The Journal of Neurological and Neurosurgical Nursing
Pielęgniarstwo Neurologiczne i Neurochirurgiczne

Wydawnictwo Państwowej Akademii
Nauk Stosowanych we Włocławku
ul. Mechaników 3, pok. 20
87-800 Włocławek

eISSN 2299-0321 ISSN 2084-8021
https://apcz.umk.pl/PNIN

DOI: 10.15225/PNN.2026.15.1.4 JNNN 2026;15(1):21–28 Case Report

Dysphagia Rehabilitation after Cerebellar Stroke: The Role of Interdisciplinary Care

Rehabilitacja dysfagii po udarze móżdżku: rola opieki interdyscyplinarnej

Małgorzata Wiszniewska[1,2], **Maciej Gawrysiak**[3,4], **Anna Żdanowicz**[2,3]

❶ Department of Emergency Medical Services, University of Applied Sciences in Piła, Poland
❷ Neurological Department with Stroke Treatment Subdivision, Specialist Hospital, Piła, Poland
❸ Department of Nursing, University of Applied Sciences, Piła, Poland
❹ Department of Economics, University of Applied Sciences, Piła, Poland

Abstract

Introduction. Dysphagia, a serious complication of stroke, requires precise diagnosis and interdisciplinary treatment, including dietary modifications.
Aim. The aim of this study is to present a case of a patient with cerebellar stroke and dysphagia, highlighting the effectiveness of comprehensive treatment and rehabilitation in restoring swallowing function and oral feeding.
Case Report. A retrospective analysis of medical records was conducted to evaluate diagnostic and therapeutic interventions. The study presents a case of a patient hospitalized in the Neurology Department of Stanisław Staszic Specialist Hospital in Piła with a diagnosis of cerebellar ischemic stroke, in whom dysphagia was an early and significant complication. Due to swallowing difficulties the patient initially required feeding via a nasogastric tube. Swallowing function was assessed on the first, eighth, and ninth days of hospitalization using the Gugging Swallowing Screen (GUSS) test, a simple and easy-to-administer screening tool. By the eighth day of hospitalization, the patient demonstrated sufficient improvement in swallowing function to initiate oral intake of fluids, which was well tolerated. From the ninth day, the patient was able to consume foods of varying consistencies, as confirmed by a structured swallowing assessment. These improvements were achieved through targeted rehabilitation conducted by a speech therapist and supported by nursing staff. Clinical progress led to the removal of the nasogastric tube on the tenth day, indicating substantial advancement in the patient's recovery.
Discussion. Post-stroke dysphagia is a serious medical condition that can be effectively managed through interdisciplinary rehabilitation. Complications such as aspiration pneumonia and impaired nutritional status are widely recognized risks among patients with dysphagia.
Conclusions. This case illustrates how early diagnosis using simple methods and a comprehensive treatment approach can improve vital functions and enhance the quality of life in stroke patients. **(JNNN 2026;15(1):21–28)**
Key Words: ischemic stroke, rehabilitation, swallowing disorders

Streszczenie

Wstęp. Dysfagia, stanowiąca poważne powikłanie udaru mózgu, wymaga precyzyjnej diagnostyki oraz interdyscyplinarnego leczenia, obejmującego m.in. modyfikacje dietetyczne.
Cel. Celem niniejszego badania jest przedstawienie przypadku pacjenta z udarem móżdżku oraz dysfagią, ze szczególnym uwzględnieniem skuteczności kompleksowego leczenia i rehabilitacji w przywracaniu funkcji połykania oraz żywienia doustnego.
Opis przypadku. Przeprowadzono retrospektywną analizę dokumentacji medycznej w celu oceny zastosowanych interwencji diagnostycznych i terapeutycznych. W pracy przedstawiono przypadek pacjenta hospitalizowanego w Oddziale Neurologii Szpitala Specjalistycznego im. Stanisława Staszica w Pile z rozpoznaniem niedokrwiennego udaru móżdżku,

u którego dysfagia stanowiła wczesne i istotne powikłanie choroby. Z uwagi na trudności w połykaniu pacjent początkowo wymagał żywienia za pomocą sondy nosowo-żołądkowej. Funkcję połykania oceniano w pierwszej, ósmej oraz dziewiątej dobie hospitalizacji z wykorzystaniem testu Gugging Swallowing Screen (GUSS), będącego prostym i łatwym w zastosowaniu narzędziem przesiewowym. W ósmej dobie hospitalizacji stwierdzono wystarczającą poprawę funkcji połykania, umożliwiającą rozpoczęcie doustnego przyjmowania płynów, które były dobrze tolerowane. Od dziewiątej doby pacjent mógł spożywać pokarmy o zróżnicowanej konsystencji, co potwierdzono w ustrukturyzowanej ocenie połykania. Uzyskana poprawa była wynikiem ukierunkowanej rehabilitacji prowadzonej przez logopedę przy wsparciu personelu pielęgniarskiego. Postęp kliniczny umożliwił usunięcie sondy nosowo-żołądkowej w dziesiątej dobie hospitalizacji, co świadczyło o istotnym etapie powrotu pacjenta do zdrowia.

