienced a decrease in consciousness, lying on the bed, lips were asymmetrical, appeared weak
Allergy	No allergies	installed ventilator, installed RL infuse next to left hand accessory, NGT installed, Catheter,
Treatment/action taken	Hypertension medication (Amlodipine)	No allergies
Previous Medical History	The client's family said the client had a history of hypertension 5 years ago	Hypertension medication (Amlodipine)
Family Health History	The client said he had a family medical history, the client's father had a medical history of hypertension	The client's family said the client had a history of hypertension 5 years ago

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Nursing Diagnosis

a. Ineffective airway clearance related to airway spasms is characterized by the patient experiencing a decrease in consciousness with GCS E1V2M2 = 6 (Sopor), snoring breath sounds, irregular breathing rhythm, there is cyanosis, TD: 240/80 mmHg ,HR: 90 x / min body temperature 37 ºC. RR : 22 x/i, SPO2 : 90%. Apparent cyanosis, asymmetrical client lips, infusion attached, ventilator attached, infusion attached, catheter attached, NGT, NRM,
b. Ineffective airway clearance related to airway spasm, characterized by decreased consciousness of GCS E1V3M2 = 6 (Sopor), snoring breath sounds, irregular breathing rhythm, ventilator installed, cyanosis, RR: 23 x/i, SPO2: 90%.

DISCUSSION

The application of suction techniques in improving airway cleanliness in haemoragic stroke patients in the ICU room of Vita Insani Pematangsiantar Hospital, after the suction action was carried out, the following results were obtained:

Assessment

The results of the assessment on the first patient obtained data, namely a male patient with the age of 54 years. The study obtained data on patients with decreased consciousness with GCS E1V2M2 = 5 (Sopor), snoring breath sounds, irregular breathing rhythm, appeared to be on a ventilator, there was cyanosis, RR: 22 x/i, SPO2: 90%. In line with the theory from Rondonuwu., Warouw., Sarimin., Deden (2023) with the assessment of patients experiencing decreased consciousness and shortness of breath, RR: 28 x/I, initially the patient experienced obstruction in the airway before entering the hospital.

The second patient obtained data, namely a male patient with the age of 58 years. The study obtained data on patients with decreased consciousness of GCS E1V3M2 = 6 (Sopor), snoring breath sounds, irregular breathing rhythm, appeared to be on a ventilator, there was cyanosis, RR: 23 x/i, SPO2: 90%. in line with the theory of Karlina., Alfiyah., Nurcahyana (2023) with the client's assessment with GCS 6 (E1 M1 V1), using a ventilator, a ronkhi sound in the right and upper left lungs, RR: 33 x/i.

Nursing Diagnosis

Based on the results of the physical examination, observation and data analysis that has been carried out, it is determined that the nursing diagnosis is in accordance with the problems that exist in patients 1 and 2 with haemoragic stroke patients is ineffective airway clearance related to airway spasms (D.0001)

Research conducted by Rondonuwu., Warouw., Sarimin (2023) established a nursing diagnosis in haemoragic stroke patients, namely ineffective airway clearance related to airway spasm, characterized by an assessment of the patient's decreased consciousness and shortness of breath, RR: 28 x/I, initially the patient experienced a blockage in the airway before entering the hospital.

This diagnosis was upheld because there were signs that the patient had excessive sputum, there was a snoring breath sound. This is in accordance with the Indonesian Nursing Diagnostic Standards (SDKI Working Group Team, PPNI, 2017). Causes of airway spasm, airway hypersecretion, foreign bodies in the airway, retained sputum secretions, foreign bodies in the airway. The characteristics of ineffective airway hygiene are as follows (SDKI Working Group Team, PPNI, 2017)

1. Major symptoms and signs: ineffective cough, inability to cough, excessive sputum, and vomiting.
2. Minor symptoms and signs: restlessness, cyanosis, decreased breathing sounds, altered breathing frequency.

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Nursing Intervention

The outcomes in this nursing care are adjusted to the nursing diagnosis that has been established. Nursing outcomes and outcome criteria are compiled based on the Indonesian Nursing Output Standards book (SLKI Working Group Team, 2018). The nursing output in this study was that airway clearance increased with the following outcome criteria: effective cough increased, sputum production decreased, *wheezing* ronkhi decreased, dyspnea improved, respiratory rate improved.

The intervention was taken from the book Indonesian Nursing Intervention Standards (Working Group Team, SIKI, PPNI 2018). The implementation plan to be carried out on both clients is as follows: Breath pattern monitor (frequency, depth, breath effort), additional breath sound monitor (e.g., gurgling, wheezing, wheezing), sputum monitor (number, color and aroma), maintain airway patentity, perform mucus suction (*suction*) in less than 15 seconds, and collaboration in the administration of bronchodilators, expectorants, mucolytics, if necessary.

