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COMPARATIVE EFFECTIVENESS OF LOBECTOMY AND SUBLOBAR RESECTIONS IN EARLY-STAGE NON-SMALL CELL LUNG CANCER: A SYSTEMATIC REVIEW AND META-ANALYSIS

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ABSTRACT

Relevance: *Non-small cell lung cancer (NSCLC) remains one of the leading causes of cancer-related mortality despite significant advances in diagnostic and therapeutic approaches. Anatomical lobectomy is traditionally considered the "gold standard" for stage I NSCLC, but the increasing detection of small-sized tumors through screening programs has renewed interest in sublobar resections.*

The study aimed to *compare the efficacy and safety of lobectomy versus sublobar resec-tions (segmentectomy and wedge resection) in patients with early-stage non-small cell lung cancer.*

Methods: *The meta-analysis was conducted following the PRISMA and AMSTAR guidelines. Literature was searched across PubMed, Embase, Cochrane Library, Scopus, Web of Science, and other databases for studies published between 2010 and 2024. Eligible studies included adult patients with stage I NSCLC undergoing either lobectomy or sublobar resection, with reported oncological or perioperative outcomes. Statistical analysis was performed using RevMan 5.4. Relative risks (RRs) with 95% confidence intervals (CIs) were calculated; heterogeneity was assessed using the I^2 statistic.*

Results: *Twelve studies comprising 17,454 patients were included; 13,692 underwent lobectomy, and 3,762 received sublobar resection. No statistically significant difference in recurrence rates was found (RR=0.92; 95% CI: 0.65-1.31; p=0.66), although heterogeneity was substantial (I^2=87%). The risk of postoperative complications was significantly higher after lobectomy (RR=1.22; 95% CI: 1.08-1.37; p<0.01; I^2=0%). Five-year overall survival favored lobectomy (RR=1.08; 95% CI: 1.00-1.17; p=0.05), with high heterogeneity (I^2=91%).*

Conclusion: *Sublobar resections demonstrate comparable oncological outcomes to lobec-tomy in selected patients with tumors ≤2 cm, no signs of invasion, and reduced physiological reserve. These findings support the importance of an individualized surgical approach. Further multicenter randomized trials are warranted to confirm oncological equivalence and define clinical indications.*

Keywords: *non-small cell lung cancer (NSCLC), lobectomy, sublobar resection, segmentectomy, survival, recurrence-free survival, recurrence.*

Introduction: Lung cancer (LC) continues to be one of the leading causes of mortality from malignant neoplasms (malignant neoplasms) globally, despite significant progress in cancer diagnostics and treatment. According to GLOBOCAN data 2020, the total number of new cases of malignant neoplasms among women was 9,227,484, followed by colorectal cancer (865,630; 9.4%) and LC (770,828; 8.4%). Over the same period, 10,065,305 new cases of malignant neoplasms were registered in men, among which LC took the 1st place – 1,435,943 cases (14.3%), followed by prostate cancer (1,414,259; 14.1%) and colorectal cancer (1,065,960; 10.6%) [1].

In terms of cancer mortality, LC also occupies a leading position, causing about 1.8 million deaths, which comprises 18% of all deaths due to malignant neoplasms [1].

In Kazakhstan, according to D. Yessenbayev et al. (2023), 36,916 new cases of LC were registered over a ten-year period, of which 80.5% were recorded in men and 19.5% in women. The mean age of the cases was 64.2 ± 0.1 years. The highest incidence rates per 100,000 population were observed in the age groups of 65-69 years (147.6 ± 2.7), 70-74 years (159.3 ± 2.5), and 75-79 years (147.1 ± 3.2). The annual standardized average amounted to 22.2 cases per 100,000 population. At the same time, there is a trend towards a decline in incidence, especially among the male population, where the incidence rate is six times higher than in women [2].

As of today, surgery remains the main treatment option for non-small cell lung cancer (NSCLC). Anatomical lobectomy with systemic lymphatic dissection is traditionally considered the "gold standard" of the surgical approach, providing high rates of overall and recurrence-free survival. However, with the development of screening programs and the increase in the number of

small tumors (<2 cm) detected, approaches to the volume of resection are increasingly being revised [3, 4].

Although lobectomy remains an oncologically reliable method, sublobar resections – segmentectomy and wedge resection (wedge) – show comparable results in older patients with limited lung function and high levels of comorbidity. Due to their organ-preserving nature, such interventions become preferable in this category of patients [3].

According to the results of the analysis of data from 43,469 patients, the rate of postoperative complications in lobectomy reached 48%, while in sublobar resections it was 46.6%. Elevated rates were associated with severe baseline conditions, age, and comorbidities. In most studies, the complication rate for sublobar resections did not exceed 15.3%. The higher burden on the cardiovascular system during lobectomy explains the higher incidence of complications [5].

