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Speech therapy performance in patients with esophagus cancer receiving radiotherapy treatment: A case series

Atuação fonoaudiológica em pacientes com câncer de esôfago submetidos a tratamento radioterápico: Série de casos

Actuación fonoaudiológica en pacientes con cáncer de esófago en radioterapia: Serie de casos

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Abstract

Introduction: Speech therapy performance in dysphagia resulting from esophageal cancer is still a recent subject. To date, there are no studies describing the speech therapy performance of patients with esophageal cancer undergoing radiotherapy. For this reason, the aim of this study was to describe speech therapy performance in patients with esophageal cancer receiving radiotherapy treatment and with complaints of dysphagia. **Methods:** This is a series of five cases, with patients that received outpatient speech therapy. The patients were assessed using clinical swallowing evaluation, classification of the degree of swallowing alteration with application of visual analog scale and quality of life protocols used in oncology. They also underwent a therapeutic approach to swallowing. **Results:** The patients' swallowing was improved and, at the end of the treatment, there were reduced symptoms of dysphagia, possibility of oral intake of food and improved quality of life. **Conclusions:** Speech therapy, comprising the clinical assessment of the swallowing function, followed by swallowing training and myofunctional

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Authors' contributions:
BLS: Conception of the study; methodological design; data collection; drafting the article.
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exercise to open the upper esophageal sphincter, supported the rehabilitation of esophageal dysphagia.

Keywords: Speech, Language and Hearing Sciences; Esophageal Neoplasms; Radiotherapy; Deglutition Disorders; Quality of Life.

Resumo

Introdução: A atuação fonoaudiológica na disfagia decorrente do câncer de esôfago ainda é recente. Não foi encontrado até o momento, estudos que descrevam a atuação fonoaudiológica em pacientes com câncer de esôfago submetidos a radioterapia. Sendo assim, este trabalho teve como objetivo descrever a atuação fonoaudiológica em pacientes com câncer de esôfago, submetidos a tratamento radioterápico com queixa de disfagia. **Métodos:** Trata-se de uma série de cinco casos, que receberam acompanhamento fonoaudiológico ambulatorial. Os pacientes foram avaliados por meio de avaliação clínica da deglutição, classificação do grau de alteração de deglutição com aplicação de escala visual analógica e protocolos de qualidade de vida utilizados na área da oncologia. Foram submetidos ainda a uma abordagem terapêutica para deglutição. **Resultados:** Os pacientes obtiveram melhora da deglutição, apresentando, ao término do tratamento, diminuição dos sintomas de disfagia, possibilidade de ingesta de alimentos via oral e melhora da qualidade de vida. **Conclusão:** A fonoterapia, compreendendo a avaliação clínica da deglutição, seguida de treino da deglutição e exercício miofuncional para abertura do esfíncter esofágico superior (Shaker), auxiliou na reabilitação da disfagia esofágica.

Palavras-chave: Fonoaudiologia; Neoplasias Esofágicas; Radioterapia; Transtornos de deglutição; Qualidade de vida.

Resumen

Introducción: La actuación fonoaudiológica en disfagia decurrente de cáncer del esófago es todavía reciente. Hasta ahora, no se han encontrado estudios que describan la actuación fonoaudiológica en pacientes con cáncer de esófago sometidos a radioterapia. De esta forma, este trabajo tuvo como objetivo describir la actuación del fonoaudiologo en pacientes con cáncer de esófago sometidos a tratamiento de radioterapia con queja de disfagia.**Métodos:** Esta es una serie de cinco casos, que recibieron terapia fonoaudiologica en ambulatorio. Los pacientes fueron evaluados mediante evaluación clínica de deglución, clasificación del nivel de alteración de la deglución con aplicación de escala visual analógica y protocolos de calidad de vida utilizados en el área de oncología. También fueron sometidos a un enfoque terapéutico para la deglución. **Resultados:** Los pacientes mejoraron su deglución, presentando, al final del tratamiento, una reducción en los síntomas de disfagia, la posibilidad de ingesta de alimentos por vía oral y una mejora en la calidad de vida. **Conclusión:** La terapia fonoaudiologica, que comprende la evaluación clínica de deglución, seguida del entrenamiento de deglución y ejercicio miofuncional para abrir el esfínter esofágico superior, ayudó en la rehabilitación de la disfagia esofágica.

Palabras clave: Fonoaudiología; Neoplasias Esofágicas; Radioterapia; Trastornos de Deglución; Calidad de Vida.

