

რეზიუმე

ჰარტმანის პროცედურისა და პირველადი ანასტომოზით რეზექციის შედარება მსხვილი ნაწლავის კიბოს მარცხენამხრივი ობსტრუქციის მართვის დროს: პროსპექტული კოჰორტული კვლევა

გ.მერაბიშვილი, ბ. მოსიძე, ზ. დემეტრაშვილი,
ი. აღდგომელაშვილი

თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი; მაღალი სამედიცინო ტექნოლოგიების ცენტრი, საუნივერსიტეტო კლინიკა, საქართველო

პროსპექტული კვლევის მიზანს წარმოადგენს მსხვილი ნაწლავის მარცხენამხრივი ავთვისებიანი ობსტრუქციის მკურნალობის ორი მეთოდის - ჰარტმანის პროცედურის და რეზექციისა და პირველადი ანასტომოზის შედეგების შედარება და ანალიზი.

გამოკვლეულია მარცხენამხრივი მსხვილი ნაწლავის ავთვისებიანი ობსტრუქციის დიაგნოზით 90 პაციენტი. პაციენტები გაიყო ორ ჯგუფად: ჰარტმანის პროცედურის (HP) ჯგუფი და რეზექციისა და პირველადი ანასტომოზის ჯგუფი (RPA). ჯგუფებს შორის განისაზღვრა და შეფასდა რამდენიმე კლინიკური ნიშანი: საავადმყოფოში ყოფნის დღეები, ოპერაციის ხანგრძლივობა,

პოსტოპერაციული გართულებები (ოპერაციიდან 30 დღის განმავლობაში) და ლეტალობა.

HP ჯგუფი შედგებოდა 37 პაციენტისგან, RPA ჯგუფი - 53 პაციენტისგან, რომელთაც ჩაუტარდათ მსხვილი ნაწლავის რეზექციის სხვადასხვა ტიპის ოპერაციები პირველადი ანასტომოზით. HP ჯგუფში დაიღუპა 1, RPA ჯგუფშიც 1 პაციენტი. RPA ჯგუფში აღინიშნა 7 (13,2%) გართულება: 1 ინტრააბდომინალური აბსცესი კოლორექტალური ანასტომოზის შემდეგ, რომელიც განიკურნა ანტიბიოტიკოთერაპიითა და პერკუტანული დრენირებით, ჭრილობის ინფექციის 5 შემთხვევა, კოლორექტალური ანასტომოზის გაქონვის 1 შემთხვევა; ჰარტმანის პროცედურულ ჯგუფში - 8 (21,6%) გართულება: 7 - ჭრილობის ინფექცია, 1 - კოლოსტომის ნეკროზი, სხვაობა სტატისტიკურად სარწმუნო არ არის ($P=0.110$). პოსპიტალიზაციის პერიოდი RPA ჯგუფში შეადგენდა 6 დღეს, HP ჯგუფში - 8 დღეს, განსხვავება სტატისტიკურად სარწმუნოა ($P=0,02$).

კვლევის შედეგებზე დაყრდნობით ავტორებს გამოტანილი აქვთ დასკვნა, რომ მსხვილი ნაწლავის მარცხენამხრივი ავთვისებიანი ობსტრუქციის დროს უპირატესობა ეძლევა პირველადი ანასტომოზის პროცედურას და რეკომენდებულია მომავალში რანდომიზებული კვლევების ჩატარება ამ მეთოდის გრძელვადიანი შედეგების (კიბოს რეციდივი, გადარჩენის მაჩვენებელი) შესასწავლად.

COMPARATIVE ANALYSIS OF CURRENT SURGICAL APPROACHES TO THYMIC TUMORS TREATMENT

Lagvilava A., Giorgadze D., Chaduneli G.

¹David Aghmashenebeli University of Georgia; „New Hospitals”, Tbilisi, Georgia

The unified neuroendocrine-immune system (NEIM-system) operating in the human body ensures the maintenance of homeostasis under conditions of constant exposure to adverse factors, and participates in the mechanisms of regulation of immunological and endocrine processes. One of the central connecting organs that simultaneously participate in the reactions of the immune system and the endocrine system is the thymus (thymus gland). Thymus tissue is responsible for the blood serum concentration of the peptide hormone thymulin, which has a pronounced effect on the development of T- and B-lymphocytes, and, as a result, on subpopulations of T-cells, the expression of CD28, CD27 and CD40L. The complexity of the interaction of systems and

errors in regulation cause disturbances in the functional and morphological status of the thymus, leading to the formation of pathology of tissue growth, in particular to various variants of hyperplasia of the thymus tissue, which in the structure of oncological morbidity are up to 1-1,5% [10].

