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Surgical treatment of patients with a combined forms of pulmonary tuberculosis and lung cancer

Objective – to improve surgical treatment of patients with combined forms of pulmonary tuberculosis and non small cell lung cancer due to minimally invasive diagnostics and with the use of sterno-mediastinal surgical dissection of tissue and complete systematic bilateral lymph node dissection (CSBLND).

Materials and methods. Our studies involved retrospective analysis of 101 cases of treatment of patients with stage I–II–IIIA non-small cell lung cancer (NSCLC) and pulmonary tuberculosis. A review of diagnostics and operations over the past decade were conducted. All patients underwent surgical treatment. The main group included 48 patients who underwent 16 lobectomy and 32 pneumonectomy from the sternomediastinal access. A comparative analysis of the effectiveness of the CSBLND was carried out. The comparison group included 53 patients who underwent 17 lobectomy and 36 pneumonectomy, a surgical operation for lateral thoracotomy and selective dissection of the mediastinal lymph nodes was performed.

Results and discussion. The analysis of the morphological features of combined forms of pulmonary tuberculosis and NSCLC has been made in comparison groups, that were explored retrospectively. There was a trend improved survival patients combined forms of pulmonary tuberculosis and NSCLC stage I–II–IIIA, who underwent of CSBLND ($p = 0.05$). A statistically significant of survival of patients who underwent pneumonectomy in the mail group ($n = 32$) with CSBLND ($p = 0.01$). In a comparative analysis of the frequency and nature of complications during surgery, we found out that in general in the main group they met in 2.1 times less often than in the comparison group ($p < 0.05$). Complications during operation in patients of the main group occurred in $(11.4 \pm 2.6) \%$, while in the comparison group – in $(22.6 \pm 4.2) \%$ of cases. The analysis of data showed that patients with adenocarcinoma of lung cancer have been improvements in the performance of sterno-mediastinal surgical techniques (CSBLND) ($p = 0.12$). Therefore, patients with combined forms of pulmonary tuberculosis and NSCLC for suspected «jumping metastases» we recommended to carry out operations with sternotomy surgical access with full system bilateral lymph nodes dissection and radical rezection of pathologically altered lung. All this requires further development of high-tech surgical techniques in our country.

Conclusions. The leading effect of pulmonary tuberculosis on the surgical treatment of patients with combined forms of tuberculosis and lung cancer has been shown in groups of comparison. The increase of 3 years survival in patients of basic groups is set, demonstrating the advantage of active diagnostical surgical tactics of stage I–II–IIIA NSCLC with used sterno-mediastinal access and the appliance of more radical CSBLND. Thus, the clinical effect of operative patients of the main groups in the immediate postoperative period was reached 95.7 % patients, in the groups comparison clinical effect be noted in 80.5 %.

Keywords

Pulmonary tuberculosis, non-small cell lung cancer, combined forms, diagnostics, surgical treatment.

The subject of this article is determined by its relevance [10–12, 15, 17, 18]. Today, pulmonary tuberculosis (TB) is a major source of errors in diagnosis of lung cancer (LC), including non-small cell lung cancer (NSCLC), which is promising in the surgical treatment [13, 19, 21]. Lung cancer detection on the background of TB in 60–70 % of patients is registered in case of inveterate stages IIIB–IV, when surgical treatment already is impossible [9]. The frequency of combined lesion of TB and LC is quite variable, according to various literary sources the combination ranges from 3 to 18 % among all cases of LC [3]. The effectiveness of early diagnosis of combined forms does not exceed 67.9 % [4]. Application of surgical stage in the complex treatment of patients with combined forms of TB and LC allows the improving summary results of treatment of 10–20 % [5]. However, to date, there has not been resolved the adequate surgical tactics of the radical treatment for patients with combined forms of TB and LC, not developed methods of surgical resection and mediastinal lymph dissection in such patients [6]. A result of orthograde or retrograde metastasis of tumor cells into the lymphatic system of the lungs is causes the appearance of cancer lymphangitis and lymphadenitis. Metastasis of LC is always hematogenous instead, with pulmonary TB they are mostly lymphogenic. Therefore, the appearance of CT scans of patients who have had TB, non-calcified lymph nodes is always suspected of LC. Blackout type of glance glass opposites (GGOs) of 75 % are persistent and that's basically of adenocarcinomas in situ it (AIS) or minimally invasive adenocarcinomas (MIA), which have 100 % of rate no recurrent surgically survival [7]. Therefore, when SCT appears, strengthening and deformation of the pulmonary pattern, striped shadows that extend to the root and solid nodes in the mediastinum, it is necessary to diagnose suspected LC in a patient who has suffered from TB [8]. Instead, most radiologists diagnoses of TB recurrence was establishes and directs of patients on conservative treatment, which contributes to neglect of LC in combined forms (<http://www.ielcap.org/professionals/docs/ielcap.pdf>). Very important in the diagnosis of combined forms is the verification of LC and detection of atypical, malignant cells. Such cells can occur with forms of TB, especially in the elderly [20]. Cytological examination with bronchoscopy does not allow to establish of LC on the presence of alveolar macrophages. This requires electron microscopy or immunofluorescence methods. Accumulations of hemosiderin, malignant cells from broncho-alveolar content, lymph nodes, bronchi of lungs, especially placed groups are help diagnoses of early stages I–IIA–B LC [22]. The activating (sensitizing) receptors of

