ORIGINAL RESEARCH

Effect of Collaborative Care on the Improvement of Daily Living Abilities and Reduction of Aspiration Pneumonia in Patients with Swallowing Disorders Following Cerebral Ischemic Stroke

Mojia Wu, MM; Xiaohua Li, MM

ABSTRACT

Objective • This study aimed to assess the efficacy of collaborative care in patients with dysphagia after cerebral infarction (CIS) and its preventive impact on aspiration pneumonia (AP), providing valuable clinical insights.

Methods • A total of 78 patients with swallowing disorders following CIS, treated at West China Hospital, Sichuan University, from March 2021 to March 2023, were included in this study cohort. The control group comprised 35 patients receiving conventional care, while the research group comprised 43 patients receiving collaborative care. Swallowing function pre- and post-care was compared between the groups, and AP incidence was statistically analyzed. The patients' daily living abilities and emotional well-being were assessed using the Activities of Daily Living (ADL) Scale, Self-rating Anxiety Scale (SAS), and Self-rating Depression Scale (SDS). Additionally, the care satisfaction level among patients was investigated.

Results • After care, the research group demonstrated significantly improved swallowing function and a notable reduction in AP incidence compared to the control group ($P < .05$). ADL scores increased in both groups, with higher scores observed in the research group ($P < .05$). Moreover, SAS and SDS scores decreased, with lower scores in the research group ($P < .05$). Additionally, care satisfaction was higher in the research group ($P < .05$).

Conclusions • Collaborative care proves effective in enhancing the recovery of patients with swallowing disorders following CIS and reducing the occurrence of AP. Its clinical use is recommended. (*Altern Ther Health Med.* 2024;30(10):292-296).

Mojia Wu, MM; West China Hospital, Sichuan University, Chengdu, China; West China Hospital, Sichuan University's Subordinate Industries, Chengdu, China. **Xiaohua Li, MM,** Department of Dermatology, West China Hospital, Sichuan University, Chengdu, China; West China School of Nursing, Sichuan University, Chengdu, China.

Corresponding author: Xiaohua Li, MM
E-mail: Lxh652033@163.com

INTRODUCTION

Cerebral ischemic stroke (CIS) is a prevalent cardiovascular and cerebrovascular disease in clinical practice, primarily impacting the middle-aged and elderly population. It exhibits a rapid onset with minimal observed prodromal symptoms.[1-2] CIS denotes ischemic and hypoxic alterations induced by an acute disruption in brain blood circulation, leading to ischemic necrosis and softening of brain tissues.[1] Clinical manifestations may include sudden limb numbness, language disorders, swallowing difficulties, and drooling, with the severity primarily associated with the size of the infarcted vascular site.[2] Swallowing disorders that occur after CIS, a common sequel of CIS, have a profound impact on various aspects of patients' well-being. These disorders affect mood, nutritional intake, and the recovery process and increase the risk of developing aspiration pneumonia (AP).[3] The presence of swallowing disorders significantly influences the prognosis and recovery of individuals who have experienced CIS.[3,4] Clinical management of swallowing disorders post-CIS relies on a comprehensive and personalized treatment strategy, considering diverse etiologies. Given the incurable nature of the condition, nursing care interventions play a crucial role in enhancing patients' prognosis and quality of life, complementing effective treatment.[5]

Previous conventional nursing care methods were constrained by a limited and one-sided conceptual framework.[6]More targeted care models have emerged with the evolution of concepts and advancements in methods, demonstrating effectiveness in enhancing the recovery process.[7] Collaborative care, a novel nursing approach in clinical practice, highlights cooperation among various healthcare professionals, including neurologists, nurses, and rehabilitation physicians. This approach aims to provide patients multidimensional care.[8,9]

Therefore, this study aimed to implement collaborative care for patients experiencing swallowing disorders after CIS and observe its impact on improving daily living abilities and preventing AP. The intent is to offer valuable insights for future clinical applications.