Classification. According to recent studies [4], the types of thymic hyperplasia include tumor-like lesions, cysts, and thymomas, the latter accounting for 60% of all thymic lesions [5, 6], although some authors believe that they account for up to 90% [2, 3]. In the clinic, thymomas appear more often after 35 years of age with a positive trend in women under 70 years of age [1]; peak incidence occurs between the ages of 55 and 65 [10].

In the pathomorphological differentiation of the nature of neoplasia, the classification of thymomas into types A, AB, B1, B2, B3 proposed by WHO (1999, update 2004) is used. Generally, the most common thymoma histotypes are AB and B2 [9]. Some authors distinguish neuroendocrine tumors of the thymus [7] based on the detection of specific neurosecretory granules in tumor cells, which, according to the WHO recommendation (2015), is defined as “neuroendocrine cancer”.

In practical medicine, on the recommendation of ITMIG (International Thymic Malignancy Interest Group), the Masaoka-Koga classification (1981, 1994) is widely used, which focuses on the stage of the disease with the definition of the nature of invasion in the pleural cavity, pericardium, lungs and mediastinal vessels: no signs of invasion (I), with micro-(IIa) and macro-(IIb) signs of capsular invasion, invasion into the surrounding tissues without involvement of the great vessels (IIIa) and with invasion into the vessels (IIIb); the presence of dissemination in the pleura and pericardium (IVa) and metastases (IVb) of a lymphogenous and hematogenous nature [1].

Clinical and diagnostic aspects. The clinical picture of thymoma can be asymptomatic (30-40%), or have a set of diverse non-specific symptoms and syndromes due to the individual characteristics of the tumor and the body, as well as patient comorbidity (weakness, low-grade fever, night sweats).

A third of patients with thymomas develop myasthenia gravis (Myasthenia gravis - MG) - general paraneoplastic syndrome (in 10-40% of cases) [2, 3, 8]. Histotypes B2 and B3 are more commonly associated with MG, while type A tumors are often associated with other paraneoplastic manifestations such as hypogammaglobulinemia [10]. Myasthenia gravis is accompanied by progressive weakness of the striated muscles, increased fatigue, which in 60-70% of cases leads to decreased working capacity. Thymoma is associated with myasthenia at a young age more often than in the elderly. It worsens the patient's condition and the prognosis of the disease. The main cause of myasthenia in the case of thymoma is the production of specific antibodies to acetylcholine receptors. When carrying out diagnostic measures, all patients can be divided into 2 groups - with and without myasthenia gravis.

Earlier studies identified MG as a negative predictor for long-term survival, which was associated with suboptimal MG therapy. Recent studies have not shown a statistically significant effect of MG on patient survival, which can be explained by the earlier diagnosis of thymoma in patients with MG and earlier thymectomy [8, 10]. However, MG can also develop after thymectomy (1-3%). The main risk factor in this case is a positive level of antibodies to acetylcholine receptors before surgery [10]. Postoperative myasthenic crisis is characterized by an acute exacerbation of MG symptoms with severe muscle weakness requiring intubation or delayed extubation after surgery.

With the progression of the disease, the formation of mediastinal compression syndrome is possible, which is

manifested by shortness of breath, cough, chest pain, arrhythmias and superior vena cava syndrome (11%). Shortness of breath can also be formed as a result of a violation of the neuro-muscular interaction in myasthenia gravis.

Thymoma is diagnosed on the basis of data from highly informative research methods, such as contrast-enhanced computed tomography (CT) and magnetic resonance imaging (MRI) [1], which contributes to earlier diagnosis and a significant increase in surgical interventions on the gland [2,3]. CT is used to assess invasion of adjacent structures and to better display small pleural/pericardial implants. Thymoma is most commonly an oval or round mass with mild to moderate enhancement, with or without calcifications. Degenerative changes or signs of necrosis may be present [10]. Chest CT is a routine imaging modality for thymic lesions, in some cases differentiation between hyperplasia and thymoma can be ambiguous. The frequency of unnecessary thymectomy performed only according to CT diagnostics is 43.8% (of which 17.1% are cases of thymic hyperplasia). In these cases, although not commonly used, MRI may be useful in evaluating patients with MG to distinguish between normal and hyperplastic thymic variant from thymic tumors [10]. Comparative evaluation of the methods indicates a high diagnostic efficiency of CT. Its sensitivity is 94.6% and its specificity is 93.3%. MRI is highly sensitive (up to 100%) and specific (96.7%).

