The Effectiveness of Endobronchial Sanitation in the Treatment of Patients with An Abscess of a Mild Complication of a Bronchial Fistula

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ABSTRACT

The results of the research on 110 patients, treated in the Purulent Surgical Department of the Clinical Base of the Bukhara State Institute in 2010-2019, with lung abscesses with complications of bronchial fistula with various etiology were analyzed. According to the treatment method all patients were divided into 2 groups: I - comparison group and II – main group. The control of group I which consisted of 42 (38.2%) patients received traditional (conservative) methods of treatment. The main group which included 68 (61.8%) patients treated by conservative treatment and daily sanitation bronchoscopy with antibacterial and thinning drugs in the same time. The analysis of the obtained results revealed that the combined use of conservative therapy with sanitation bronchoscopy is a more effective method of treatment in comparison of conservative therapy without fibro-bronchoscopy.

Keywords: Lung abscess, suppurative diseases of the lungs and pleura.

Relevance. Studies of the authors show that the percentage of development of pulmonary-pleural complications with lung abscesses ranges from 30 to 70% and the incidence of gangrenous forms from 28 to 74% [Bisenkov L.N., Okhunov A.O.]. The level of mortality also remains high, in general, with various forms of purulent-necrotic process from 12.7% to 77.8% [Geller D.B., Gostishchev V.K. and etc.]. Acute abscesses and gangrene of the lungs are most often caused by staphylococcus and gram-negative microbial flora and non-clostridial forms of anaerobic infection and fuso-spirillary flora which is previously considered as a factor leading to the etiology of gangrenous processes in the lungs as having secondary role. The strains of staphylococcus such as hemolytic staphylococcus and staphylococcus aureus and gram-negative flora, Klebsiella and Escherichia coli and Proteus and Pseudomonas aeruginosa, and anaerobic microorganisms, Bacteroid melanyngenicus, B. fragilis, Fusobacterium nucleatum are most often found as reasons of acute suppuration of the lungs. There is no doubt that one of the leading causes of purulent-destructive diseases is pneumonia and the unfavorable course of abscesses that negatively affect the effectiveness of therapy are impaired patency of the bronchial tree with the formation of atelectasis as well as circulatory disorders in

the bronchial and pulmonary vessels with the development of ischemia of the bronchopulmonary structures. Coupled with concomitant diseases, smoking, alcoholism and immunosuppression [Okhunov A.O., Babadzhanov B.D., Pulatov U.I. 2019].

The main treatment for an abscess is drainage. However, lung abscess is usually treated conservatively because drainage of the lung abscess is problematic. Drainage is considered only in cases of refractory lung abscess. In such cases, percutaneous lung drainage is usually used. Even when drainage is successful, percutaneous drainage is associated with the risk of complications such as pneumothorax and pleural culture. Those complications occur in 16.1% of patients (Drobyazgin E.A. et al 2020).

The use of techniques provides the supply of antibacterial and other drugs to the pathological focus through the vascular bed presents great difficulties for their implementation, especially in the group of seriously ill patients and, moreover, does not solve many problems of local treatment. In this situation it becomes necessary to carry out sanitation measures through the chest wall using the techniques of "minor pulmonary surgery" [Kapitulin, S. Y. 2013].

New technologies in the diagnosis and treatment of purulent-inflammatory lung diseases have made it possible over the past decades to slightly reduce the incidence, which is confirmed by existing literary publications, but the search for the most effective and low-traumatic treatment options is extremely relevant.

Purpose of the study: to reveal the effectiveness of endobronchial sanitation in the treatment of patients with lung abscesses complicated by bronchial fistula.

Materials and methods:

The results of the research on 110 patients, treated in the Purulent Surgical Department of the Clinical Base of the Bukhara State Institute in 2010-2019, with lung abscesses with complications of bronchial fistula with various etiology were analyzed. According to the treatment method all patients were divided into 2 groups: I - comparison group and II – main group. The control of group I which consisted of 42 (38.2%) patients received traditional (conservative) methods of treatment. The main group which included 68 (61.8%) patients treated by conservative treatment and daily sanitation bronchoscopy with antibacterial and thinning drugs in the same time. The analysis of the obtained results revealed that the combined use of conservative therapy with sanitation bronchoscopy is a more effective method of treatment in comparison of conservative therapy without fibro-bronchoscopy.

The effectiveness of the used and proposed clinical methods for the treatment of suppurative lung diseases was assessed by the duration of bronchopulmonary symptoms, general symptoms of intoxication, the dynamics of the size of the purulent-destructive cavity, and the total bed-day.