Regarding recurrences, the preference is given to lobectomy, with a risk of 32% compared to 53.4% with sublobar interventions. This is due to the greater radicality of the operation and the possibility of a full assessment of the lymph nodes, especially the 11th zone. If the tumor has spread, limited resections are associated with a higher risk of recurrence (42.6%, versus 12.7% after lobectomy) [6, 7].

In terms of overall survival, the 5-year rates after anatomical segmentectomy range from 43.8% to 49.9%, while after lobectomy they reach 78.4%. Sublobar interventions yield the best results in patients with lepidic-type tumors measuring less than 2 cm in diameter, detected at an early stage [5, 8, 9].

Thus, in modern conditions, revising surgical strategies for early NSCLC becomes extremely relevant. The present study aims to conduct a systematic review and meta-analysis to compare the efficacy and safety of lobectomy and sublobar resection in patients with early-stage NSCLC.

The study aimed to compare the efficacy and safety of lobectomy and sublobar resections (segmentectomy and wedge resection) in patients with early-stage non-small cell lung cancer.

Materials and methods: This study was conducted following the PRISMA and AMSTAR guidelines (Figure 1).

A systematic literature search was conducted in the international databases PubMed, Embase, Cochrane Library, Scopus, Web of Science, MedLine, as well as the Google Scholar search engine (the first 300 relevant results). In addition, to expand coverage, the clinical trial registration platform ClinicalTrials.gov was analysed, and references in previously published systematic reviews and meta-analyses were manually searched. All found articles were imported into EndNote X9 to remove duplicates.

The search period covered publications from January 1, 2014, to December 31, 2024. Articles in English and Russian were included. The following keywords and MeSH terms were used in various combinations: "non-small cell lung cancer", "NSCLC", "early-stage lung cancer", "lobectomy", "segmentectomy", "wedge resection", "sublobar resection", "surgical treatment", "meta-analysis", "survival", "recurrence", "postoperative complications".

Criteria for inclusion in the systematic review: adult patients with histologically confirmed early-stage NSCLC (stage I, T1–T2N0M0); anatomical lobectomy surgery; presence of a comparison group including patients undergoing segmentectomy or wedge resection; indication of at least one of the following outcomes: overall survival, recurrence-free survival, rate of recurrence or postoperative complications; study type – randomized controlled trials (RCTs), cohort studies, as well as retrospective comparative studies.

Publications that did not contain a direct comparison between lobectomy and sublobar resections, did not describe clinically significant outcomes, and reviews, case reports, experimental animal studies, duplicate publications, or sources with overlapping data have been *excluded*.

Data on patient characteristics, type of surgery, tumor size, presence of lymphatic dissection, clinical outcomes, and duration of follow-up were extracted from each included article. The comparability of the study groups was assessed by age, gender, resection volume, and concomitant diseases.

Meta-analyses were performed using RevMan 5.4 software (Cochrane Collaboration, London, UK). For binary variables, odds ratios (ORs) or risk ratios (RRs) with 95% confidence intervals (CIs) were calculated. Heterogeneity between studies was assessed using the I^2 score; studies with an I^2 value greater than 50% were analyzed using the random effects model. Statistical significance was determined at the p level < 0.05. The results were visualized using forest plots, and the presence of publication bias was estimated using funnel plots.

Results: The final meta-analysis included 12 studies published between 2014 and 2023, with a total of 17,454 participants. Of these, 13,692 patients (78.44%) underwent lobectomy (group L) and 3,762 patients (21.56%) underwent sublobar resection (SR groups), including segmentectomy and wedge resection. The analysis included studies with different designs: two RCTs [11, 19], two cohort studies [18, 21], and eight retrospective comparative studies (Table 1).

