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Efficiency of Chemotherapy for Adolescent Pulmonary TB

ABSTRACT

46 medical histories of adolescents with pulmonary tuberculosis were analyzed to study the efficiency of chemotherapy. It was found that the majority of adolescents were infected with tuberculosis mycobacterium in the early childhood, received preventive treatment, but later because of many factors tubercular process developed in adolescence, more often among adolescent boys. At the same time, in most cases tuberculosis was revealed as a result of FLG examination or tuberculosis diagnostics without complains and in satisfactory condition of adolescents. The absence of apparent contact with tuberculosis infected people among 1/3 adolescents points out the existence of hidden reservoir of tuberculosis infection.

The treatment analysis showed that in case of optimal chemotherapy patients releasing sensitive strains of tuberculosis mycobacterium have faster clinical and X-ray dynamics and less expressed residential changes in pulmonary tissue, than patients with multidrug resistance of tuberculosis mycobacterium. This led to reduction of period of hospitalized treatment and decline of price of treatment courses due to reduction of steady-state period and rational use of antibacterial drugs.

Keywords: TB infection, adolescents, chemotherapy efficiency.

INTRODUCTION

Nowadays, together with decrease of TB infection among adults, the fact of drug-resistant TB among adults and increase of TB infection among teens become warning. In Russia, TB infection among adolescents was 39.9 out of one hundred thousand in 2012, in 2013 it was 38.7. In 2012 the quantity of TB infected adolescents at the age of 15-17 was 32.1 out of one hundred thousand teenagers, in 2013 it was 31.4.

According to state budget institution of the Republic of Sakha (Yakutia) scientific and practical center "Phthisiatry" the epidemiologic situation of tuberculosis infection among adolescents tends to worsen in the Republic of Sakha (Yakutia). Thus, the indicator of TB among adolescents in 2012 was 50.4 for 100thousand population, in 2013 – 60.8, and in 2014 – 63.6. The indicator of tuberculosis infection among adolescents of the Republic of Sakha (Yakutia) in 2012 was 28.5 for 100 thousand of population, in 2013 it was 51.1 and in 2014 it was 43,3 [7]. The high rate of tuberculosis infection among adolescents underlines the necessity of systemized and organized examination of the following group for early determination of tuberculosis because due to their physiologic features connected with hormonal changes of organism adolescents are "risk

group" for tuberculosis infection. At the same time, due to their psycho-emotional features, adolescents pay little attention on changes of their state and have little motivation for treatment [9]. It is known that the base of a sharp rise of tuberculosis infection among grown-ups and the whole population is formed in childhood due to untimely diagnostics, low efficiency of prevention and treatment of the following disease.

Most authors state that tuberculosis among adolescents has torpid, little symptoms of disease. Then the specific process quickly destroys tissues and brings to semination of organism. This is connected with a whole complex of factors, the leading of which are: late detection and late treatment; solidity of the infection (close familiar contact); long duration of the first tuberculosis in childhood, the residual changes of which cause spread infiltrative processes in lungs in adolescent years; inadequate therapy when the disease is detected (low dozes, short courses); poor tolerance of antibacterial drugs; concomitants; social factors (harmful habits of the patients or their parents, poor living and material conditions, lone-parent families and so on); tuberculosis mycobacterium resistance to antituberculous drugs [1,2,2,10].

According to different authors, the drug resistance of tuberculosis mycobacterium of adolescents reaches from 37.5% to 65,8% among people discharging bacteria [4,5], i.e. medicamentous supersaturation of organism brings to drug resistance, development of toxic and allergic reactions. Each of these factors create problems while treating adolescents' tuberculosis, requires individual approach to the patient, clearly organized chemotherapy, and different types of pathogenic treatment [8].

The modern tendencies of tuberculosis chemotherapy are directed to achieve higher results of treatment, to work out more effective schemes of chemotherapy, to reduce hospitalization period and to use antibacterial drugs rationally [6,11].

Consequently, hard clinical course and chronic features of tuberculosis infection require complex approach to the chosen therapeutic actions to increase efficiency of pulmonary TB treatment.