MATERIALS AND METHODS

Study Design

This prospective cohort study involved 78 patients with swallowing disorders post-CIS treated at West China Hospital. Patients were categorized into two groups based on the type of care interventions they received. The control group comprised 35 patients who received conventional care, while the research group comprised 43 patients who received collaborative care to evaluate the impact of conventional and collaborative care interventions on daily living abilities and aspiration pneumonia incidence. Demographic data, including age, gender, and medical history, were collected for comprehensive statistical analysis.

Patient Selection

The inclusion criteria were as follows: (1) individuals diagnosed with CIS through imaging and other examinations[10]; (2) those in a stable condition; (3) participants who were informed about and agreed to participate in the study; (4) those capable of cooperating with the study; and (5) individuals with complete medical records. Exclusion criteria encompassed individuals complicated with other major diseases, including tumors, those with low treatment compliance, and individuals with psychiatric abnormalities or communication difficulties. Approval for this study was obtained from the medical ethics committee of West China Hospital.

Control Group Nursing Interventions

In this group, the nursing staff played an important role in patient care, involving routine examinations, disease management education to enhance understanding, nasal feeding administration, oral care procedures, guidance on eating and swallowing exercises, close monitoring of physiological indicators, and provision of appropriate encouragement to alleviate negative emotions. Additionally, the nursing team promptly intervened in response to any occurring symptoms or adverse events based on medical advice.

Research Group Comprehensive Care Strategies

In this group, a dedicated collaborative care team consisting of departmental physicians, specialized nurses, and rehabilitation therapists was established. The team carefully collected patient data, recorded complete patient information, and created personalized files to guide the implementation of tailored procedures.

Patient Education and Guidance. The nursing staff played an important role in delivering health guidance, explaining the causes of swallowing disorders to patients and their families, and fostering a deeper understanding of the disease. They provided detailed information about oral care and other eating-related precautions, instructed patients on correct treatment methods, and mandated daily swallowing function exercises. Active patient cooperation was encouraged to maximize the effectiveness of these procedures.

Physiological Monitoring and Emotional Support. The nursing staff closely monitored changes in physiological parameters and emotional states. Scientific psychological counseling services were provided to offer support and comfort to patients. Furthermore, patients were actively encouraged, and successful treatment cases with similar conditions were introduced to boost enthusiasm for treatment.

Holistic Approach to Patient Well-being. In addition to addressing the immediate medical concerns, the nursing staff guided patients in self-testing for diseases, fostering the development of self-management skills. Reminders were given to develop healthy dietary and lifestyle habits, maintain a balanced sleep schedule, and engage in scientifically informed daily exercise. These collective efforts aimed to enhance overall physical well-being, contributing to a favorable prognosis and optimal patient recovery.

Outcome Measures

Kubota Drinking Test. Patients underwent the Kubota drinking test,[11] where they swallowed 30 mL of warm boiled water at once. Observations included instances of choking, duration of drinking, and the number of drinks during the process. Swallowing function was classified into five grades: (1) Grade I: Patient drinks all the water in one gulp within 5 seconds without choking; (2) Grade II: Patient drinks all the water in two gulps within 5 seconds without choking or in one gulp within 5 seconds with some choking; (3) Grade III: Patient drinks all the water in one gulp for more than 5 seconds with some choking; (4) Grade IV: Patient drinks all the water in two or more gulps, with frequent choking; (5) Grade V: Patient often chokes and has difficulty drinking all the water.

Saito's 7-Level Swallowing Disorder Level. A seven-level scale[12] was employed, with level 7 representing normal swallowing. Lower levels indicated more severe swallowing disorders.

Dysphagia Outcome and Severity Scale (DOSS). A seven-point scale[13] was utilized, with a higher score indicating better swallowing function, which was adopted to assess the swallowing function of patients. The incidence of AP in the two groups was counted.

Activities of Daily Living (ADL). The assessment of patients' daily living abilities in both groups employed the Activities of Daily Living (ADL) scale.[14] This scale, with a maximum score of 100, gauged the proficiency of daily living skills. A higher score denoted an enhanced ability to perform daily tasks.