The use of a set of topical diagnostic methods allows you to get a complete picture of the shape and localization of the tumor, its size, the nature of the topographic and anatomical relationships of the pathological formation with the surrounding tissues and organs of the mediastinum and, in some cases, speak about the true nature of the pathological process [5]. Timely diagnosis and surgical tactics determine the 5-year survival rate of patients with thymomas and is 90% for the first two stages of the disease, and 60, 25% for III, IV stages, respectively [1]. The level of 5- and 10-year survival rate after radical surgery for stage I thymoma reaches 100% and 100%, respectively. In stage II, 5- and 10-year survival rates are 91% and 98%, in stage III - 89% and 78%, in stage IVa - 71% and 47% [1].

Surgical technologies. Surgical treatment is the main treatment of choice, especially in the early stages - for stage I and II thymomas it is characterized by a 10-year survival rate of 70-90% of cases [13]. In advanced stages, in cases of tumor recurrence, a multidisciplinary approach is required with various combinations of chemotherapy and radiotherapy. Contraindications for surgery are the acute phase of MG, decompensated somatic pathology and inflammation in the area of the operative access. The main method of treatment for thymoma is thymothymectomy - complete removal of thymoma along with the thymus gland, fatty tissue and lymph nodes of the mediastinum [2,3].

The doctor should evaluate the surgical approach, the duration of the operation and the possible resection of surrounding structures. An invasive open approach may be required to remove the tumor completely, while the

possibility of a minimally invasive approach is limited to early stages. Indeed, the more aggressive the approach, the more it affects the postoperative course, in terms of pulmonary function, drug requirements and pain relief. Sternotomy and thoracotomy cause a marked decrease in pulmonary function and this factor is especially important in patients with MG, where the disease itself causes impaired lung function associated with weakness of the diaphragm and pectoral muscles [10].

Surgery for thymoma usually involves resection of the gland and adjacent mediastinal fat. They are associated with the paraneoplastic syndrome - MG [13]. In addition, surgical resection of thymoma often requires resection of adjacent organs, such as the lung parenchyma or great vessels. In the case of parenchyma resection, careful briefing between the surgeon and the anesthesiologist is mandatory to plan for a possible extension of the resection [10].

For a long time, due to the anatomical position of the thymus in the mediastinum, resection of thymus tumors was almost always performed by a median approach (complete sternotomy, division of the sternum, cervicotomy), and in exceptional cases, by a “clamshell” or combined approach. According to I.V. Dmitrochenko et al. “open” access was presented in various ways: transcervical, complete, partial and oblique partial transsternal, right-, left- and bilateral transpleural [6]. Thymectomy included complete removal of the thymus and perithymic tissue.

In the last decade, thanks to technological improvements, new directions in the surgical treatment of thymic tumors have been proposed including minimally invasive

surgery that is changing the historical dogma regarding thymus surgery around the world [9].

In the 1990s, the concept of minimally invasive surgery was introduced into the field of thoracic surgery; it began to be used in surgical resections of the mediastinum. The use of minimally invasive thymectomy was motivated by the ability to minimize the side effects of prolonged general anesthesia and postoperative pain caused by thoracotomy in patients with myasthenia gravis. Studies have proven that total thymectomy using thoracoscopic videography is possible in patients with MG, as well as in patients with stage I and II thymomas [13]. The widespread use of minimally invasive techniques in various areas of surgery and in thoracic surgery (video-assisted thoracic surgery, VATS), has led to their introduction into thymus surgery. And the introduction of Robot Assisted Thoracic Surgery (RATS) has prompted many surgeons to explore the possibility of using a robot for the resection of thymic tumors. Since the beginning of the 21st century, robotic surgery has emerged as an interesting alternative because not only does it offer the benefits of minimally invasive surgery, but it also allows for a wider range of motion for surgical procedures, reduces the effects of surgeon hand tremors, allows for better precision in forceps movement and provides better 3D visualization of the operating field [12]; the only drawback of the method is the cost of purchasing high-tech equipment.