epidermal growth factor (EGFR) are predictive of tumor's response to use of tyrosine kinase inhibitors – gefitinib and erlotinib. The gene EML4-ALK was identified, which is the result of inversion in chromosome 2, which turned out to be an oncogenic factor of carcinoma in patients with multi-drug-resistant TB [16]. It is necessary testing with tyrosine kinase inhibitors (crisotinib) on patients with combined forms of TB and NSCLC (stages IIA–B) and performs it in combination with mutational analysis of EGFR/KRAS according to the method of fluorescent hybridization in situ (FISH). Immunohistochemistry may to play a role in excluding negative cases of LC in patients with pulmonary TB [14]. Diagnosis of cases for young patients with suspicion of TB and NSCLC by us in the early diagnosis algorithm was reflected [1, 2].

Objective – to improve surgical treatment of patients with combined forms of pulmonary tuberculosis and non small cell lung cancer due to minimally invasive diagnostics and with the use of sterno-mediastinal surgical dissection of tissue and complete systematic bilateral lymph node dissection.

Materials and methods

The retrospective analysis of 101 patients with combined forms of pulmonary TB and LC, who had been treated in Ternopol TB hospitals, surgical departments of pulmonary surgery of the Regional Unit Clinical and Preventive Medicine Center «Phthisiology», Dnipro of Ukraine was conducted. The main group amounted of 48 (47.5 %) patients who underwent the methods of comprehensive early diagnosis, which we perfected including spiral computer tomography of thorax organs (SCT) with contrast study, video-assisted thoracoscopy (VATS) with biopsy of lymph nodes. The authors developed methodology of lobectomy and pneumonectomy using sterno-mediastinal surgical access with complete systematic bilateral lymph node dissection (CSBLND). The comparison group consisted of 53 (52.5 %) patients who underwent standard methods of diagnosis and radical surgical treatment using the standard lateral thoracotomy with selective mediastinal lymph nodes dissection (SMLND). The calculation of the required sample size was performed in accordance with the recommendations for good clinical practice.

Preliminary selection of patients was carried out taking into account the requirements of the clinical trial according to the following criteria, based on informed consent of patients' rights to surgery, compliance with medical ethics, approvals of the bioethics commission, literature analysis and personal experience. The diagnostic possibilities of VATS in patients with combined forms of TB and

Table 1. Separation of patients groups with age and sex

	The main group (n = 48)					Comparison group (n = 53)				
	Age, years				Total, (M ± m)	Age, years				Total
	> 45	46—55	56—65	66—75		> 45	46—55	56—65	66—75	
Men	1	2	39	2	44 (91.5 %)*	1	1	44	1	47 (88.7 %)*
Women	—	—	3	1	4 (8.4 %)*	1	2	2	1	6 (11.3 %)*
Total	1	2	42	3	48 (100.0 %)	2	3	46	2	53 (100.0 %)

Note. *The level of significance within the main and comparison group χ^2 -criterion Pearson ($p < 0.05$).

LC, that were studied retrospectively, were analyzed. Criteria for inclusion of objects of study in the research: aged from 20 to 80 years; sex — both sexes; clinical and radiological confirmation of tuberculous changes in the lungs with stages I—II—IIIA NSCLC in patients of 1—4 clinical categories of TB patients; clinical category 5.1 residual changes of the earlier tuberculosis (RCT); stage 0—II of pulmonary insufficiency. The effectiveness of long-term outcomes was evaluated on the basis of criteria for clinical cure, progression of TB and LC (average life expectancy, percentage of local recurrences of purulent process), formation of chronic TB, death from TB and complications.

All types of statistical processing were performed using the standard package Statistica, v. 6.1. (serial number AGAR 909 R455721FA). Statistical characteristics are presented as: number of observations (n), arithmetic mean (M), standard error of the mean (m), median (Me), relative values (%).

The separation of patients in this group were evaluated retrospectively (Table 1).

The effectiveness of the immediate results were assessed on the basis of studying and comparing of the number during surgery and postoperative complications and their types, causes of postoperative mortality.

The effectiveness of remote results were estimated on the basis of clinical treatment, the progression of TB and oncological process (life expectancy, percent of the tumor process relapse), death from TB and cancer.

The analysis of clinical groups of patients by age, sex, localization and stage of LC, general condition, indicators of spirometry, ECG, bronchoscopy and concomitant pathology was representative.

