



APPLICATION OF SHAKER EXERCISE TECHNIQUE IN OVERCOMING SWALLOWING PROBLEMS IN ISCHEMIC STROKE PATIENTS: A SINGLE CASE STUDY

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ABSTRACT

Stroke is a clinical sign characterized by focal or global neurological deficits that may worsen and persist for 24 hours or more, potentially resulting in death. One of the symptoms experienced by stroke patients is difficulty swallowing (dysphagia). Patients with positive dysphagia are at significantly increased risk of aspiration and pneumonia. One of the independent nursing interventions for managing swallowing disorders is swallowing training using the Shaker Exercise technique. This case study aims to determine whether the Shaker Exercise technique can help improve swallowing ability in ischemic stroke patients. This study used a single case study of a patient suffering from Ischemic Stroke. This involves performing 1 intervention called the Shaker Exercise Technique. The intervention was carried out twice a day for 15–20 minutes over 5 days. The intervention was evaluated using the Royal Adelaide Prognostic Index for Dysphagic Stroke. The implementation of the Shaker Exercise showed that the patient was able to swallow after 5 days of intervention. The Royal Adelaide Prognostic Index for Dysphagic Stroke score before the intervention was 71, and after the intervention, it increased to 92, allowing the patient to swallow normally and enabling the removal of the Nasogastric Tube. Swallowing exercises using the Shaker technique can improve swallowing function in patients with positive dysphagia and are therefore recommended as a structured intervention for stroke patients experiencing swallowing disorders.

KEYWORDS: Dysphagia, Ischemic Stroke, Shaker Exercise

INTRODUCTION

Stroke is a condition where clinical signs are found in the form of focal and global neurological deficits that can worsen and last for 24 hours or more and can result in death (World Stroke Organization, 2022). A stroke occurs when a blood vessel becomes blocked or ruptured, resulting in a part of the brain not getting the blood supply that carries the necessary oxygen, resulting in cell or tissue death (Kemenkes, 2019). Stroke is generally divided into two, one of which is ischemic stroke. This stroke is generally caused by atherothrombosis of cerebral blood vessels, both large and small. In ischemic stroke, blockages can occur along the arterial blood vessel pathways leading to the brain. Blood to the brain is supplied by two internal carotid arteries and two vertebral arteries. These arteries are branches of the aortic arch of the heart. The main causes of ischemic stroke include atherosclerosis of the large arteries, cardioembolism and diseases of the small blood vessels of the brain (Ismoyowati, 2022; Kuriakose & Xiao, 2020).

Stroke causes the death of one person every six seconds worldwide and an estimated 15 million people worldwide have a stroke, with five million dying and five million experiencing physical disability (World Health Organization, 2021). Data from the Indonesian Health Survey in 2023, the prevalence of stroke in Indonesia reached 8.3 per 1,000 population. Stroke causes health problems with a percentage of 29.7% or more than a quarter of stroke patients with permanent



disability and death. Problems that often arise due to stroke are that almost 70% or more than half experience paralysis of the extremities, loss of feeling of half the body, aphasia and dysphagia and difficulty swallowing (dysphagia).

Dysphagia is a disorder that causes difficulty chewing and swallowing food. Dysphagia is a swallowing disorder that can be divided into oropharyngeal dysphagia and esophageal dysphagia according to the different stages of swallowing. Oropharyngeal dysphagia is caused by oropharyngeal dysfunction or difficulty in perception during swallowing. This condition can cause serious complications such as pneumonia, aspiration, dehydration, malnutrition and death (Aryanti, 2023).

The Indonesian Nursing Intervention Standards explain that one of the independent nursing interventions with swallowing disorders is to teach swallowing techniques (SIKI PPNI, 2017). One intervention that can be used is the shaker exercise. It aims to strengthen the suprahyoid muscles in the neck which during swallowing increases the upward and forward movement of the hyoid bone and larynx so that there is an increase in the opening of the upper esophageal sphincter and will make it easier for food to enter the lower digestive tract (Winandari, 2022).