Dyskusja. Dysfagia poudarowa stanowi poważny problem medyczny, który może być skutecznie leczony dzięki interdyscyplinarnej rehabilitacji. Do powszechnie rozpoznawanych powikłań u pacjentów z dysfagią należą m.in. zachłystowe zapalenie płuc oraz zaburzenia stanu odżywienia.

Wnioski. Przedstawiony przypadek wskazuje, że wczesna diagnostyka oparta na prostych metodach oraz kompleksowe postępowanie terapeutyczne mogą prowadzić do poprawy kluczowych funkcji życiowych oraz zwiększenia jakości życia pacjentów po udarze mózgu. **(PNN 2026;15(1):21–28)**

Słowa kluczowe: udar niedokrwienny, rehabilitacja, zaburzenia połykania

Introduction

Dysphagia is a serious problem in patients following cerebellar stroke and can lead to serious complications such as aspiration pneumonia, malnutrition, and dehydration [1]. The prevalence of dysphagia among patients with acute stroke ranges from 29% to 81%, depending on the diagnostic criteria and assessment methods used. While many individuals regain the ability to swallow within the first few weeks after a stroke, approximately 11% to 50% of patients continue to experience dysphagia six months post-event. Post-stroke dysphagia significantly impacts swallowing safety, increasing the risk of aspiration and the development of pneumonia. Furthermore, swallowing difficulties may impair the ability to maintain adequate nutrition and hydration [1–7]. These complications significantly reduce quality of life and prolong hospitalization. Effective rehabilitation requires early diagnosis and a comprehensive interdisciplinary approach involving neurologists, otolaryngologists, speech therapists, physiotherapists, dietitians, and nurses [8–11].

Dysphagia causes difficulties in food intake and its movement from the oral cavity to the pharynx, esophagus, and stomach. Proper diagnosis and identification of the underlying causes of dysphagia are essential for implementing appropriate treatment [8–10,12]. A rapid swallowing assessment performed by a physician, nurse, or speech therapist is crucial in minimizing the risk of complications, particularly aspiration pneumonia, which is one of the most severe consequences of ischemic stroke (IS) [10].

In patients with dysphagia, both symptoms related to food intake and the consequences of improper nutrition can be observed.

Symptoms related to food and fluid intake: coughing or sneezing that may occur before, during, or after swallowing; uncontrolled leakage of food or liquid from the mouth; changes in voice quality to a "wet" or "gurgling" sound after eating; involuntary throat clearing or repeated swallowing of saliva.

Consequences of improper food intake: aspiration pneumonia; dehydration; malnutrition; weight loss; recurrent respiratory infections [2,5,7,9,10].

Aspiration pneumonia is one of the most serious complications associated with swallowing disorders. It occurs due to the aspiration of food, liquids, saliva, or gastric contents into the airways. Symptoms of aspiration pneumonia develop rapidly after aspiration and include coughing, low-grade fever or fever, shortness of breath, a feeling of chest tightness, and expectoration of secretions. Prompt treatment is crucial to minimize the risk of respiratory failure or pulmonary edema [2,5,7,9,10].

Swallowing is a complex process involving muscle groups responsible for transporting food and liquids from the oral cavity through the pharynx and esophagus to the stomach, all under the control of the central nervous system. Swallowing consists of three phases: the oral phase, which is voluntary, and the pharyngeal and esophageal phases, which are reflexive.

In a neurological examination focused on dysphagia, particular attention should be given to: facial and tongue symmetry, as well as tongue mobility, condition of tongue muscles, including the presence of atrophy or fasciculations, positioning and mobility of the soft palate, palatal and pharyngeal reflexes, presence of involuntary movements within the face, speech disorders, particularly dysarthria, sensory disturbances in the facial region, head and neck positioning [8,13,14].

Cranial nerve assessment plays a crucial role in the evaluation of swallowing function. The most important cranial nerves involved in the swallowing process are [8,10,13]:

1. Hypoglossal Nerve (Cranial Nerve XII): Controls the intrinsic and extrinsic tongue muscles, which

are essential for proper food movement during swallowing. Assessment of the hypoglossal nerve involves evaluating tongue function. In cases of nerve damage, the tongue deviates toward the affected side, and when retracted, it moves toward the healthy side. Muscle strength can be tested by asking the patient to push the tongue against resistance from a tongue depressor.

