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COMPROMISED SWALLOWING: A REHABILITATION NURSING APPROACH[1]

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ABSTRACT

The normal swallowing process in individuals is complex, related to the diversity of structures and organs involved in it. Because of its complexity, the commitment to swallowing requires a systematic, multidisciplinary and detailed approach. Based on the identification of such commitment in patients with neurological problems, a rehabilitation nursing program was designed, applied and evaluated.

Objectives: Identify the changes in swallowing in hospitalized patients with neurological problems in a department of medicine of a Hospital Center with own scales according to the state of the art; Establish a swallow optimization program for these patients.

Methodology: Descriptive study of a qualitative approach using the methodology of case studies.

Results: Patients enrolled in the program did not develop complications and even reversed their commitment to swallowing, thereby increasing their autonomy and independence.

Conclusion: An adequate planning of rehabilitation nursing care is effective in reversing commitment in swallowing patients and increasing their autonomy.

Keywords: Deglutition; deglutition disorders; nursing; rehabilitation nursing.

INTRODUCTION

The commitment in swallowing limits patient ability to achieve his nutritional goals and also limits his independence inasmuch as people with this type of commitment often depend on family for the supply of self-care related to the satisfaction of this physiological need, which can have devastating consequences and can lead to high rates of depression and social isolation[1]. The compromised swallowing in addition to affecting the quality of life and the patients nutritional status[1,2], can also lead to serious complications such as dehydration, malnutrition, pneumonia, suffocation and even death[2].

In the process of patient rehabilitation, with commitment to swallowing, it is essential that the multidisciplinary team is aware of the consequences of this commitment and is able to identify its clinical signs[2]. Early assessment of altered swallowing is as important as assessing the patient's state of consciousness, and nursing teams should be prepared for the rapid identification of this problem in patients in order to facilitate diagnosis and treatment of dysfunction[3]. The intervention of nurses, especially nurses who are specialists in rehabilitation nursing, is of the utmost importance in patients with compromised swallowing, accompanying them in the rehabilitation process from its beginning and in constant permanence.

Patients' perception of this commitment is central to nursing diagnosis, and the *Eat Assessement Tool* (EAT-10) is an instrument applicable to all patients with swallowing commitment regardless of their diagnosis. It is a *Likert* type questionnaire where the patient refers to the intensity of the perceived commitment, assigning a score to each of his ten affirmations, from which a score can be obtained that can vary from 0 to no problem and 4 that corresponds to a serious problem[4,5].

Approximately 48% of patients with aspirations detected by videfluroscopy did not present cough after aspiration, proving a high incidence of silent aspirations, a problem that needs special attention[6]. *Volume-Viscosity Swallow Test* (V-VST) is a method of clinical exploration that adds pulse oximetry to help identify patients and to identify clinical signs of change in efficacy and safety of swallowing in three types of consistencies: nectar, liquid and pudding[6]. Changes in efficacy include: ineffective lip closure, presence of oral or pharyngeal waste, and multiple swallowing per bolus administered. Signs of safety compromise include: change in voice quality, coughing, or decreased pulse oximetry greater than or equal to 3%[6].

Another equally important fact in the correct diagnosis is the categorization of the severity degree of functional limitations in oral feeding. Thus, the *Functional Oral Intake Scale* (FOIS), with its 7 items, is another instrument that can contribute to this diagnosis. A patient positioned at level 7 does not present any type of limitation, in turn, a patient positioned at level 1 does not ingest any food orally[5]. Patients positioned at levels 1 to 3 are those who require a nasogastric tube to maintain a consistent feed and water supply. Patients in levels 4 to 7, on the other hand, are those with total oral intake[5].

Like EAT-10, FOIS is a cross-sectional scale for all patients with compromised swallowing and no invasive methods (video-flapscopy or endoscopy) are required to make the swallowing compromise evident. Therefore, these two instruments are easy to apply and an added value for the evaluation of patients with swallowing commitment and for their rehabilitation[5].

