

Gene Expressions in Left Ventricle Heart Tissue of Rat after 150 Mev Proton Irradiation

Authors : R. Fardid, R. Coppes

Abstract : Introduction: In mediastinal radiotherapy and to a lesser extent also in total-body irradiation (TBI) radiation exposure may lead to development of cardiac diseases. Radiation-induced heart disease is dose-dependent and it is characterized by a loss of cardiac function, associated with progressive heart cells degeneration. We aimed to determine the in-vivo radiation effects on fibronectin, ColaA1, ColaA2, galectin and TGFb1 gene expression levels in left ventricle heart tissues of rats after irradiation. Material and method: Four non-treatment adult Wistar rats as control group (group A) were selected. In group B, 4 adult Wistar rats irradiated to 20 Gy single dose of 150 Mev proton beam locally in heart only. In heart plus lung irradiate group (group C) 4 adult rats was irradiated by 50% of lung laterally plus heart radiation that mentioned in before group. At 8 weeks after radiation animals sacrificed and left ventricle heart dropped in liquid nitrogen for RNA extraction by Absolutely RNA® Miniprep Kit (Stratagen, Cat no. 400800). cDNA was synthesized using M-MLV reverse transcriptase (Life Technologies, Cat no. 28025-013). We used Bio-Rad machine (Bio Rad iQ5 Real Time PCR) for QPCR testing by relative standard curve method. Results: We found that gene expression of fibronectin in group C significantly increased compared to control group, but it was not showed significant change in group B compared to group A. The levels of gene expressions of Cola1 and Cola2 in mRNA did not show any significant changes between normal and radiation groups. Changes of expression of galectin target significantly increased only in group C compared to group A. TGFb1 expressions in group C more than group B showed significant enhancement compared to group A. Conclusion: In summary we can say that 20 Gy of proton exposure of heart tissue may lead to detectable damages in heart cells and may distribute function of them as a component of heart tissue structure in molecular level.

Keywords : gene expression, heart damage, proton irradiation, radiotherapy

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