Following current trends [8,11,12], it is proposed to consider minimally invasive surgery, including video-assisted thoracic surgery and robot assisted thoracic sur-

Table 1. Evolution of ideas about minimally invasive techniques (MIT) in the treatment of thymus tumors [12]

Source	Results	Remark
Databases of medical literature	Resection of thymic tumors in early stages is performed using open surgery (OS), including median sternotomy, partial or complete. Results are better than with minimally invasive methods	Better visualization, especially in the neck area More radical resection Risk of pleural culture No ventilation with one lung Bilateral view of the mediastinum
Recent publications	In the early stages, MIT gives no worse oncological results than open surgery. MITs are associated with shorter stays, reduced blood loss, better cosmetic outcomes and lower morbidity rates. Possibilities of subxiphoidal access require further confirmation, although preliminary results are promising. VATS and RATS provide similar oncological and perioperative outcomes.	Excellent visualization of the thymus region up to both poles of the thymus with MIT The use of CO2 significantly improves dissection and operational visibility, even on the opposite side.
Guidelines ^[14]	For patients with stage I-II thymoma, MIT is recommended at centers with MIT experience. VATS or RATS are equally effective.	
Findings	In patients and in specialized centers, MIT has been proven to be the treatment of choice for early-stage thymomas. It is desirable that cost reduction contribute to the widespread use of robotic technologies.	

gery, as the surgical technique of choice in the treatment of thymus tumors in the early stages. Minimal invasive treatment is associated with shorter hospital stays, less intraoperative bleeding, and better aesthetic outcomes. Robotic surgery is associated with shorter pleural drainage and shorter hospital stays, averaging 1 and 2 days, respectively. In addition, minimally invasive surgery proved to be as effective as open surgery in terms of complication rates, local recurrences, and survival (Table 1). Low risk of complications was confirmed given that only one complication (late chylothorax) was observed and none of the patients required reoperation. Studies of complications after minimally invasive thoracic surgery have shown that they respond well to conservative methods of treatment.

Complete surgical resection of the thymus is considered the world's "gold" standard, if possible; chemotherapy and radiotherapy are used as induction in advanced stages when complete resection is not possible, as adjuvant treatment in case of advanced tumor stages, aggressive histological studies or resection R+ [9].

The correct determination of the surgical approach for thymic tumors depends on several factors: stage, tumor size, tumor histology and individual clinical characteristics of the patient [12].

According to E. Ruffini's group (2018), some aspects of surgical treatment are currently "challenging and changing the historical point of view". They identified four key issues that are widely discussed today:

- I) the role of minimally invasive surgery;
- II) the role of lymph node dissection;
- III) extension of resection in case of non-myasthenic thymoma;
- IV) treatment of locally advanced thymus tumors with pleura involvement.

Critical discussion on the role of lymphadenectomy and extension of resection is ongoing. So far, the role and limits of minimally invasive surgery are quite clear in all areas of thoracic surgery, as well as in the treatment of borderline cases in patients with locally advanced tumor. On the other hand, the usefulness of staging lymph nodes in thymic tumors and the need to perform partial thymectomy are new principles that have not yet been validated or accepted [12]. In thymomas, lymph node assessment during surgical resection has not previously been performed except in Japan. The Masaoka staging system that has been used for thymic tumors included non-intervention for stage IV. For a long time, the Masaoka-Koga system has been one of the cornerstones in the treatment of thymus tumors.

Joint efforts of the International Thymic Malignancy Group (ITMIG) in collaboration with several other international communities have created a new TNM classification system with marked differences from the previous classification. Specifically, surgeons can identify, sample, or remove anterior perithymic (N1) and deep intrathoracic or cervical (N2) lymph nodes. Studies clearly show that N⁺ is an independent prognostic factor affecting prognosis,

since associated with tumor size and aggressive histology. ESMO guidelines suggest lymphadenectomy for adjacent thymomas, thymic carcinoma, or thymic neuroendocrine tumor. The question arises: how does the management of these patients change after lymph node dissection? We all know that in patients with lung cancer, the presence of N⁺ disease favors adjuvant therapy regardless of histology or T-status. This is not the case in thymic neoplasia, as patients with invasive tumors or more aggressive histology should already be on adjuvant therapy. On the other hand, it should be taken into account that lymph node dissection increases the operation time and may adversely affect the postoperative course. The second point of discussion is related to the surgical choice in patients with non-myasthenic thymoma.

