

### Comparative Study of Treatment Results between Two Methods of Dissection of Lymph Nodes in Laryngeal Cancer (Radical and Modified)

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#### ABSTRACT

*The problem of choosing treatment tactics arises in patients with locally widespread regional metastases on the neck, especially when the examination reveals the involvement of the carotid arteries in the tumor process. The frequency of metastases to regional lymph nodes reaches 30% even with negative clinical data on their lesion.. Most often of the malignant neoplasms of the head and neck, laryngopharyngeal cancer metastasizes (up to 60%). the surgical method of treating regional metastases, both independent and in terms of a combined method, remains one of the leading. However, the use of this method is limited for regional metastases corresponding to the symbols N2 and N3.*

**Introduction.** To choose the correct treatment program for head and neck cancer, it is necessary to have a complete understanding not only of the features of primary tumors, but also of the characteristics of cervical metastases. A number of patients with squamous cell carcinoma of the head and neck already have changes in the lymph nodes at the preclinical stage, which is a common cause of failures in their treatment. The problem of choosing treatment tactics arises in patients with locally widespread regional metastases on the neck, especially when the examination reveals the involvement of the carotid arteries in the tumor process. The frequency of metastases to regional lymph nodes reaches 30% even with negative clinical data on their lesion [ 3, 4]. Most often of the malignant neoplasms of the head and neck, laryngopharyngeal cancer metastasizes (up to 60%). [2,13].

To date, the surgical method of treating regional metastases, both independent and in terms of a combined method, remains one of the leading [8]. However, the use of this method is limited for regional metastases corresponding to the symbols N2 and N3. [2].

Over the past decade, many authors have come to the conclusion that there is no need to perform elective cervical lymph node dissection in patients with N-positive lymph nodes who have achieved the full effect of radiation or chemoradiotherapy [11], and if it is still carried out, it must be carried out according to a modified technique [1]. In parallel, the role of cervical lymph dissection is considered as a diagnostic procedure for detecting micrometastases at N0, thereby serving as a preventive treatment against regional metastases. This is usually called staging, selective cervical lymphodissection, and is often used in oral tumors [12] in connection with the

prevention of the risk of micrometastasis [6, 7]. Also the subject of discussion is the classification of various types of cervical lymphodissections. In European countries, the most commonly used classification is the Committee for Head and Neck Surgery and Oncology of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) [5, 10].

There is a tendency towards less extensive surgical interventions, in which only regional metastases are removed, which are more likely to be affected.

The accumulated new knowledge about the ways and patterns of cancer metastasis to the lymph nodes of the neck is a prerequisite for improving the technique of surgical removal of lymph nodes in the neck.

**The aim of the study** was to study the comparative results between two methods of dissection of lymph nodes in laryngeal cancer (radical and modified).

**Material and methods.** Of the 615 patients, pharyngeal tumors were observed in 258 patients (nasopharynx – 101, oropharynx – 93, larynx – 64), oral mucosa – 160 (of which, tongue – 52, oral floor – 42, lower jaw – 36, cheek – 30) and 197 patients with laryngeal tumors. The medical histories of these patients were treated and analyzed. Patients (retrospective analysis - 336 patients) whose medical histories were incomplete, concerning information about the clinical outcome after remote radiation therapy or, in the absence of a histological examination, were excluded from the study.

The main group consisted of 279 patients with tumors of the oropharyngeal region with metastases to the lymph nodes of the neck. 336 patients were included in the control group. All patients underwent combined and complex treatment in accordance with the international standard. The difference in the compared groups was as follows: the patients of the main group underwent a modified cervical dissection of lymph nodes developed by us, in the control group classical radical cervical lymph node dissection according to the type of Krail (operations on the regional lymph collector).

Of the 615 patients with tumors of the oropharyngeal region (OFO), there were 522 men and 93 women. The average age of the patients was  $57 \pm 4.27$  years.

