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Some aspects of complex rehabilitation of patients with acquired defects and deformities of the oropharyngeal area

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ABSTRACT

The aim of this study was to assess the features of disturbed food intake and find ways to optimize rehabilitation and resocialization processes for patients with acquired defects and deformities of the oropharyngeal zone.

Materials and methods. The study included 86 patients of a surgical hospital with defects and deformities of the oropharyngeal zone: 59 men and 27 women. The degree of dysphagia was assessed using clinical scales: volume-viscosity swallow test (V-VST) [7] and swallowing disability scale (SDS) [7]. Rehabilitation measures to normalize swallowing were performed in the experimental group (I), which consisted of 42 patients. The control group (II) consisted of 40 patients and was not included in the restorative effect. The groups were balanced according to the severity of the disorder, sex and age. Comparative analysis of the severity of impaired swallowing before and after rehabilitation and evaluation of its effectiveness were conducted.

Results. Data from the study of the dysphagia degree on the SDS scale for the whole sample ($n = 82$) suggest that the degree of disorder manifestation depends on the location and extent of anatomical defect. Moreover, comparative analysis suggests that the presence of a combined defect exacerbates the severity of dysphagia. Step-by-step speech therapy in the control group aimed at overcoming swallowing disorders included adaptive, compensatory and restorative strategies used in various combinations depending on the location of the defect and the severity of dysphagia. The comparison of the repeated assessment data on dysphagia severity in two groups of patients (I and II) showed that the rehabilitation measures had a positive impact.

Conclusion. We can state that speech therapy, which is a non-drug and non-invasive rehabilitation method, allows patients to successfully normalize eating process and helps in preventing cachexia-anorexia and dehydration, which is important for a successful postoperative period, as well as for improving the life quality of patients.

Key words. Dysphagia, swallowing disorders, oropharyngeal zone, speech therapy, rehabilitation, postoperative defects and deformities of the oropharyngeal region.

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Conformity with the principles of ethics. An initial conversation was conducted with each patient, informing them about the purpose, tasks, methods and techniques of pedagogical impact on the eating process normalization. All patients signed an informed consent to participate in the study.

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Некоторые аспекты комплексной реабилитации пациентов с приобретенными дефектами и деформациями орофарингеальной зоны

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РЕЗЮМЕ

Цель: оценка особенностей нарушений процесса приема пищи и поиск путей оптимизации процесса реабилитации пациентов с приобретенными дефектами и деформациями орофарингеальной зоны.

Материалы и методы. В исследование были включены 86 пациентов хирургического стационара с дефектами и деформациями орофарингеальной зоны: 59 мужчин и 27 женщин. Степень дисфагии оценивалась с помощью клинических шкал: Volume Viscosity Swallow Test (V-VST), Swallowing Disability Scale (SDS). Реабилитационные мероприятия по нормализации глотания проводились в экспериментальной группе (I), которую составили 42 пациента. Группа контроля (II), не включенная в восстановительное воздействие, состояла из 40 пациентов. Группы были уравновешены по тяжести дефекта, полу и возрасту. Проведен сравнительный анализ выраженности нарушений акта глотания до и после восстановительного воздействия и оценка его эффективности.

Результаты. Данные исследования степени дисфагии по шкале SDS по выборке в целом ($n = 82$) позволяют говорить о наличии зависимости степени проявления нарушения от места и объема анатомического дефекта. Причем сопоставительный анализ позволяет утверждать, именно наличие комбинированного дефекта усугубляет тяжесть дисфагии. Поэтапно проводимое в контрольной группе логопедическое воздействие, нацеленное на преодоление расстройств глотания, включало в себя адаптивные, компенсаторные и восстановительные стратегии, применяемые в различных комбинациях в зависимости от локализации дефекта и тяжести дисфагии. Результаты сопоставления данных повторной оценки тяжести дисфагии у двух групп пациентов (I и II) показали, что проведенные реабилитационные мероприятия оказали положительное влияние.

Заключение. Таким образом, можно утверждать, что логопедическое воздействие, которое относится к немедикаментозным, неинвазивным методам реабилитации, позволяет успешно нормализовать процесс приема пищи, способствует профилактике кахексии-анорексии и дегидратации, что важно для успешного течения послеоперационного периода, а также улучшения качества жизни пациентов.

