

The Effect of Hesperidin on Troponin's Serum Level Changes as a Heart Tissue Damage Biomarker Due to Gamma Irradiation of Rat's Mediastinum

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Abstract : The heart is a radiosensitive organ, and its damage is a dose-limiting factor in radiotherapy. Different side effects including vascular plaque and heart fibrosis occur in patients with thorax irradiation. The present study aimed to evaluate the radioprotective efficacy of Hesperidin (HES), a naturally occurring citrus flavanoglycone, against γ -radiation induced tissue damage in the heart of male rats. Sixty-eight rats were divided into four groups. The rats in group 1 received PBS, and those in group 2 received HES. Also, the rats in group 3 received PBS and underwent γ -irradiation, and those in group 4 received HES and underwent γ -irradiation. They were exposed to 20 Gy γ -radiation using a single fraction cobalt-60 unit, and the dose of Hesperidin was (100 mg/kg/d, orally) for 7 days prior irradiation. Each group was divided into two subgroups. Samplings of rats in subgroup A was done 4-6 hours after irradiation. The samples were sent to laboratory for determination of Troponin's I (TnI) serum level changes as a cardiac biomarker. The remaining animals (subgroups B) were sacrificed 8 weeks after radiotherapy for histopathological evaluation. In group 3, TnI obviously increased in comparison with group 1 ($p < 0.05$). The comparison of groups 1 and 4 showed no significant difference. Evaluation of histopathological parameters in subgroup B showed significant differences between groups 1 and 3 in some of the cases. Inflammation ($p=0.008$), pericardial effusion ($p=0.001$) and vascular plaque ($p=0.001$) increased in the rats exposed to 20 Gy γ -irradiation. Using oral administration of HES significantly decreased all the above factors when compared to group 4 ($P > 0.016$). Administration of 100 mg/kg/day Hesperidin for 7 days resulted in decreased Troponin I and radiation heart injury. This agent may have protective effects against radiation-induced heart damage.

Keywords : hesperidin, radioprotector, troponin I, cardiac inflammation, vascular plaque

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