Method and scope of endobronchial manipulation. Broncho-scopic manipulation was performed in a sitting position of the patient. In purpose of local anesthesia, immediately before the study, the nasal and oral cavity was treated with 10% Lidocaine spray. To reduce the gag reflex at the time of the introduction of the bronchoscope, the patient was recommended to breathe shallowly and as often as possible. A flexible bronchoscope was passed to the trachea through the nose, larynx, and vocal cords under visual control. The end of the bronchoscope was directed to the main bronchus of the affected lung. At the same time, if necessary, the bronchial lumen was sanitized. The bronchoscope was advanced as close as possible to the area of the bronchial ligament, taking into account the lumen of the bronchus. The bronchial tree was sanitized. Material for bacteriological examination was taken from the aspiration discharge, if necessary for cytological examination. Enzymes (Lydaze, Trypsin) and antibacterial therapy, taking into account sensitivity, were used for bronchial sanitation for dilution.

Results and discussion. In the examined patients, laboratory indicators of signs of endogenous intoxication from peripheral blood (hemoglobin concentration, leukocytosis, ESR,

LII, LII, MSM), the qualitative composition of the sputum microflora, and the length of stay of the patient in the hospital were studied as criteria for assessing the general condition. At the time of admission and in the course of treatment, the condition of the patients was assessed by clinical signs, according to laboratory and instrumental examination methods as well as using X-ray

Research methods. Analysis of the results of indicators of intoxication of the body of patients with lung abscesses complicated by bronchial fistula I - the comparison group revealed the following changes (Table 1). As can be seen from the table, on the first day of treatment, the body temperature of patients averaged 39.1±0.360C. The content of blood leukocytes was on average 9.6±0.5 x 109 / l. Volume c). 0.198 ± 0.016 units Similarly, an increase in LII and ESR was noted. On the third day of treatment there was a slight decrease in body temperature indicators from 39.1±0.36 to 38.6±0.22, the number of blood leukocytes decreased on average to 8.6±0.25 × 109 / L. The volume of medium molecules averaged 0.182 ± 0.009 units. There was a decrease in LII and ESR indicators to 2.2 до0.07 and 42.3±1.43, respectively.

Table 1

Dynamics of indicators of intoxication in patients with purulent lung diseases I - comparison groups (n = 42)

	day of admission	Third day	Seventh day	Fourteenth day	Twentth
t^0 body	39,1±0,36	38,6±0,22*	38,1±0,12*	37,4±0,15	36,7±0,30*
L blood $\times 10^9$/l	9,8±0,36	8,6±0,25*	7,8±0,32	7,2±0,27	6,9±0,40
MCM unit	0,198±0,016	0,182±0,009**	0,166±0,006	0,137±0,007**	,118±0,006***
LII unit	2,4±0,08	2,2±0,07*	1,9±0,05	1,7±0,07	1,4±0,06***
ESR mm / h	45,6±1,79	42,3±1,43*	36,6±1,73*	28,6±1,15***	16,8±0,80***

*Note: * - differences relative to the data of the previous day are significant (* - P <0.05, ** - P <0.01, *** - P <0.001)*

By the seventh day of treatment, the patients of the comparison group with purulent lung diseases had a slight febrile condition (38.1±0.12 ° C). At the same time, according to all indicators of body intoxication: L, MSM, LII and blood ESR, their further decrease was noted, that is, there was a tendency towards normalization - 7.8 70.32 × 109; 0.166 * 0.006; 1.9±0.05; 36.6±1.73 respectively. By the fourteenth day of treatment, these numbers, although they tended to further decrease, however, remained above the norm.

Analysis of the results of indicators of intoxication of the body of patients with purulent lung diseases II –comparison group revealed the following changes (table. No. 2). As can be seen from the table, on the first day of treatment, the body temperature of patients averaged 39.3±0.410C. The content of blood leukocytes was on average 9.9±0.46 x 109 / l. The volume of medium molecules averaged 0.199 - 0.010 units. Similarly, an increase in LII and ESR was noted. On the third day of treatment, there was a slight decrease in body temperature indicators from 39.3±0.41 to 38.2±0.13, the number of blood leukocytes decreased on average to 8.4±0.45 × 109 / l. The volume of medium molecules averaged 0.168 ± 0.007 units. There was a decrease in LII and ESR indices to 1.9 10.08 and 40.4±1.52, respectively. By the seventh day of treatment, patients in the

comparison group with purulent lung diseases retained a slight sub-febrile condition (37.8 - 0.14 ° C). At the same time, according to all indicators of intoxication of the body L, MSM, LII and blood ESR, their further decrease was noted, that is, there was a tendency towards normalization - 7.4±0.39 × 109; 0.152 * 0.009; 1.7±0.07; 34.1±1.22 respectively.