Historically, for oncological reasons, thymectomy involved the complete resection of the thymus tumor and the thymus itself. Recently, a new approach has been proposed, called "thymectomy" or limited thymectomy, in which only resection of the thymoma is performed, sometimes associated with the removal of part of the thymus gland. Supporters of this "philosophy", especially suitable for thoracoscopic resections, consider this procedure to be oncologically adequate in the early stages, emphasizing that in patients who have undergone a total thymectomy or thymectomy, disease-free survival and the frequency of new manifestations of myasthenia gravis are similar. They believe that the preservation of the thymus may be useful as an immunological structure of the body. However, there are controversial points: firstly, the likelihood of potentially incomplete resection in the case of limited thymectomy is higher, especially at stage II, as shown in a study by the Chinese Society for Thymoma Research (2.9% to 14.5%). In addition, follow-up of patients should be longer and in surgery prospective studies are needed [7,12].

Own research. We conducted a study of the possibilities of minimally invasive surgical treatment of patients with tumors of the thymus on the basis of our hospital in order to determine the optimal tactics for managing patients with different initial status.

Material and methods. The study included the retro- and prospective analysis of the results of minimally invasive therapy in 18 patients with thymus tumors who were treated within the period from 2018 to 2021 in the Department of Thoracic Surgery of the "New Hospitals" Clinic (Tbilisi).

The average age of patients was 51.4±13.2 (M±SD), the group of patients consisted of 3 men (22.2%) and 15 women (77.8%). 50.0% of patients complained of general weakness, easy fatigue, periodic dry cough and shortness of breath. 44.4% of patients (8 people) were diagnosed with MG, of whom 5 patients had a severe generalized form with bulbar symptoms and two patients had a history of concomitant oncopathology (breast cancer, kidney carcinoma). Some patients received hormone therapy (glucocorticoids).

For differential diagnosis, the CT method was used in 100% of cases. The analysis was carried out using descriptive statistics in Microsoft Excel.

Table 2. Histological types of thymus tumors, the nature of the surgical intervention and the postoperative period

Diagnosis upon admission to the surgical department	Cases	Age	Gender	Histology data	Tumor size, mm	Surgery	Total surgery time, minutes	Drainage, days	MG	Bed days
Thymoma, C37	1	37	F	B3	71x40 right 60x47 left	GESC24	140	3	-	6
	2	53	M	B1	54x24x63	VATS GESC24	160	3	G70	4
	3	40	F	B1	43x25		75	2	-	5
	4	54	F	AB	70x80		135	2	-	6
	5	37	F	B2	110x57x58		90	2	-	4
	6	52	M	C	34x47		125	4	-	8
Thymoma, D15.0	7	59	F	Thymolipoma	15x13		50	1	-	2
	8	61	F		14x31		80	1	G70	2
	9	36			72x26		95	2	-	3
	10	30			19x35		90	2	G70	2
	11	27	F		13x14		100	2	G70	4
	12	38	F		7x8	200	2	G70	3	
	13	56	M		9x18	90	4	G70	5	
	14	34	F	Hodgkin's lymphoma	49x30x55	130	2	-	4	
	15	72	F	Micronodular thymoma	16x15	140	2	G70	4	
	16	47	M	Thymus hyperplasia	8x10	120	2		4	
	17	49	F	Multilocular cysts of the thymus	45x40 right 44x28 left	75	2	G70	4	
	18	58	F	Multilocal pericardial cyst	84x41	100	2	-	4	

Results and discussion. Surgical intervention was performed using minimally invasive surgery under general anesthesia. The nature of the operation, the postoperative period and the histological features of the tumors are presented in Table 2. The average number of bed-days was 4.17 ± 1.46 .

There were no lethal outcomes. In the postoperative period all patients received antibacterial, analgesic and anticoagulant therapy and were discharged from the hospital in a satisfactory condition. Postoperative MG crises were not detected in any case.

Findings. Today there are significant changes in the tactics of surgical treatment of thymoma; while maintaining the relevance of the basic surgical principles and rules of oncology in order to eliminate potential negative consequences for patients. The role of surgery remains indisputable in all tumors of the thymus and at all stages.