Ключевые слова: дисфагия, нарушения глотания, орофарингеальная зона, логопедическое воздействие, реабилитация, послеоперационные дефекты и деформации орофарингеальной области.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии источников финансирования при проведении исследования.

Соответствие принципам этики. С каждым из пациентов была проведена первичная беседа, информирующая о целях, задачах, методах и приемах педагогического воздействия по нормализации процесса приема пищи. Все пациенты подписали информированное согласие.

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INTRODUCTION

Currently, most experts support the view that eating disorders increase the risk of postoperative complications, and adequate and timely correction makes it possible to reduce their frequency after surgery, as well as to increase the treatment tolerance and life quality of patients [1]. In patients with cachexia-anorexia syndrome, the overall results of treatment deteriorate in proportion to the degree of body exhaustion. Today, it is obvious for specialists that nutritional support is a necessary part of accompanying therapy in the treatment of patients, including those with a surgical profile [2–5]. Within multidisciplinary approach, it is a convincing proof that a dietitian should participate in a rehabilitation process [6]. However, there are categories of patients with various types of eating disorders, for example, caused by structural or neurogenic disorders in head and neck [7–9]. In these cases, a rehabilitation process is more complicated, and it requires special approaches to recovering of impaired functions and inclusion of a dysphagia rehabilitation specialist into a multidisciplinary team.

Eating process is important not only for life quality, but also for social integration. In this context, it is important to mention an extremely difficult contingent of children with congenital cleft lip and palate, as well as patients with acquired defects and deformities of the oropharyngeal area because of various injuries or anti-neoplastic treatment. These anatomical areas are important for chewing, swallowing, breathing, and speech production. Therefore, inevitably occurring disorders of the above functions significantly worsen the body exhaustion and complicate treatment and rehabilitation [10].

This issue is most acute after surgical removal of neoplasms of the oropharyngeal area. According to G. Nitenberg and B. Raynard, malnutrition is detected in 40–80% of patients with head and neck tumors [1]. Alimentary disorders are the main cause of developing complications or increase them. Our observations suggest that 64.7% of patients after oropharyngeal surgeries reported significant weight loss (more than 10 kg within 3 months after surgery).

According to J. Logemann, the act of swallowing involves several successive stages: placing food in the oral cavity (oral-preparatory phase), passing it through the oral cavity (oral-transfer phase), transporting through the pharynx to the cricopharyngeal sphincter (pharyngeal phase), the process of overcoming the pharyngeal-esophageal junction and getting food into the esophagus (esophageal phase) [12]. Thus, anatomical defects of the oropharyngeal area with high probability lead to so-called “pre-swallowing” disorders that occur before the swallowing reflex is triggered. The result of such swallowing disorders will be the development of malnutrition and dehydration. Thus, according to S.A. Kravtsov, N.V. Kirillov and T.V. Korshunova, one of the main reasons of nutritional insufficiency development is post-resection defects of the oropharyngeal area [2].

Unfortunately, there is not enough information on the pathogenesis and correction of these disorders in specialized literature. This explains the lack of awareness in specifics of working with this pathology. Traditionally, it is a speech pathologist who treats swallowing and speech disorders, but this issue is not clearly defined within a multidisciplinary rehabilitation program yet.

The aim of our research is to assess the features of disturbed food intake and find ways to optimize rehabilitation for patients with acquired defects and deformities of the oropharyngeal zone.

MATERIALS AND METHODS

This multicenter parallel study was conducted from 2017 to 2019 at FSAI “LRC” of Health Ministry of the Russian Federation and PHI CCH “RZD-Medicine”. The study was open, non-randomized, longitudinal, panel, and controlled.

86 patients of the surgical hospital with postoperative defects and deformities of the oropharyngeal area were examined: 59 men and 27 women. The entry criterion was the disturbed pre-swallowing phase of eating. Later 4 patients were excluded from the study due to the main disease progression.

The experimental group (I) included 42 patients, 26 men and 16 women. These patients underwent a full course of speech therapy for correcting dysphagia during 2.5–3 months. The control group (II) consisted of 40 patients (29 men and 11 women) with similar swallowing disorders who, due to various objective and subjective circumstances, were unable to complete a full rehabilitation course aimed at dysphagia treatment. The groups were balanced according to the severity of the defect, sex and age. The control group was examined for swallowing act problems and consulted. A repeated examination was performed in both groups of patients during their planned hospitalization after 3 months.