2. Glossopharyngeal and Vagus Nerves (Cranial Nerves IX and X): These nerves control the pharyngeal muscles, which are necessary for closing the airway during swallowing and initiating the gag reflex. Examination involves assessing the symmetry of uvular movement while the patient sustains the sound "a". In cases of nerve damage, the uvula deviates toward the healthy side and does not elevate properly during phonation.
3. Trigeminal Nerve (Cranial Nerve V): Controls the masticatory muscles and muscles of the mouth floor, playing a role in sucking, chewing, and swallowing. Assessment includes evaluating jaw opening against resistance and testing tactile, temperature, and vibration sensitivity on both sides of the face.
4. Facial Nerve (Cranial Nerve VII): Controls facial muscles, including those involved in lip movements during swallowing. Examination includes assessing facial symmetry through various movements, such as forehead wrinkling, whistling, puffing out the cheeks, and baring the teeth.

Swallowing disorders frequently accompany the acute phase of ischemic stroke (IS), making it essential to conduct screening for dysphagia in all stroke unit patients within 24 hours of admission. The depth of dysphagia should be assessed as soon as the patient's condition stabilizes, either by a physician or a nurse. Patients who test positive in the screening are referred for a detailed swallowing evaluation by a speech therapist [8,10,14].

Until the screening test is performed, a "nil per os" (NPO) approach — meaning no oral intake — is recommended to minimize the risk of aspiration. The screening test helps identify patients requiring speech therapy support and facilitates the implementation of appropriate therapeutic and nutritional interventions aimed at improving swallowing function and reducing the risk of aspiration pneumonia, malnutrition, and dehydration [3,4,15–17].

Screening tests for dysphagia assessment include [3,4,8–10,15–18]:

1. 90 ml Water Test: The patient is asked to drink 90 ml of water continuously, provided there are no contraindications. The examiner observes for signs of coughing or changes in voice quality for one minute. If aspiration symptoms occur during the test, it must be stopped immediately.
2. Gugging Swallowing Screen (GUSS): This test consists of two stages. The first stage assesses the patient's alertness, cough reflex, and spontaneous saliva swallowing. If the patient passes, the second stage evaluates direct swallowing by administering three test substances of varying consistencies. After each swallow, the examiner assesses swallowing ability, voice quality changes, coughing reflex, and food leakage. If the patient fails any stage, indicating a risk of aspiration, the test is discontinued. The results help determine the patient's nutritional management and further therapeutic approach.

The prognosis and rehabilitation of patients with dysphagia following a stroke depend on multiple factors, including the time of symptom onset, hospital admission time, diagnostic accuracy, and the speed of initiating treatment [10–12,18].

Dysphagia, by limiting social activity, requires close collaboration between the patient, their family, and the medical team, including physicians, speech therapists, nurses, and dietitians [10,15,18].

In dysphagia therapy, key elements include body and head posture control, as well as the assessment of sensory, motor, and respiratory function. Therapeutic methods aim to enable oral food intake while protecting the airways from aspiration.

Clearing techniques play a crucial role in preventing food residue accumulation in the oral cavity, which could lead to choking and increase the risk of aspiration pneumonia.

Regular oral hygiene is essential for maintaining cleanliness and preventing respiratory infections in patients with dysphagia.

Dysphagia treatment methods can be classified into three main categories [8,10,16,18]:

1. Restorative Method: Focuses on strengthening muscles and improving motor coordination. It involves movement exercises, passive stimulation, stretching, sucking, blowing, pressing, as well as thermal and taste stimulation. Breathing, articulation, and phonation exercises help enhance tongue function and temporomandibular joint mobility.
2. Compensatory Method: Includes body posture adjustments to facilitate swallowing and minimize aspiration risk. The recommended posture is sitting with the head slightly tilted forward. Compensatory techniques include specialized swallowing techniques, the Mendelsohn maneuver, glottic closure exercises, thermal and tactile stimulation, Shaker exercises (head lift in a supine position), and the Masako maneuver (holding the tip of the tongue between the teeth while swallowing saliva).
3. Adaptive Method: Focuses on modifying the diet to match the patient's condition and using specialized

tools to assist with eating. The diet may consist of soft-cooked foods, purées, mashed foods, and liquids with varying degrees of thickening. For patients at high risk of aspiration, a nasogastric tube is recommended.