With the aim of solving the clinical evaluation of standard diagnostic methods of LC detection in patients with TB, we conducted a retrospective analysis of 78 disease histories of patients with TB and LC. It turned out that a thorough study of the complaints allowed suspecting the appearance of a tumor process only in (69.2 ± 2.9) % of patients ($p < 0.05$). In the remaining patients, complaints

were absent or had minor of clinical significance. They were not an important diagnostic algorithm for early diagnosis of combined forms of TB and LC. An objective examination of the patients also had no substantial diagnostic value. During a spiral CT scan without contrast amplification, we detected the characteristic signs of the central LC only in (71.8 ± 1.9) % of patients and in (82.6 ± 1.3) % of patients — with peripheral tumor. Diagnostic value of SCT with the localization of tumor in the post-tuberculosis change does not exceed 50 %. Among 30 patients who underwent the SCT of thorax organs, in 6 (20.1 %), according to the results of postoperative study, was diagnosed the mediastinal metastases in the lymph nodes. A false conclusion about the tubercular nature of the changes in the presence of cancer metastases was observed in 57.8 % of cases. In our opinion, the low diagnostic value of SCT in diagnosing the metastatic lesion of regional lymph nodes were associated with the inability to distinguish TB and cancer lesions. According to our data, only in 67.9 % of patients the cancer was diagnosed likely in time, and these patients were subject to a radical surgical treatment.

Results and discussion

The combination of localization of the TB and tumor processes within a single lobe of the lung is marked in most patients — in 28 (58.3 %) of the main group and in 27 (50.1 %) of the comparison group (Table 2).

Anatomical forms of LC in both groups were represented as proximal — in 31 patients (64, 6 %) in the main group, 34 (64.1 %) in the comparison group, and central — in 17 (35,4 %) and 19 (35.8 %) respectively (Fig. 1 and 2).

Patients with tumor process stage II prevailed in both groups of observation — 38 (79.1 %) patients of the main group and 43 (81.1 %) of the comparison group. Patients with stages IIIB and IV were beyond the research (Table 3).

Both groups of patients by basic criteria of the prevalence, nature and activity of TB and stage of

Table 2. The localization combination of the tuberculosis and tumor processes

Localization of lung cancer	The main group (n = 48)			Group comparison (n = 53)		
	Upper lobe	Average lobe	Lower lobe	Upper lobe	Average lobe	Lower lobe
Right lung	28 (58.3 %)*	1 (2.1 %)	2 (4.2 %)*	27 (50.1 %)*	2 (3.8 %)*	5 (9.4 %)*
Left lung	13 (27.1 %)*	—	4 (8.3 %)*	15 (28.3 %)*	1 (1.9 %)*	3 (5.6 %)*
Total	41 (85.4 %)*	1 (2.1 %)	6 (12.5 %)*	42 (79.2 %)*	3 (5.6 %)*	8 (15.1 %)*

Note. *The level of significance within principal and comparison group χ^2 -criterion Pearson ($p < 0.05$).

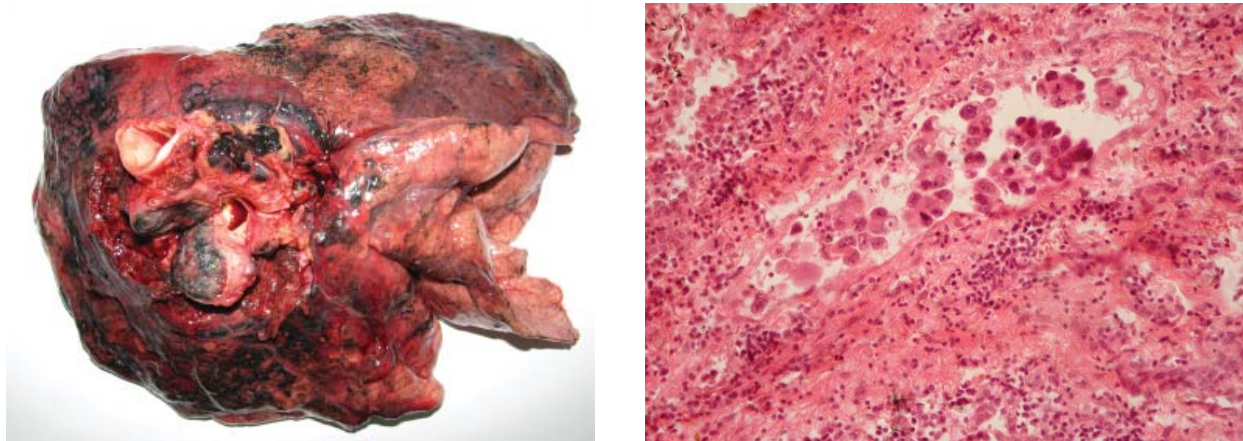


Fig. 1. Macropreparat central of lung cancer combined with metatuberculosis. Gistofotograma G2 adenocarcinoma of lung cancer on background of the tuberculosis fibrosis. Coloring gematoksyllin and eosin. $\times 400$

