

Effectiveness of new antituberculosis drugs in the treatment of children and adolescents with chemoresistant tuberculosis

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Conflict of interest: none

BACKGROUND. There is a significant decrease the effectiveness of antituberculous (anti-TB) treatment on the background of multidrug and extensive drug resistance (MDR/XDR) of *Mycobacterium tuberculosis*. Therefore, in order to increase the effectiveness of treatment MDR-/XDR-TB a new antimycobacterial drugs such as bedaquiline (Bdq), delamanid (Dlm) and pretomanid have been introduced both for adults, children and adolescents in recent years.

MATERIALS AND METHODS. On the basis of a retrospective cohort analysis of the data of patients' medical records the evaluation of the clinical effectiveness of chemotherapy with Bdq and Dlm was carried out. The main group: 40 children and adolescents with MDR-/XDR-TB of lungs, who received complex antimycobacterial therapy (AMBT) with Bdq and Dlm. The control group consisted of 27 patients who received complex AMBT without Bdq and Dlm. Age range – from 3 to 18 years.

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RESULTS AND DISCUSSION. On the background of AMBT during the first 3 months of treatment was established stopping bacterial secretion among all patients of main and control groups. However, in control group compare to main one stopping bacterial secretion was significant slowly ($p < 0.05$). At the stage of completion of the intensive phase of AMBT, the normalization of immunological indicators occurred in 29.6 ± 2.8 % of control group and in 43.4 ± 4.5 % of main one. A significant difference between the groups among the immunoregulatory index $CD3^+CD4^+/CD3^+CD8^+$, IgM and circulating immune complexes was obtained. Among children and adolescents of the main group positive dynamic of immunological changes were observed 1.5 times more often.

Among all patients of main group the resolution of the infiltration, consolidation of the focus and the absence of decay cavities were ascertained at the end of the anti-TB course. Anti-TB treatment with the formation of small residual changes into lung tissue ended in 77.5 % patients of main group. In 12.5 % cases of control group destructions persisted and bacterial excretion resumed. A large residual changes such as multiple dense foci, fibrosis and residual decay cavities in control group were observed 2.3 times more often (51.9 % vs 22.5 %), $p < 0.05$, than in main one.

Using Bdq and Dlm among children and adolescents with MDR-/XDR-TB significantly increased efficiency of complex treatment. Among main group (72.5 %) compare to control (33.3 %) one the results of treatment to be considered “cured” were 2.2 times more likely and 1.5 times less often – “completed” (27.5 % vs 51.8 % respectively). The success rate of treatment among children and adolescents who received Bdq and Dlm was 100.0 % and among patients without these new drugs – 85.2 %.

CONCLUSIONS. The criteria used show that AMBT combined with Bdq and Dlm is 1.5-2.2 times more effective (according to a separate criterion) than AMBT without these drugs.

KEY WORDS: tuberculosis, children, adolescents, multidrug resistance, extensive drug resistance, treatment, bedaquiline, delamanid.