All patients were subject to a thorough examination. Radiation therapy is used in the form of postoperative exposure or as part of simultaneous chemotherapeutic and radiation treatment, which can significantly increase the cure of patients with common forms of laryngeal cancer and increase the number of patients who receive organ-preserving treatment.

Irradiation was carried out with a photon beam on gamma-therapeutic devices  $^{60}\text{Co}$  (1.25 MV) or a linear accelerator (4-8 MV), as well as an electron beam (6-12 MeV). Irradiation was carried out daily from each field. A single dose on the hearth is 2 G. When treated according to the radical program, SOD is 70 Grams.

The lymph nodes of the neck on both sides were included in the larynx irradiation zone. If necessary, irradiation of the lymph nodes of the lower neck of the patients was carried out using a direct field with a block. The lower edge of the straight field passed 1 cm below the lower edge of the collarbones. When the supraclavicular lymph nodes were affected, the lymph nodes of the upper mediastinum were irradiated.

With insufficient regression of metastases after the treatment and their resectability, radical cervical lymph dissection was performed.

With tumors within the larynx, the laryngeal version of this operation was performed (without the inclusion of tissues of the submandibular region). When laryngeal cancer spread to the oropharynx or larynx, the block of tissues to be removed also included the fiber of the chin and submandibular area with the submandibular salivary gland on the side of the lesion.

The treatment of common tumors is combined, while the advantage is given to methods of organ-preserving treatment.

With complete regression of the primary tumor focus and metastases, dynamic observation was performed or radical or modified cervical lymphodissection was performed in patients with initial N2-3.

Surgical intervention on the primary tumor focus with cervical lymph node dissection and simultaneous chemo-radiation therapy or radiation therapy was performed in the following cases: at N1, laryngectomy was performed with resection of the thyroid lobe on the affected side with radical or modified cervical lymphodissection (N1) and contralateral selective cervical lymphodissection; at N2-3, laryngectomy was performed with resection of the thyroid lobe on the affected side with single- or bilateral radical or modified cervical lymphodissection (in the case of unilateral metastases, contralateral selective cervical lymphodissection was performed).

Postoperative simultaneous chemotherapy and radiation therapy were performed in the presence of a tumor in the cut-off margin, extracapsular spread of metastases, multiple metastases, perineural/lymphatic/vascular invasion.

Postoperative simultaneous chemotherapy and radiation therapy were performed in the presence of a tumor at the edges of the cut-off, perineural/lymphatic/vascular invasion and/or the presence of multiple metastases detected by morphological examination of prophylactically removed lymph nodes (pN+):

Cancer of the sublingual larynx is characterized by low sensitivity to radiation and drug treatment. Therefore, with these tumors, and especially their spread to neighboring anatomical parts, treatment began with radical surgical intervention. Removal of the larynx was performed with a thyroid lobe on the side of the tumor localization. In the postoperative period, radiation or simultaneous chemotherapeutic and radiation treatment was performed (the choice of method was determined by the presence of risk factors and the radicality of surgical intervention). During postoperative treatment, the areas of regional lymph nodes, including paratracheal ones, were necessarily irradiated.

For drug therapy, 5-fluorouracil preparations of 800-1000 mg/ m<sup>2</sup> of body surface per day for 1-5 days and platinum preparations of 100 mg/ m<sup>2</sup> of the patient's body surface per day for 1 day were used. The infusion of drugs was carried out, intravenously drip. Evaluation of the results of neoadjuvant chemotherapy in patients with OFO tumors was carried out after the end of the second course on the recommendation of WHO (Brussels, 1979).

**Statistical methods.**

The survival rate was calculated (depending on the date of diagnosis before the date of death registration) until December 31, 2012. The survival curves are derived using the Kaplan Mayer method.

Censored observation of the time of death was used in the analysis of cause-specific survival, mortality associated with head and neck tumors. The survival period difference test was performed using the log-rank test.

All statistical processing was performed using the program SPSS for Windows version 17.0.1 (SPSS Inc., Chicago, IL).