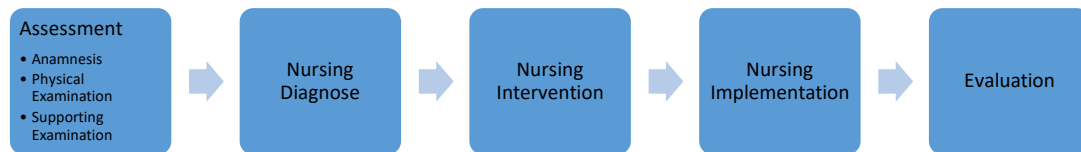
Research related to shaker exercise has been conducted previously. The shaker exercise technique was given twice a day for 10 days with a period of 30 minutes. The results of the patient's swallowing ability 89% of patients recovered for swallowing ability after the shaker exercise technique for 4 days. Although 11% of patients were still unable to swallow in the first week, patients still have the potential to improve dysphagia outcomes for the next six months (Tumanggor et al., 2023). It is supported by Adel Ebada El Sayed & Mohamed Khalifa Ewees (2021) who stated that the shaker exercise technique is an effective measure in improving the swallowing ability of stroke patients

Based on the description above, the authors consider it necessary to apply the shaker exercise technique in patients with swallowing disorders in ischemic stroke patients. The purpose of this study is to know whether the effect of giving shaker exercise techniques can overcome swallowing disorders in ischemic stroke patients.

MATERIALS AND METHODS

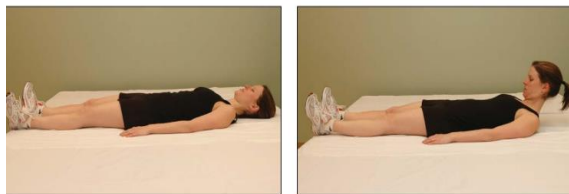
This study uses a single case study method with data collection through a nursing care approach for 5 days. This research procedure starts from assessment, determining nursing diagnoses, developing interventions, implementing, and evaluating nursing (Figure 1). The selection of patients in this study was adjusted to the indications and contraindications of the shaker exercise technique, which consisted of patients who showed decreased movement of the superior and anterior hyolaryngeal complex, had not undergone tracheostomy, did not have difficulty mobilizing the neck, was not performed on patients who were in a coma or unconscious, did not have neck or spine problems (neck injury, chronic neck pain, influence on the spine), injury or history of neck surgery, severe cardiovascular disorders, pregnancy, or significant muscle fatigue (Gamal et al., 2020; Tarihoran, 2019).

Figure 1. Nursing Care Steps



The shaker exercise intervention was performed with an acute ischemic stroke patient who experienced swallowing disorders, dysphagia, paresis nervus fascis (VII), glossopharyngeus (IX), vagus (X), and hypoglossus (XII). The shaker exercise intervention is carried out by arranging the patient's position as comfortably as possible by lying on the bed. Ask the patient to lift the head without shrugging (can be assisted if unable), then the patient looks at the tip of the foot for 60 seconds. After that, the patient can lower the head back to the bed to rest for 60 seconds. After resting, perform isotonic exercise by encouraging the patient to lie down on the bed, prop up the head with a pillow, and encourage the patient to lift the head in the same posture as the first exercise and look at the tip of the foot 30 times in a row. Exercise is done twice a day for a maximum of 2 weeks for optimal results (Winandari, 2022).

Picture 1. The Implementation Of The Shaker Exercise Technique



The output of this study was the patient's swallowing ability, which was assessed using The Royal Adelaide Prognostic Index for Dysphagic Stroke (RAPIDS). This measurement was developed by Richard Champion and Leslie Mortensen from Westmead Hospital, Sydney in 2007. In RAPIDS, several things must be considered, starting from awareness, breath sounds, comprehensive, speech, lip motor, tongue movement, palate, gag reflex, phonation, coughing, chewing, oral, pharynx, and swallowing tolerance. When the resulting RAPIDS scale is between 20-80, it indicates that there is a high risk of aspiration so it is not recommended to be given food and drink per oral, if the RAPIDS results are between 81-100, it indicates a low risk of aspiration so it is allowed to be given food and drink per oral gradually.

