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Oxidative Antioxidative Status and DNA Damage Profile Induced by Chemotherapy in Algerian Children with Lymphoma

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Abstract : Introduction and aims: Chemotherapeutic agents used to inhibit cell division and reduce tumor growth, increase reactive oxygen species levels, which contributes to their genotoxicity [1]. The comet assay is an inexpensive and rapid method to detect the damage at cellular levels and has been used in various cancer populations undergoing chemotherapy [2,3]. The present study aim to assess the oxidative stress and the genotoxicity induced by chemotherapy by the determination of plasma malondialdehyde (MDA) level, protein carbonyl (PC) content, superoxide dismutase (SOD) activity and lymphocyte DNA damage in Algerian children with lymphoma. Materials and Methods: For our study, we selected thirty children with lymphoma treated in university hospital of Beni Messous, Algeria, and fifty unrelated subjects as controls, after obtaining the informed consent in accordance with the Declaration of Helsinki (1964). Plasma levels of MDA, PC and SOD activity were spectrophotometrically measured, while DNA damage was assessed by alkaline comet assay in peripheral blood leukocytes. Results and Discussion: Plasma MDA, PC levels and lymphocyte DNA damage, were found to be significantly higher in lymphoma patients than in controls ($p < 0.001$). Whereas, SOD activity in lymphoma patients was significantly lower than in healthy controls ($p < 0.001$). There were significant positive correlations between DNA damage, MDA and PC in patients ($r = 0.96$, $p < 0.001$, $r = 0.97$, $p < 0.001$, respectively), and negative correlation with SOD ($r = 0.87$, $p < 0.01$). Conclusion and Perspective: Our results indicated that, leukocytes DNA damage and oxidative stress were significantly higher in lymphoma patients, suggesting that the direct effect of chemotherapy and the alteration of the redox balance may influence oxidative/antioxidative status.

Keywords : chemotherapy, comet assay, DNA damage, lymphoma
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