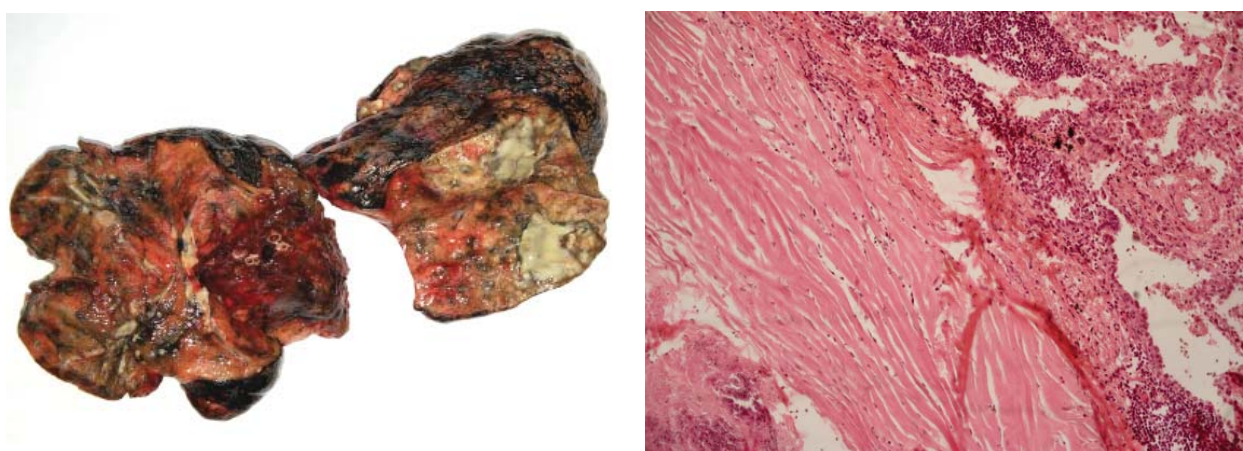


Fig. 2. Macropreparat peripheral (squamous cell) of lung cancer combined with tuberculoma. Gistofotograma G3 squamous cell of lung cancer in the wall of tuberculoma. Coloring gematoksyllin and eosin. $\times 200$

Table 3. Stages of lung cancer of the comparison group

Stages of lung cancer	Main group (n = 48)	Comparison group (n = 53)	Accuracy of significance
IA	3 (6.2 %)*	3 (5.7 %)*	$\chi^2 = 0.03$, $p = 0.89$
IB	5 (10.4 %)*	4 (7.5 %)*	$\chi^2 = 1.03$, $p = 0.19$
IIA	21 (43.7 %)*	24 (45.3 %)*	$\chi^2 = 0.06$, $p = 0.43$
IIB	17 (35.4 %)*	19 (35.8 %)*	$\chi^2 = 3.83$, $p = 0.21$
IIIA	2 (4.1 %)*	3 (5.7 %)*	$\chi^2 = 1.85$, $p = 0.47$
Total	48 (100.0 %)	53 (100.0 %)	—

Note. *The level of significance within principal and comparison group χ^2 -criterion Pearson ($p < 0.05$).

Table 4. Comparative analysis of groups

Index	Main group (n = 48)	Comparison group (n = 53)
Age 55–65 years	84.2 ± 1.2*	86.8 ± 1.4*
Average age, years	59.0 ± 1.6*	61.5 ± 1.8*
men	89.5 ± 1.8*	88.7 ± 1.2*
women	10.5 ± 2.1*	11.3 ± 2.4*
Average length of TB, years	3.3 ± 0.2*	3.7 ± 0.3*
Consist of MTB+, %	39.6 ± 2.2*	28.3 ± 1.9*
Poly resistance MTB, %	13.1 ± 2.1*	15.1 ± 2.8*
MTB+ at the time of operation, %	29.2 ± 1.4*	24.2 ± 1.5*
Rate of peripheral LC, %	64.6 ± 1.3*	64.1 ± 1.1*
Central LC, %	35.4 ± 2.1*	35.8 ± 1.6*
Accompanying pathology, %	42.1 ± 1.4*	43.4 ± 1.9*

Note. * The level of significance within principal and comparison group χ^2 -criterion Pearson ($p < 0.05$).

LC, age, sex, functional parameters and frequency of accompanying pathology were representative (Table 4).

A comparative analysis of the results of extended lobectomy and pneumonectomy in two groups of patients lies on the basis of scientific research. Herewith, 48 patients of the main group underwent lung resection from sterno-mediastinal surgical access. In 53 patients with combined forms of TB and LC the resection was performed according to the standard method of lateral thoracotomy (Table 5).

Table 5. Types of operations

Operation	Main group (n = 48)	Comparison group (n = 53)
Pneumonectomy	32 (66.6 %)	36 (67.9 %)*
Bilobectomy	1 (2.1 %)	2 (3.8 %)*
Lobectomy	15 (31.3 %)	15 (28.3 %)*
Total	48 (100.0 %)*	53 (100.0 %)*

Note. * The level of significance within main and comparison group χ^2 -criterion Pearson ($p < 0.05$).