Examination and case management of patients were carried out by the multidisciplinary team of specialists. After removal of nasogastric tubes, all

observed patients underwent a postoperative speech examination. With the help of a surgeon, their swallowing process was tested by asking them to swallow food and liquids of various consistencies (the volume viscosity swallow test (V-VST) [7]. To determine a diet type for each patient, the degree of dysphagia was also assessed (swallowing disability scale (SDS)) [7]. According to this scale, a score of 0 points was considered as no dysphagia, 1 point – light dysphagia, 2 points – medium-light dysphagia, 3 points – medium dysphagia, 4 points – medium-severe dysphagia, 5 points – severe dysphagia, 6 points – aphagia, lack of ability to take food perorally and the need for a nasogastric tube or gastrostomy. It was also visually assessed which swallowing phase demonstrated most severe disorders.

After detecting dysphagia, speech therapy was used to eliminate swallowing disorders, differentiated by stage and the degree of severity. In the course of speech therapy, compensatory, adaptive and restorative strategies were employed.

The IBM SPSS Statistics 22.0 statistical package was used to process the received data.

RESULTS AND DISCUSSION

Among patients with acquired food intake disorders caused by "pre-swallowing" disorders, difficulties are observed in the oral-preparatory and oral-transfer phase of the swallowing act or in both phases. The problematic phase is determined by the location and extent of anatomical defect. The number of patients with one or another problem in the "pre-swallowing" phase is shown in Table 1, which demonstrates that groups I and II are comparable in frequency of occurrence of various disorders.

Table 1

The localization of violations in eating acts (phases of the "pre-swallowing" cycle)

Disturbed phase before swallowing cycle	Group I (n = 42)	Group II (n = 40)	The sample as a whole (n = 82)
Oral-preparatory (subgroup 1)	7 (16.7%)	9 (22.5%)	16 (20%)
Oral-transfer (subgroup 2)	20 (47.6%)	18 (45%)	38 (46%)
Combined (subgroup 3)	15 (35.7%)	13 (32.5%)	28 (34%)

Note. Number of patients – n.

Data on the degree of dysphagia on the SDS scale [7] for the sample as a whole (n = 82) allow to claim that the degree of disorder manifestation depends on the location and extent of anatomical defect. The Mann – Whitney U-test for independent samples is significant when comparing the subgroups 1 and 3 ($p < 0.0001$), as well as the subgroups 2 and 3 ($p < 0.0001$), and is not significant when comparing subgroups 1 and 2 ($p < 0.249$), which suggests that it is the combined defect that aggravates the severity of dysphagia. Figure 1 shows differences in the frequency of occurrence for different degrees of dysphagia in patients with different problematic phases in the pre-swallowing cycle.

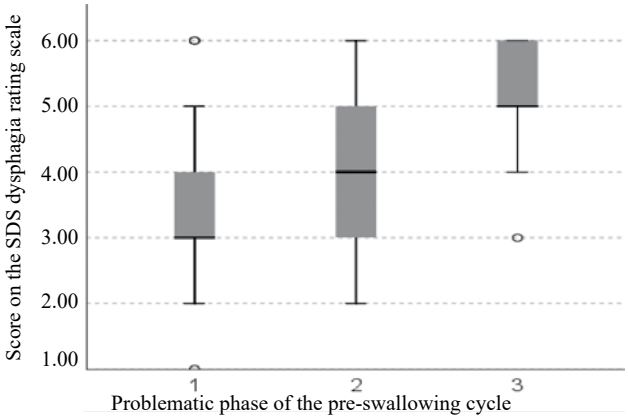

Fig. 1. Severity of dysphagia for various phases of the pre-swallowing cycle

These data were taken into account when defining the strategy of rehabilitation measures.

Then, patients in the group I underwent a course of speech therapy aimed at normalizing the eating process. Speech therapy began in a hospital, where classes were held daily for 7–10 days, and then continued on an outpatient basis, on average 2–3 times a week for 2 months. After completing the course on normalization of the swallowing act, the food intake process was evaluated again in 3 months.