Once the commitment has been identified, nursing care planning is required, which is aimed at the re-education of swallowing, which, due to its complexity, requires skills in the area[7]. The rehabilitation of compromised swallowing involves the training of skills and training of muscular strength, these being developed to ensure a safe oral intake and to definitively change dysfunction in swallowing[8]. Also essential are the provision of other rehabilitation nursing care, such as ventilation improvement techniques, respiratory pattern correction and improvement of ventilatory mechanics, seeking to optimize the permeability of the airways and to promote the strengthening of the respiratory muscles[7].

Preventing the consequences of immobility also requires adequate planning of nursing care as patients with compromised swallowing often experience changes in mobility. Interventions for the maintenance of mobility should always focus on the logic of self-care[9] with the central aim of promoting self-control and self-care in these patients.

Rehabilitation is an educational, dynamic, continuous and progressive process that aspires to the functional recovery of the person, reintegration into the family, community and society[10]. Therefore a holistic approach is required of the patient with compromised deglutition focused on these objectives.

In patients with compromised swallowing, nurses can help reduce aspiration episodes by enhancing compensatory swallowing techniques, making the process safer[11]. The use of compensatory swallowing techniques in patients with such problems allows for better self-management of food and drink as it allows the maintenance of adequate nutrition and hydration. With the central focus on promoting the efficacy/safety of swallowing in patients with this commitment, a program was designed that also sought to demonstrate the benefits of rehabilitation nursing interventions in these patients.

The study focused on the implementation of an intervention program consisting of a set of interventions or rehabilitation nursing care in patients with compromised swallowing. Using a set of strategies based on the nursing process, it was possible to evaluate the results of this same program.

METHODS

This study was carried out in an academic context and followed the guidelines of Gangeness & Yurkovich (2006), which emphasize that the case studies allow a holistic approach that is perfectly adapted to the nursing metaparadigm[12]. It describes multiple cases of patients with compromised swallowing and presents a longitudinal character, presenting initial and final comparative measures.

All participants signed the informed consent form to participate in the study and it was approved by the Ethics Committee for Health and authorized by the Administration Board of the Hospital Center.

As the intervention program contemplates the use of specific instruments for the evaluation of the swallowing commitment that were adapted for European Portuguese by national researchers, requests were made and the authorizations of these same researchers were obtained.

The target population consisted of adults and elderly individuals hospitalized in a department of medicine of a Hospital Center of the Regional Health Administration of Lisbon and Vale do Tejo. Patients who were included in the cases were selected between November 1, 2017 and January 6, 2018, and the inclusion criteria of the participants were: Glasgow Coma Scale greater than or equal to 11 points, so as to include in the study the patients with deficit of expression (maximum score in the items "eye opening" and "better motor response"); EAT-10 score greater than or equal to 3 points (suggesting self-perception of commitment in swallowing[4]), FOIS higher than level 1 and lower than level 7 (allowing the inclusion of oral patients but with the ingestion of certain consistencies[5]).

All patients included in the intervention program were assigned a letter, safeguarding their identity and the confidentiality of the data.

A statistical analysis of all the EAT-10 questionnaires applied throughout the intervention program was performed using the IBM-SPSS software version 22.0, facilitating a subsequent descriptive analysis of the results.

PROCEDURES

Initial Evaluation and Intermediate Evaluations

In patients with this type of compromise, a 48-hour interval is advocated for evaluation with EAT-10[4]. In the case of the V-VST, in the bibliography consulted, no information was available on the frequency of evaluation and FOIS is advocated for its application within 24 hours after admission and 3 to 10 days after an initial evaluation[5]. Thus, all patients included in the intervention program were assessed at baseline and intermediate evaluations in a three-hour interval until discharge, service transfer or total functional recovery, avoiding to exceed the recommended time for the application of the FOIS scale.

In each of the intermediary evaluations, in addition to the evaluation instruments mentioned above, the patient's ability to perform swallowing exercises and techniques, the patient's knowledge of swallowing exercises and techniques, and the knowledge of the care provider to promote safe swallowing[13].