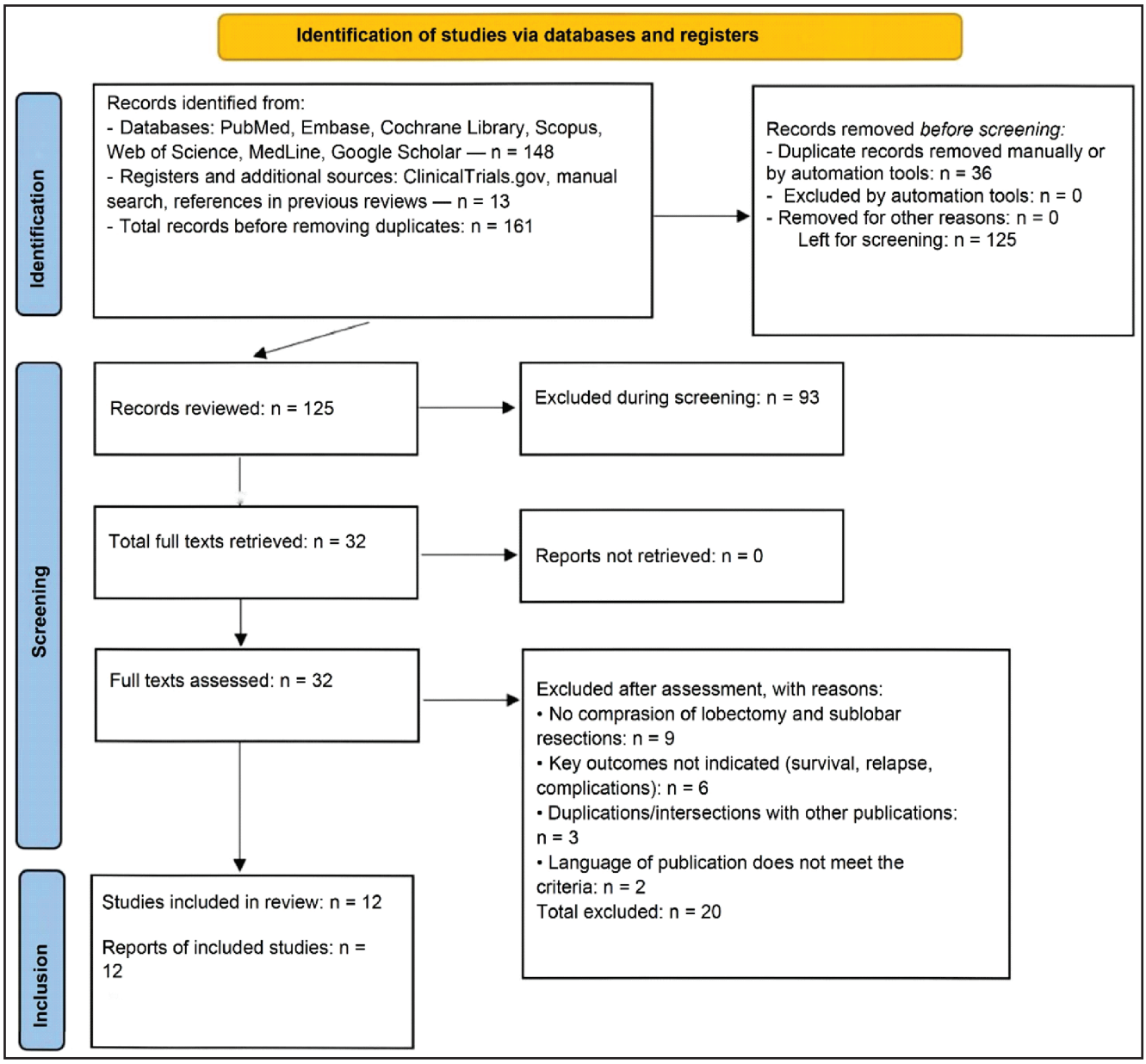

Figure 1 – Selection process for publications for systematic review and meta-analysis [10]

The mean age of patients in the L groups ranged from 59.8 to 77.9 years, while in the SR groups, it ranged from 59.7 to 79.2 years. However, in most studies, the average age in the SR group was slightly higher. The gender composition showed heterogeneity: in the L group, the proportion of men ranged from 41.2% to 86.4%, while in the SR group, women predominated in several studies, for instance, 59% [13], 63.3% [14], and 71.3% [18].

The duration of follow-up ranged from 30.3 to 109 months. The longest follow-up period was reported in the study by N. Altorki et al., which spanned over 84 months. [11], K. Kodama et al. – 87 months. [19], W. Nishio et al. – 109 months [20]. In the studies of A. Fiorelli et al. [13], A.V. Levitsky et al. [15], and R. Perez Holguin et al. [18] provided information on the timing of observation that was either absent or limited.

The average tumor size ranged from 1.42 to 2.29 cm in the L group and from 1.4 to 2.02 cm in the SR group. The average values for all studies were 9.4% and 7.5%, respectively.

Recurrence rates ranged from 0% to 29.3% in the L group and from 0% to 39% in the SR group, with a trend towards higher recurrence rates in the sublobar resection group in most publications.

The 30-day postoperative mortality rate in all studies was low, ranging from 0% to 1.6%, with no statistically significant differences between the interventions.

The five-year recurrence-free survival rates in the L group ranged from 60% to 91.5%, while in the SR group, they ranged from 36% to 92.7%. Five-year overall survival was higher in the lobectomy group (60.5% to 94.1%) compared with the sublobar resection group (45% to 95.7%), with an advantage of lobectomy in most studies.

