https://doi.org/10.56598/2957-6377-2024-2-12-12-16
UDC 616-006; 615.849
IRSTI 76.29.49; 76.29.62

Short communication

Clinical Significance of Multispiral Computed Tomography in Organ-Preserving Surgery of Laryngeal Cancer

Nargiz Karimova [1], Namig Amiraliyev [2]

[1] *Doctor oncologist of the Oncology Clinic of Azerbaijan Medical University, Baku, Azerbaijan. E-mail: info@amu.edu.az*
[2] *Professor of the of the Oncology Clinic of Azerbaijan Medical University, Baku, Azerbaijan. E-mail: namiqamiraliyev@gmail.com*

Abstract

The effectiveness of the treatment of oncological patients is determined by the diagnosis of the disease, the adequate therapeutic measures of the boundaries of the tumor process. Therefore, the search for ways to improve the early detection of tumors in patients with oncological, including laryngeal cancer, is of great importance.

***The present article** is devoted to the study of the role of multispiral computed tomography (MSCT) in organ-preserving surgery of laryngeal cancer.*

***Methods.** In the study, the effectiveness of comparison with MSCT and other diagnostic methods was evaluated in 68 patients who underwent surgery for laryngeal cancer and its recurrence at the Oncology Clinic of Azerbaijan Medical University in 2010-2018.*

***Results.** in 68 patients for whom organ-sparing surgery was planned, based on MSCT data, the volume of surgery was expanded in 6 patients (37.5±5.87%), and the type of resection was changed in 10 patients (62.5±5.87%) (t= 3.01; p<0.01).*

***Conclusions**. From all of the above, it can be concluded that MSCT is a highly effective diagnostic method for the diagnosis of internal laryngeal cancer. The inclusion of this method in the complex examination algorithm of patients with laryngeal cancer allows for a more honest assessment of the degree of spread of the tumor within the larynx and optimization of the volume and type of organ-preserving surgical operation.*

***Key words:** larynx cancer, multispiral computed tomography, organ-preserving surgical operations.*

Corresponding author: Nargiz Karimova, Doctor oncologist of the Oncology Clinic of Azerbaijan Medical University, Baku, Azerbaijan.
Postal code: AZ1033
Address: Azerbaijan, Baku, Bakihanova street, 23
Phone: +994 12 597 43 23
E-mail: info@amu.edu.az

Oncology.kz 2024; 2 (12): 12-16
Recieved: 21-04-2024
Accepted: 18-05-2024

Introduction

Diagnosis and treatment of laryngeal cancer is one of the urgent problems of modern oncology. First of all, this is due to the fact that laryngeal cancer is one of the most common forms of head and neck [1-5].

Mortality from laryngeal cancer is 30-35% within the first year after diagnosis. The main reasons for this are errors in diagnosis, failure to use modern diagnostic methods, which leads to inadequate and delayed treatment. Therefore, in patients with laryngeal cancer, the location of the tumor, the size of the first tumor and the quality and accurate diagnosis of its spread play an important role in the selection of the treatment method and the planning of the surgical volume [1,6-9].

The effectiveness and prognosis of the treatment of oncological patients are not determined by timely diagnosis of the disease, assessment of tumor spread boundaries and adequate therapeutic measures. Therefore, early detection of the tumor process in oncological patients, including patients with laryngeal cancer, is important [5,8,10].

Obtaining accurate information about the size and localization of the tumor, the degree of its spread, allows choosing the correct surgical volume, determining the optimal treatment tactics, and increasing the effectiveness of treatment [3,4,10].

Non-straight laryngoscopy, fibrolaryngoscopy, X-ray examination are included in the traditional diagnostic methods of laryngeal cancer [1,3,6,8].

Various difficulties are encountered during the uneven examination of the larynx. Usually, this condition is observed when the epiglottis is rigid, and it makes it difficult to view the laryngeal surface of the epiglottis, the anterior part of the larynx. In endophytic cancer of the larynx, non-straight laryngoscopy is not informative, and in exophytic and laryngeal-shaped tumors, it is not possible to determine the depth of invasion of the process [3,4,9].