The aim of this study is to analyze a case of a patient hospitalized due to cerebellar stroke who developed dysphagia. Special attention is given to the importance of collaboration among various specialists in the diagnostic and treatment process, highlighting the role of interdisciplinary care in restoring swallowing ability and improving the patient's quality of life. This study aims to emphasize the necessity of rapid dysphagia diagnosis and the importance of a multidisciplinary approach to dysphagia therapy.

The research presents a case of a patient hospitalized in the Neurology Department with the Stroke Treatment Subdivision at Stanisław Staszic Specialist Hospital in Piła. It describes the course of treatment, progress in swallowing ability and oral feeding, as well as the rehabilitation process.

Case Report

A retrospective analysis of the medical records of a patient hospitalized in January 2025 was conducted. The case included in the analysis involved a patient diagnosed with ischemic stroke of the left cerebellar hemisphere within the first 24 hours of symptom onset, based on clinical examination and CT imaging.

Swallowing function was assessed on the first, eighth, and ninth days of hospitalization. The analysis included medical documentation comprising diagnostic test results, medical and nursing interviews, discharge summary, vital parameters, administered treatment, and therapeutic recommendations. Swallowing disorders were evaluated using the standardized 90 ml water screening test and a test involving various food consistencies.

Inclusion Criteria

1. Confirmed Diagnosis of Cerebellar Stroke — Ischemic cerebellar stroke confirmed by computed tomography (CT) or magnetic resonance imaging (MRI).
2. Presence of Dysphagia — The patient exhibits symptoms of swallowing disorders, assessed by a speech therapist based on medical records and clinical examination results.
3. Patient Age — Adults aged 18 years and older.
4. Availability of Medical Records — The patient has complete medical documentation containing information on health status, diagnosis, symptoms, and rehabilitation interventions.
5. Participation in Rehabilitation — The patient underwent rehabilitation, including speech therapy, to improve swallowing function.

Exclusion Criteria

1. Other Neurological Disorders — Patients with neurological conditions other than cerebellar stroke (e.g., multiple sclerosis, Parkinson's disease) that may affect swallowing ability.
2. Contraindications to Rehabilitation — Patients whose health status prevents effective rehabilitation or who have medical contraindications to therapy.

A 72-year-old female patient was admitted as an emergency to the Neurology Department with the Stroke Treatment Subdivision at Stanisław Staszic Specialist Hospital in Piła due to the sudden onset of dizziness, balance disturbances, and ataxic paresis of the left limbs. The patient did not exhibit any signs of cranial nerve nuclei involvement. Computed tomography (CT) of the head revealed in the left cerebellar hemisphere, a hypodense area measuring 46×44×35 mm was observed, consistent with acute ischemic changes. Additionally, malacic lesions measuring 36×35×17 mm were identified in the anterior region of the left frontal lobe. No other