Table 1 – Characteristics of the studies included in the meta-analysis comparing sublobar resection and lobectomy in patients with NSCLC

Authors	Study design	Follow-up (median), months.	Number of patients, abs.		Age, years		Gender (male/female), abs. (%)		Tumor size, cm		Complications after surgery, %		Recurrence rate, abs. (%)		Mortality on day 30, %		Five-year disease-free survival, %		Five-year overall survival, %	
			L	SR	L	SR	L	SR	L	SR	L	SR	L	SR	L	SR	L	SR	L	SR
Altorki N. (2023) [11]	РКИ	>84	357	340	67.6±13.0	68.3±11.4	147 (41.2%)/ 210 (58.8%)	150 (44.1%)/ 190 (55.9%)	н/д	н/д	13.5	8.17	103 (29.3%)	102 (30.4%)	1.1	0.6	63.6	64.1	80.3	78.9
Dziedzic R. (2017) [12]	Ретро.	36.9	5911	761	62.7±9.0	67.0±8.8	3444 (58.3%) /2467 (41.7%)	468 (61.5%)/ 293 (38.5%)	2.12±0.73	2.02±0.74	7.85	5.6	568 (9.6%)	93 (12.2%)	1.6	1.4	н/д	н/д	79.1	78.3
Fiorelli A. (2016) [13]	Ретро.	н/д	149	90	77.9ұ2.6	79.2±3.1	107 (72%)/ 42 (28%)	37 (41%)/ 53 (59%)	н/д	н/д	17	7	29 (19%)	21 (23%)	н/д	н/д	60	36	60.5	45
Mynard N. (2022) [14]	Ретро.	30.3	1916	275	65.6±9.5	67.6±9.6	805 (42.0%)/ 1111 (58.0%)	101 (36.7%)/ 174 (63.3%)	1.42±0.4	1.55±0.34	9.13	10.8	315 (16.4%)	63 (22.9%)	1.0	1.0	н/д	н/д	54	46
Левицкий А.В. (2021) [15]	Ретро.	н/д	78	38	60.6±8.5	59.7±8.5	61 (78.2%)/ 17 (21.8%)	27 (71.1%)/ 11 (28.9%)	1.95±0.49	1.82±0.37	3.56	2.4	0 (0%)	1 (2.6%)	0	0	85.2	76.2	82.0	74.8
Subramanian M. (2018) [16]	Ретро.	60	1354	333	66.3±10.0	69.6±9.6	579 (42.8%)/ 775 (57.2%)	158 (47.4%)/ 175 (52.6%)	2.0±0.7	1.7±0.6	8.9	7.4	0 (0%)	130 (39%)	н/д	н/д	н/д	н/д	61.8	55.6
Yaldız D. (2020) [17]	Ретро.	53.9	257	12	59.8±9.9	60.6±10.3	222 (86.4%)/ 35 (13.2%)	8 (66.7%)/ 4 (33.3%)	2.2±0.8	1.8±0.6	6.3	4.8	18 (7%)	0%	1.3	0.9	н/д	н/д	73.3	62.5
Perez Holguin R.A. (2023) [18]	Ког.	36.7	306	401	н/д	н/д	101 (33%)/ 205 (67%)	115 (28.7%)/ 286 (71.3%)	н/д	н/д	13.5	9.5	33 (10.8%)	25 (6.23%)	0.3	0.2	н/д	н/д	88.9	85.1
Kodama K. (2015) [19]	РКИ	87	69	69	62.1±9.52	62.6ұ7.81	32 (46.4%)/ 37 (53.6%)	33 (47.8%)/ 36 (52.2)	2.29±0.52	1.67±0.5	5.3	4.72	17 (24.6%)	3 (4.3%)	0	0	86.9	92.7	94.1	95.7
Nishio W. (2016) [20]	Ретро.	109	59	59	61±13.5	64ұ13	38 (64.4%)/ 21 (35.6%)	38 (64.4%)/ 21 (35.6%)	1.7±3.0	1.7±0.4	11.2	10.3	12 (19.5%)	5.6% (3.3%)	н/д	н/д	91.5	76.3	93.0	86.4
Okada M. (2014) [21]	Ретро.	34.2	479	155	66±14.8	66ұ14.5	223 (46.6%)/ 256 (53.4%)	74 (48.1%)/ 81 (51.9%)	1.7±0.4	1.5±0.4	7.15	5	37 (7.72%)	13 (8.3%)	0	0	86.9.	92.7	94.1	95.7
Stiles B.M. (2019) [22]	Ког.	40.15	2757	1229	74.3±5.5	75.6±5.7	1558 (56.6%)/ 1196 (43.4%)	731 (59.5%)/ 498 (40.5%)	1.5±0.4	1.4±0.4	13.4	11.7	256 (9.28%)	193 (15.7%)	0	0	90.8	82.8	65	48

Note: L – lobectomy; SR – sublobar resection; Retro - Retrospective study; RCT – randomized clinical trial; Cohort. – cohort study; not available – n/a.