Fibrolaryngoscopy is important in the diagnosis of laryngeal cancer. Fibrolaryngoscopy allows regular examination of all departments of the larynx and collection of material for morphological research [6, 8].

The shortcomings of this examination method include the fact that it is possible to examine the patient during laryngeal stenosis, the lack of informativeness in endophytic tumors, as well as the difficulties in determining the boundaries of its endophytic component in laryngeal-shaped tumors [9].

Traditional x-ray examination methods (side x-ray, frontal tomography) have limited diagnostic capabilities in the case of laryngeal cancer [2,7].

The MSCT application of multispiral computed tomography significantly increased the capabilities of classical tomography. Due to its informativeness and accuracy, this examination method plays an important role in determining the treatment method and the size of the operation [5,7].

The first information about the use of computed tomography in laryngeal cancer is Wortzman G. et.al. given in 1976 by Mancuso A. et al. in 1977, he was one of the first to study the role of computer tomography in the diagnosis and treatment of laryngeal cancer and noted its promising role in the accurate assessment of the anatomical structures of the larynx [9,10].

After that, as a result of the development of computer tomographic technologies, spiral computer tomography and MSCT methods appeared in the 90s of the last century. With the use of MSCT, there was a quality breakthrough in the diagnosis of laryngeal cancer. By improving the early diagnosis of the tumor, new opportunities have been opened for the selection of the surgical volume and optimal treatment tactics [11,12].

The purpose of the study. It was to study the role of MSCT in accurate diagnosis and determination of surgical volume in organ-preserving surgery of larynx cancer.

Material and methods

In the study, the effectiveness of comparison with multispiral CT and other diagnostic methods was evaluated in 68 patients who underwent surgery for laryngeal cancer and its recurrence at the Oncology Clinic of Azerbaijan Medical University in 2010-2018.

67 patients were male and 1 female. Their age fluctuated between 40-72, the average age was 58. In the examination results, the diagnosis of laryngeal cancer was verified in 66 (97.1±2.03%) patients, in the remaining 2 (2.9±2.03%) patients, the result of the preoperative histological examination was evaluated as various malignant dysplasia, and in the postoperative morphological examination, one of these patients in one, squamous cell carcinoma, and in the other, squamous cell non-keratinizing cancer. Instrumental examination of diseases was carried out by non-straight laryngoscopy, fibrolaryngoscopy, and ultrasound examination methods. At the same time, MSCT with intravenous contrast was performed in all patients. Scanning was performed in spiral mode, with slices of 3 mm thickness. As a result of contrast examination, its arterial, parenzymatous and venous phases were studied. The arterial phase of the study was obtained 15-25 seconds after the injection of the contrast agent. Repeated scans were performed in the parenzymatous and venous phases.

The conducted research determined the high informativeness of MSCT in accurate diagnosis of intralarynx cancer. The presence of tumor was confirmed in all 68 patients as a result of MSCT performed with intravenous contrast. On the basis of the performed MSCT, the main signs of intra-organ spread of the tumor were determined. These signs include reticular contours of the tumor, infiltration of the vestibular ligament, laryngeal ventricle, fixed area of the epiglottis, anterior commissure, subligamentous department without changes in the mucous membrane of the larynx (Figure 1).

In order to assess the degree of spread of intralarynx tumor, the data obtained as a result of MSCT performed in 68 patients were compared with the results of non-straight laryngoscopy and fibrolaryngoscopy, as well as the results of intraoperative inspection and morphological examination.

The obtained results showed that compared to non-straight laryngoscopy, MSCT allowed obtaining additional information in determining the borders of swelling spread in 53 of 68 patients (78.0±5.02%). This is related to the difficulties in examining certain areas of the larynx by means of non-straight laryngoscopy and the low informativeness of this examination method in the form of tumor infiltrative growth. At the same time, it was possible to obtain additional information in 16 (23.5±5.14%) of 68 patients, most of whom had an endophytic or endophytic component growth form compared to fibrolaryngoscopy based on MSCT results.