Introduction

Esophageal cancer is a malignant, highly aggressive neoplasm with an insidious onset and an unfavorable prognosis. In Brazil, it is considered to be the 6th most common cancer among men and the 15th among women, except for non-melanoma skin cancer. It is estimated that for each year of the 2018-2019 biennium, there will be 8,240 (3.8%) new cases of esophageal cancer in men and 2,550 (1.3%) in women.[1]

Factors such as the extent of the disease, the patient's clinical condition and specific type of tumor will determine the therapeutic modality to be employed. In cases of resectable diseases, chemotherapy, radiotherapy, surgical resection and/or an association of these modalities are recommended. Frequently, neoadjuvant radiotherapy and chemotherapy are used, followed by surgery.[2]

Individuals with esophageal cancer may present, to a greater or lesser extent, abnormal swallowing, either due to the symptoms caused by the

tumor itself, e.g., sensation of food stuck in the pharyngoesophageal transition because of obstruction in the passage of food, and/or by the type of treatment, such as radiotherapy, chemotherapy and/or surgery. In a recent systematic review, it was found that rehabilitation of oropharyngeal dysphagia after esophagectomy is effective through breathing exercises, exercises, namely pursed-lip breathing, cervical range of motion (head tilted forward, backward and sideways), shoulder lengthening, jaw opening, isometric and isotonic exercises for the tongue (protrusion, retraction, elevation and lowering), suprahyoid muscle strengthening exercise (isometric and isotonic Shaker exercise), in addition to the use of maneuvers to protect the airways, such as the chin-down maneuver during swallowing.[3] However, to date, no descriptions of the therapeutic approach have been found for speech therapy for patients with esophageal dysphagia undergoing exclusively combined treatment (chemotherapy and radiotherapy).

Given the scarcity of publications on the topic, case reports are necessary to start the process of expanding, deepening and producing scientific evidence about the therapeutic approaches used in speech therapy rehabilitation of patients with esophageal cancer. This fact justifies the importance of this study, whose objective is to describe speech therapy performance in patients with esophageal cancer, with complaint of dysphagia, during radiotherapy treatment.

Clinical case reports

This is a descriptive case-report study, approved by the institution's Research Ethics Committee, under the opinion number 3,109,023. All participants signed an Informed Consent Form.

The sample consisted of adult individuals, diagnosed with esophageal cancer, who had undergone radiation treatment combined or not with chemotherapy, from April to July 2019, who presented complaints of dysphagia and were referred to a Speech-Language Pathology Service. Patients were excluded if they had undergone surgical procedures in the pharyngoesophageal region, had a previous history of other neoplasms, and had metastases, in order to focus more particularly on esophageal issues. According to these criteria, five cases were selected for description.

- Case 1 - Female; 79 years old; widow; retired; three years of schooling; hypertensive; non-alcoholic drinker and/or non-smoker; family history of laryngeal cancer (mother). She sought medical care because she had complaints of abdominal pain after eating and weight loss; diagnosed with invasive adenocarcinoma of the distal esophagus; with recommendation for radiotherapy and chemotherapy. She was fed exclusively through a nasogastric (NG) tube.
- Case 2 - Female; 45 years; married; housewife; 11 years of schooling; without comorbidities; non-alcoholic and/or non-smoker; family history of uterine cancer (mother and sister). When she sought medical care, she had complaints of dysphagia, odynophagia and weight loss; she was diagnosed with distal esophageal squamous cell carcinoma; radiotherapy and chemotherapy and surgery after combined clinical treatment were recommended. She was fed through exclusive a NG tube.
- Case 3 - Female; 84 years; married; retired; four years of schooling; hypertensive; diabetic; non-alcoholic and/or non-smoker; no family history of cancer. She sought medical care with a complaint of dysphagia for solids, weight loss and a history of recent gastric ulcer; she was diagnosed with distal esophageal adenocarcinoma. Exclusive radiotherapy was recommended. She was fed orally with thick puree food.
- Case 4 - Male; 60 years; divorced; retired; one year of schooling; cardiopath; pneumopathic patient; ex-drinker and ex-smoker; family history of stomach cancer (grandfather). He sought medical care with a complaint of dysphagia for solids and weight loss; diagnosed with squamous cell carcinoma of the middle third of the esophagus; recommendation for chemotherapy and radiotherapy. He was fed orally with semi-solid food.
- Case 5 - Male; 68 years old; married; retired; five years of schooling; presenting comorbidities such as alcoholic cirrhosis; left iliac aneurysm; right-sided heart failure; atrial fibrillation; seropositive. Ex-drinker and ex-smoker; family history of stomach cancer (brother) and breast cancer (daughter). He sought medical care because he had dysphagia for solids and weight loss. He was diagnosed with squamous cell carcinoma invading the middle third of the esophagus. Recommendation for chemotherapy and radiotherapy. He was fed orally with semi-solid food.

