

OPTIMIZATION of COMPLEX TREATMENT of PATIENTS with DESTRUCTIVE PULMONARY TUBERCULOSIS

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ABSTRACT

OBJECTIVES: *Increasing the effectiveness of treatment by improving the reparative processes in the treatment of patients with drug-resistant destructive pulmonary tuberculosis (DR DPT) is one of the topical problems of medicine. One of such methods of complex treatment is collapsotherapy. The aim of the study was to study the effectiveness of collapsotherapy in the complex treatment of patients with DR DPT.*

MATERIAL AND METHODS: *76 patients were examined with DR DPT. Of them, 23 patients (30.3%) with full sensitivity to all anti-tuberculosis drugs (ATD), 25 patients (32.9%) with mono- and polyresistance and 28 (36.8%) - with multiresistance. Patients were divided into two groups: I group - basic group, 34 patients, who were prescribed treatment with ATD taking into account the sensitivity test with the use of collapsotherapy and group II (control group) consisted of 42 patients, who only received ATD, also taking into account sensitivity. As a result of the study, it was found that the use of collapsotherapy in patients with DR DPT in the complex treatment increases the effectiveness of treatment, and also by sputum microscopy at the end of the second month in 79.4% and at end 4 months of treatment in 94.1% of patients there was persistent abacillation (in the control group, 52.4% and 66.7%, respectively). It was also found that the use of collapsotherapy for patients with DR DPT led to the closure of the decay cavities in 58.8% (in the control group 23.1%).*

CONCLUSION: *Thus, we came to the conclusion that the use of collapsotherapy in the complex treatment of newly diagnosed DR DPT, taking into account the test for sensitivity to antibacterial drug, increases the effectiveness of treatment.*

KEYWORDS: pulmonary tuberculosis, drug resistance, collapsotherapy

INTRODUCTION

Despite the use of new ATD treatment regimens, the effectiveness of tuberculosis treatment is still low. One of the main reasons for this is the increase in the frequency of occurrence of drug-resistant forms of tuberculosis (DR-TB). Treatment of these patients remains difficult, expensive and takes a long time, along with this, they have a prolonged discharge of mycobacterium tuberculosis (MBT) with sputum and there is no closure of the cavity of decay in the lungs, which subsequently leads to a worsening of the epidemiological situation and to growth cases with primary-resistant pulmonary tuberculosis. In particular, among the DR-TL, the most frequent and severe course. of the disease are patients with multidrug-resistant tuberculosis (MDR-TB), whose resistance to both the most powerful ATD, ie isoniazid and rifampicin. As well as throughout the world, in Azerbaijan also noted the growth of the incidence of new cases and previously treated TB treatment MDR TB. In patients with MDR forms of tuberculosis, the pathological process in the lungs tends to spread rapidly, characterized by lesions most of the parenchyma and a severe clinical course. And in this regard, increasing the effectiveness of treatment by improving the reparative processes in the treatment of patients with drug-resistant destructive pulmonary tuberculosis (DR DPT) is one of the most topical problems of medicine. One of such methods of complex treatment is collapsotherapy. It should be noted that the use of collapsotherapy is advantageous not only from the economic, but also from the point of view of simplicity and obtaining a rapid therapeutic effect. In the treatment of tuberculosis before is often used collapsotherapy. But since the 60s of the XX century, after the discovery of effective ATD, this method of treatment was not widely used. But in

recent years with the growth of the incidence of DR TB it became more urgent collapsotherapy use in treatment of tuberculosis.