Psychological Status Assessment. The Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) were employed to evaluate changes in psychological status before and after care in both groups.[15] A decline in scores reflected a reduction in anxiety and depression levels.

Patient Satisfaction Evaluation. A self-made scale by the hospital assessed patients' satisfaction with care intervention, covering care effect, care content, and care attitude. Results were categorized as "satisfied," "basically satisfied," or "unsatisfied." The total satisfaction rate was calculated as follows:

Total Satisfaction Rate = (Number of basically satisfied patients + Number of satisfied patients) / Total number of patients × 100%.

Statistical Analysis

The data underwent statistical analysis using GraphPad Prism 9.0 (GraphPad Software, v 9.0). For qualitative data representation, [n (%)] percentage was utilized, employing the chi-square (χ^2) test. Quantitative data were expressed as ($\bar{x} \pm s$), with analysis conducted through either the independent samples *t* test or paired *t* test as appropriate. A significance level of $P < .05$ was considered statistically significant.

RESULTS

Comparison of Demographic Characteristics

Clinical data, including age, gender, and history of hypertension and diabetes mellitus, were collected for statistical analysis. The findings revealed no statistically significant difference between the two groups ($P > .05$). Refer to Table 1.

Comparison of Swallowing Function

In the initial assessment, there was no evident distinction in the results of swallowing function tests between the two groups ($P > .05$). After care, both groups exhibited a reduction in Kubota drinking test scores and an elevation in scores for Saito's swallowing disorder level and DOSS. Notably, the research group displayed a significantly lower Kubota drinking test score and higher scores for Saito's swallowing disorder level and DOSS compared to the control group ($P < .05$), refer to Figure 1.

Comparison of Daily Living Abilities

There was no notable difference in ADL scores between the two groups prior to care ($P > .05$). After care, both groups demonstrated an increase in ADL scores; however, the research group exhibited significantly higher ADL scores compared to the control group ($P < .05$), see Figure 2.

Comparison of Aspiration Pneumonia Incidence

During the care period, the incidence of AP was carefully recorded. The research group exhibited a notably lower incidence of AP at 4.65%, in contrast to the 20.00% observed in the control group. This difference was statistically significant, favoring the research group ($P < .05$), refer to Table 2.

Comparison of Psychological Status

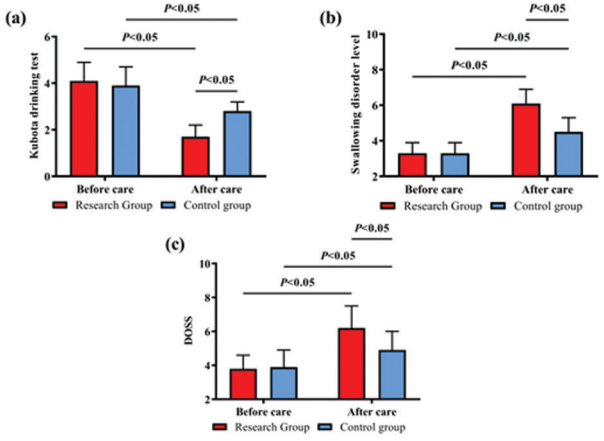
Before care, no statistical distinction in SAS and SDS scores was evident between the two groups ($P > .05$). After

Table 1. Baseline Information of Patients in Both Groups

Variables	Research Group (n = 43)	Control Group (n = 35)	χ^2/t	*P* value
Age	60.7±7.9	61.2±5.5	0.317	.752
Gender			0.043	.836
Male	28(65.1)	22(62.9)		
Female	15(34.9)	13(37.1)		
Combined Hypertension			0.116	.733
Yes	25(58.1)	19(54.3)		
No	18(41.9)	16(45.7)		
Combined Diabetes Mellitus			0.104	.747
Yes	20(46.5)	15(42.9)		
No	23(53.5)	20(57.1)		