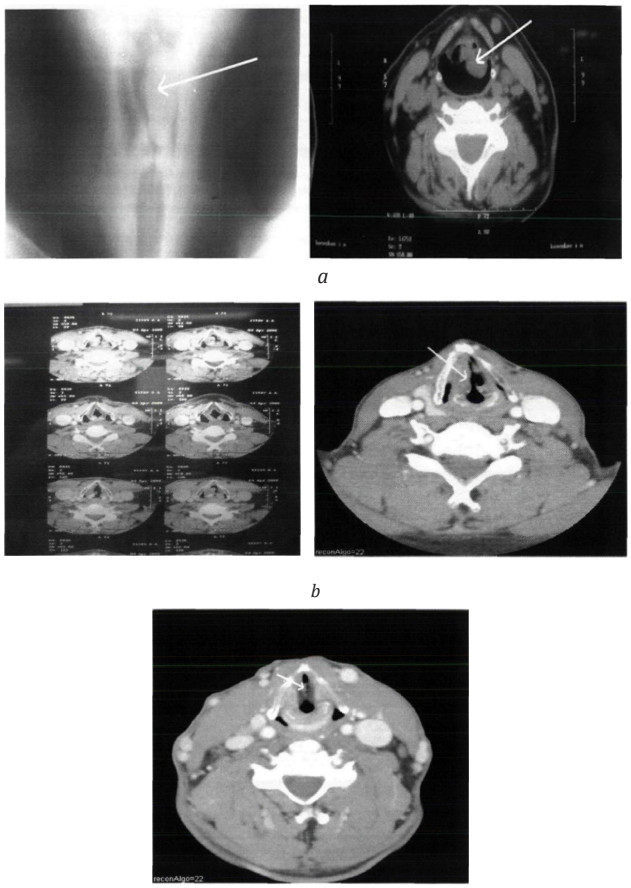

Figure 1 - MSCT signs for determining the extent of organ-preserving surgery in case of laryngeal cancer: a) the tumor compresses the left vestibular ligament and the clavicular laryngeal ligament and the pharyngeal sinus, but has it spread to the pharynx; b) exophytic tumor of the right vocal cord of the larynx, with infiltration of the right laryngeal ventricle; c) a tumor of the right vocal cord of the larynx with a size of ≈ 5 mm

Thus, in the MSCT examination of 68 patients with limited laryngeal cancer (T1-T2), additional information was obtained in 16 (23.5±5.14%) patients compared to the summary information provided by improper laryngoscopy and fibrolaryngoscopy. All obtained changes were morphologically confirmed (t=7.59; p<0.01).

As a result of MSCT, the additional information obtained on the degree of intralarynx spread of the tumor in 16 patients led to a change in the planned treatment plan based on the results obtained during non-straight laryngoscopy and fibrolaryngoscopy and the volume of organ-preserving surgery in these 16 patients. Changes in the volume of surgery and the type of resection in this patient group are reflected in Table 1.

Table 1 - Determining the scope and type of surgery in organ-preserving surgery of larynx cancer based on MSCT

Planned surgical volume based on summary data of non-straight and fibrolaryngoscopy	The scope of the operation performed based on the additional information of the MSCT examination	Changing the scope and type of operation	Number of patients 16 (23,5±5,14%)
Chordectomy	Anterior-lateral resection of the larynx	The type of operation has been changed	2 (2,9±2,03%)
Anterior resection of the larynx	Anterior-lateral resection of the larynx	The scope of operation has been expanded	4 (5,9±2,86%)
Anterolateral resection of the larynx	Hemilaryngectomy	The resection boundaries were expanded	1 (1,5±1,04%)
	Lateral resection	The transaction type has been changed	4 (5,9±2,86%)
	Horizontal resection	The transaction type has been changed	1 (1,5±1,04%)
Lateral resection of the larynx	Anterior-lateral resection of the larynx	The transaction type has been changed	3 (4,4±2,43%)
	Hemilaryngectomy	The scope of the operation was expanded	1 (1,5±1,04%)

As can be seen from Table 1, in 68 patients for whom organ-sparing surgery was planned, based on MSCT data, the volume of surgery was expanded in 6 patients (37.5±5.87%), and the type of resection was changed in 10 patients (62.5±5.87%) (t= 3.01; p<0.01).