Analysis of tumor recurrences. The total relative risk (RR) of recurrence was 0.92 [95% CI: 0.65-1.31], which does not indicate a statistically significant difference between lobectomy and sublobar resection (p=0.66). Thus, both surgical strategies have shown comparable efficacy in preventing recurrence in the early stages of NSCLC.

However, high inter-study heterogeneity was observed (I^2=87%, p<0.01), indicating significant differences between the included studies in design, population characteristics, duration of follow-up, and criteria for assessing relapse. For example, RR values ranged from 0.00 [0.00-0.02] in M. Subramanian et al. [16] to 5.67 [1.74-18.46] in K. Kodama et al. [19]. In a study of B.M. Stiles et al. [22], relapse occurred significantly more frequently after sublobar resection (RR=0.59 [0.50-0.70]) (Figure 2).

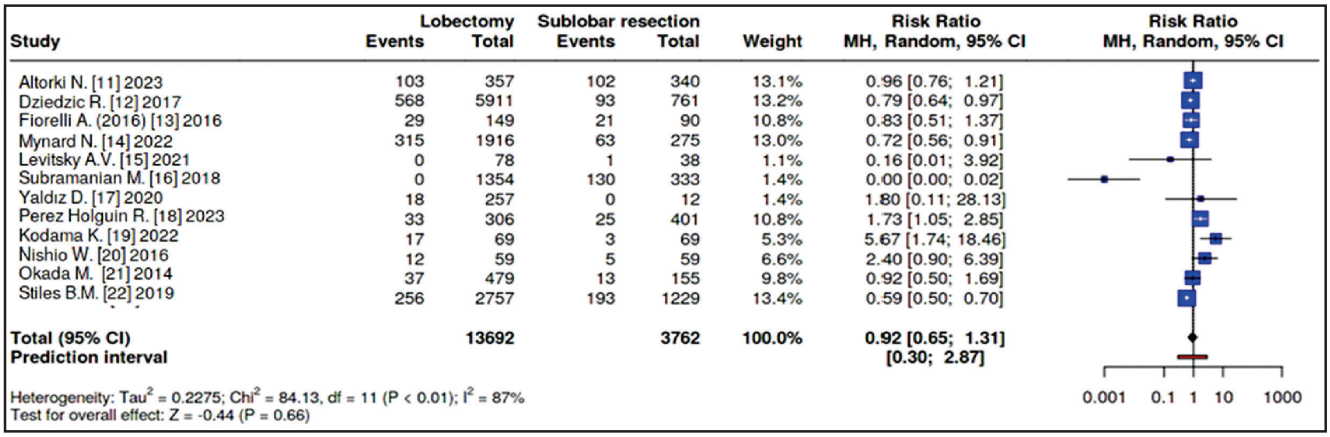

Figure 2 – Forest graph: risk of recurrence after lobectomy and sublobar resection (RR=0.92 [95% CI: 0.65 to 1.31]; p=0.66; I^2=87%)

Postoperative complications. Comparative analyses revealed a higher risk of postoperative complications in the lobectomy group (RR=1.22 [95% CI: 1.08-1.37]; p<0.01). This suggests that lobectomy is 22% more likely to develop complications, compared to SR (Figure 3).

The heterogeneity of the analysis was found to be minimal (I^2=0%; χ^2=10.62; df=11; p=0.48), indicating a high consistency of results between studies, regardless of region, clinical setting, and design.

Five-year overall survival. A meta-analysis of five-year overall survival showed an advantage of lobectomy over sublobar resection (RR=1.08 [95% CI: 1.00-1.17]; Z=1.96; p=0.05), but the difference is at the limit of statistical significance (Figure 4).