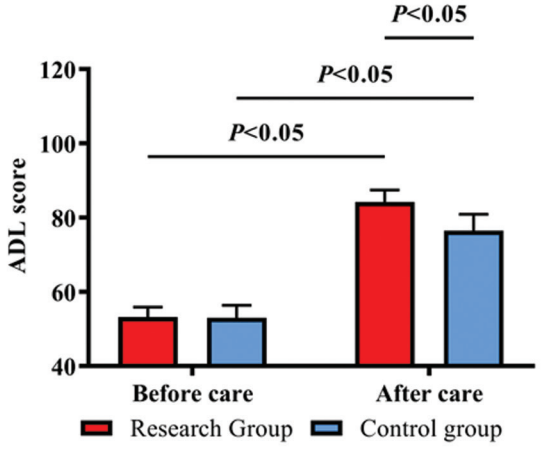
Note: Values for age are presented as mean ± standard deviation ($\bar{x} \pm s$). Categorical variables are expressed as [n (%)]. χ^2 denotes the chi-square statistic, and t represents the independent samples *t* test. *P* values less than .05 are considered statistically significant.

Figure 1. Comparison of Swallowing Function. (a) Score of Kubota Drinking Test Before and After Care. (b) Score of Saito's Swallowing Disorder Level Before and After Care. (c) Score of Dysphagia Outcome and Severity Scale (DOSS) Before and After Care.



Note: DOSS represents the Dysphagia Outcome and Severity Scale.

Figure 2. Comparison of ADL Score



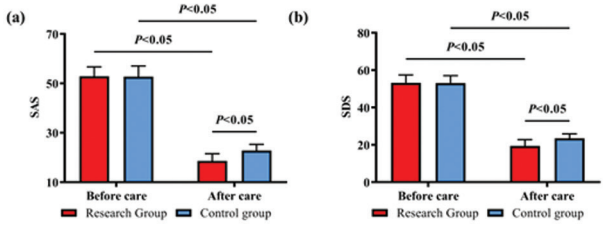
Note: ADL refers to the Activities of Daily Living.

Table 2. Comparison of Aspiration Pneumonia (AP) Incidence

Study Group	n	AP	No AP occurred
Research Group	43	2(4.65)	41(95.35)
Control Group	35	7(20.00)	28(80.00)
χ^2/t		4.453	
P value		.035	

Note: AP denotes Aspiration Pneumonia. Values for AP incidence are expressed as [n (%)]. χ^2 represents the chi-square statistic, and *P* denotes the significance level. *P* values less than .05 are considered statistically significant.

Figure 3. Comparison of Psychological Status. (a) Comparison of SAS. (b) Comparison of SDS.



Note: SAS refers to the Self-rating Anxiety Scale, and SDS refers to the Self-rating Depression Scale.

Table 3. Comparison of Care Satisfaction

Study Group	n	Satisfied	Basically Satisfied	Unsatisfied	Total Satisfaction Rate
Research Group	43	27(62.79)	15(34.88)	1(2.33)	42(97.67)
Control Group	35	12(34.28)	18(51.43)	5(14.29)	30(85.71)
χ^2/t		6.271	2.164	3.887	3.887
P value		.012	.141	.049	.049

Note: Values for satisfaction are expressed as [n (%)]. χ^2 represents the chi-square statistic, and *P* denotes the significance level. *P* values less than .05 are considered statistically significant.

care, both SAS and SDS scores experienced a decrease, with a particularly noteworthy reduction observed in the research group ($P < .05$), see Figure 3.

Comparison of Care Satisfaction

According to the outcomes of the care satisfaction survey, both the satisfaction rate and total satisfaction rate in the research group significantly surpassed those in the control group ($P < .05$). However, no statistical difference was observed between the two groups concerning the basic satisfaction rate ($P > .05$), refer to Table 3.

DISCUSSION

Rehabilitation care, as a crucial component post-CIS, is designed to prevent complications, maximize functional improvement, and elevate the overall quality of life for patients.[16] In our study, collaborative care significantly enhanced the recovery of patients with swallowing disorders after CIS, ensuring the safety of CIS patients in terms of treatment and prognosis.