During the intervention program, it was possible to collect other data that allowed the interpretation of the ventilatory condition and the nutritional status of the patients. Regarding the ventilatory condition, oxygen saturation, obtained through oximeter

peripheral oximetry, which was monitored and recorded daily. In the context of nutritional status evaluation, the Body Mass Index (BMI) of the patients was monitored every six sessions.

Strategies

Once the swallowing commitment was identified in patients with the initial EAT-10 score and the initial FOIS level obtained in the patient's subjective assessment, each patient was assessed objectively with the V-VST application in order to determine the consistency of the food and the volume that was allowed for safe swallowing. These data made it possible to confirm or corroborate the level of FOIS obtained in the subjective evaluation of the patient and to the recommended base diet and supervision required. Signs of compromised swallowing detected on V-VST were recorded in a recording instrument developed for the purpose.

During the V-VST, clinical manifestations of the swallowing commitment were observed in the various stages of swallowing, as reported in the literature consulted[11,14]. These manifestations were recorded in a recording instrument developed for this purpose, which made it possible to identify the phase of swallowing with greater commitment.

Taking into account the phase of swallowing with the greatest number of dysfunctions, a rehabilitation program was selected, consisting of montion range exercises and muscle strengthening, training of compensatory postures and training of compensatory deglutition maneuvers directed to the detected dysfunctions, as suggested by several authors[11,15,16,17,18]. Three rehabilitation programs were defined to be applied throughout the intervention program, aimed at the swallowing phase with the greatest number of disorders (Table 1).

Table 1 – Therapeutic exercises program , postures and compensatory swallowing techniques[11, 15, 16, 17, 18].

Stage of swallowing with greater number of disorders	Program	Exercises	Duration
Preparatory phase (Program 1)	Muscular Strengthening Exercises	Lips; Tongue; Cheeks; Tongue and Cheeks; Lower jaw	15 minutes
	Compensatory postures	Reclining Position; Cervical extension; Cervical rotation for the less functional side; Cervical rotation to the less functional side and cervical extension; Lateral decubitus with head supported.	10 minutes
	Compensatory techniques / swallowing facilitators	Control of food boluses; Multiple swallowing; Effort swallowing.	5 minutes
Oral Phase (Program 2)	Muscular Strengthening Exercises	Tongue; Cheeks; Tongue and Cheeks; Lower jaw.	10 minutes
	Compensatory postures	Reclining Position; Cervical rotation for the less functional side; Cervical Flexion; Cervical rotation for the less functional side and cervical flexion; Lateral decubitus with head supported.	10 minutes
	Compensatory techniques / swallowing facilitators	Thermal Stimulation; Control of food boluses; Multiple Deglutition; Effort swallowing; Supraglottic swallowing.	10 minutes
Pharyngeal phase (Program 3)	Muscular Strengthening Exercises	Tongue and cheeks; Lower jaw; Larynx.	5 minutes
	Compensatory postures	Reclining Position; Cervical Flexion; Cervical Inclination.	5 minutes
	Compensatory techniques / swallowing facilitators	Thermal stimulation; Effort swallowing; Supraglottic swallowing; Super-supraglottic swallowing; Mendelsohn maneuver; Masako; Shaker Exercise.	20 minutes

Each rehabilitation program had an average duration of 30 minutes[15]. In addition to these rehabilitation programs, other rehabilitation nursing care was built using the language of the International Classification for Nursing Practice (CIPE®)[19] from the nursing diagnoses swallowing compromised; self-care compromised drinking; dependent food; compromised airway clearance; risk of aspiration; risk of dehydration; risk of compromise in nutritional intake; sensory deficit present; compromised body balance; decreased muscle movement[13,19]. Interventions were ensured in all sessions and aimed at recovering the function of swallowing documented by the evolution in the FOIS scale and aimed at the rehabilitation of the patients as a whole.

RESULTS

A total of 77 patients were evaluated in the period in question, but only 7 met the inclusion criteria in the initial evaluation. These patients were assigned a letter (A, B, C, D, E, F and G).