The patients received weekly speech therapy, with 40-minute sessions, by the same speech therapist, throughout the radiotherapy treatment. The service has routine assessment protocols described below.

All the patients underwent indirect swallowing assessment, in which sensitivity, mobility, tone and function of the phonoarticulatory organs were assessed, as well as direct swallowing assessment, with different food consistencies, in order to check each patient's oral inventory, according to the institution's specific protocol. The oral inventory was established by means of the following classification:[4] saliva, thin liquid, slightly thick liquid, mildly thick liquid (nectar thick), moderately thick liquid (honey thick), extremely thick liquid (pudding thick), puree, semi-solid and solid. The level of oral intake was determined by means of the Functional Oral Intake Scale (FOIS)[5].

To classify the degree of swallowing impairment, the Visual Analogue Scale (VAS) was used. This scale scores this impairment from zero to ten, with ten being the maximum value, equivalent to severe impairment; five a moderate value, equivalent to moderate impairment; and zero a null value, equivalent to no impairment. This instrument shows the evolution of swallowing impairment.

Health-related quality of life was assessed using questionnaires used in the field of oncology from the European Organization for Research and Treatment of Cancer (EORTC): the EORTC QLQ-C30 and the EORTC QLQ-OES18. The EORTC QLQ-C30 questionnaire, which was translated and validated for Brazilian Portuguese,[6] contains 30 general quality of life issues, and it is used for any type of cancer. It is divided into three scales: global health status and quality of life, functional and symptoms. This instrument is generally used together with other modules, specific to each tumor, particularly, esophageal cancer in this study.

The EORTC QLQ-OES18 questionnaire, validated for Portuguese,[7] contains 18 specific questions about esophageal cancer. The instrument is divided into two scales: functional and symptoms. For the interpretation of the results of the two instruments, the standards of the EORTC manual are used.[8] The higher the functional scale, the better the quality of life, while a high score on the symptom scale represents a low level of tolerance to symptoms and side effects.

The results presented by the patients were described using the instruments applied at each speech therapy session, namely, clinical evaluation of swallowing to determine the level of oral intake (Table 1), the food consistencies favorable to each patient (Table 2) and AVS (Table 3). In addition, quality of life protocols were applied at the beginning and at the end of speech therapy and radiotherapy treatments: QLQ-C30 version 3.0 (Table 4) and QLQ-OES18 version 2.0 (Table 5).

Table 1. Level of oral intake in each speech therapy session - FOIS Scale

Case	1st session	2nd session	3rd session	4th session	5th session	6th session	7th session
C1	1	2	2	3	3	3	-
C2	1	1	2	2	2	2	-
C3	5	5	3	3	3	3	-
C4	6	6	6	7	7	7	-
C5	6	6	6	6	7	7	7

Caption: C – case.

Table 2. Evolution of food consistency in each speech therapy session

Case	1st session	2nd session	3rd session	4th session	5th session	6th session	7th session
C1	Saliva	Thin liquid	Nectar	Pudding/ Puree	Pudding/ Puree	Semi-solid	-
C2	NO	Saliva	Thin liquid	Nectar	Nectar	Honey	-
C3	Pudding/ Puree	Pudding/ Puree	Pudding/ Puree	Honey	Honey	Honey	-
C4	Semi-solid	Semi-solid	Semi-solid	Solid	Solid	Solid	-
C5	Semi-solid	Semi-solid	Semi-solid	Semi-solid	Solid	Solid	Solid

Caption: C - case; NO - nothing orally.

Table 3. Visual analogue scale in each speech therapy session

Case	1st session	2nd session	3rd session	4th session	5th session	6th session	7th session
C1	10	5	4	2	2	2	-
C2	10	7	5	2	2	2	-
C3	4	6	6	7	7	7	-
C4	2	2	2	0	0	0	-
C5	4	2	2	3	2	2	0

Caption: C – Case.