Adenocarcinoma prevailed in 34 (70.8 %) cases of the main group and 40 (75.5 %) of the comparison group in pathohistological studies. Also, different kinds of squamous cell carcinoma was confirmed in 12 (25.1 %) in the principal and 12 (22.6 %) in the comparison group. In addition, other forms of NSCLC were likely determined in 2 cases (4.1 %) of the main group and in one (1.9 %) of the comparison group (Table 6).

Morphological features of combined forms of TB and NSCLC were analyzed in the comparison group, which were explored retrospectively. Cancer on the background of TB changes was noted in 85.4 % or 86.7 % of cases. Cancer in active tuberculoma was in 6.3 % and in 8.3 % of cases there was an emergence of cancerous tumors in the fibrous cavern (Table 7).

Herewith, in 23.5 % of cases there was a violation of metastatic lesion of lymph nodes in the root of

Table 6. Histological forms of lung cancer

Histological forms	Main group (n = 48)	Comparison group (n = 53)	Accuracy of significance
Adenocarcinoma	34 (70.8 %)*	40 (75.5 %)*	$\chi^2 = 0.34, p = 0.12$
Squamous cell carcinoma of lung	12 (25.1 %)*	12 (22.6 %)*	$\chi^2 = 0.09, p = 0.13$
Other forms	2 (4.1 %)*	1 (1.9 %)*	$\chi^2 = 0.72, p = 0.26$
Total	48 (100.0 %)	53 (100.0 %)	

Note. * The level of significance within main and comparison group χ^2 -criterion Pearson ($p < 0.05$).

Table 7. Morphological features of combined forms of tuberculosis and non-small cell lung cancer

Morphological features	Main group (n = 48)		Comparison group (n = 53)	
	Abs.	%	Abs.	%
Cancer in posttuberculosis changes:	41	85.4 ± 2.6*	46	86.7 ± 1.8*
fibrosis	4	8.3 ± 2.2*	6	11.3 ± 2.7*
cirrhosis	3	6.3 ± 0.1*	4	7.5 ± 0.6*
dense foci	6	12.5 ± 1.0*	8	15.1 ± 3.2*
conglomerates foci	5	10.4 ± 3.6*	7	13.2 ± 3.2*
inactive tuberculoma	8	16.7 ± 5.2*	11	20.7 ± 2.4*
inactive cavern	5	10.4 ± 2.9*	10	18.8 ± 3.9*
Cancer in Active tuberculoma	3	6.3 ± 2.1*	4	7.5 ± 2.3*
Cancer in Active fibrosis cavern	4	8.3 ± 2.6*	3	5.6 ± 1.8*

Note. * The level of significance within main and comparison group χ^2 -criterion Pearson ($p < 0.05$).

Table 8. Violation of metastatic lesion of patients with combined forms of the tuberculosis and lung cancer

Group of patients	Violation of metastatic lesion		
	Lymph nodes in the root of the lung (N1)	Lymph nodes in the root of the lung and mediastinum (N2)	Lymph nodes in the mediastinum without root of the lung
Combined forms of the TB and LC (n = 17)	9 (52.9 %) *	4 (23.5 %) *	4 (23.5 %) *
LC (n = 15)	7 (46.6 %) *	8 (53.3 %) *	0

Note. * The level of significance within main and comparison group χ^2 -criterion Pearson ($p < 0.05$).

the lung and mediastinal and the emergence of so-called «jumping metastases». However, in patients which operative about lung cancer without TB we not discovered there «jumping metastases» (Table 8).

While studying the impact of TB on the surgical treatment of patients with combined forms of TB and LC in the comparison group we revealed that the pleural cavity was completely obliterate in 10.2 % of patients and is partially obliterate in 17.2 %. Multiple pleural adhesions were in 47.6 % of cases. In 75 % of cases to discharge the lung from an adhesion, we used extra-pleurally pneumolysis. In 11.3 % of cases the presence of adhesion process and serious pneumolysis in the pleural cavity were led to the intraoperative bleeding. Pulmonary TB in 9.4 % of patients was a reason for expanding the volume of surgical intervention to pneumonectomy. High frequency (7.5 %) of intrapleurally bleeding was caused by the necessity of carrying out extra-pleurally pneumolysis during the approach to the root of the lung, as well as cicatrice and caseous changes of the lymph nodes in the root of lung and mediastinum. The presence of the fibrosis-sclerosis meta-tuberculous transformation of bronchial fiber formed technical difficulties during the formation of residual limb of the main bronchi. The inability of residual limb of the main bronchi in patients of comparison group was noted in 7.5 %. High share of intraoperative (22.6 %) and postoperative complications (28.4 %) when performing surgical interventions using a standard lateral thoracotomy is noteworthy in the retrospectively analysis of 53 operations (17 lobectomy and 36 pneumonectomy) in patients of comparison group.

