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Cytogenetic biomarkers as indicators of the absorbed dose in the peripheral leukocytes of head & neck cancer patients undergoing radiotherapy

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The lympho-hematopoietic elements undergo rapid multiplication in humans and are also the most radiosensitive cells. Ionizing radiations target DNA and induce mutations. Radiotherapy resulting in optimum absorbed dose will help us to minimize the unwanted side effects irradiation. The present in vivo study is undertaken to know the dispersed radiation dose-response in the peripheral blood leukocytes of cancer patients in the context of partial body irradiation. The genotoxic effect of γ-radiation was studied in HNSCC patients exposed to various cumulative doses 60Co gamma rays during radiotherapy (RT). These patients (P1 to P30) were irradiated for a period of six weeks with a daily fraction of 2 Gy, consecutively for 5 days every week. The genotoxic effects of radiation in these patients were analyzed every weekend employing the chromosomal aberration, comet assay and cytokinesis block micronucleus assay. Blood of these patients collected before starting with RT (pre-therapy) served as control samples, whereas, blood collected during the week ends at weekly intervals of 1 to 6 weeks during the course of RT served as treated (10, 20, 30, 40, 50 and 60 Gy) samples. Radio-sensitivity of these patients was analyzed by employing linear regression analysis. Genetic damage observed in all patients on a weekly basis were recorded and analyzed at the individual level in comparison with their own pre-therapy baseline data, employing student's t-test. High level ($p<0.001$) intra-individual variations were observed in the genotoxic response of HNSCC patients exposed to gamma irradiation (ANOVA). Results of this study indicate a dose dependent increase of cytogenetic damage in leukocytes. Thus, cytogenetic studies in peripheral lymphocytes following gamma radiotherapy of tumors may help to understand the optimum/precise dose of radiation to be employed for RT beyond which it may lead towards the induction of secondary tumors in irradiated HNSCC patients.

Biography

Shyama Soorambail Keshava has completed his PhD degree in 1989 from Mangalore University. He is currently serving as a Professor in Zoology in Goa University since 2006. He has published 30 papers in reputed journals and has been serving as a Reviewer for several journals of international repute.

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