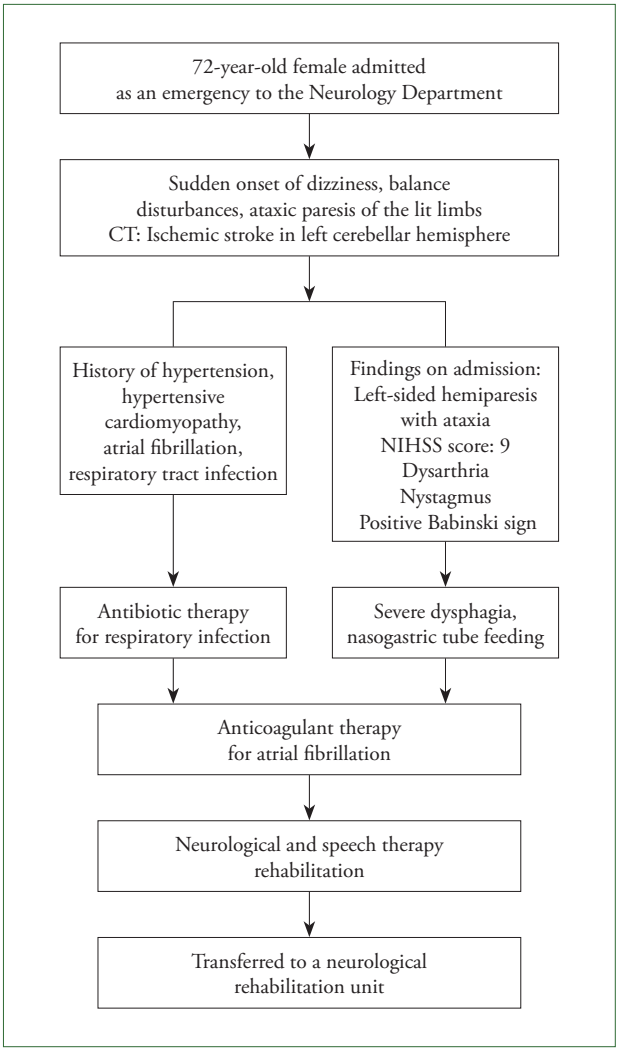


Figure 1. Treatment process

abnormalities were detected in the cerebral hemispheres or brainstem. The patient's medical history, clinical presentation, and therapeutic course are illustrated in Figure 1. From the first hours of hospitalization, the patient experienced significant swallowing difficulties. On the first day, she did not qualify for the 90 ml water swallowing screening test, indicating severe dysphagia. As a result, nasogastric tube feeding was initiated, and a comprehensive neurological and speech therapy rehabilitation plan was established.

Due to the respiratory tract infection, empirical antibiotic therapy was administered, leading to clinical improvement. Additionally, given the presence of paroxysmal atrial fibrillation, the patient was consulted by a cardiologist, and anticoagulant therapy was initiated.

With pharmacological treatment and rehabilitation, the patient's limb function gradually improved, and she was able to stand upright. Swallowing difficulties decreased, allowing her to start consuming pureed meals orally. For continued treatment, the patient was transferred to a neurological rehabilitation unit.



Figure 2. CT scan of the cerebellum. The arrow indicates an acute ischemic stroke in the left cerebellar hemisphere (dated January, 2025)

The Role of Nurses in Monitoring Patient Status

During the first days of hospitalization, the patient exhibited apathy, which may have been associated with her overall health condition and the course of the stroke. Dysarthria was present from the time of admission, and her voice had a wet, gurgling quality, suggesting excessive oral secretions. During this time the patient scored 5 points on the GUSS, indicating severe dysphagia with a high risk of aspiration. Due to swallowing difficulties, the patient required regular suctioning of secretions to reduce the risk of choking and improve breathing comfort. At the time of admission, the patient did not qualify for the 90 ml water swallowing test, indicating severe swallowing impairment. As a result, a nil per os (NPO) status was recommended, prohibiting oral fluid intake. To ensure proper nutrition while minimizing aspiration risk, a nasogastric tube was placed, allowing for effective feeding and nutritional support. On the second day of hospitalization, the patient developed a low-grade fever (37.5°C). Paracetamol was administered as an antipyretic, and a chest X-ray and CT scan were performed. The imaging revealed minor consolidations in the left lung parenchyma and mild fibrotic changes, but no signs of aspiration pneumonia.

The patient received oxygen therapy along with a comprehensive pharmacological regimen that included: mannitol 15%, furosemide, urapidil, enoxaparin, acetylsalicylic acid, paracetamol, insulin, metoclopramide, ceftriaxone, Lactobacillus rhamnosus (probiotic), electrolyte solution (oral rehydration), sodium chloride 0.9%, metoprolol, valsartan, bisoprolol, proton pump inhibitors (PPIs), potassium chloride, hydrochlorothiazide, methyldopa, amiodarone, lactulose, and a polymeric enteral nutrition formula.

As the therapy progressed, the patient's condition gradually improved. On the eighth day of hospitalization, an initial attempt was made to administer oral fluids, starting with 50 ml. This trial was successful, raising optimism for further swallowing recovery. However, attempts to consume larger amounts of fluids led to coughing and choking, necessitating continued dietary precautions. By the ninth day, the patient was more alert and actively engaged in the treatment process. A multiple-consistency swallowing test was conducted to assess her ability to consume various textures of food and liquids. This evaluation allowed for the introduction of pureed meals and thickened fluids into her diet, marking a significant step toward improving her quality of life and independence in eating.

On the tenth day of hospitalization, the nasogastric tube was removed, marking a significant milestone in the patient's rehabilitation. Despite this progress, she still required assistance during meals due to persistent dysphagia. To ensure safety and minimize the risk of aspiration, her diet remained pureed, and fluids were thickened.

The entire care and rehabilitation process was closely monitored by the medical team, which regularly assessed the patient's progress and adjusted the therapeutic plan according to her individual needs and response to treatment.

As the patient's condition improved, the multidisciplinary team — comprising physicians, nurses, speech therapists, and dietitians — played a pivotal role

in supporting the transition to oral feeding. The patient was educated on safe swallowing techniques and carefully monitored for her response to different food textures. At discharge, she achieved a score of 19 on the GUSS scale, indicating the ability to safely consume pureed foods and thickened fluids at a slow, controlled pace.