With the purpose of early diagnosis of pulmonary TB and LC, we refined the known way using the spiral SCT scan with endovenous contrast enhancement. For this purpose, a systematic algorithm was used with an application of multiplanar reconstructions, MIP reconstructions for better visualization of micronodular changes, Mini P for better visualization of tracheobronchial tree, and 3 D-reconstructions for profound study of pathology. With the help of a systematic algorithm for the study of radiant SCT semiotics and the analysis of densitometry

indices, the difference in the density of lesions natively and after contrast enhancement made possible a differential analysis of tumor and TB changes, or their combination.

In 32 patients under investigation, a VATS was used prior to surgery to conduct a biopsy and assess the metastatic lesion of the lymph nodes of the root and mediastinum. The obtained data showed the superiority of the few invasive diagnostic methods in assessing the metastatic lesson of the mediastinal lymph nodes, namely the refinement of the stage by the status N0; N1–2 in cases of NSCLC. The use of the differential diagnostic algorithm developed by us made it possible to improve the stages diagnosis of LC in patients with pulmonary TB in the possibility of earlier surgical treatment (Fig. 3).

Using sterno-mediastinal access, we performed an operation in 48 patients with combined TB and LC. 15 persons underwent lobectomy, 1 patient bilobectomy, 32 – pneumonectomy. In general, in 25.4 % of our observations, the degree of prevalence of the tumor process was exaggerated. The use of sterno-mediastinal access allowed the more accurately determining the border of a tumor transition to adjacent anatomical structures and carry out the planned radical operation. When the lymph nodes of the root of the lung and the mediastinum are fused to the bronchi, and the tumor is peribronchially and perivasally intimately adherent or concrecence to the mediastinum process, we developed a technique of extended lobectomy and pneumonectomy using sterno-mediastinal access. The use of sterno-mediastinal access in the course of advanced resection in patients with combined TB and LC allowed interfering with the mediastinum to remove the drug that correspond the principle of oncological radicalism and ablatic and provides the accessibility and completeness of the bilateral lymph node dissociation. It also significantly reduced the volume of intraoperative bleeding by implementing a retrograde regimen of resection of an expansive process bypassing the pleural adhesions.

In a comparative analysis of the frequency and nature of intraoperative complications, we found out that in general in the main group they met in