International communities of thoracic surgeons critically approached the discussion of historical dogmas in treatment tactics. The main postulates of surgical tactics for thymoma were formulated [2,5,12-14]:

- in the early stages, minimally invasive methods of thymus resection (VATS, RATS) are preferable to open access and surpass it in terms of postoperative length of stay in the hospital, the frequency of intra- and postoperative complications, and cosmetic condition;

- the inclusion of thymus tumors in the updated TNM international classification of malignant neoplasms of the chest requires that lymphadenectomy based on the proposed ITMIG/IASLC lymph node classification be an integral part of the surgery according to the stage and histology of the tumor;

- the role of limited thymectomy in the case of non-MG stage I-II thymomas remains to be assessed;

- positive results have been obtained using large pleural resections (pleurectomy/decortication, extrapleural pneumonectomy) in selected patients with stage IVa thymomas (pleural).

Knowledge and understanding of these new trends in thymic tumor surgery, including them in the surgical arsenal of thoracic surgeons dealing with malignant neoplasms of the thymus, will contribute to the optimal management of patients.

REFERENCES

1. Aleksandrov OA, Ryabov AB, Pikin OV. Thymoma (literature review). *Siberian journal of oncology* 2017; 16(4): 76–83. doi: 10.21294/1814-4861-2017-16-4-76-83.
2. Vetshev PS, Ablitsov YuA, Ablitsov AYu, Kryachko VS. A modern view on the surgical treatment of thymoma. *Bulletin of the National Medical and Surgical Center named after N.I. Pirogov* 2017; 12(2): 89-94.
3. Vetshev PS, Ablitsov AYu, Sanadze AG, Ablitsov YuA, Vasilashko VI, Kryachko VS, Lukyanov PA, Magomedov BA. Robot-assisted and thoracoscopic operations in the treatment of patients with thymus tumors. *Medical Bulletin of the South of Russia* 2018; 9(2): 15-25.
4. Dzidzawa II, Kotiv BN, Dmitrochenko IV, Fufaev EE, Yasyuchenya DA, Kudryavtseva AV, Bardakov SN, Apollonov AA. Neoplasms of the thymus gland: clinic, diagnosis, treatment. *Bulletin of the Russian Military Medical Academy* 2018; 1(61): 225-229.
5. Dzidzawa II, Dmitrochenko IV, Fufaev EE, Kotiv BN, Barinov OV, Yasyuchenya DA, Popov VA. Video-assisted thoracoscopic interventions for thymus neoplasms. *Military Medical Journal* 2020; 341(5): 52-56.
6. Dmitrochenko IV, Dzidzava II, Kotiv BN, Fufaev EE, Yasyuchenya DA, Chuprina AP, Barinov OV, Leonovich AP, Bisenkov LN, Shalaev SA. Comparative analysis of surgical access options in the treatment of thymus tumors (meta-analysis). *Bulletin of surgery named after I.I. Grekov* 2017; 176 (5): 106–110.
7. Chekini AK, Polotskiy BE, Machaladze ZO, Khasbulatov AM. Neuroendocrine tumors of the thymus. *Russian journal of oncology* 2017; 22(2): 72–75. doi: <http://dx.doi.org/10.18821/1028-9984-2017-22-2-72-75>.
8. Shevchenko YuL, Ablitsov AYu, Vetshev PS, Sanadze AG, Sidnev DV, Ablitsov YuA, Vasilashko VI, Kondratenko YuA, Lukyanov PA, Kryachko VS. Robot-assisted thymectomy in the treatment of generalized myasthenia gravis. *Bulletin of the National Medical and Surgical Center named after N.I. Pirogov* 2017; 12(1): C. 15–20.
9. Anile M, Poggi C, Diso D, Pecoraro Y, Rendina EA, Venuta F. Wind of change in surgical treatment of thymic tumors. *Journal Thoracic Diseases* 2018; 10(Suppl 26): S3121-S3123. doi: 10.21037/jtd.2018.07.134
10. Comacchio GM, Marulli G, Mammanna M, Natale G, Schiavon M, Rea F. Surgical Decision Making Thymoma and Myasthenia Gravis. *Thoracic Surgery Clinic* 2019; 11. <https://doi.org/10.1016/j.thorsurg.2018.12.007>.

