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The Relationship of Thiol-Disulfide Homeostasis with Severity of Disease and Isoniazid Resistance in Pulmonary Tuberculosis Patients

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Objectives: This study aimed to evaluate oxidant-antioxidant profile of pulmonary tuberculosis patients by a novel method measuring thiol-disulfide values in serum and to establish the changes of this homeostasis through the treatment, by severity of the disease and isoniazid resistance.

Methods: This prospective observational study conducted from 01.06.2018 to 01.12.2018, in Health Sciences University Süreyyapaşa Chest Diseases and Thoracic Surgery Training and Research Hospital, on 49 newly diagnosed pulmonary tuberculosis patients and 34 healthy control. The thiol-disulfide levels analyzed in the serum of patients before the treatment and on 4th, 7th and 30th days of treatment. Isoniazid resistance, radiological and microbiological severity of the disease, erythrocyte sedimentation rate, C-reactive protein, leukocyte, hemoglobin and albumin were recorded. Statistical analyses were calculated by SPOP-25.0 and $p < 0.05$ was considered as statistically significant.

Results: Serum disulfide levels were lower in pulmonary tuberculosis group than the control group, contrary to other infectious diseases ($p < 0.05$). Severity of the disease was evaluated by parenchymal involvement and the presence of cavity on the chest radiographs, there was no statistically significant difference between the groups. Native and total thiol levels were found to be significantly lower in the group that diagnosed by sputum smear ARB positivity than those diagnosed with other methods (sputum culture, PCR, bronchial lavage, histopathological) ($p < 0.05$). The native thiol levels were significantly higher on 7th and 30th days of the treatment than before the treatment ($p < 0.05$). There was no significant difference in thiol-disulfide values of patients with isoniazid resistance ($n=6.12\%$) and the group that has no drug resistance ($n=43$). Negative correlation was found between native thiol, total thiol values and albumin ($r=-0.53$, $p < 0.001$).

Conclusion: There was a significant relationship between bacillus load and oxidant stress in tuberculosis. These findings suggest that the thiol-disulfide balance can be used in follow-up of the disease, but more comprehensive studies are needed to use for diagnostic purposes. Our study is the first research that evaluates the oxidant/antioxidant balance in tuberculosis disease by the thiol-disulfide method which is cheap and patented by a Turkish scientist.

Keywords: Isoniazid resistance, pulmonary tuberculosis, thiol-disulfide homeostasis