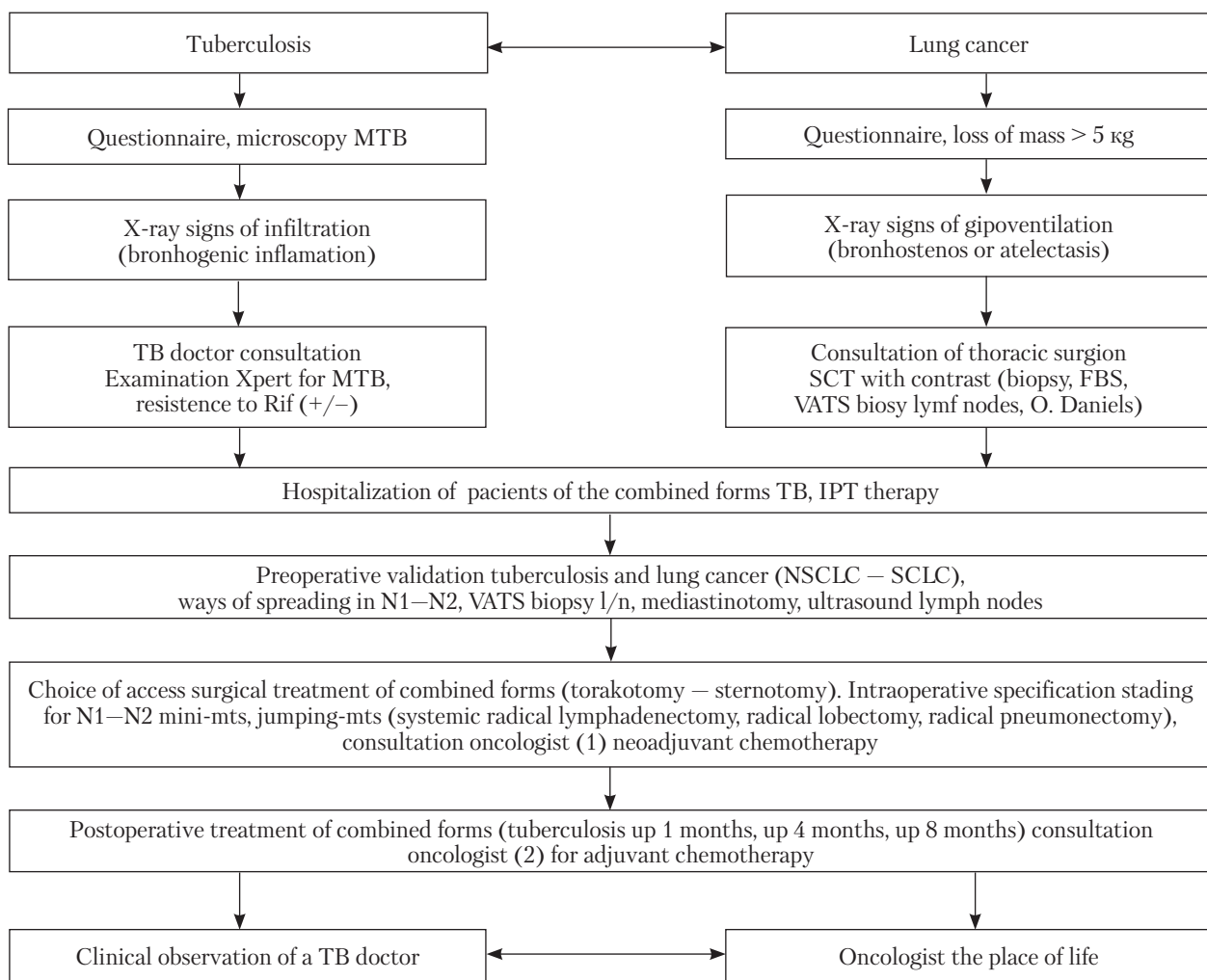


Fig. 3. Algorithm for diagnosis and surgical treatment of combined forms of tuberculosis and lung cancer

2,1 times less often than in the comparison group ($p < 0.05$). Intra operative complications in patients of the main group occurred in $(11.4 \pm 2.6) \%$, while in the comparison group – in $(22.6 \pm 4.2) \%$ of cases. The main types of intraoperative complications of the patients in the main group were the disclosure

of the rectal lateral pleural cavity and violations of the cardiac rhythm. Among the intraoperative complications in the comparison group, the most threatening was damage to the vessels of the lung root in anatomical conditions covered by fibrous-sclerotic meta-tuberculous changes, as well as the removal of

Table 9. Postoperative complications

Character complication	Main group (n = 48)	Comparison group (n = 53)
Lobectomy ± bilodectomy	16	17
Pneumonia of the operated lung	1 (5.8 %)*	2 (11.7 %)*
Slow pulmonary discharge	1 (5.8 %)*	2 (11.7 %)*
Pneumonectomy	32	36
Pleural empyema with bronchial bursa	1 (3.1 %)*	4 (11.1 %)*
Intraperitoneal bleeding	1 (3.1 %)*	4 (11.1 %)*
Pulmonary heart failure	2 (6.2 %)*	1 (2.8 %)*
Thromboembolism of pulmonary arteries	1 (3.1 %)*	1 (2.8 %)*
Total complication	7 (14.6 %)*	14 (28.4 %)*
Died	1 (3.1 %)*	2 (3.8 %)*

Note. * The level of significance within principal and comparison group χ^2 -criterion Pearson ($p < 0.05$).

Table 10. Remote results of surgical treatment of patients with combined forms

Criteria of efficiency	Main group	Comparison group
Local recurrency, %	10.2 ± 1.8 *	23.4 ± 3.7*
Survival, months	48.6 ± 4.7 *	37.4 ± 5.2*
Reactivation of tuberculosis, %	7.3 ± 0.2 *	9.4 ± 0.6*
Mortality from progression of TB, %	3.1 ± 0.7 *	5.6 ± 0.8*

Note. * The reliable difference between groups by ANOVA ($p < 0.05$).

conglomerates of lymph nodes from the major vessels. Intraoperative bleeding in patients of the main group was on average (542.5 ± 44.8) ml, whereas in patients of the comparison group (822.3 ± 21.7) ml (in 1.5 times more). Reduction of blood loss during the operation of sterno-mediastinal access was achieved by ligation of the pulmonary arteries (partial or main) without the preliminary releasing of the lungs from adhesions. The frequency of postoperative complications in the comparison group was 1.5 times more likely than in patients of the main group. The empyema of the pleura with bronchial bursa in the postoperative period was significantly less common in 3.2 times ($p < 0.05$) in the group of patients who had pneumonectomy from sterno-mediastinal access. This is due to the possibility of creating the shortest major bronchus residual limb regardless of the side of operation with plastic its covering with mediastinal bands. In the early postoperative period, patients in the main group experienced seven complications: slow pulmonary discharge (1), pneumonia of the operated lung (1), pleural empyema with bronchial bursa (1), intraperitoneal bleeding (1), pulmonary heart failure (2), thromboembolism of pulmonary arteries (1). At the same time, the greatest number of complications (57.1 %) was recorded in patients with concomitant active TB (Table 9). Long-term results of surgical treatment of patients with combined forms of both observation groups are shown in Table 10.