Table 2.

Dynamics of indicators of intoxication in the II-comparison group (n = 68)

Indicators	Observation time				
	day of admission	Third day	Seventh day	Fourteenth day	Twentieth day
t^0 body	39,3±0,41	38,2±0,13*	37,8±0,14*	36,9±0,14	36,6±0,20*
L blood ×10^9/l	9,9±0,46	8,4±0,45*	7,4±0,39*	7,0±0,31*	6,6±0,25**
MCM unit	0,199±0,010	0,168±0,007**	0,152±0,009	0,126±0,005**	,114±0,006***
LII unit	2,4±0,06*	1,9±0,08*	1,7±0,07*	1,4±0,05	1,2±0,04***
ESR mm / h	45,8±1,66*	40,4±1,52*	34,1±1,22*	27,2±1,11***	15,2±0,62***

*Note: * - differences relative to the data of the previous day are significant (* - P <0.05, ** - P <0.01, *** - P <0.001)*

By the seventh day of treatment these figures although they tended to further decrease, however, remained above the norm.

With further treatment and observation by the tenth day all analyzed indicators of intoxication except for ESR of blood were within normal limits.

The next of the characteristic criteria for assessing the purulent process in the lungs was to determine the level of microbial contamination to identify the species composition of microflora.

In most cases 76 (69.1%) patients had pathogenic staphylococci (Staphylococcus aureus) inoculated, of which 48 (63.2%) in the form of monoculture and 28 (36.8%) in associations. In 14 (12.5%) cases, Pneumococcus was sown in and 9 (8.2%) cases E. coli was sown. Proteus was next in frequency of detection-5 (4.5%) observations. This was followed by streptococci (Streptococcus haemoliticus) in 10 (9.1%) cases. Pseudomonas aeruginosa was inoculated in 8 (7.3%) patients.

Table 3

Dynamics of decreasing the size of abscess cavities of groups I and II.

Patient groups	Cavity demensions cm				
	Day of admission	3 сутки	7 сутки	14 сутки	20 сутки
Group I	6,9±0,36*	6,7±0,46**	5,8±0,43**	4,9±0,32*	3,8±0,36*
Group II	6,8±0,66**	5,9±0,26*	5,2±0,28*	4,5±0,34**	3,1±0,35**

Note: - mark(*) is the reliability of differences (p <0.05) in the size of the foci of destruction between the dynamics in terms of the time given in the table.

When analyzing the control images of X-ray examination and MSCT of the chest it was found that in the second group of patients on the day of admission, the sizes of the cavities of the purulent focus of the lung were identical than patients in the first group. Table 3 shows that the numbers of both groups on the day of admission did not differ significantly. In dynamics, throughout the observation period the size of the cavity of the purulent focus decreased systematically but the rate of cavity decay in patients of group II differed group I. By the 18-20th day of treatment the size of the cavities decreased to 3.1 ± 0.35 cm, by 45.6% of the initial size which in patients of group I during these periods was exactly 3.8 + 0.36 cm. 55, 1% of the original size, respectively.

It should be noted that the daily long-term bronchoscopic examination although it has a number of advantages but also has its drawbacks. With prolonged daily bronchoscopic examination in patients of group II omplications were noted in the form of tracheobronchitis up to 23.52%, hoarseness up to 2.94% of cases. All these complications arose as a result of irritation and traumatization of the vocal cord, trachea and bronchi. Thus, we carried out the analysis and the results of the study of patients with lung abscesses complicated by bronchial fistula revealed the following:

-The patients with PDL with lung abscesses complicated by bronchial fistula are usually affected by St. aureus and Pneumococcus.

-Conservative treatment with the use of endobronchial sanitation and with the introduction of antibiotics into the bronchial tree is an effective method of treatment than only conservative treatment.

-All indicators of intoxication and the dynamics of a decrease in the size of purulent cavities when using a treatment is complex way in the form of endobronchial sanitation with antibiotic therapy. Since, it accelerates the normalization time ahead of group I by 2-3 days compared to the control group.

-The average duration of conservative treatment of a lung abscess complicated by a bronchial fistula using endobronchial sanitation should be done within 18 ± 2.1 days which is 2-3 days ahead of the conservative method of treatment.

- Daily long-term bronchoscopic examination has its drawbacks. Long-term daily bronchoscopic examination can increase complications during the manipulation. As a result of irritation and traumatization of the vocal cord trachea and bronchi in the form of tracheobronchitis up to 23.52%, hoarseness up to 2.94% of the case.