CASE OVERVIEW

The patient came to the Emergency Room with complaints of weakness in the right extremity for 1 day before admission. The patient also complained of slurred speech and mouth sagging. The patient said the cough was phlegm and difficult to expel. The results of the physical examination of the patient obtained GCS E3M6V5, blood pressure 165/88 mmHg, pulse 96 times/minute, breathing: 20 times/minute, temperature: 36°C. Muscle strength of the right and left upper extremities is 4 and 5, right and left lower extremities are 3 and 5, pupils are isocor with positive light reflex. Cranial nerve examination results are paresis nervus facialis (VII), Glossopharyngeal (IX), Vagus (X), and hypoglossus (XII). The results of the Non-Contrast Head CT-Scan examination showed acute infarction in the left internal capsule. So, the nursing problem of ineffective perfusion of cerebral tissue can be raised in this case. The patient said it was difficult to expel phlegm, choked when drinking, and was unable to swallow well. The results of the RAPIDS score obtained a value of 72, which indicates a nursing problem of swallowing disorders. Ronchi breath sounds in the upper lungs and trachea, and breathed 22

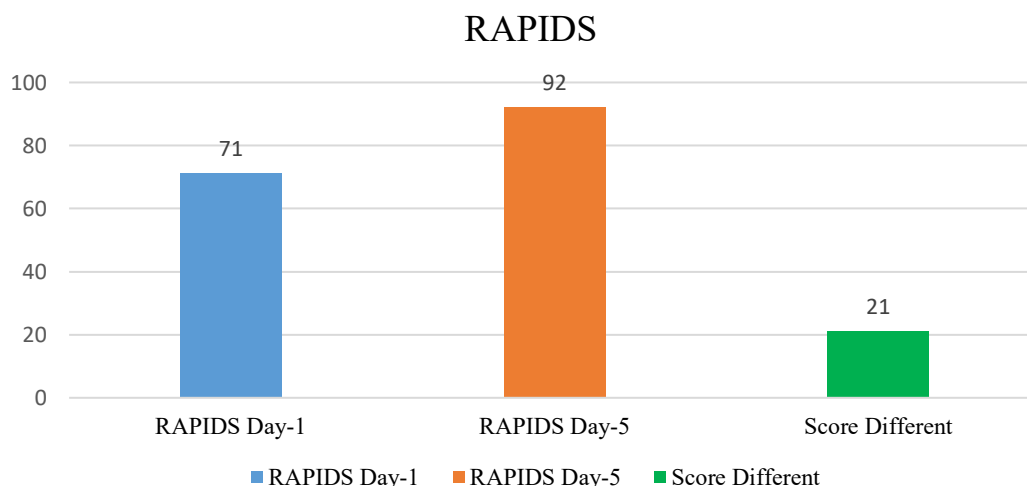


times/minute, so the appropriate nursing problem was ineffective airway clearance. The patient was fitted with a Nasal Gastric Tube (NGT) to meet the needs of nutrition, fluids, and oral medication.

RESULT

One of the nursing problems raised in patients is swallowing disorders. The nursing problem of swallowing disorders is characterized by the patient saying it is difficult to remove phlegm and when drinking choking, parese nervus IX and X, when a swallowing function examination is carried out with the Massey Bedside Swallowing Screen, the results are positive dysphagia due to coughing when given water, a RAPIDS score of 72 (there is a swallowing disorder). The patient was implemented with the shaker exercise swallowing technique for 5 days with a duration of twice a day, swallowing disorders were resolved marked by the patient being able to eat and drink orally and there was an increase in the RAPIDS score from the initial 72 to 92 (no swallowing disorders).

Figure 2. Difference In RAPIDS Scores On Day One (Before Intervention) And Five (After Intervention)



Source:
Primary
Data,
2024

DISCUSSION

The results of this case study showed that there was a difference in the RAPIDS score after the shaker exercise intervention. The purpose of managing swallowing disorders is to prevent aspiration and improve swallowing ability. Swallowing disorders or dysphagia in stroke patients occur due to disorders of the nervous system that controls the swallowing muscles. Stroke causes impaired blood flow to the brain, especially in areas that control the swallowing process such as the motor cortex, brainstem and cranial nerves (especially nerves V, VII, IX, and XII), resulting in impaired coordination and strength of the swallowing muscles. Cranial nerves, especially nerve V (trigeminal), control the jaw muscles for chewing. Nerve VII (phasial) controls the cheek and lip muscles to prevent food spillage. Nerve IX (glopharyngeal) is responsible for the swallowing reflex and pharyngeal sensors. Nerve X (vagus) controls the muscles of the pharynx and larynx so that food enters the esophagus instead of the lungs. Nerve XII (hypoglossal) controls tongue movement during swallowing (Ristinawati et al., 2021).