Nursing Implementation

The main nursing implementation in this study is: the provision of suction techniques. This action is carried out as an effort to improve airway cleanliness so that the patient's breathing rate also becomes normal. The suction action in this study was carried out on both patients on the first day and then continued on the second and third days for less than 15 seconds.

Effective cough techniques taught to both patients according to the procedure include: (a) give the patient a comfortable position, namely to a slight extension, (b) Place the base under the patient's chin, (c) Place the bent near the patient, (d) Wear gloves, (e) Connect the preparation catheter with a suction device hose, (f) Put on the machine, pressure check and the holding bottle, (g) Perform mucus aspiration by inserting a comb containing aquadest or NaCI 0.9 % , to maintain sterility levels, (h) Insert the suction catheter carefully (nose + 5 cm, mouth + 10 cm) in a non-suction state, (i) Suck the mucus by closing the opening of the suction catheter, pull it out slowly while rotating (+ seconds in children and + 10 seconds in adults; pressure 110-150 mmHG in adults, 95-110 mmHG in children and 50-95 mmHG in infants), (j) Rinse the suction catheter with aquadest or 0.9% NaCI and give the patient a chance to breathe, (k) Perform preparations with a duration of 20-30 seconds between the first and subsequent preparations, (l) Repeat the procedure 3-5 times of suctioning.

Research conducted by Rondonuwu., Warouw., Sarimin, Deden (2023) explains that the implementation of nursing with suction techniques. is done to remove retained secretions or mucus. This action is done to remove sputum to maintain airway. Research conducted by Karlina., Alfiyah., Nurcahyana (2023) also implemented suction action in haemoragic stroke patients, for three days to improve airway clearance.

Nursing Evaluation

The evaluation in this implementation aims to determine the results of actions and changes in the patient's condition after the implementation of suction by comparing nursing outcomes and outcomes as well as outcome criteria. The data obtained during the evaluation are:

1. On the first day of Mr. D, the patient experienced a decrease in consciousness with GCS E1V2M2 = 5 (Sopor), snoring breath sounds, irregular breathing rhythm, appeared to be on a ventilator, there was cyanosis, RR: 22 x/i, SPO2: 90%.
2. On the second day of Mr. D, the patient experienced a decrease in consciousness with GCS E21V4M2 = 7 (Somnolen), mucus could be excreted, snoring breath sounds, irregular breathing rhythm, appeared to be on a ventilator, RR: 21 x/I, SPO2: 92%.
3. On the third day, Mr. D the patient experienced a decrease in consciousness with GCS E1V4M2 = 7 (Somnolen), mucus could be excreted, vesiulary breath sounds, regular breathing rhythm, appeared to be on a ventilator, RR: 20 x/I, SPO2: 93%.

4. On the first day, Mr. I the patient experienced a decrease in consciousness with GCS E1V3M2 = 6 (Sopor), snoring breathing sounds, irregular breathing rhythm, appeared to be on a ventilator, there was snoring, RR: 23 x/i, SPO2: 90%.
5. On the second day of Mr. I, the patient experienced a decrease in consciousness with GCS E1V4M2 = 7 (Somnolen), mucus could be excreted, snoring breath sounds, irregular breathing rhythm, appeared to be on a ventilator, RR: 22 x/I, SPO2: 92%.
6. On the third day of Mr. I, the patient experienced a decrease in consciousness with GCS E1V4M2 = 7 (Somnolen), mucus could be excreted, vesiulary breath sounds, regular breathing rhythm, appeared to be on a ventilator, RR: 21 x/I, SPO2: 93%.

The results of the evaluation of Karlina, Alfiyah, Nurcahyana (2023), stated that the results carried out on the patient for 3 consecutive days increased the patient's airway clearance. The results of the evaluation conducted by Rondonuwu., Warouw., Sarimin., Deden (2023) the results of the application of suction can help remove sputum, shortness of breath is reduced, there is an increase in the client's airway clearance

CONCLUSION

The implementation in two patients with haemoragic stroke with the administration of suction techniques was carried out for three days of treatment. The results of the study found data that both patients experienced a decrease in consciousness, excess sputum, and shortness of breath. The nursing problem in both patients, namely airway clearance is ineffective. The administration of the suction technique was carried out with a duration of less than 15 seconds. The results of the evaluation showed that after 3 days of nursing intervention, it was found that both patients experienced a decrease in consciousness, the respiratory frequency in patient 1 the frequency of the first day was 22 x/minute to 20 x/minute, patient 2 respiratory frequency was 23 x/minute to 21 x/minute and the sputum had come out, the sound of the client's breath became vesicular to vescular. The suction technique is able to improve airway clearance in haemoragic stroke patients.

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