We observed a significant improvement in the swallowing function of patients in the research group after collaborative care intervention, indicating the excellent positive impact of collaborative care on swallowing disorders following CIS. Furthermore, the ADL scores for patients in the research group were markedly higher than those in the control group after receiving care, signifying that collaborative care played a crucial role in enhancing the overall quality of life for patients.

Hazzard et al.[17] discussed similar results in their study that the implementation of collaborative care improved the prognosis and quality of life for patients with head and neck tumors, providing additional support to the findings of our study. Previous studies revealed certain shortcomings in the traditional nursing care model for patients with swallowing disorders following CIS.[18,19]

The care team for swallowing disorders after CIS should be overseen by neurology nursing staff. The absence of pertinent knowledge among nursing staff can lead to inadequate professional skills and incomplete care, potentially resulting in limited improvement or even exacerbation of swallowing disorders. To address these limitations, collaborative care integrates multidisciplinary professionals into rehabilitation care tailored to patients' individual needs. This approach ensures patients receive more comprehensive and multifaceted care services.[20]

In our study, collaborative care delivered professional and comprehensive services through collaborative patient rounds involving neurologists, nutritionists, rehabilitation therapists, and psychological counselors. Daily training sessions for swallowing and eating incorporated repeated exercises targeting patients' lips, tongue, cheeks, and throat muscle groups. These exercises aimed to enhance the function of patients' swallowing-related muscle groups and improve the coordination and motor skills of patients' nervous systems, thereby fostering the recovery of swallowing function from multiple perspectives.

AP directly manifests as a consequence of swallowing disorders, and addressing it becomes crucial for influencing the prognosis and overall health of patients.[21] The enhancement in swallowing function significantly diminishes the risk of AP. Our study evidenced a lower incidence of AP in the research group, reinforcing our perspective.

Furthermore, during rehabilitation care, particular attention should be directed towards addressing the psychological burden experienced by patients with swallowing disorders following CIS. Considering that a significant portion of CIS patients are elderly, they often struggle with deep negative emotions stemming from various factors, including the impact of the illness and concerns about placing additional burdens on their families and children during treatment.[22] The presence of swallowing disorders impedes patients' ability to care for themselves, necessitating prolonged support from family members, thereby significantly heightening the pressure on patients' daily lives.[23] Therefore, many patients exhibit noticeable resistance to rehabilitation care and lack confidence in treatment efficacy.[24]

In collaborative care, the primary emphasis is to mitigate negative psychological states in patients. In this study, the ADL scores in the research group exhibited a more

pronounced decrease compared to those in the control group after receiving care. This observation indicates that collaborative care plays a crucial role in alleviating the negative emotions experienced by patients. Such improvement can be attributed to the delivery of more professional and precise services through collaborative care. Additionally, the collaborative care approach fosters a sense of value for patients, contributing to an increased trust in medical staff.

These results are aligned with previous studies that have reported that collaborative care improved the postoperative negative psychological status of patients with mental illness.[25] In our study, patient satisfaction in the research group improved, highlighting the positive impact of collaborative care on the overall quality of healthcare services. Our study demonstrated that collaborative care significantly improved swallowing function, daily living abilities, and psychological well-being in patients following cerebral ischemic stroke. The observed decrease in aspiration pneumonia incidence and heightened patient satisfaction underscores the effectiveness of collaborative care.

Study Limitations

This study is subject to limitations primarily arising from the relatively small sample size, introducing a potential for chance effects in the observed results. Additionally, the need for an extended follow-up period is evident to evaluate the long-term prognosis associated with collaborative care comprehensively. Furthermore, there remains room for optimization and refinement of the specific details involved in collaborative care, emphasizing the importance of summarizing the care experiences continually to enhance and fine-tune the details of patient care.

CONCLUSION

In conclusion, collaborative care emerged as a valuable intervention, showcasing substantial improvements in the swallowing function of patients after cerebral ischemic stroke. The intervention not only lowered the incidence of AP but also contributed to enhanced patient prognosis, improved quality of life, and alleviated negative psychological states. These findings emphasize the high clinical application value of collaborative care, recommending its broader adoption to enhance the safety and prognosis of patients dealing with swallowing disorders after CIS.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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