Swallowing therapy is carried out to improve the patient's swallowing ability, namely with shaker exercise. Swallowing exercises with the shaker exercise technique are one of the nursing interventions to train patients with difficulty swallowing. Shaker exercise is a rehabilitation to strengthen weak muscles and overcome difficulties in the suprahyoid muscles in the neck which increases the upward and forward movement of the hyoid bone and larynx when swallowing, then there is an increase in the opening of the upper esophageal sphincter so that food enters the lower digestive tract (Winandari, 2022). Evaluation of patients who have been carried out for 5 days found that the delivery of fluids or food from the mouth to the hypopharynx improved from initially being slow to move food up to 5 seconds, there was food residue in the mouth, and coughing when given food to food entering normally, holding food and fluids better, patients can chew food well. This shows an increase in the results and status of swallowing function after shaker exercise for 4 days. It can perform in patient who showed decreased movement of the superior and anterior hyolaryngeal complex, had not undergone tracheostomy, did not have difficulty mobilizing the neck, was not performed on patients who were in a coma or unconscious, did not have neck or spine problems (neck injury, chronic neck pain, influence on the spine, or history of neck surgery), severe cardiovascular disorders, pregnancy, or significant muscle fatigue (Gamal et al., 2020).

A study conducted by Sari et al (2023) explained that shaker exercise on 14 patients with a duration of 2 times a day for ten days resulted in increased swallowing ability in stroke patients with dysphagia. This training method is easy to do, easy to master, and does not have side effects on patients. A study conducted by Adel Ebada El Sayed & Mohamed Khalifa Ewees (2021) found that there was a statistically significant difference in dysphagia, including deglutition, coughing, drooling, and voice changes before and after the implementation of shaker exercise. Another study found that there was a significant difference between digestive sensation values before and after shaker exercise intervention. It can be concluded that shaker exercise significantly improves swallowing ability, respiratory pulse regurgitation, and improves digestive sensation (Ismoyowati, 2022).

Shaker exercise actions can improve the swallowing ability of patients with swallowing disorders and can be applied in nursing intervention practices to patients independently. Nurses can teach without the need for complex tools and training to carry out shaker exercise management. The results achieved are in accordance with the planned outcome criteria for each nursing problem, where the patient's response shows an increase in swallowing ability, in the form of reduced frequency of choking and coughing, NGT can be removed, increased portions of food consumed by patients, and the risk of nutritional deficits can be avoided.

Limitations in the implications of implementing shaker exercise training depend on several factors. Patients with brain damage involving less severe motor and sensory areas may have better outcomes than patients with more extensive or complex damage. Lesions or blockages in the brainstem often cause more severe dysphagia and require additional approaches. Patients with mild to moderate dysphagia tend to respond better to this exercise than those with severe dysphagia or dysphagia due to severe muscle weakness or with a lower RAPIDS score. Patients with sufficient cognitive ability to understand and carry out instructions are more likely to succeed. Patient compliance with performing exercises routinely and for the appropriate duration can provide significant success. Another limitation of this study is that it was only conducted on 1 patient case, so further research using a randomized controlled trial is necessary.



CONCLUSIONS

Ischemic stroke is a disease caused by the sudden loss of blood supply from circulation in the brain area due to a blockage. One of the symptoms of stroke patients is swallowing disorders. Giving the shaker exercise swallowing technique during treatment which is carried out twice a day for 15-20 minutes for 5 days. The summative evaluation obtained by the patient was able to swallow and eat gradually which was indicated by an increase in the RAPIDS score before and after the intervention from a score of 71 to 92. In accordance with the purpose of writing this scientific paper, the author wants to know the effect of giving the shaker exercise technique on overcoming swallowing disorders in ischemic stroke patients. This study is expected to be applied in the nursing care process, especially the application of interventions in stroke patients with positive dysphagia through the provision of shaker exercise techniques and become a guide for the Standard Operating Procedure for swallowing exercises in stroke patients.

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