MATERIAL AND METHODS

To carry out the research tasks in the tuberculosis dispensary No. 4 in Baku, which is the base of the phthisiology department of the Azerbaijan Medical University, 76 patients with DR DPT were examined. Patients aged 18-57 years were included in the study, mostly aged 20-43 years (67%), of whom 52 were men (68.4%) and 24 (31.6%) women. Of these, 23 patients (30.3%) with full sensitivity to all ATD, 25 patients (32.9%) with mono- and polyresistance and 28 (36.8%) - with MDR TB. Most of the patients were identified for the first time (82%). Patients were divided into two groups: I group basic group of patients was 34, which was designated ATD given sensitivity test using collapsotherapy and group II (control group) consisted of 42 patients who received only ATD, also taking into account the sensitivity. Depending on the clinical forms of tuberculosis, 25 and 32 patients with infiltrative (73.5 and 76.2%), 3 and 4 (8.8 and 9.5%) disseminated and 6 patients in each group (17.7 and 14.3%) with cavernous pulmonary tuberculosis were detected in the main and control groups, respectively. Two-sided specific process in the main and control groups were noted respectively in 63 and 65% of cases. In both groups of patients, the decay cavities were revealed in 73.5% (25 patients) and 80.9% (34 patients) respectively, and the formed caverns, respectively, 26.5% (9 patients) and 26.2% (11 patients) of cases.

The study was in accordance with the ethical standards of the bioethical committee, developed in accordance with the Helsinki Declaration of the World Association «Ethical Principles of Scientific Medical Research Involving Human Beings" with the amendments of 2013 and the "Rules of Ethical Conduct of Medical Workers" approved by the Order (№137) of the Ministry of Health of the Republic of Azerbaijan dated 29.12. 2011. All patients gave written informed consent to participate in the study.

Samples were subjected to microscopy and culture on Löwenstein-Jensen (LJ), Xpert® MTB/RIF (Cepheid, Sunnyvale, CA, USA) and MGIT™ (BD, Sparks, MD, USA) media. All culture-positive isolates were subjected to drug susceptibility testing (DST) on LJ medium for first-line anti-tuberculosis drugs (FLDs) (isoniazid [INH], rifampicin [RMP], streptomycin [SM], ethambutol [EMB] and pyrazinamide), and MDR-TB isolates were further subjected to DST for second-line anti-tuberculosis drugs (SLDs) (ofloxacin, capreomycin [CPM], amikacin [AMK], prothionamide, cycloserine and para-amino-salicylic acid).

In the basic group, drug resistance was detected in 69.6% of patients, of which 36.7% were multidrug-resistant, and in the control group, 69.8% and 36.9%, respectively. Both groups of patients were assigned individual antibiotic therapy according to the sensitivity test. Patients from the basic group 2-3 months after the start of chemotherapy in the case of a specific lesion of the bronchi not revealed with the help of tracheobronchoscopy, collapsotherapy was performed. 30 patients were carried out artificial pneumothorax because of localization of destruction in the upper lobes, and 4 patients because of the localization in the lower lobes - pneumoperitoneum. Collapsotherapy was used for 4.6 ± 1.4 months on average. The state of the collapse of the lungs and the dynamics of treatment were monitored by X-ray methods (fluoroscopy, radiography). On the first day, 250-300 cm³ of air was injected into the pleural cavity, the next day 250-300 cm³, and then 2 days' break, then again 300-350 cm³. After this, a radiographic collapse revealed 1/3 of the thorax's collapse.

The obtained results were subjected to statistical processing on a personal computer using the application package Microsoft Office Excel 2007 and StatSoft Statistic 6.1, the license agreement BXXR006D092218FAN11. Significance of differences tested using Pearson U - Mann-Whitney. The statistical significance of differences was taken at $p < 0.05$.

DISCUSSION

The results of a 6-month treatment of the above groups of patients were analyzed. The effectiveness of treatment was assessed by cessation of sputum discharge of MBT (abacillation) and by healing of cavities of decay in the lungs. Results showed to high efficiency of collapse therapy in complex treatment of patients with pulmonary tuberculosis (Table 1).