Regarding sociodemographic characteristics, six patients were male and one a female. Three patients were in the 50-year-old age group, three in the 70-year-old age group and one in the 90-year-old age group. Four were married, two were single, and one was a widower.

In the 7 patients who started the intervention program, 2 patients were excluded during the intervention because they did not fulfill the inclusion criteria in the intermediate evaluations. The patient signaled by the letter F left the intervention program at the beginning of the third session and the patient signaled with the letter E at the beginning of the eighth session. The abandonment of these patients was linked to depression in the state of consciousness, resulting in scores in the Glasgow Coma Scale of less than 11 points, which could compromise the safety of the interventions implemented. Thus, 5 patients were integrated and completed the intervention program, resulting in 5 cases.

All 5 patients were compromised in swallowing neurological etiology, and had as their main diagnostic being diagnosis has Cerebral Vascular Accident.

In the initial phase 2 patients (B and D) had an alternative feeding route (nasogastric tube). Not all patients completed the same number of sessions and assessments during the intervention program. Patient A performed a total of 10 sessions, with 4 evaluations, respecting the interval of 3 sessions and remained in the program until the functional recovery of swallowing; the patient B performed 10 sessions, and a total of 4 evaluations

were performed, respecting the interval of 3 sessions and remained in the program until discharge; the patient C performed 7 sessions and a total of 3 evaluations were performed, respecting the interval of 3 sessions and remained in the program until hospital discharge and patient D performed 13 sessions, and a total of 5 evaluations were performed, respecting the interval of 3 sessions, and remained in the program until functional recovery from swallowing. Lastly, patient G completed 7 sessions, 3 evaluations were performed, respecting the interval of 3 sessions and remained in the program until the end of the selection period.

Three patients (A, B and D) had EAT-10 scores lower than or equal to 3 in the final evaluation (table 1). That values suggest the total remission of the symptoms of compromised swallowing[4,5].

Table 1 – Score EAT-10 Synthesis.

Patient	Initial EAT-10 Score	Final EAT-10 Score
A	13	2
B	28	3
C	18	8
D	13	2
G	25	10

Throughout the intervention program the perception of swallowing of patients was evaluated through the application of the EAT-10 tool, for a total of 19 evaluations. The problems perceived more frequently by the patients resided in "swallowing liquids requires a greater effort" and "I eat as when" with averages of 2.16 and 1.95 points (for minimum values of 0 and maximum of 4 points), suggesting these are the perceptions that most concern patients with compromised swallowing.

Regarding the clinical operation of swallowing, through the V-VST method, of the 5 patients, only two (A and D) concluded the intervention program with no signs of compromise in the safety or efficacy of swallowing. It was verified that patient G was the only one who concluded the intervention program still with oxygen saturation below that considered normal during the implementation of such method (table 2).

Table 2 – Synthesis of V-VST/MECV-V Results.

Patient	Evaluation	Signs of Commitment in Security			Signs of Commitment in Effectiveness			
		Cough	↓SpO_2	Vocal Changes	Lip Closure	Oral Waste	Multiple Deglutition	Pharyngeal Waste
A	Initial	X	4%		X	X	X	X
	Final							
B	Initial	X	6%	X				
	Final	X					X	
C	Initial	X	4%	X	X		X	X
	Final	X						X
D	Initial	X			X	X	X	
	Final							
G	Initial		4%				X	X
	Final	X	4%		X	X	X	X

All patients completed the intervention program to tolerate liquid *bolus*.

It was observed that patients had more dysphagia in the pharyngeal phase, and program 3 was chosen more frequently.

We emphasize the high adherence of patients and informal caregivers to the exercises and swallowing techniques proposed. Patients demonstrated increased ability in the exercises and techniques they performed most frequently throughout the intervention program, with greater difficulty in performing the thermal stimulation technique (technique that frequently had to be performed by the nurse) and in the *Masako* maneuver (because it is a technique of difficult execution).