11. Fok M, Bashir M, Harky A, Sladden D, DiMartino M, Elsyed H, Howard C, Knipe M, Shackcloth MJ. Video-assisted thoracoscopic versus robotic-assisted thoracoscopic thymectomy: systematic review and meta-analysis. *Innovations (Phila)* 2017; 12(4): 259–264. doi: 10.1097/IMI.0000000000000382.

12. Ruffini E, Filosso PL, Guerrero F, Lausi P, Lyberis P, Oliaro A. Optimal surgical approach to thymic malignancies: New trends challenging old dogmas. *Lung Cancer* 2018; 118: 161-170. doi.org/10.1016/j.lungcan.2018.01.025

13. Terra R M, Milanez-de-Campos JR, Haddad R, Trindade JR. M, Lauricella LL., Bibasf BJ, Pêgo-Fernandes PM. Robotic thoracic surgery for resection of thymoma and tumors of the thymus: technical development and initial experience. *Journal Brasil Pneumol.* 2020; 46(1): e20180315. doi: 10.1590/1806-3713/e20180315.

14. Yokoi K, Kondo K, Fujimoto K, Hara M, Kadota Y, Kawaguchi K, Kunitoh H, Matsuno Y, Nakajima J, Nishio M, Ogawa K, Omasa M. JLCS medical practice guidelines for thymic tumors: summary of recommendations. *Japan Journal Clinical Oncology* 2017; Dec 1;47(12):1119-1122. doi: 10.1093/jjco/hyx138. PMID: 29036455

SUMMARY

COMPARATIVE ANALYSIS OF CURRENT SURGICAL APPROACHES TO THYMIC TUMORS TREATMENT

Lagvilava A., Giorgadze D., Chaduneli G.

¹David Aghmashenebeli University of Georgia; „New Hospitals”, Tbilisi, Georgia

The aim of the work was a comparative analysis of scientific sources, covering current surgical approaches in the treatment of thymus tumors, as well as the analysis of the results of own experience in minimally invasive surgery for thymus neoplasm.

Thymic hyperplasia include tumor-like disorders, cysts and thymic tumors, the latter compose for 60-90% of all thymic lesions. Over the past ten years, due to the development of technologies, a new trends of surgical treatment of thymic tumors has been proposed - minimally invasive techniques, which all over the world changes the historical dogmas concerning thymus surgery, since associated with shorter hospital stays, less intraoperative bleeding, the best aesthetic outcomes. There are four key problems are discussed in thymus surgery today: the role of minimally invasive surgery, the role of lymph node dissection, extension of resection in the case of nonmyasthenic thymoma, treatment of locally advanced tumors of the thymus with pleural defects.

A retro- and prospective analysis of the results of minimally invasive surgery was carried out in 18 patients with thymic tumors in our research, who received surgi-

cal therapy during 2018 and 2021 in the department of thoracic surgery („New Hospitals”, Tbilisi, Georgia). The average age of patients was 51.4 ± 13.2 ($M \pm SD$), 3 men (22.2%), 15 women (77.8%). All patients were performed thymectomy by videothoroscopic method, there were no postoperative crises of myasthenia gravis and other complications in any case.

Research results demonstrate high efficiency minimally invasive thymus surgery in clinic practice, which be of help to optimal management and allows to reduce the socio-economic loading on health service.

Keywords: minimally-invasive techniques thymectomy, video-assisted thoracic surgery, thymoma, myasthenia gravis.

РЕЗЮМЕ

СОВРЕМЕННЫЕ ХИРУРГИЧЕСКИЕ МЕТОДЫ ЛЕЧЕНИЯ ОПУХОЛЕЙ ВИЛОЧКОВОЙ ЖЕЛЕЗЫ

Лагвилава А.Л., Гиоргадзе Д.М., Чадунели Г.Н.

Грузинский университет Давида Агмашенебели; „New Hospitals”, Тбилиси, Грузия

Гиперплазии вилочковой железы включают опухолеподобные поражения, кисты и тимомы, последние составляют 60-90% всех поражений тимуса. На сегодняшний день предложено новое направление хирургического лечения опухолей тимуса - минимальная инвазивная хирургия, которая во всем мире меняет исторические догмы, касающиеся хирургии тимуса, т.к. связана с более коротким пребыванием в больнице, меньшим количеством интраоперационных кровотечений и лучшими эстетическими результатами. В хирургии тимуса дискуссионными являются четыре ключевых вопроса: роль минимально инвазивной хирургии, лимфодиссекции, расширение резекции в случае немиастенической тимомы, лечение местно распространенных опухолей тимуса с поражением плевры.