Table 4. Average scores of quality of life scales before and after speech therapy and radiotherapy, according to QLQ-C30

Scales of the QLQ-C30	Treatment period	C1	C2	C3	C4	C5
Global health Status and quality of life	Before	100	100	75	83.33	75
	After	41.66	100	75	100	66.66
Functional	Before	13.33	4.44	11.11	24.44	13.33
	After	31.11	8.88	57.77	17.77	6.66
Symptoms	Before	10.25	15.38	17.94	15.38	5.12
	After	61.53	15.38	51.28	7.69	10.25

Caption: C – Case.

Table 5. Average scores of quality of life scales before and after speech therapy and radiotherapy, according to QLQ-EOS18

Scales of the QLQ-EOS18	Treatment period	C1	C2	C3	C4	C5
Functional	Before	11.11	11.11	33.33	77.77	66.66
	After	22.22	22.22	11.11	88.88	88.88
Symptoms	Before	22.22	33.33	28.88	4.44	6.66
	After	28.88	17.77	40	2.22	2.22

Caption: C – Case.

After the evaluations, therapy sessions were held. Speech therapy was based on the data of the evaluations that pointed to the therapeutic plan. The therapy session started by listening to the patients and making them aware of the treatment goals and each procedure, followed by a direct evaluation of swallowing using food and practice of exercises to improve the motor gesture. In all cases, the Shaker technique was applied in the form of isometric and isotonic exercises,[9] since all patients reported the sensation of food stuck in the region of the pharynx and esophagus. The patients were instructed to perform the exercise during health care and in their household, three times a day. In addition, they were asked to fill out an exercise diary, as a way to ensure they had adhered to the treatment. Four

patients had a total of six speech therapy sessions, depending on the radiotherapy period, and one of them had seven sessions, because the radiotherapy of such patient lasted for seven weeks.

Discussion

Speech therapy started being used in cases of esophageal cancer just recently, but there is an increase in demand and referrals for these patients because of pharyngeal and/or esophageal dysphagia. This study presented a series of cases and showed that, for patients with esophageal cancer undergoing radiotherapy, clinical evaluation must include instruments to check the swallowing function, especially at the esophageal level, as well as quality of life.

Histologically, esophageal cancer can be classified into two main types: squamous cell carcinoma and adenocarcinoma. The first type mostly affects the upper and middle thirds of the esophagus, with alcoholism and smoking as risk factors. The second type occurs in the lower third, which can result in intestinal metaplasia because of chronic gastric reflux. Risk factors include obesity, smoking and Barrett's esophagus.[10] That finding is in agreement with the data collected from patients described in this report, in which esophageal abnormalities in the distal third were found in patients who were not smokers or drinkers (Cases 1, 2 and 3). In contrast, the two patients who had esophageal abnormalities in the middle third had a history of smoking and drinking (Cases 4 and 5).

Regarding the patients' symptoms, there was a predominance of dysphagia for solids and weight loss. These data corroborate those of another study[11] which described the following symptoms as resulting from esophageal cancer: dysphagia, odynophagia, retrosternal discomfort, foreign body sensation in the esophagus, epigastric pain, fever, fatigue, nausea, vomiting after meals, dehydration, changes in voice quality and weight loss without a clear cause. The symptoms reported in this study are due to the esophageal obstruction caused by the tumor in this organ.

In speech therapy, the Shaker technique was applied in the form of isometric and isotonic exercises[9] in all reported cases, since the main complaint of the patients was dysphagia for solids and sensation of food stuck in the pharyngoesophageal region. The Shaker technique has been used in other studies[12], including those with dysphagic patients with a dysfunctional upper esophageal sphincter (UES), because it is based on the elevation and anteriorization movements of the larynx. These movements result from the traction of the mylohyoid, thyrohyoid, geniohyoid muscles and the anterior belly of the digastric muscle, resulting in the opening of the UES. It can be inferred that the practice of the Shaker exercises during radiotherapy may have resolved the complaints of esophageal dysphagia. The weekly speech therapy service and the monitoring of the exercises performed by filling in a diary may have increased adherence to therapy and, consequently, improved the symptoms of swallowing impairment.

In the cases reported, there was an improvement in oral intake of food from the beginning to the end of speech therapy/radiotherapy, when the results of the FOIS scale were analyzed, except for a single patient who needed to use a NG tube for food intake during radiotherapy. This finding shows that speech therapy, associated with radiotherapy and/or chemotherapy, can improve oral intake of food, since the aim of speech therapy exercises is to maximize the swallowing function and, consequently, assist in esophageal motility, while the tumor decreases as a resulting from the treatment of cancer. Importantly, the oral diet could be maintained, in the case of the patient who needed to use the NG tube, because a mixed diet with involution of food consistency was introduced as a compensation strategy, in the face of the patient's worse performance, resulting from treatment complications.