As to patients' knowledge about exercises and swallowing techniques, it was more difficult to understand techniques such as Supraglottic Deglutition, Super Supraglottic Deglutition and *Mendelsohn* Maneuver.

Informal caregivers were not always present at all sessions but correctly apprehended the activities and techniques taught, demonstrating consistent knowledge in the techniques that were common throughout the intervention program, such as recumbent position, cervical rotation, and effort swallowing. Throughout the intervention program, both patients and their informal caregivers gradually acquired knowledge of adapted consistency.

Only one patient (patient G) did not present progression of autonomy in the compromised swallowing diagnosis. In the context of diagnoses of self-care compromised, compromised feeding and compromised airway clearance, all patients presented a positive evolution in the degree of autonomy. As for the diagnostic risk of dehydration present, only one patient (patient A) terminated the intervention program, not evidencing this risk.

Although 4 of the 5 patients studied maintained the risk of aspiration, which was related to their neurological situation, the basal values of peripheral oximetry showed an upward trend after the completion of the intervention program (table 3).

Table 3 – Basal oximetry values (%).

Session	Patient A	Patient B	Patient C	Patient D	Patient G
1	93	98	93	97	94
2	94	98	95	96	95
3	96	94	94	91	97
4	96	95	94	97	98
5	97	94	96	98	97
6	97	96	95	96	98
7	98	97	95	97	98
8	98	97		98	
9	98	97		97	
10	98	97		97	
11				96	
12				97	
13				97	

In these patients the risk of compromise in nutritional intake is a constant. However, throughout the intervention program, no major fluctuations in BMI values were observed. The greater oscillation was verified in patient D with 0.5 kg/m2.

In the analysis of the obtained data we observed that all patients studied presented functional improvement of swallowing, as evidenced by the progression in the FOIS level. It should be noted that two patients (A and D) completely reversed their commitment to swallowing, reaching level 7 on the FOIS scale (Table 4).

Table 4 – Synthesis of categorization in the FOIS scale.

Patient	Initial FOIS	Final FOIS
A	4	7
B	2	6
C	4	6
D	3	7
G	4	6

DISCUSSION

The intervention program results demonstrate that differentiated care in rehabilitation nursing can play a key role in early intervention among patients with compromised swallowing, as nurses are the professionals who stay longer with patients and are responsible for ensuring their autonomy and security[3]. Reinforcing this idea, it is recommended that, for an effective approach of patients with swallowing commitment, consider the need to consider this reality as a priority of multidisciplinary action[20].

Further research is needed to establish the efficacy of rehabilitation in patients with specific swallowing disorders, defining the appropriate treatment to monetize costs and produce positive results in patients[8]. Concurring for this purpose, the cases presented included the evaluation of the swallowing commitment, through appropriate assessment instruments and the implementation of a swallow optimization program in function of the changes detected, interventions that aimed to recover the lost function.

In the process of selecting the most appropriate swallowing rehabilitation program, the use of the EAT-10 and V-VST tools was essential to adequately characterize the observed commitment[4,6].

The commitment of swallowing can cause social and psychological disturbances, leading to feelings of depression and anxiety during meals[4]. The EAT-10 tool has been used to quantify the degree of severity of the symptoms of compromised patients' swallowing, to monitor the effectiveness of the rehabilitation program[4,5] and to identify the problems perceived more frequently and that swallowing. It was found that all patients had a significant reduction of symptoms.

The conjugation of EAT-10 to V-VST shows great precision in the detection of compromised swallowing[6]. The results presented with the application of these instruments emphasize the importance of performing a clinical screening by a trained person, being able to be a nurse, integrating the evaluation of the efficacy and safety of swallowing, determining the presence, severity and mechanism of the swallowing commitment[20]. V-VST was able to detect changes in the safety and efficacy of swallowing and it was found that all patients at the end of the program already tolerated liquid *bolus*. This suggests the effectiveness of planned interventions.