Conclusions

From all of the above, it can be concluded that MSCT is a highly effective diagnostic method for the diagnosis of internal laryngeal cancer. The inclusion of this method in the complex examination algorithm of patients with laryngeal cancer allows for a more honest assessment of the degree of spread of the tumor within the larynx and optimization of the volume and type of organ-preserving surgical operation.

Conflict of interest. The author declares the absence of a conflict of interest.

Financing. There are no external sources of financing.

Author's contribution. The author contributed equally to the research and the writing of the manuscript.

References

1. Vasil'ev P.V., Iudin A.L., Sdvizhkov A.M., Kozhanov L.G. Multispiral computed tomographic semiotics of laryngeal cancer. Vestnik Rentgenologii i Radiologii, 2007; (5): 4-8. [Google Scholar]

2. Petrovichev V. S., Neklyudova,M. V., Sinitsyn V. E., SinitsynV. E., Nikitin I.G. Dual-energy computed tomography for head and neck cancer. Digital Diagnostics, 2021; 2(3): 343-355. [Crossef]

3. Ni X. G., He S., Xu Z.G., Gao L., et al. Endoscopic diagnosis of laryngeal cancer and precancerous lesions by narrow band imaging. The Journal of Laryngology & Otology, 2011; 125(3): 288-296. [Crossef]

4. Arens C., Dreyer T., Glanz H., Malrahn K. İndirect autofluore scence laryngoscopy in the diagnosis of laryngeal cancer and its precursor lesions. Eur. Arch. Otorhinolaryngol. 2004; 261(2): 71-76. [Crossef]

5. Atlanoglu Ş., Gürbüz M., Acikalin M., Adapinar B., Özüdogru E. Laryngeal cancer: radiological staging by multislice computer tomography and pathological correlation Osmangazi Journal of Medicine 2016; 38(3): 25-33. [Google Scholar]

6. Crosetti E., Pilolli F., Succo G. A new strategy for endoskopic staging of laryngeal carcinoma: multistep endoscopy. Acta Otorhinolaryngol İtal. 2012; 32(3): 175-181. [Google Scholar]

7. Joshi V., Wadhwa V., Mukherj G. Imaging in laryngeal cancers. Indian Journal of Radiology and Imaging. 2012; 22(3): 209-226. [Crossef]

8. Kraft M., Betz C.S., Leunig A., Arens C. Value of fluorescence endoscopy for the early diagnosis of laryngeal cancer and its precursor lesions. Head & neck, 2011; 33(7): 941-948. [Crossef]

9. Wortzman G., Holgate R.C. Computerized tomography (CT) in otolaryngology. The Laryngoscope, 1976; 86(10): 1552-1562. [Crossef]

10. Mancuso A.A., Hanafee W.N., Juillard G.J., Winter J., Calcaterra T.C. The role of computed tomography in the management of cancer of the larynx. Radiology, 1977; 124(1): 243-244. [Crossef]

11. Sharkawy L., Antably A., Gharib F., Hareedy A., Algart T. Correlation between preoperative endoscopic finding and computed tomography with postoperative histopatology in the staging of laryngeal carcinoma. The Egyptian Journal of Otolaryngology, 2019; 35: 41-46. [Crossef]

12. Wu J., Zhao J., Li Z., Yang W., Li R., et.al. Comparison of CT and MRI in diagnosis of laryngeal carcinoma with anterior vocal commissure invelvemnt. Scientific Reports, 2016; 6; 1-7. [Crossef]

Көмейдің қатерлі ісігі кезінде ағзаны сақтау хирургиясындағы мультиспиральды компьютерлік томографияның клиникалық маңызы

Каримова Н.В. [1], Амиралиев Н.М. [2]

[1] Онкологиялық клиниканың дәрігері, Әзірбайжан медициналық университеті, Баку, Әзірбайжан. E-mail: info@amu.edu.az

[2] Онкологиялық клиникасының профессоры, Әзірбайжан медицина университеті, Баку, Әзірбайжан. E-mail: namigamiraliyev@gmail.com

Түйіндеме

Онкологиялық науқастарды емдеудің тиімділігі аурудың диагностикасымен, ісік процесінің ауқымына қарай таңдалған терапиялық шараларымен анықталады. Сондықтан онкологиялық науқастарда ісіктерді, оның ішінде көмей обырын ерте анықтауды жақсарту жолдарын іздестіру үлкен маңызға ие.