### **The results of the study.**

There was no difference in the volume of movements in the neck and mouth opening between patients who underwent radical cervical lymphadisection (RSHLD) and modified cervical lymphadisection (MSHLD) from the beginning of treatment to CLT or DLT up to 12 months after treatment. There was a significant decrease in all three parameters of the volume of

movements in the neck and the ability to open the mouth in patients after modified and radical cervical lymphatic dissection within 2 months after treatment ( $p < 0.001$ ). 12 months after treatment, there was still a significant reduction in rotational movements in the neck, but its effect on other parameters was insignificant.

There was also no effect on the estimated parameters at any time during the first year of radical cervical lymph dissection. In addition, there was no significant difference in the duration of lymphedema between these two groups after 12 months.

The groups of patients after 12 months became smaller than at the beginning, due to the loss of patients from relapses or death ( $N = 33$ ), as well as for unknown reasons ( $N = 24$ ). Relapses of the primary focus were equally common both in the main (7.9%) and in the control group (8.9%) (9/113 and 13/145, respectively). The development of metastases in the deeper layers of the neck occurred mainly in patients with RSHLD (17/145, 11.7%) and exceeded three times as compared with MSHLD (3/113, 2.7%).

The total number of patients with shoulder dysfunction in patients after cervical lymphodissection was 17.0% (44/258 of the total). There was a large numerical difference between patients who were operated on with MSHLD (14/113, 12.4%) and those who were operated on with RSHLD (30/145, 20.7%). However, there was no significant difference in the prevalence of swallowing disorders between patients with RSLD (47/145, 32.4%) and patients after MSLD (34/113, 30.1%) ( $p = 0.053$ ).

Comparison of the volume of cervical movements and opening of the oral cavity between patients after RSLD and MSLD were as follows. The volume of cervical movements and the volume of mouth opening for 12 months were satisfactory in 67 and 52 patients, respectively ( $p > 0.05$ ).

There were no significant differences in weight loss between the main (-5.9 kg) and control groups (-6.2 kg). There was a slight difference in the frequency of patients with weight loss  $> 10\%$  in the control group, but this difference was not significant. The overall 2-year survival rate for all patients in the study (out of  $n = 258$  at the beginning of the second year,  $n = 194$  patients) was 74.7% ( $n = 145$ ). There was a significant difference in 2-year survival between the main ( $n = 89$ ; 78.8%) and control groups ( $n = 105$ , 72.4%) (log rank,  $p = 0.49$ ). The difference of 5% is due to the fact that patients subjected to RSLD more often had relapses of metastases in the deep layers of the neck. The 5-year survival rates of patients differed significantly. In patients of the control group, this indicator did not exceed 52.2% (83/145 patients), whereas in the main group, this indicator was 78/113 patients (69%) ( $p < 0.01$ ). Next, we present data on the 5-year survival rate of patients depending on the method of lymph dissection performed.

**Table 1. Results of 5-year survival of patients with pharyngeal tumors in patients of the main and control groups.**

Surgical treatment method	2-year survival rate	5-year survival rate
Radical cervical lymph node dissection $n=145$	105 (72,4%)	83 (52,2%)
Modified cervical lymph node dissection $n=113$	89 (78,8%)	78 (69%)
Total $n=258$	194 (75,2%)	161 (62,4%)

The best indicators, as expected, were recorded in patients with modified SHLD, which is associated with the low traumatic nature of this operation and the possibility of more radical removal of lymph nodes from the deep layers of the neck.

**Conclusions.** 1. There was a significant difference in 2-year survival between VIKL ( $n = 89$ ; 78.8%) and HCL ( $n = 105$ , 72.4%) (log rank,  $p = 0.49$ ).

2. 5-year survival rates of patients differed significantly. In patients subjected to RSLD, this indicator did not exceed 52.2% (83/145 patients), whereas in the group of patients who underwent MSLD, this indicator was 78/113 patients (69%) ( $p < 0.01$ ).
3. Metastases in the deep layers of the neck developed only in patients subjected to RSLD. In patients with MSL, metastases in regional lymph nodes were not detected in any case.

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