Conclusions:1. - The pathogenic microfloras St.aureus and Pneumococcus are mainly causes of purulent diseases of the lung.

2. In the treatment of patients with lung abscesses complicated by bronchial fistula endobronchial debridement is an effective method than conservative therapy.

3. Carrying out daily long-term bronchoscopic sanitation has its disadvantages in the form of tracheobronchitis up to 23.52%, and hoarseness up to 2.94% of cases. This indicates the need for further research aimed at finding new minimally invasive treatment methods

List of literatures

1. Okhunov A.O., Babadzhanov B.D., Pulatov U.I. Причинй генерализатсии инфектсии у бол'нйкҳ с гнойновоспалител'нйми заболеваниями мягкикҳ тканей на фоне сакҳарного диабета // Vestnik Tashkentskoy Meditsinskoy Akademii. № 4, 2016. S. 89-93. [In Russian]
2. Safoyev B.B. Kurbonov O.M. Khasanov A.K., Yarikulov SH.SH. Rol' bronkhoskopii lechenii oslozhnonnykh endobronkhial'nykh ligaturnykh svishchey posle ekhinokokkektomii legkogo. //Novyy den' v meditsine.-2019.-№3 (27).-S.239-241. [In Russian]
3. Khasanov A.K., Yarikulov SH.SH., Mukhamadiyev I.SH., Mirsoliyev SH.G. Problema ostrogo abstsessa legkogo: etiopatogenez, diagnostika i lecheniye na sovremennom etape//Novyy den' v

meditsine.-2019.-№ 4 (28).-S.324-328. [In Russian]
4. Khasanov A.K., Yarikulov SH.SH., Mirsoliyev SH.G. Sovremennoye sostoyaniye problemy etiopatogeneza i lecheniya bol'nykh gnoynymi zabolevaniyami legkogo //Novyy den' v meditsine.-2020.-№3 (31).-S.149-155. [In Russian]
5. Boltaev T.Sh., Safoev B.B., Borisov I.B., Yarikulov Sh.Sh., KHasanov A.A., Rahmatov Sh.Sh., Rajabov V.B. Effectiveness of the application of the physical method on a wound by plasma flow of argon in the complex treatment of patients with purious diseases of soft tissues Federal state budgetary institution (fsbi), “national medical research center for surgery named after.
6. Safoev B.B., Turdiev Kh.K., Boltaev T.SH., Clinical and Laboratory Features of Covid - 19 Course in Combination with Pneumonia// European multidisciplinary journal of modern science. – 2022, Vol. 4, 2021, Pages. 622 – 626.
7. Turdiev Khurshid Kobilovich. Diagnostic criteria for covid - 19 combined with pneumonia. European Journal of Interdisciplinary Research and Development, Volume-05 July-2022, ISSN (E): 2720-5746.
8. Turdiev Khurshid Kobilovich, Rakhmatov Shukhrat Sharopovich. Complications After Covid - 19 Combined with Pneumonia. Texas Journal of Medical Science, ISSN NO: 2770-2936.
9. Сафоев Б.Б., Ярикулов Ш.Ш., Икромов Т.Э. Влияние различных доз ультрафиолетовый лучей на резистентности патогенные микроорганизмы в эксперименте (in vitro). Тиббиётда янги кун - Бухоро, 2020. №4(33) –– С. - 129-131. (14.00.00; № 22)
10. Сафоев Б.Б., Ярикулов Ш.Ш. Подавление резистентности микрофлоры под воздействием раствора диметилсульфоксида при лечении гнойно-хирургических заболеваний мягких тканей // Биология ва тиббиёт муаммолари - Самарканд, 2021. - №2 (127). - С. - 125-130. (14.00.00; №19)
11. Ярикулов Ш.Ш., Хасанов А.К., Мухаммадиев И.Ш., Пути снижения резистентности микрофлоры к антибиотикам при лечения гнойных ран. // Тиббиётда янги кун - Бухоро, 2020. -№3(31). – С. 156-160 (14.00.00; № 22)
12. Safoyev Bakhodir Barnoyevich, Yarikulov Shukhrat Shokirovich, Boltayev Timur Shavkatovich. Influence of different concentrations of dimethylsulfoxide solution on antibiotic sensitivity of pathogenic microorganisms in experiment (In Vitro) European Journal of Molecular & Clinical Medicine. Great Britain. 2020, Volume 7, Issue 3, P. 5194-5198 (14.00.00; Scopus)
13. Safoev Baqodir Barnoyevich., Yarikulov Shuxrat Shokirovich. The influence of different doses of ultraviolet rays on the resistance of pathogenic microorganisms in experiment (in vitro) // Journal NX - A Multidisciplinary Peer Reviewed Journal. Maharashtra India. - 2021. - Vol 7. - №. 06. - P. 285–290. Impact Factor 7.223.
14. Ярикулов Ш.Ш. Влияние различных концентраций раствора диметилсульфоксида на чувствительности к антибиотикам патогенных микроорганизмов в эксперименте. Тиббиётда янги кун. Бухоро. - №4 – 33 - 2020. – С. 153 – 155.
15. Сафоев Б.Б., Ярикулов Ш.Ш., Арашев Р.Р. *М*етоды улучшения местного лечения гнойных ран с применением ультрафиолетового облучения в комбинации с многокомпонентными мазями на водорастворимой основе // Innovation in the modern education system*:* a collection scientific works of the International scientific conference // 25th April, 2021. – Washington, USA: "CESS", 2021. Part 5, Issue 1 – p, P. 558-565.