MATERIALS AND METHODS OF RESEARCH

For 2010-2011 we analyzed 46 case histories of patients with tuberculosis of adolescents who were undergoing treatment in the Department of children and adolescents. All the patients were divided into 3 groups: first group – patients with pulmonary TB without bacterial excretion – 14 patients, second group – patients with pulmonary TB with bacterial excretion – 15 patients, third group – patients with multidrug resistance – 17 teenagers.

RESULTS AND DISCUSSIONS

In the first and second groups of examination (patients with pulmonary tuberculosis without bacterial excretion and patients with pulmonary tuberculosis with bacterial excretion) there were mainly teenage boys (70.6% and 66.7% respectively), in the third group the quantity of girls and boys were equal.

The results of epidemiological anamnesis showed that tubercular contact among patients of all three groups was closely familiar – 34.8% (16 adolescents), 26.1% (12 adolescents) – free contact, and 39.1% (18) adolescents had no tubercular contact. This may be connected with insufficient information while accepting the patients to hospital or may witness of concealed reservoir of tubercular infection.

The anamnesis showed that all teenagers were vaccinated BCG right after the birth. And secondary vaccination of BCG at the age of 7 received only 10% of teenagers in the 1st group and 16.7% - in the second group. In the third group the patients had not received secondary vaccination because of being infected by tuberculosis mycobacterium.

Consequently, the anamnesis shows that the majority of adolescents was infected by tuberculosis mycobacterium in childhood, was treated in tuberculosis dispensary, received preventive treatment and was discharged from the dispensary. But later the children did not receive proper attention of doctors of general medical net that caused local tuberculosis development.

All the patients of the first group were sent to the scientific and practical center "Phthisiatry" for examination and treatment after the results of tuberculosis diagnostics and FLG examination, were received in satisfactory condition and had no complaint. 50% of the patient had poor general condition, complained of high fatigability, weakness, weight decrease and dry cough.

The adolescents with pulmonary tuberculosis were divided according to clinical forms (chart 1).