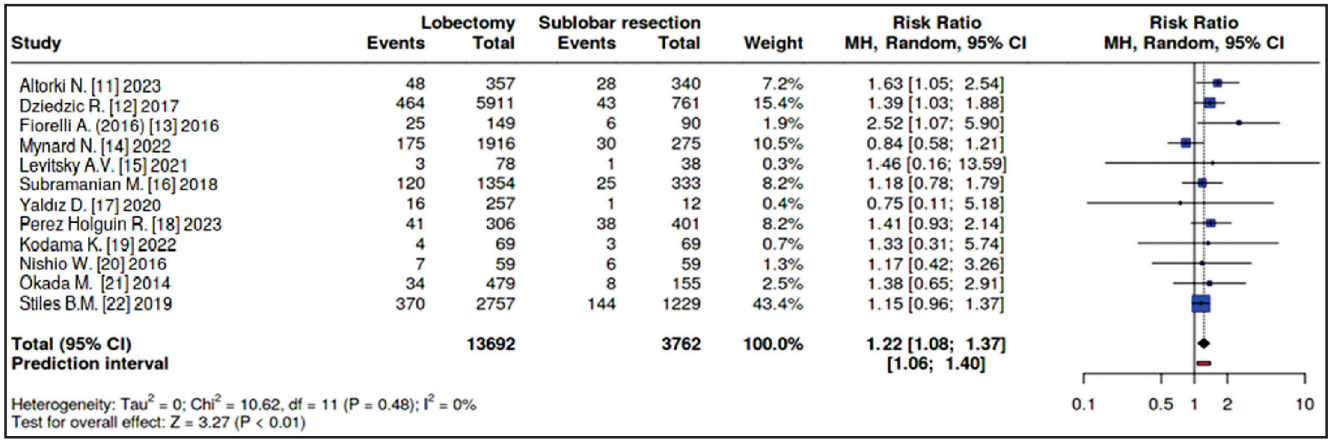

Figure 3 – Forest graph: incidence of postoperative complications (RR=1.22 [95% CI: 1.08 to 1.37]; p<0.01; I^2=0%)

Heterogeneity was pronounced (I^2=91%; χ^2=125.55; df=11; p<0.01), reflecting significant differences between studies. The prognostic interval [0.81-1.44] demonstrates potential variability in effect depending on the clinical context. This emphasizes the need for individualized selection of surgical tactics, taking into account the concomitant risk factors and the patient's overall condition.

Discussion: The results of the meta-analysis made it possible to comprehensively assess the oncological effectiveness and safety of lobectomy and sublobar resections (segmentectomy and wedge resection) in patients with stage I NSCLC. Even though lobectomy remains the standard of surgical treatment, the increased interest in organ-preserving interventions is due to the need to minimize surgical risks, especially in elderly and comorbid patients.

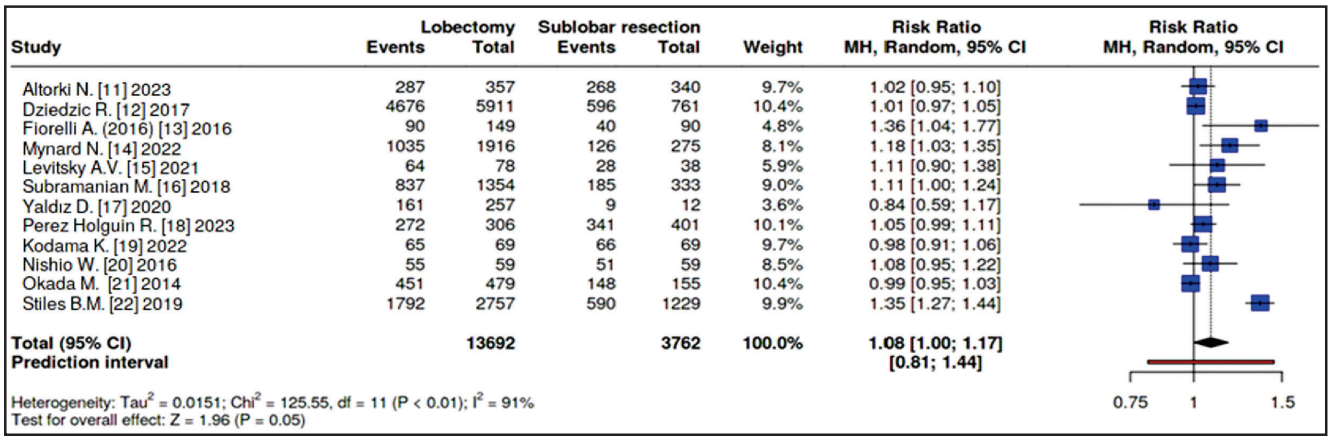

Figure 4 – Forest graph: five-year overall survival (RR=1.08 [95% CI: 1.00-1.17]; p=0.05; I^2=91%)

Analysis of recurrence rates revealed no statistically significant differences between lobectomy and sublobar resection (RR=0.92; 95% CI: 0.65-1.31; p=0.66). However, the high heterogeneity (I^2=87%) reflects variability in study designs, population characteristics, and evaluation criteria. The range of individual RR values from 0.00 to 5.67 emphasizes the importance of a stratified approach, taking into account tumor morphology, degree of invasion, and lepidic growth.

The incidence of postoperative complications was significantly higher after lobectomy (RR=1.22; 95% CI: 1.08-1.37; p<0.01), in the absence of inter-study heterogeneity (I^2=0%), confirming the persistence of the effect. These findings are particularly important for patients with limited functional reserve, who may prefer less invasive interventions.