Цель исследования - сравнительный анализ научных источников, посвященных современным хирургическим подходам к лечению опухолей тимуса и анализ результатов собственного опыта в малоинвазивной хирургии новообразований тимуса.

Проведен ретро- и проспективный анализ результатов малоинвазивной хирургии 18 пациентов с опухолями тимуса, находившихся на лечении в период с 2018 по 2021 гг. в отделении торакальной хирургии клиники „New Hospitals” г. Тбилиси, Грузия. Средний возраст пациентов $51,4 \pm 13,2$ ($M \pm SD$) лет, мужчин - 3 (22,2%), женщин - 15 (77,8%). Всем пациентам проведена тимэктомия видеоторакоскопическим методом (VATS), постоперационных кризов миастении и дру-

гих осложнений ни в одном случае не выявлено.

Результаты исследования демонстрируют высокую эффективность малоинвазивной хирургии тимуса в клинической практике, что способствует оптимальному ведению пациентов и позволяет снизить социально-экономическую нагрузку на здравоохранение.

რეზიუმე

მკერდუკანა ჯირკვლის სიმსივნეების მკურნალობის ქირურგიული მეთოდები

ა. ლაგვილავა, დ. გიორგაძე, გ. ჩადუნელი

საქართველოს დავით აღმაშენებლის სახ. უნივერსიტეტი; კლინიკა „ნიუ ჰოსპიტალს“, თბილისი, საქართველო

თიმუსის ჰიპერპლაზია მოიცავს სიმსივნის-მაგვარ დაზიანებებს, კისტებსა და თიმომებს, ეს უკანასკნელი შეადგენს თიმუსის დაავადებების 60-90%-ს. ბოლო ათწლეულის განმავლობაში ტექნოლოგიების განვითარების შედეგად შემოთავაზებულია თიმუსის სიმსივნის ქირურგიული მკურნალობის ახალი მიმართულება - მინიმალურად ინვაზიური ქირურგია, რომელიც მსოფლიოს მასშტაბით ცვლის ისტორიულ დოგმებს თიმუსის ქირურგიულ ოპერაციებთან დაკავშირებით, ვინაიდან ხელს უწყობს საავადმყოფოში უფრო ხანმოკლე დაყოვნებას, დაკავშირებულია ინტრაოპერაციული სისხლდენების ნაკლებ რაოდენობასა და უკეთეს ესთეტიკურ შედეგებთან. თიმუსის ქირურგიაში დღეისათვის განიხილება ოთხი ძირითადი საკითხი: მინიმალურად ინვაზიური ქირურგიის როლი, ლიმფოდისექციის როლი, გაფართოებული რეზექცია არამიასთენიური თიმომის შემთხვევაში, ადგილობრივად გავრცელებული, პლევრის დაზიანებით მიმდინარე თიმუსის სიმსივნის მკურნალობა. კვლევისას გაკეთდა ნაკლებინვაზიური ქირურგიის შედეგების რეტრო და პროსპექტიული ანალიზი თიმუსის სიმსივნის მქონე 18 პაციენტისთვის, რომლებიც მკურნალობდნენ 2018-2021 წწ. პერიოდში, კლინიკა „ნიუ ჰოსპიტალსის“ თორაკალური ქირურგიის განყოფილებაში, ქ. თბილისი, საქართველო. პაციენტების საშუალო ასაკი $51,4 \pm 13,2$ ($M \pm SD$), მამაკაცი - 3 (22,2%), ქალი 15 (77,8%). ყველა პაციენტს ჩატარდა თიმექტომია ვიდეოთორაკოსკოპიის ან VATS მეთოდით, პოსტოპერაციულ კრიზს ან სხვა გართულებებს ადგილი არ ჰქონია არცერთ შემთხვევაში.

კვლევის შედეგებმა აჩვენა თიმუსის ნაკლებინვაზიური ქირურგიის ეფექტურობა კლინიკურ პრაქტიკაში, რომელიც ხელს უწყობს პაციენტის ოპტიმალურ მართვასა და ჯანდაცვაზე სოციალურ-ეკონომიკურ დატვირთვის შემცირებას.