

The Relation Between Oxidative Stress, Inflammation, and Neopterin in the Paraquat-Induced Lung Toxicity

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Abstract : Paraquat (PQ) is a well-known quaternary nitrogen herbicide. The major target organ in PQ poisoning is the lung. Reactive oxygen species (ROS) and inflammation play a crucial role in the development of PQ-induced pulmonary injury. Neopterin is synthesized in macrophage by interferon γ and other cytokines. We aimed to evaluate the utility of neopterin as a diagnostic marker in PQ-induced lung toxicity. Sprague Dawley rats were randomly divided into two groups (sham and PQ), administered intraperitoneally 1 mL saline and PQ (15 mg/kg/mL) respectively. Blood samples and lungs were collected for analyses. Lung injury and fibrosis were seen in the PQ group. Serum total antioxidant capacity, lactate dehydrogenase (LDH), and lung transforming growth factor-1 (TGF-1) levels were significantly higher than the sham group (in all, $p < 0.001$). In addition, in the PQ group, serum neopterin and lung malondialdehyde (MDA) levels were also significantly higher than the sham group (in all, $p < 0.001$). Serum neopterin levels were correlated with LDH activities, lung MDA, lung TGF-1 levels, and the degree of lung injury. These findings demonstrated that oxidative stress, reduction of antioxidant capacity, and inflammation play a crucial role in the PQ-induced lung injury. Elevated serum neopterin levels may be a prognostic parameter to determine extends of PQ-induced lung toxicity. Further studies may be performed to clarify the role of neopterin by different doses of PQ.

Keywords : paraquat, inflammation, oxidative stress, neopterin, lung toxicity

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