Five-year overall survival was higher in the lobectomy group (RR=1.08; 95% CI: 1.00 to 1.17; p=0.05), but the effect was on the verge of statistical significance, with pronounced heterogeneity (I^2=91%) and a wide prognostic interval [0.81 to 1.44], which limits the universality of the findings. This emphasizes the need to individualize surgical tactics, taking into account the tumor's characteristics, size, localization, and risk factors for recurrence.

This meta-analysis is characterized by its coverage and strict adherence to the PRISMA and AMSTAR methodologies. Unlike previously published studies, this study includes various designs, covers key outcomes (relapses, complications, survival), and also contains a formal analysis of heterogeneity and confidence intervals, which increases the reliability of the conclusions.

The present study has several methodological limitations that should be considered when interpreting the results. Firstly, studies with different designs (randomized, cohort, and retrospective) were included in the meta-analysis, which, in itself, may be a source of heterogeneity. Pronounced variability in the duration of follow-up, patient characteristics, the volume of lymphatic dissection, and the use of additional methods of treatment also affects the comparability of results.

A key limitation is the aggregation of two different types of sublobar resections – anatomical segmentectomy and non-anatomical wedge resection – into one subgroup. These interventions differ significantly in radicality, volume of tissue removed, and the ability to assess resection margins and lymph nodes. Segmentectomy, as a rule, provides higher oncological reliability compared to wedge resection, a finding confirmed by several studies. Thus, combining these approaches in a single analysis could affect the accuracy of the cancer efficacy assessment and increase the heterogeneity of the results. Due to the limitations of the initial data and the lack of stratified data on the type of sublobar resection in separate publications, it was not possible to conduct a separate analysis of segmentectomy and wedge resection in this meta-analysis.

An additional limitation is the prevalence of retrospective studies with variable quality of initial data, which reduces the level of evidence. In addition, the lack of access to individual patient data limits the possibility of conducting an in-depth subgroup analysis on the morphological characteristics of the tumor, age, comorbidities, and other significant factors.

Conclusion: Sublobar resections demonstrate comparable oncological outcomes to lobectomy in patients with NSCLC, stage I. Despite the modest benefit of lobectomy in terms of five-year overall survival, the difference did not reach a clinically significant level and was accompanied by high heterogeneity. The recurrence rate did not differ statistically between groups; however, the risk of postoperative complications was significantly higher in the lobectomy group.

The data obtained confirm the validity of an individualized approach to determining the scope of intervention. Sublobar resections can be considered as a safe alternative to lobectomy in patients with tumors ≤2 cm, low invasiveness, and limited functionality.

Multicenter randomized trials with long-term follow-up, standardized inclusion criteria, and access to individual data are necessary for the final assessment of cancer equivalence.

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АҢДАТПА

ЕРТЕ САТЫДАҒЫ ҰСАҚ ЖАСУШАЛЫ ЕМЕС ӨКПЕ ҚАТЕРЛІ ІСІГІНДЕ ЛОБЭКТОМИЯ МЕН СУБЛОБАРЛЫҚ РЕЗЕКЦИЯЛАРДЫҢ САЛЫСТЫРМАЛЫ ТИІМДІЛІГІ: ЖҮЙЕЛІ ШОЛУ ЖӘНЕ МЕТА-ТАЛДАУ

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Өзектілігі: *Ұсақ жасушалы емес өкпе обыры (ҰЖЕӨО) – заманауи диагностика мен емдеудің жетістіктеріне қарамастан, онкологиялық өлім-жітімнің негізгі себептерінің бірі болып қалуда. I сатыдағы ҰЖЕӨО кезінде анатомиялық лобэктомия дәстүрлі түрде «алтын стандарт» болып саналады, алайда скринингтік бағдарламалардың дамуы және шағын өлшемді ісіктердің жиі анықталуы сублобарлық резекцияларға қызығушылықты арттыруда.*

Зерттеу мақсаты *– ұсақ жасушалы емес өкпе обырының ерте сатысында анатомиялық лобэктомия мен сублобарлық резекциялардың (сегментэктомия, клиновидті резекция) тиімділігі мен қауіпсіздігін салыстырмалы түрде бағалау мақсатында жүйелі шолу және мета-талдау жүргізу.*

Әдістері: *Мета-талдау PRISMA және AMSTAR әдістемелік ұсынымдарына сәйкес жүргізілді. 2010–2024 жылдар аралығындағы жарияланымдарға PubMed, Embase, Cochrane Library, Scopus, Web of Science және басқа да дереккорлар бойынша іздеу жүргізілді. Іріктеуге I сатыдағы ҰЖЕӨО диагнозы қойылған, лобэктомия немесе сублобарлық резекция жасалған ересек пациенттерге қатысты зерттеулер енгізілді. Статистикалық талдау RevMan 5.4 багдарламасы арқылы жүргізілді. Қауіп-қатердің салыстырмалы көрсеткіштері (RR) 95% сенімділік интервалымен есептелді, гетерогенділік I^2 индикаторы бойынша бағаланды.*