The content of speech therapy for dysphagia correction is correctional-pedagogical work in the following ways: teaching hygienic care of the oral cavity; static and dynamic (active and passive) gymnastics aimed at normalization of swallowing, recovery of the functional activity of the preserved muscles involved in the swallowing act (chewing, mimic muscles, tongue muscles), as well as stimulation of the oral mucosa sensitivity; if necessary, "disinhibition" of the swallowing act; differentiated (activating/relaxing) massage of the face and cheeks from the outside and inside, massage of the tongue and soft palate, neck and shoulder girdle (with caution, after discussing it with a surgical oncologist); recovery of coordination between swallowing, breathing and phonation.

When treating swallowing disorders of a peripheral genesis by pedagogical methods, we followed the certain steps:

1. Preparatory – establishing contact, assessing the manifestation degree of swallowing disorders, physiologically conditioned phonation breathing, passive and active articulatory gymnastics, recommendations on nutrition (food consistency) and conversations aimed at supporting and motivating the patient to recover.

2. Active training – restoration of the functional activity of the muscles involved in the swallowing act with the help of static and dynamic articulatory gymnastics, the formation of the skill of "safe swallowing" using adaptive and compensatory technologies.

3. Consolidation of the restored skills and the formation of a stable stereotype of "safe" swallowing (coordination of swallowing, phonation and breathing).

From the viewpoint of corrective action, the restoration of swallowing function is possible through restoring the motor function of intact anatomical structures. Because of a significant anatomical defect in the tongue tissues and floor of the oral cavity, there can arise severe difficulties. An effective movement (migration) of the bolus to the pharynx (into the oropharynx) for a subsequent swallow can be even impossible. In this case, during the postoperative period patients often complain about the accumulation of food in the mouth or their inability to swallow it. In this regard, the use of postural techniques and the selection of textures for swallowing is particularly relevant in rehabilitation of the swallowing function.

On the one hand, the texture of the bolus should be moderately viscous (solid) so that the intact neuromuscular zones "have time" to react to the bolus and activate for the act of swallowing. On the other hand, this texture must be sufficiently liquid (fluid) so that when the head is thrown back, the bolus can automatically move to the pharynx for swallowing, which becomes especially relevant in the case of extensive tongue resections. The optimal (to be transported through the oral cavity) food consistency was selected empirically, individually for each patient.

Since the wound healing process in this case can be time-consuming, and there are often a number of objective reasons that impede eating through natural ways, an important component of speech therapy is to inform not only medical personnel, but also a patient and his family about the rules and peculiarities of food intake in the postoperative period. These rules must be followed in case of such swallowing disorders. After removal of the nasogastric tube, food should be eaten in a sitting, half-sitting position, or lying on the side with the chin raised as in this case aspiration is less likely. In severe cases, when swallowing food is completely impossible, the patient continues to use a nasogastric tube, and then feeding can be carried out through a gastrostomy tube.

At the end of the course aimed at normalizing the act of swallowing, the food intake process was evaluated again.

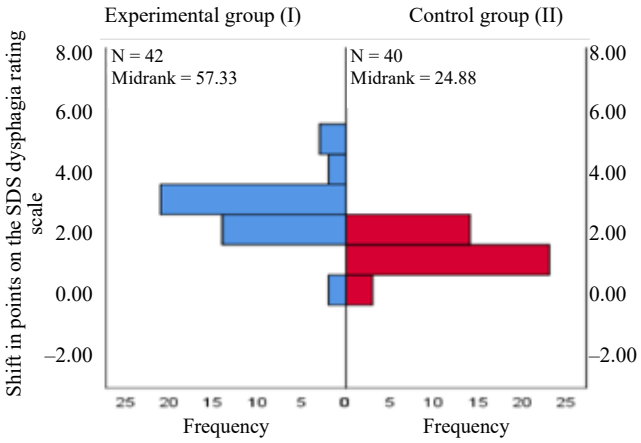

Fig. 2. SDS scale shift in two groups of patients (points)

The repeated assessment of the dysphagia severity was carried out, the results of two groups of patients (I and II) were compared. They showed that the rehabilitation measures carried out in the group I had a positive impact. Differences in the shift on the SDS scale [7] (the difference in points between the first and the second assessment of the dysphagia degree) between the groups were significant (Mann – Whitney *U*-test, $p < 0.0001$). Figure 2 demonstrates the frequency of improvement degree (in 0, 1, 2, 3, 4, 5 points) in two groups (I – took the rehabilitation course; II – did not take the rehabilitation course).