The Role of a Speech Therapist in Dysphagia Therapy

During neurological speech therapy assessments conducted on the fourth, fifth, and ninth days of hospitalization, the patient exhibited significant difficulties in swallowing and speech. A notable delay in the swallowing reflex was observed, indicating a weakened response to food stimuli. When food or liquids were introduced into the oral cavity, the time between placement and initiation of swallowing was prolonged, increasing the risk of aspiration and food retention in the mouth.

The patient also demonstrated impaired coordination between breathing and swallowing, making it difficult to synchronize these two functions. This increased the risk of aspiration and caused discomfort during eating. To address these issues, the introduction of appropriate rehabilitation techniques was essential to help the patient learn effective breathing control while eating.

The patient was diagnosed with pharyngeal dysphagia, meaning she had difficulty transporting food from the pharynx to the esophagus. Food was sometimes retained in the pharynx, leading to choking episodes and discomfort. As a result, the speech therapist implemented targeted strategies, including modification of food consistency and techniques to facilitate safe swallowing such as supraglottic swallow and Mendelsohn maneuver, postural adjustments, and structured exercises to improve oral motor control and airway protection.

Additionally, the patient exhibited mixed dysarthria, characterized by unclear speech and weakened articulation, leading to communication difficulties. Speech therapy exercises were introduced to improve muscle strength and coordination, aiming to restore speech fluency and articulation clarity.

As the patient's condition improved, she gradually transitioned to oral feeding. This process was conducted in a controlled manner, with a gradual introduction of pureed foods and thickened fluids to ensure safe consumption. The entire rehabilitation process was closely monitored by the speech therapist, who adjusted the therapy plan according to the patient's individual needs and progress.

Thanks to interdisciplinary care and regular therapy sessions, the patient experienced a significant improvement in swallowing and speech abilities, ultimately enhancing her quality of life.

Speech therapy focused on strengthening the muscles of the oral cavity and pharynx, improving breath-swallow coordination, and gradually introducing appropriate food consistencies. Regular exercises combined with dietary modifications enabled the patient to regain the ability to eat independently.

The Role of Neurologists and Otolaryngologists

The neurologist played a key role in diagnosing the patient, assessing symptoms, and monitoring the treatment process. The implementation of anticoagulant therapy, blood pressure control, and respiratory infection management significantly influenced the patient's overall condition, creating optimal conditions for the initiation of rehabilitation.

An otolaryngology consultation was essential in excluding anatomical causes of dysphagia and ear pain, which was crucial for further planning of speech therapy and dietary interventions.

The Role of Physiotherapists and Dietitians

Physiotherapists supported the patient in regaining motor function, which had a significant impact on the swallowing process. Mobilization and increased physical activity improved muscle coordination and overall neuromuscular function, facilitating recovery.

Dietitians adapted the nutritional plan to match the patient's current abilities, ensuring adequate caloric intake and food consistency. Gradual dietary modifications enabled a smooth transition from nasogastric feeding to full oral nutrition with balanced meals.

Discussion

Dysphagia remains a serious complication in stroke patients, with significant risks of aspiration pneumonia, malnutrition, and dehydration [8–12,19]. In the presented case, comprehensive rehabilitation following cerebellar ischemic stroke led to gradual improvement in swallowing function and the reintroduction of oral feeding, underlining the value of early diagnosis and coordinated care.

Although post-stroke dysphagia has been extensively documented — affecting up to 50% of patients — the cerebellar localization in this case reinforces findings that dysphagia is not limited to cortical strokes [8,12,19,20]. The patient's swallowing was monitored on days 1, 8, and 9 using the Gugging Swallowing Screen (GUSS), a practical clinical tool that allowed for therapy adjustments in real time. While more objective

assessments such as VFSS or FEES are considered gold standards [15,16,21,22], access to these may be limited, particularly in smaller stroke units. Thus, this case demonstrates how structured clinical screening and timely intervention can still achieve significant therapeutic progress.

Clinical consequences such as aspiration pneumonia and poor nutritional status are well-known risks in patients with dysphagia [10,23–25]. Although nutritional parameters were not the primary focus in this case, interdisciplinary care involving a dietitian helped tailor diet consistency and caloric intake. Literature emphasizes that both infection control and nutritional support are critical to reducing morbidity in dysphagic patients [10,24].

Swallowing recovery is influenced by various factors, including age and lesion location. In this case, the patient's gradual recovery supports studies highlighting the role of neuroplasticity in regaining swallowing function [18,26]. Moreover, behavioral therapy — including postural adaptations and specific exercises — was used successfully, as supported by recent findings [18].