16. Сафоев Б.Б., Ярикулов Ш.Ш., Каршиев Н.Р. Application of physical and chemical methods in treatment of purulent diseases of soft tissue Proceedings of Ingenious Global Thoughts An International Multidisciplinary Scientific Conference Hosted from San Jose, California November 29th, 2020 P. 55-56.
17. R.R.Arashov, & Sh.Sh.Yarikulov. (2022). Comparative evaluation of the outcome of treatment of patients with cavity liver formation with a simple and complex subdiagphragmal position. World Bulletin of Public Health, 13, 55-62. Retrieved from.
18. Radjabov Vohit Bafoyevich, & Yarikulov Shukhrat Shokirovich. (2022). Modern approaches to abdominal drainage in diffuse peritonitis. World Bulletin of Public Health, 13, 50-54. Retrieved from.
19. Р. Р.Арашов, & Ш. Ш. Ярикулов. (2022). Особенности хирургического лечения больных полостными образованиями печены при сложных внутрипеченочных расположениях. European Journal of Interdisciplinary Research and Development, 6, 30–38. Retrieved from.
20. R. R. Arashov, Sh. Sh. Yarikulov, & B. B. Safoev. (2022). Treatment of patients with cavity liver formation with a simple and complex subdiagphragmal position. Galaxy International Interdisciplinary Research Journal, 10(8), 65–74. Retrieved from.
21. Шаропова М. С., Сафоев Б. Б., & Ярикулов Ш. Ш. (2022). Особенности клинико-лабораторного течения гнойных ран в сочетанном фоне сахарного диабета и диффузного токсического зоба. Galaxy International Interdisciplinary Research Journal, 10(8), 75–87. Retrieved from
22. Safoev Baqodir Barnoyevich, & Yarikulov Shuxrat Shokirovich. (2021). The influence of different doses of ultraviolet rays on the resistance of pathogenic microorganisms in experiment (in vitro). JournalNX - A Multidisciplinary Peer Reviewed Journal, 7(06), 285–290.
23. T K Kobilovich Diagnostic criteria for covid-19 combined with pneumonia European Journal of Interdisciplinary Research and Development 5, 75-80
24. T K Kobilovich, RS Sharopovich Complications After Covid-19 Combined with Pneumonia Texas Journal of Medical Science 11, 17-21/ 2022
25. K K Turdiev, SS Yarikulov, FT Norov, BB Ubaydullaev FEATURES OF THE COURSE OF CLINICAL AND LABORATORY INDICATORS IN PATIENTS WITH AN INTERMEDIATE DEGREE OF COVID-19 2022
26. K K Turdiev, SM Khamroev, SS Yarikulov FEATURES OF X-RAY DIAGNOSTICS OF PATIENTS WITH MODERATE COVID-19. Open Access Repository, 8 (12), 441–446. 2022
27. KK Turdiev, SM Khamroev, SS Yarikulov FEATURES OF X-RAY DIAGNOSTICS OF PATIENTS WITH MODERATE COVID-19 Open Access Repository 8 (12), 441-446. 2022
28. KK Turdiev, BB Safoev, SM Khamroev, BB Ubaydullayev FEATURES OF THE DIFFERENCE IN CLINICAL AND LABORATORY PARAMETERS IN PATIENTS WITH COVID-19 AND PNEUMONIA WITHOUT COVID-19 2022
29. ХК Турдиев. ДИАГНОСТИЧЕСКИЕ КРИТЕРИИ ТЕЧЕНИЯ COVID-19 В СОЧЕТАНИИ С ПНЕВМОНИЕЙ European Journal of Interdisciplinary Research and Development 5, 68-74. 2022