Conclusions

The leading effect of pulmonary TB on the surgical treatment of patients with combined forms of TB and LC was shown in groups of comparison. Development of lung resection methods and bilat-

eral lymphadenectomy from the sterno-mediastinal access allowed the reducing of intraoperative complications from 22.6 to 11.4 %, postoperative complications – from 28.4 to 14.6 %, the incidence of empyema pleura – from 11.1 to 3.1 %. The increase of 3 years survival in patients of the principal group from 37.4 to 48.6 %, and the decrease of the number of local recurrence rate from 23.4 to 10.2 % was set, demonstrating the advantage of active surgical tactics of sterno-mediastinal access and the application of more radical bilateral lymphadenectomy.

Thus, the clinical effect of operative patients of the main groups in the immediate postoperative period was reached 95.7 % patients, in the groups comparison clinical effect be noted in 80.5 %. With order to facilitate the management and technical stage of LC and increase the radicalism of surgery in patients with combined forms of the TB and LC we have developed and used sterno-mediastinal access technical methods lobectomy and pneumonectomy with bilateral mediastinal lymph dissection. In a comparative analysis of the frequency and nature of complications during surgery, we found out that in general in the main group they met in 2.1 times less often than in the comparison group ($p < 0.05$). This is due to the creation of favourable operating conditions for the handling of vessels and bronchus of the lungs of root anatomical conditions, which are not covered by metatuberculosis and posttuberculosis charges. Therefore, patients with combined forms of the TB and non small cell lung cancer for suspected «jumping metastases» we recommended to carry out operations with sternotomy surgical access with full system bilateral lymphadenectomy and radical resection of pathologically altered lung.

Authors declare no conflict of interest.

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Хірургічне лікування хворих із поєднанням туберкульозу і раку легень

Мета роботи — підвищити ефективність хірургічного лікування хворих із поєднаними формами легеневого туберкульозу та недрібноклітинного раку легень шляхом застосування малоінвазивної діагностики, стерно-медіастинального розтину тканин із повною системною білатеральною дисекцією лімфатичних вузлів межистіння (СБДЛВМ).

Матеріали та методи. Проведено ретроспективний аналіз 101 випадку поєднання форм раку легень (стадії I—II—IIIА) і легеневого туберкульозу. До основної групи залучено 48 пацієнтів, яким виконано 16 лобектомій і 32 пневмонектомії зі стерно-медіастинального доступу. Проведено порівняльний аналіз ефективності системної повної білатеральної дисекції лімфатичних вузлів межистіння. До групи порівняння залучено 53 хворих, яким виконано 17 лобектомій і 36 пневмонектомій, яким виконано хірургічну операцію з бокової торакотомії та селективної дисекції лімфатичних вузлів межистіння.

Статистична достовірність ефективності результатів операцій представлено в групах порівняння в таблицях.

Результати та обговорення. Проаналізовано морфологічні особливості поєднаних форм легеневого туберкульозу, асоційованого із недрібноклітинною формою раку легень (НДКРЛ) у групах порівняння, яких досліджували ретроспективно. Відзначено тенденцію до поліпшення виживаності хворих із поєднанням туберкульозу і НДКРЛ стадії I–II–IIIА, яким виконали СБДЛВМ ($p = 0,05$). Статистична достовірність виживаності відмічена в пацієнтів основної групи ($n = 32$), яким виконана пневмонекомія з повною СБДЛВМ ($p = 0,01$). При порівняльному аналізі частоти та характеру інтраопераційних ускладнень виявилось, що в цілому в основній групі вони спостерігалися у 2,1 разу рідше, ніж у групі порівняння ($p < 0,05$). Інтраопераційні ускладнення у хворих основної групи спостерігали у $(11,4 \pm 2,6) \%$, в той час, коли у групі порівняння – у $(22,6 \pm 4,2) \%$ випадків. Аналіз даних показав, що у хворих з формою аденокарциноми злоякісного утвору легень поліпшення виживаності спостерігається частіше при виконанні стерно-медіастинальної техніки СБДЛВМ ($p = 0,12$). Отже, пацієнтам з поєднаними формами туберкульозу з НДКРЛ при підозрі на «стрибаючі метастази» ми рекомендуємо проводити операції зі стернотомічного хірургічного доступу із повною системною білатеральною лімфодисекцією та наступною радикальною резекцією патологічно зміненої легені. Все це вимагає подальшого розвитку високих хірургічних технологій в нашій країні.

Висновки. Установлено значний вплив легеневого туберкульозу на хірургічне лікування хворих із поєднанням туберкульозу та раку легень. Збільшення трирічної виживаності у пацієнтів основної групи свідчить про ефективність хірургічної тактики у разі НДКРЛ (стадії I–II–IIIА) із використанням стерно-медіастинального доступу і радикальної СБДЛВМ. Клінічний ефект у найближчий післяопераційний період досягнуто у 95,7 % пацієнтів основної групи та 80,5 % групи порівняння.

Ключові слова: легеневий туберкульоз, недрібноклітинний рак легень, поєднані форми, діагностика, хірургічне лікування.

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