Importantly, this case illustrates that even in settings without access to advanced diagnostics, effective dysphagia management is possible through early screening and a team-based approach. However, the lack of instrumental assessment is a limitation, and future studies should aim to include objective evaluations.

Recent advances in digital health offer additional avenues to support patients with chronic dysphagia. Wearable epidermal sensors can monitor laryngeal movement or acoustic signals, enabling real-time swallowing assessment beyond hospital settings [27–29]. Combined with mobile applications, these systems enhance adherence and enable remote monitoring.

Furthermore, smart utensils, kitchen sensors, and personalized nutrition platforms have shown potential in supporting dietary management, particularly in individuals with cognitive impairments [30]. These technologies allow for greater personalization of care and autonomy in post-stroke recovery. Their integration into routine practice may offer earlier detection of complications and optimize long-term outcomes.

Conclusions

In summary, this case highlights the importance of early diagnosis and coordinated interdisciplinary care in managing post-stroke dysphagia. Through the collaboration of various specialists, the patient's swallowing function was successfully restored, supporting her recovery and quality of life. The case emphasizes that standardized diagnostic and therapeutic strategies not only improve clinical outcomes but also reduce the risk of complications.

From a clinical perspective, timely dysphagia screening, team-based rehabilitation, individualized nutrition plans, and ongoing education for patients and caregivers are crucial. An interdisciplinary approach remains key to optimizing therapy and promoting patient independence after stroke.

References

[1] Huang L., Wang Y., Sun J. et al. Incidence and Risk Factors for Dysphagia Following Cerebellar Stroke: a Retrospective Cohort Study. *Cerebellum*. 2024;23(4):1293–1303.

[2] Banda K.J., Chu H., Kang X.L. et al. Prevalence of dysphagia and risk of pneumonia and mortality in acute stroke patients: a meta-analysis. *BMC Geriatr*. 2022;22(1):420.

[3] Galovic M., Stauber A.J., Leisi N. et al. Development and Validation of a Prognostic Model of Swallowing Recovery and Enteral Tube Feeding After Ischemic Stroke. *JAMA Neurol*. 2019;76(5):561–570.

[4] Liang J., Yin Z., Li Z. et al. Predictors of dysphagia screening and pneumonia among patients with acute ischaemic stroke in China: findings from the Chinese Stroke Center Alliance (CSCA). *Stroke Vasc Neurol*. 2022;7(4):294–301.

[5] Ouyang M., Boaden E., Arima H. et al. Dysphagia screening and risks of pneumonia and adverse outcomes after acute stroke: An international multicenter study. *Int J Stroke*. 2020;15(2):206–215.

[6] Scrutinio D., Lanzillo B., Guida P., Passantino A., Spaccavento S., Battista P. Association Between Malnutrition and Outcomes in Patients With Severe Ischemic Stroke Undergoing Rehabilitation. *Arch Phys Med Rehabil*. 2020;101(5):852–860.

[7] Wu M.R., Chen Y.T., Li Z.X. et al. Dysphagia screening and pneumonia after subarachnoid hemorrhage: Findings from the Chinese stroke center alliance. *CNS Neurosci Ther*. 2022;28(6):913–921.

[8] Budrewicz S., Słotwiński K., Madetko N., Koszewicz M. Zaburzenia połykania w chorobach układu nerwowego — diagnostyka i leczenie. *Pol Przegl Neurol*. 2018;14(1):28–34.

[9] González-Fernández M., Ottenstein L., Atanelov L., Christian A.B. Dysphagia after Stroke: an Overview. *Curr Phys Med Rehabil Rep*. 2013;1(3):187–196.

[10] Martino R., Foley N., Bhogal S., Diamant N., Speechley M., Teasell R. Dysphagia after stroke: incidence, diagnosis, and pulmonary complications. *Stroke*. 2005;36(12):2756–2763.

[11] Remesso G.C., Fukujima M.M., Chiappetta A.L. et al. Swallowing disorders after ischemic stroke. *Arq Neuropsiquiatr*. 2011;69(5):785–789.

[12] Mohebi N., Emamikhah M., Moghaddasi M., Sepahvand M., Bashiri M. Prevalence of Dysphagia in Acute Ischemic Stroke: Which Patients Are at Risk? *Razi J Med Sci*. 2023;29:78–86.