Taking into account the clinical manifestations observed, it was essential to adjust muscle strengthening exercises, compensatory postures and techniques that facilitate swallowing[15]. This adjustment made it possible to individualize the rehabilitation program for each patient.

The functional re-education of swallowing the patient with stroke should include therapeutic measures aimed at increasing oral sensitivity, oral motor exercises and compensatory maneuvers in order to prevent aspiration[21]. These aspects have always been included in the three proposed rehabilitation programs. In the case of stroke patients, the nursing interventions implemented in the field of Motor Functional Reeducation were fundamental for the remission of motor and sensory deficits observed. A positive evolution was observed, mainly in the hemiplegic patients, contributing in a solid way to the accomplishment of the self-care.

Patients have generally demonstrated knowledge and ability to perform exercises and swallowing techniques, and the positive reinforcement is fundamental and necessary for their implementation. The participation of the informal caregiver in the patient's rehabilitation process has proved to be fundamental, reinforcing the importance of their role in the continuity of care[11]. The difficulty of the patients to perform certain techniques, especially with regard to the techniques that facilitated swallowing, was due to

the presence of motor and sensory deficits that prevented their autonomy in performing them.

These conclusions suggest that the intervention program could have a longer duration, since these therapeutic exercises take about 1 to 6 weeks to produce benefits[22]. However, the number of sessions and the program days were within that indicated by a study of the same nature[15].

Through the review of the literature and the results obtained, we believe that nursing rehabilitation care is fundamental in patients with compromised swallowing, recognizing some urgency in a systematized and specialized attention in this field, in order to promote the rehabilitation processes and to promote the capacity to self-care[23]. The importance of the planning of rehabilitation nursing care based on nursing diagnoses in accordance with the observed dysfunction is highlighted. The results show that all the patients presented an improvement in the commitment to swallowing, improving the ventilatory condition and self-care.

The emphasis on respiratory kinesitherapy was fundamental, preventing aspiration pneumonia and optimizing the patient's ventilatory condition[16,24].

Overall, the interventions implemented contributed to the re-education of compromised deglutition, with functional improvement being demonstrated in all patients who completed the program. This was attested by the progression on the FOIS scale. It should be noted that the functional recovery of swallowing has been shown to be directly proportional to the patient's commitment to self-care.

The study of these cases allowed to judge about the importance of the systematic evaluation of the deglutition and the monitoring of the nutritional risk of the patients with strokes that require a continuous effort[25].

CONCLUSIONS

The results achieved with the intervention program made it possible to highlight the effectiveness of the recommended rehabilitation nursing interventions to increase the safety and functionality of patients with swallowing commitment, in the expectation that it could be integrated into rehabilitation nursing care patients.

During midterm evaluations, it was critical to detect the discriminative ability of patients to safely and efficiently feed and hydrate, as was possible with monitoring of the state of consciousness. the use of the EAT-10 tool made it possible to assess the risk of compromise based on the perception of such commitment by the patients, which proved to be of great importance and facilitated patients' involvement in their rehabilitation process. The clinical findings identified with the application of the clinical exploration method (V-VST) were fundamental for the selection of the appropriate rehabilitation program.

In the context of self-care, all patients presented a positive evolution in the degree of autonomy. Only one patient completed the program showing no risk of aspiration, however baseline values for oxygen saturation showed an upward trend, demonstrating the efficacy of Respiratory Function Rehabilitation interventions in these patients. Although all patients presented an increased risk of compromise in nutritional intake, no significant fluctuations were observed in BMI values that demonstrated such a compromise. These data allow us to conclude that nursing interventions have proven to be effective in reversing the patient's commitment to swallowing and have contributed to improve their autonomy.

Of the implementation of this intervention program, some limitations stand out. It would be important, in future research, to extend the time available for program implementation, allowing more meaningful and expressive sampling.

There are not many studies published by nurses in the area of functional re-education of compromised swallowing. The present study may provide a contribution to demonstrate the importance of the role of nurse rehabilitation specialists in caring for patients with this commitment, and further studies are needed in this area.

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