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Evaluation of the Gamma-H2AX Expression as a Biomarker of DNA Damage after X-Ray Radiation in Angiography Patients

Authors : Reza Fardid, Aliyeh Alipour

Abstract : Introduction: Coronary heart disease (CHD) is the most common and deadliest diseases. A coronary angiography is an important tool for the diagnosis and treatment of this disease. Because angiography is performed by exposure to ionizing radiation, it can lead to harmful effects. Ionizing radiation induces double-stranded breaks in DNA, which is a potentially life-threatening injury. The purpose of the present study is an investigation of the phosphorylation of histone H2AX in the location of the double-stranded break in Peripheral blood lymphocytes as an indication of Biological effects of radiation on angiography patients. Materials and Methods: This method is based on measurement of the phosphorylation of histone (gamma-H2AX, gH2AX) level on serine 139 after formation of DNA double-strand break. 5 cc of blood from 24 patients with angiography were sampled before and after irradiation. Blood lymphocytes were removed, fixed and were stained with specific ϒH2AX antibodies. Finally, ϒH2AX signal as an indicator of the double-strand break was measured with Flow Cytometry Technique. Results and discussion: In all patients, an increase was observed in the number of breaks in double-stranded DNA after irradiation (20.15 ± 14.18) compared to before exposure (1.52 ± 0.34). Also, the mean of DNA double-strand break was showed a linear correlation with DAP. However, although induction of DNA double-strand breaks associated with radiation dose in patients, the effect of individual factors such as radiosensitivity and regenerative capacity should not be ignored. If in future we can measure DNA damage response in every patient angiography and it will be used as a biomarker patient dose, will look very impressive on the public health level. Conclusion: Using flow cytometry readings which are done automatically, it is possible to detect ϒH2AX in the number of blood cells. Therefore, the use of this technique could play a significant role in monitoring patients.

Keywords : coronary angiography, DSB of DNA, ϒH2AX, ionizing radiation
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