CONCLUSION

Among patients with acquired anatomical defects and deformities of the oropharyngeal area, disturbances of the food intake act at the "pre-swallowing" stage are observed. These disorders manifest in the oral-preparatory or oral-transfer phase or in both phases, and require immediate normalization. Moreover, the presence of a combined defect aggravates the severity of dysphagia. Eating process is a vital function, so normalizing food intake in the postoperative period is an integral part of speech therapy of acquired swallowing disorders. Corrective action, which refers to non-drug and non-invasive rehabilitation methods, includes compensatory, adaptive and restorative strategies. This allows successful normalization of the eating process and helps to prevent cachexia-anorexia and dehydration, which is important for a successful postoperative period, as well as for improving the life quality of patients.

REFERENCES

1. Loeser K., Adends J., Huebner J. Nutrition in modern oncology. 1st ed. Bremen: UNI-MED, 2013: 128 (in Russ.).

2. Kravtsov S.A., Kirillov N.V., Korshunova T.V. Algorithm of nutritive support in patients with oropharyngeal malignant neoplasms. *Head and Neck Tumors (HNT).* 2016; 6 (2): 26–34 (in Russ.). DOI: 10.17650/2222-1468-2016-6-2-26-34.
3. Mudunov A.M., Udintsov D.B. Nutritional support of patients after surgical treatment for oral squamous cell carcinoma. *Head and Neck Tumors (HNT).* 2017; 7(3): 47–52 (in Russ.). DOI: 10.17650/2222-1468-2017-7-3-47-52.
4. Osipova N.A., Reshetov I.V., Sokolov V.V., Pankratova M.A., Filushin M.M., Dolgopolova T.V., Sevryukov F.E. Enteral nutritional support in surgical treatment of patients with head and neck tumors. *Oncosurgery*. 2010; 2(4): 22–25 (in Russ.).
5. Udintsov D.B. Correction of malnutrition in patients with oropharyngeal squamous cell carcinoma. *Head and Neck Tumors (HNT)*. 2015; 5(3): 13–15 (in Russ.). DOI: 10.17650/2222-1468-2015-5-3-13-15.
6. Elia M. Screening for malnutrition: A multidisciplinary responsibility. Development and use of the Malnutrition Universal Screening Tool (MUST) for adult. Maidenhead: British Association for Parenteral and Enteral Nut, 2003.
7. Guntram V., Ikenstein et al. Diagnosis and treatment of neurogenic dysphagia. Bremen–London–Boston: UNI-MED Verlag AG (in Russ.).
8. Bruno E. Practical guide for the diagnosis and rehabilitation of impaired swallowing (based on research and practice in the United States). Ed. I.A. Avdyunina. M., 2015: 61 (in Russ.).
9. Avdyunina I.A. Swallowing disorders in diseases of the nervous system. In: Rehabilitation of Neurological Patients. Ed. A.S. Kadykova, L.A. Chernikova, N.V. Shakhporonovoy. M.: MEDpress-inform, 2008. 393–445 (in Russ.).
10. Levchenko I. Yu., Agaeva V.E. Modern possibilities of complex rehabilitation of children with congenital cleft lip and palate. *Pediatria*. 2017; 96 (5): 217–221 (in Russ.). DOI: 10.24110/0031-403X-2017-96-5-217-221.
11. Nitenberg G., Raynard B. Nutritional support of the cancer patient: issues and dilemmas. *Crit. Rev. Oncol. Hematol*. 2000; 34 (3): 137. DOI: 10.1016/s1040-8428(00)00048-2.
12. Logemann J.A. Evaluation and treatment of swallowing disorders. Austin, Tex: PRO-ED, 1998: 406.

Authors contribution

Uklonskaya D.V., Kosova E.V. – conception and design, carrying out of research, analysis and interpretation of data, drafting and justification of the manuscript. Neklyudova M.V., Reshetov D.N. – critical revision of the manuscript for important intellectual content. Uklonskaya A.A. – analysis of modern foreign sources on the research topic, compilation of databases, statistical processing.

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