International Journal of Mycobacteriology xxx (2016) xxx–xxx

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Interleukin-10 gene polymorphism is associated with multi-drug resistant tuberculosis during the intensive phase of standard chemotherapy

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ARTICLE INFO

Article history:
Received 18 September 2016
Accepted 20 September 2016
Available online xxxx

Keywords:
Gene polymorphism
Intensive phase
Interleukin-10
Multi-drug resistant tuberculosis
Standard chemotherapy

ABSTRACT

Objective/background: To study whether interleukin (IL)-10 gene polymorphism is associated with multi-drug resistant tuberculosis (MDR TB) during the intensive phase of standard chemotherapy.

Methods: The study comprised 170 individuals in Kharkiv region of Ukraine including 74 patients with pulmonary MDR TB (Group 1), 66 patients without MDR TB (Group 2), and 30 healthy donors (Group 3). Serum level of IL-10 was evaluated by enzyme-linked immunosorbent assay (pg/L). Measurements of serum samples were conducted before or during the initial days after hospital admission and after 2 months on antituberculous therapy. Investigations of IL-10 gene polymorphism were performed using restriction analysis of the amplification products of specific regions of the genome. The method of investigation (for the sets real-time) — an allele-specific PCR using intercalating coloring Sybr Green. Polymorphism G1082A of gene *IL-10* rs1800896 were genotyped with amplification-refractory mutation system-polymerase chain reaction.

Results: In Group 1, the level of IL-10 was (38.01 ± 0.78) pg/L, compared with 43.88 ± 0.70 in Group 2, and 50.25 ± 1.26 in Group 3 ($p < 0.05$ among the groups). In Group 1, 56 (75.68 ± 4.99%) patients had heterozygote GA genotype, 11 (14.86 ± 4.14%) patients had homozygote AA genotype, and seven (9.46 ± 3.40%) patients had homozygote GG genotype. In Group 2, 41 (62.12 ± 5.97%) patients had homozygote AA genotype, 17 (25.76 ± 5.38%) patients had heterozygote GA genotype, and eight (12.12 ± 4.02%) patients had homozygote GG genotype. In Group 3, 17 (56.67 ± 9.05%) healthy donors had homozygote GG genotype, seven (23.33 ± 7.72%) healthy donors had heterozygote GA genotype, and six (20.0 ± 7.30%) healthy donors had homozygote AA genotype ($p < 0.05$ among the groups). Following 2 months antituberculous therapy treatment, there was a significant increase in IL-10 levels in Group 1 (44.58 ± 0.78) and Group 2 (50.59 ± 0.99; $p < 0.05$ between the groups), when compared to the beginning of therapy and after 2 months ($p < 0.001$).

Conclusion: Compared to the healthy control group, patients with TB had significantly lower levels of IL-10. This coincided with a greater frequency of heterozygote GA genotype in Group 1 and homozygote AA genotype in Group 2. Further studies are warranted to deter-

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Peer review under responsibility of Asian African Society for Mycobacteriology.
http://dx.doi.org/10.1016/j.ijmyco.2016.09.048

mine whether a higher number of patients without MDR TB have a causal immunogenetic relationship with IL-10 gene polymorphisms than patients with MDR TB. Standard 2-month TB therapy results in reversal of inflammation characterized by increased IL-10 to a level comparable to that in healthy donors. IL-10 is an immune correlate of treatment outcome and can help to identify a better strategy for TB management. TB chemotherapy may have an immunomodulatory effect of an anti-inflammatory nature.

Conflicts of interest

The authors declared that they have no conflict of interest.

Please cite this article in press as: B Dmytro et al. Interleukin-10 gene polymorphism is associated with multi-drug resistant tuberculosis during the intensive phase of standard chemotherapy. Int. J. Mycobacteriol. (2016), http://dx.doi.org/10.1016/j.ijmyco.2016.09.048