As for food consistency, some adaptations were required during the treatment. In most cases (four), there was a gradual increase of consistency. Only one patient needed to regress the consistency of the diet, from a thick pureed diet to moderately thick liquids (honey thick), because of poor general condition resulting from neoadjuvant chemotherapy. Importantly, the two patients who had difficulty even in swallowing saliva at first, managed to swallow thin liquid orally after two weeks of speech therapy. It has been described in the literature[13] that the symptoms resulting from radiotherapy in the esophageal region take about two weeks to appear, since the latency time for tissue response depends on the physiological rates of cell differentiation, loss and renewal. Latency time is slower in this organ. Thus, it can be seen that patients benefited

from speech therapy before radiotherapy started to cause structural changes.

In the same way that the progression of food consistency occurred, the patients reported improvement in swallowing. i.e., it became more comfortable, and they showed a reduction of the VAS values. The most significant changes were identified as of the fourth session. Given the above, it can be seen that the vast majority of patients who received speech therapy during radiotherapy treatment maintained or improved their eating performance during the treatment, unlike the results from clinical practice in patients who do not undergo speech therapy. Most of the time, they remain without an oral route and eventually have more intense eating difficulties.

Quality of life is another crucial point in these cases, since the overall survival rate of patients with esophageal cancer is small and they are susceptible to complications resulting from neoadjuvant treatment, with chemotherapy and radiotherapy[11]. The analysis of the data collected in the questionnaire EORTC QLQ-C30 showed that the majority of the patients showed improvement in their global health status and quality of life at the end of the radiotherapy and speech therapy treatment. Regarding the functional scale, there was an improvement in most patients, especially in issues related to emotional state, physical condition and role performance, since these patients started to interact more in their social relationships when they resumed and/or improved oral intake of food. As to the scale of symptoms, there was also an increase in most cases at the end of treatment, when compared to the beginning of radiotherapy, with fatigue, pain, loss of appetite, nausea and vomiting being the most prevalent. These latter symptoms, in turn, were presented by patients who undergo the combined treatment of radiotherapy and chemotherapy. These data corroborate those of another study[14] which reported that the five most affected symptoms in QLQ-C30, in patients undergoing the same combined treatment, in decreasing order, were fatigue, loss of appetite, pain, nausea/vomiting and dyspnea. By contrast, in the same study, there was a significant decline in health-related quality of life, with physical condition and role performance being the most impaired functions after treatment.

The results of the EORTC QLQ-OES18 questionnaire, which contains specific questions about esophageal cancer, showed a functional improvement in terms of dysphagia complaints, associated with a better quality of life, in four patients. This finding is in line with the findings of another study[15], which reported that dysphagia improved after the neoadjuvant treatment. The only patient whose dysphagia worsened was the one who showed an overall poor health condition after chemotherapy sessions. With regard to the scale of symptoms, there was a decrease in the symptoms presented: food, reflux and difficulty in swallowing saliva. There was also an increase in complaints of pain and problems with taste at the end of radiotherapy, which is consistent with data from the literature regarding the adverse effects of radiotherapy[16].

Conclusion

In view of the above, it can be concluded that speech therapy activities occurred early, precisely in the first radiotherapy session, with therapeutic interventions that sought to alleviate the symptoms and, consequently, improve the patients' quality of life. The assessment of functional impact and quality of life should be considered as important factors when choosing the therapeutic modalities used in cancer treatment, especially when they result in similar survival times, as indicated tumor control. It is through this evaluation that one can realize the degree of improvement, stability or worsening that results from the treatment.

The Shaker technique, in the form of isometric and isotonic exercises, was used in all patients during speech therapy. The effects of speech therapy were measured through the clinical evaluation of swallowing and the application of quality-of-life protocols used in the field of oncology from the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30 and EORTC QLQ-OES18). It is inferred that the intervention contributed to the maintenance of functional swallowing and to the improvement of swallowing impairment.

Future studies should seek the use of objective swallowing exams, such as videofluoroscopy, to observe physiological events in the esophageal phase of swallowing in the face of maneuvers performed, to support subsequent clinical trials with a therapeutic protocol.

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