Бұл мақала көмей ісігінің ағзаны сақтау хирургиясындағы мультиспиральды компьютерлік томографияның (МСКТ) рөлін зерттеуге арналған.

***Әдістері**. Зерттеу барысында 2010-2018 жылдары Әзірбайжан медициналық университетінің онкологиялық клиникасында көмейдің қатерлі ісігі және оның қайталануы бойынша ота жасалған 68 науқаста МСКТ және басқа диагностикалық әдістермен салыстырудың тиімділігі бағаланды.*

***Нәтижесі**. МСКТ деректері бойынша мүшелерді сақтайтын хирургия жоспарланған 68 науқаста ота көлемі 6 науқаста (37,5±5,87%) кеңейтілді, ал 10 науқаста (62,5±5,87%) резекция түрі өзгертілді (62,5±5,87%) (t= 3,01; p<0,01).*

***Қорытынды.** Жоғарыда айтылғандардың барлығынан МСКТ ішкі көмейдің қатерлі ісігін диагностикалаудың жоғары тиімді әдісі болып табылады деп қорытынды жасауға болады. Бұл әдісті көмейдің қатерлі ісігі бар науқастарды кешенді тексеру алгоритміне қосу қатерлі ісіктің көмей ішінде таралу дәрежесін шынайы бағалауға және ағзаны сақтайтын хирургиялық отаның көлемі мен түрін оңтайландыруға мүмкіндік береді.*

***Түйін сөздер:** көмейдің қатерлі ісігі, мультиспиральды компьютерлік томография, мүшелерді сақтайтын хирургиялық оталар.*

Клиническое значение мультиспиральной компьютерной томографии в органосохраняющей хирургии рака гортани

Каримова Н.В. [1], Амиралиев Н.М. [2]

[1] Врач Онкологической клиники, Азербайджанский медицинский университет, Баку, Азербайджан. E-mail: info@amu.edu.az

[2] Профессор Онкологической клиники, Азербайджанский медицинский университет, Баку, Азербайджан. E-mail: namigamiraliyev@gmail.com

Резюме

Эффективность лечения онкологических больных определяется диагностикой заболевания, адекватными лечебными мероприятиями границ опухолевого процесса. Поэтому поиск путей улучшения раннего выявления опухолей у онкологических больных, в том числе рака гортани, имеет большое значение.

Настоящая статья посвящена изучению роли мультиспиральной компьютерной томографии (МСКТ) в органосохраняющей хирургии рака гортани.

***Методы.** В исследовании была оценена эффективность сравнения с МСКТ и другими методами диагностики у 68 пациентов, перенесших операцию по поводу рака гортани и его рецидива в Онкологической клинике Азербайджанского медицинского университета в 2010-2018 годах.*

***Результаты.** Из 68 больных, которым планировалось органосохраняющее хирургическое вмешательство, по данным МСКТ объем операции был расширен у 6 больных (37,5±5,87%), а вид резекции изменен у 10 больных (62,5±5,87%) (m= 3,01; p<0,01).*

***Выводы.** Из всего вышеизложенного можно сделать вывод, что МСКТ является высокоэффективным диагностическим методом диагностики внутреннего рака гортани. Включение этого метода в комплексный алгоритм обследования больных раком гортани позволяет более достоверно оценить степень распространения опухоли по гортани и оптимизировать объем и вид органосохраняющей хирургической операции.*

***Ключевые слова**: рак гортани, мультиспиральная компьютерная томография, органосохраняющие хирургические операции.*