[13] Czarnik K., Zyss T. Badanie wybranych nerwów czaszkowych — ujęcie neurologopedyczne. *Neurolingw Prakt*. 2016;2:40–51.
[14] Stipancic K.L., Borders J.C., Brates D., Thibeault S.L. Prospective Investigation of Incidence and Co-Occurrence of Dysphagia, Dysarthria, and Aphasia Following Ischemic Stroke. *Am J Speech Lang Pathol*. 2019;28(1):188–194.
[15] Jamróz B., Pabian M., Chmielewska J., Milewska M., Niemczyk K. Screening tests as a part of diagnostic process of dysphagia. *Pol Prz Otorynolaryngol*. 2017;6(4): 10–13.
[16] Lewicka T., Krzystanek E. Dysfagia po udarach mózgu — wskazówki diagnostyczne i terapeutyczne. *Aktualn Neurol*. 2017;17(4):208–212.
[17] Trapl M., Enderle P., Nowotny M. et al. Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. *Stroke*. 2007;38(11):2948–2952.
[18] Hien N.T.T., Thong T.H., Tung L.T., Tinh T.T., Trung T.H. The effect of behavioral therapy on dysphagia of acute ischemic stroke patients feeding with a nasogastric tube. *PLoS One*. 2024;19(4):e0299068.
[19] Żdanowicz A., Sobkowiak H., Gawrysiak M., Wiszniewska M. Swallowing Disorders in Ischemic Stroke: A Retrospective Analysis of Dysphagia Severity Differences Based on Hemisphere Damage and Patient Age. *J Clin Med*. 2025;14(3):900.
[20] Jones C.A., Colletti C.M., Ding M.C. Post-stroke Dysphagia: Recent Insights and Unanswered Questions. *Curr Neurol Neurosci Rep*. 2020;20(12):61.
[21] Teasell R., Salbach N.M., Foley N. et al. Canadian Stroke Best Practice Recommendations: Rehabilitation, Recovery, and Community Participation following Stroke. Part One: Rehabilitation and Recovery Following Stroke; 6th Edition Update 2019. *Int J Stroke*. 2020;15(7):763–788.
[22] D'Netto P., Rumbach A., Dunn K., Finch E. Clinical Predictors of Dysphagia Recovery After Stroke: A Systematic Review. *Dysphagia*. 2023;38(1):1–22.
[23] Westendorp W.F., Dames C., Nederkoorn P.J., Meisel A. Immunodepression, Infections, and Functional Outcome in Ischemic Stroke. *Stroke*. 2022;53(5):1438–1448.
[24] Tagliaferri S., Lauretani F., Pelá G., Meschi T., Maggio M. The risk of dysphagia is associated with malnutrition and poor functional outcomes in a large population of outpatient older individuals. *Clin Nutr*. 2019;38(6):2684 –2689.
[25] Zuercher P., Moret C.S., Dziewas R., Schefold J.C. Dysphagia in the intensive care unit: epidemiology, mechanisms, and clinical management. *Crit Care*. 2019; 23(1):103.
[26] Panebianco M., Marchese-Ragona R., Masiero S., Restivo D.A. Dysphagia in neurological diseases: a literature review. *Neurol Sci*. 2020;41(11):3067–3073.
[27] Hwang N.K., Yoon T.H., Chang M.Y., Park J.S. Dysphagia Rehabilitation Using Digital Technology: A Scoping Review. *J Evid Based Med*. 2025;18(1):e70009.
[28] Rafeedi T., Abdal A., Polat B., Hutcheson K.A., Shinn E.H., Lipomi D.J. Wearable, epidermal devices for assessment of swallowing function. *npj Flex Electron*. 2023;7(52):1–19.
[29] De Fazio R., Mastronardi V.M., De Vittorio M., Visconti P. Wearable Sensors and Smart Devices to Monitor Rehabilitation Parameters and Sports Performance: An Overview. *Sensors (Basel)*. 2023;23(4):1856.
[30] Sguanci M., Mancin S., Gazzelloni A. et al. The Internet of Things in the Nutritional Management of Patients with Chronic Neurological Cognitive Impairment: A Scoping Review. *Healthcare (Basel)*. 2024;13(1):23.

Corresponding Author:
Anna Żdanowicz
Academy of Applied Sciences of Stanisław Staszic in Piła, Poland
Podchorążych 10 street, 64-920 Piła, Poland
e-mail: azdanowicz@ans.pila.pl

Conflict of Interest: None
Funding: None
Author Contributions: Małgorzata Wiszniewska[A–H], Maciej Gawrysiak[B–H], Anna Żdanowicz[A–H]

A — Concept and design of research, B — Collection and/or compilation of data, C — Analysis and interpretation of data, D — Statistical analysis, E — Writing an article, F — Search of the literature, G — Critical article analysis, H — Approval of the final version of the article

Received: 6.09.2025
Accepted: 10.10.2025