Table 1. The impact of collapse therapy on the outcome of treatment

Indicator of the study	Patients		P
	basic group, % (n)	control group,% (n)	
Sensitivity to drugs (n=23)	(11)	(12)	-
Abacillation (microscopy)	100 (11)	83,3 (10)	<0,05
Abacillation (culture)	90,9 (10)	66,7 (8)	<0,05
Closure of the decay cavity	81,8 (9)	41,6 (5)	<0,05
Mono-polyresistance (n=25)	(11)	(14)	-
Abacillation (microscopy)	90,9 (10)	64,2 (9)	<0,05
Abacillation (culture)	72,7 (8)	42,9 (6)	<0,05
Closure of the decay cavity	54,5 (6)	21,4 (3)	<0,05
Multidrug resistance (n=28)	(12)	(16)	-
Abacillation (microscopy)	75 (9)	50 (8)	<0,05
Abacillation (culture)	58,3 (7)	37,5 (6)	<0,05
Closure of the decay cavity	41,7 (5)	12,5 (2)	<0,05
Total (n = 76)	(34)	(42)	-
Abacillation (microscopy)	88,2 (30)	64,3 (27)	<0,05
Abacillation (culture)	73,5 (25)	47,6 (20)	<0,05
Closure of the decay cavity	58,8 (20)	23,8 (10)	<0,05

Note: p - the differences were significant with the original data, $p < 0,05$

In the control group who received only chemotherapy, sputum microscopy after 2 months of treatment in 14 patients (33.3%), after 4 months in 22 (52.4%) and after 6 months of treatment 66.7% (28 patients) showed the cessation of sputum discharge of MBT. In the main group who received chemotherapy with the use of collapse therapy, in the culture of sputum after 2 months of treatment in 16 patients (47%), after 4 months - in 18 (52.9%) and after 6 months - at 73.5% (25 patients) was also observed abacillation. In the control group these indices were 7 (16.7%) 15 (35.74%) and 20 (47.6%), respectively (Table 2).

Table 2. Dynamics of abacillation in microbiological sputum examination

	Duration of abacillation					
	2 months		4 months		6 months	
	microscopy	culture	microscopy	culture	microscopy	culture
Basic group	n=34					
Amount	24	16	27	18	32	25
%	70,6	47	79,4	52,9	94,1	73,5
Control group	n=42					
Amount	14	7	22	15	28	20
%	33,3	16,7	52,4	35,7	66,7	47,6
P	<0,05	<0,05	<0,05	<0,05	<0,05	<0,05

Note: p - the differences were significant with the original data, $p < 0,05$

The closure of the decay cavities in the lungs was detected in the main group in 10 patients (29.4%) by X-ray methods of investigation after 4 months of treatment, and in the control group, respectively, in 4 (9.5%). And after 6 months of treatment in the main group, in 20 patients (58.8%), and in the control group 10 (23.8%) was observed the closure of the decay cavities (Table 3).

Table 3. The duration and frequency of closure of destructive changes

Patients	Closure of destruction	
	4 months	6 months
Basic group	n=34	
Amount	10	20
%	29,4	58,8
Control group	n=42	
Amount	4	10
%	9,5	23,8
P	<0,05	<0,05

Note: p - the differences were significant with the original data, $p < 0,05$

The use of collapsotherapy in complex treatment of patients in a short period of time (4-6 months) did not reveal any complications or respiratory failure.

Conclusion

Thus, the results of the study showed that the use of collapsotherapy in patients with DR DPT in complex treatment increases the effectiveness of treatment and also with the help of sputum microscopy at the end of the 2nd month in 79.4% and at the 4th month of treatment was observed abacillation in the 94.1% of patients (in the control group, 52.4% and 66.7%, respectively). It was also found that the use of collapsotherapy for patients with DR DPT led to the closure of the decay cavities in 58.8% (in the control group 23.1%). Thus, we came to the conclusion that the use of collapsotherapy in the complex treatment of newly diagnosed DR DPT, taking into account the test

for sensitivity to antibacterial drug, increases the effectiveness of treatment. Thus, the results of the study showed that the use of collapsotherapy in patients with DR DPT in complex treatment increases the effectiveness of treatment.

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