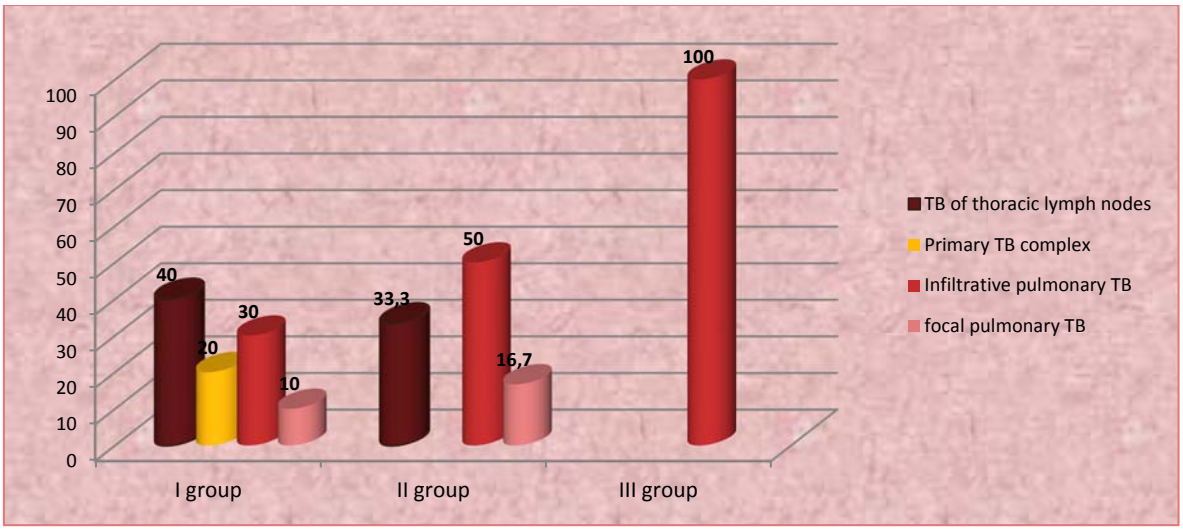

Fig. 1. Clinical forms of pulmonary tuberculosis among teenagers

The division showed that in the first group 40% of adolescents had tuberculosis of thoracic lymph nodes, 30% of adolescents had infiltrative pulmonary tuberculosis, 20% had primary tuberculosis complex, and 10% had focal pulmonary tuberculosis. In the second group 50% of adolescents had infiltrative pulmonary TB, 33,3% - tuberculosis of thoracic lymph nodes and 16.7% -focal pulmonary TB. There were no patients with primitive pulmonary tuberculosis in the following group. 100% of teenagers in the third group had infiltrative pulmonary tuberculosis.

At the acceptance to hospital 50% of patients received first regimen chemotherapy; the other half of the patients received the third regimen chemotherapy. Only one teenager received surgical treatment (resection of lungs).

33.3% of patients from the second group received the first regimen chemotherapy; the rest 66.7% received the second B regimen treatment. Three patients received surgical treatment (thoracotomy, resection, exclusion of suppurated upper tracheobronchial lymph nodes). 75% of patients in the third group received the first regimen chemotherapy. After sputum inoculation for susceptibility to antituberculous drugs mycobacterium resistance to streptomycin, rifampicin, isoniazid and ethambutol was revealed. Consequently, the chemotherapy was changed to the fourth regimen. 25% of patients received surgical treatment (three resections and one pleurectomy).

We paid a special attention to studies of efficiency of chemotherapy of patients in all three groups. 100% of patients in the first group showed positive X-ray dynamics in form of resorption of infiltration, induration, focal calcification, reduction of size of thoracic lymph nodes. Whereas

in the second group of examination bacterial excretion termination was reached after a month, and closure of destruction cavities was reached after 3-4 months.

The analysis of clinical information of patients showed the following: all patients had positive course of treatment in form of bacterial excretion termination, closure of destruction cavities, resorption and induration of infiltrative nodus, reduction of lymphadenopathy and limited fibrosis of pulmonary tissue, normalization of signs of inflammation in peripheral blood.

In the process of chemotherapy patients of the third group felt better after 1-2 months after the start of complex treatment and depended on tuberculosis process prevalence and motivation degree of the patients. According to X-ray image the resorption of infiltrative changes is reached after two months, closure of cavities- after five months. Termination of bacterial excretion was reached after 1-2 months. After etiopathogenetic therapy the patients showed positive dynamics in form of general state improvement, reduction of tuberculosis intoxication, negative tuberculosis sputum and closure of cavities, but had more expressed residual effects in pulmonary tissue than the patients from the second group. In course of complex treatment besides the chemotherapy the teenage patients also received vitamins, hepatoprotectors, antioxidants, physiotherapy, and dietotherapy and had compulsory protective regime (chart 2).