Нәтижелері: *Жалпы саны 17 454 науқасты қамтыған 12 зерттеу мета-талдауға енгізілді, олардың 13 692-сі лобэктомия, 3 762-сі сублобарлық резекциядан өтті. Рецидив жиілігі бойынша статистикалық айырмашылық байқалмады (RR=0,92; 95% CI: 0,65-1,31; p=0,66; I^2=87%). Лобэктомия тобында отадан кейінгі асқыну қаупі айтарлықтай жоғары болды (RR=1,22; 95% CI: 1,08-1,37; p<0,01; I^2=0%). Бесжылдық жалпы өмір сүру көрсеткіші лобэктомия тобында жоғары болды (RR=1,08; 95% CI: 1,00-1,17; p=0,05; I^2=91%).*

Қорытынды: *Сублобарлық резекциялар ≤2 см өлшемдегі ісіктері, инвазия белгілері жоқ және функционалдық резервтері шектеулі науқастар арасында онкологиялық тиімділік бойынша лобэктомиямен салыстыруға болатын нәтижелер көрсетеді. Хирургиялық тактиканы таңдауда жекелендірілген тәсілдің маңыздылығы арта түсуде. Бұл бағытта қосымша рандомизацияланған көпорталықты зерттеулер қажет.*

Түйінді сөздер: *ұсақ жасушалы емес өкпе обыры (ҰЖЕӨО), лобэктомия, сублобарлық резекция, сегментэктомия, өмір сүру, рецидивсіз өмір сүру ұзақтығы, рецидив.*

АННОТАЦИЯ

СРАВНИТЕЛЬНАЯ ЭФФЕКТИВНОСТЬ ЛОБЭКТОМИИ И СУБЛОБАРНЫХ РЕЗЕКЦИЙ ПРИ РАННЕЙ СТАДИИ НЕМЕЛКОКЛЕТОЧНОГО РАКА ЛЁГКОГО: СИСТЕМАТИЧЕСКИЙ ОБЗОР И МЕТА-АНАЛИЗ

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Актуальность: *Немелкоклеточный рак легкого (НМРЛ) остаётся одной из ведущих причин онкологической смертности, несмотря на прогресс в диагностике и лечении. Анатомическая лобэктомия традиционно считается «золотым стандартом» хирургического лечения НМРЛ I стадии, однако с развитием скрининга и увеличением числа выявленных опухолей малого размера растёт интерес к сублобарным резекциям.*

Цель исследования *– сравнительная оценка эффективности и безопасности лобэктомии и сублобарных резекций (сегментэктомии и клиновидной резекции) у пациентов с немелкоклеточным раком легкого на ранней стадии.*

Методы: *Мета-анализ выполнен в соответствии с рекомендациями PRISMA и AMSTAR. Поиск литературы проведён в базах PubMed, Embase, Cochrane Library, Scopus, Web of Science и других источниках за период с 2014 по 2024 год. Включались исследования с прямым сравнением лобэктомии и сублобарных резекций у взрослых пациентов с НМРЛ I стадии и оценкой клинически значимых исходов. Статистический анализ проводился с использованием программного обеспечения RevMan 5.4. Рассчитывались относительные риски (ОР) с 95% доверительными интервалами (ДИ), гетерогенность оценивали с помощью показателя I^2.*

Результаты: *В мета-анализ включены 12 исследований (n=17 454), из них 13 692 пациента перенесли лобэктомию, 3 762 – сублобарную резекцию. Частота рецидивов статистически не различалась между группами (ОР=0,92; 95% ДИ: 0,65-1,31; p=0,66), однако отмечалась высокая гетерогенность (I^2=87%). Частота послеоперационных осложнений была достоверно выше в группе лобэктомии (ОР=1,22; 95% ДИ: 1,08-1,37; p<0,01; I^2=0%). Пятилетняя общая выживаемость была выше после лобэктомии (ОР=1,08; 95% ДИ: 1,00-1,17; p=0,05), но с выраженной гетерогенностью (I^2=91%).*

Заключение: *Сублобарные резекции демонстрируют сравнимую с лобэктомией онкологическую эффективность при раннем НМРЛ, особенно у пациентов с опухолями ≤2 см, отсутствием инвазии и ограниченными функциональными резервами. Полученные данные подтверждают обоснованность индивидуализированного подхода при выборе объёма резекции. Необходимы дальнейшие рандомизированные исследования для окончательной оценки онкологической эквивалентности вмешательств.*

Ключевые слова: *немелкоклеточный рак легкого (НМРЛ), лобэктомия, сублобарная резекция, сегментэктомия, выживаемость, безрецидивная выживаемость, рецидив.*

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