

Phosphorylation of P53 (TP53) Status in Cancer Patients undergoing Radiotherapy as Second Line Treatment after Chemotherapy and/or Surgery

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ABSTRACT

Introduction: Cancer is a common disease worldwide, and radiotherapy is an important option for cancer treatment. P53 tumor suppressor Gene has a role in apoptosis and cancer treatment response. P53 protein is phosphorylated in response to ionizing radiation by kinases of the ataxia telangiectasia mutation family (ATM). The aim of this study was to detect the DNA damage in cancer patients before and after radiation therapy using the expression of phosphorylated P53 on T18.

Material and Methods: A total of 28 cancer patients on radiotherapy participated in this study Pre- and post-radiotherapy blood samples were collected and compared with 28 samples collected from healthy subjects voluntary as control group matched in age and sex. However, the study was ethically approved by the Ministry of Health, Khartoum, Sudan. Phosphorylated P53 antibody used against Phospho-p53 (Thr18) was obtained from CUSABIO as part of an enzyme linked immunosorbent assay (ELISA) kit, and then optical density detected by SPECTRO star Nano microplate reader from BMG LABTECH at 450 nm.

Results: 21 of the patients were breast cancer, and 7 were head and neck cancer patients. 6 male and 22 female with Median of age was 44 years old. Median of body mass index (BMI) for breast cancer patients was 30 while BMI for head and neck was 23. The absorbed dose for breast cancer was 40.5Gy while the doses for Head and neck cancers were between 20Gy-66Gy. Optical density (OD) of Phosphorylated P53 (T18) increased significantly ($P \leq 0.0001$). In the patients preradiotherapy compared to the control group. While no significant difference was observed between preradiotherapy and postradiotherapy groups ($P=0.7$). Individually, 19 patients showed increased in P53 phosphorylated (T18) expression postradiotherapy, while, nine patients were showed low P53 (T18) post radiotherapy, 8 of them diagnosed with breast cancer and 1 diagnosed with Oesophagus cancer.

Conclusion: Phosphorylated of P53 on T18 can be considering a predictive marker for cancer. P53 phosphorylated T18 can be indict the DNA damage response through its activation and proapoptotic effects. Protein expression such as P53 can be used as biomarker to demonstrate individual radiation sensitivity in cancer patients.

Keywords: Radiotherapy, P53, BMI, ELISA

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