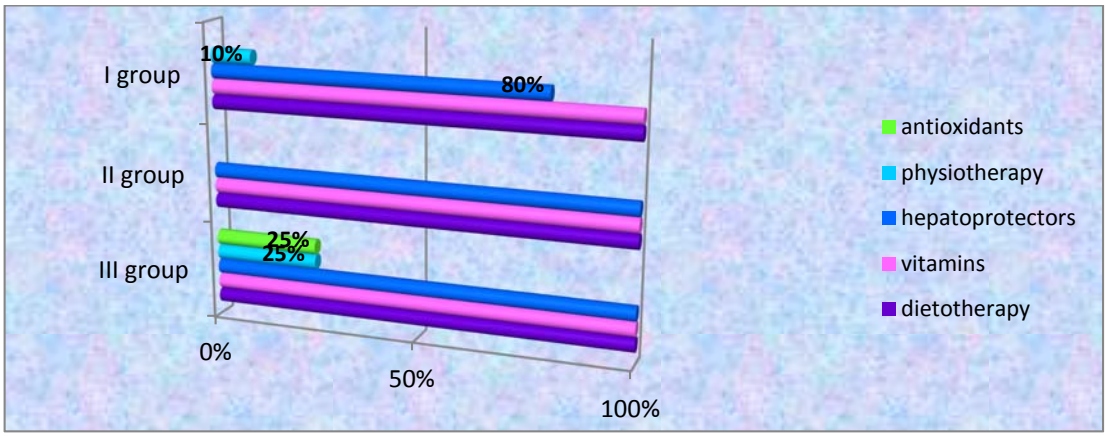

Fig. 2. Pathogenetic therapy analysis

The chart shows that the patients from the third group needed pathogenetic therapy more than others. 25% of teenagers of this group received antioxidants in the intensive phase of treatment. 25% of patients from the third group and 10% of patients from the first group received physiotherapeutic procedure in the 3-4th months of chemotherapy (phonophoresis with hydrocortisone and lydasa).

Thus, the optimal chemotherapy aims to achieve higher results of treatment that brings to reduction of hospitalization period and price reduction due to reduction of steady-state conditions and rational use of antibacterial drugs.

The following chart shows that the hospitalization period of patients with multidrug resistance (III group) in the steady-state condition was about 171 patient days, and patients without bacterial excretion (I group) – 127,3 patient days.

CONCLUSION

According to our research, the majority of teenagers were infected with tuberculosis mycobacterium in the early childhood, received preventive treatment, but later because of many factors tubercular process developed in adolescence, more often among teenage boys. It was mainly infiltrative pulmonary tuberculosis and tuberculosis of thoracic lymph nodes; rarely – primary tuberculosis complex and focal pulmonary tuberculosis. At the same time, in most cases tuberculosis was revealed as a result of FLG examination or tuberculosis diagnostics without complains and in satisfactory condition of teenagers. The absence of apparent contact with tuberculosis infected people among 1/3 teenagers points out the existence of hidden reservoir of tuberculosis infection.

The treatment analysis showed that in case of optimal chemotherapy patients releasing sensitive strains of tuberculosis mycobacterium have faster clinical and X-ray dynamics and less expressed residential changes in pulmonary tissue (single nodes and limited fibrosis of pulmonary tissue are often noticed), than patients with multidrug resistance of tuberculosis mycobacterium. This led to reduction of period of hospitalized treatment and decline of price of treatment courses due to reduction of steady-state period and rational use of antibacterial drugs.

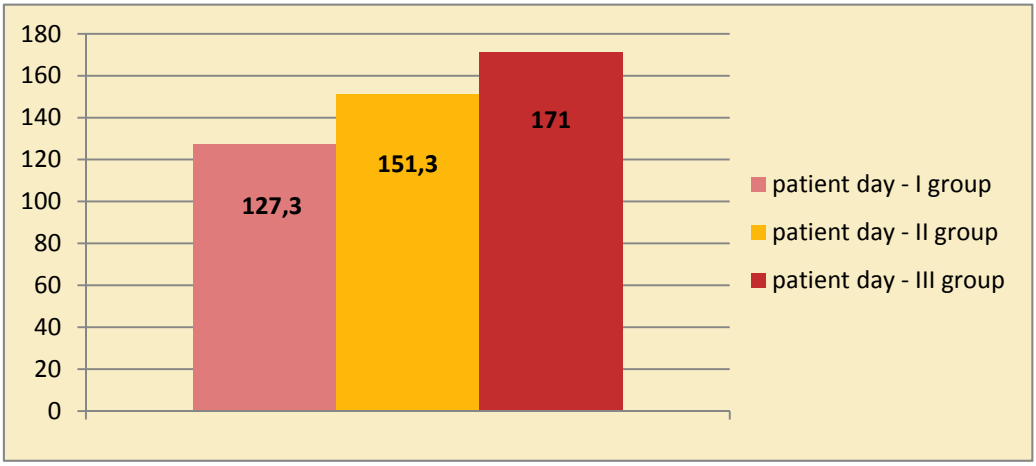

Fig. 3. Division of patients according to the steady-state period

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