Late proliferating and inflammatory effects on murine microvascular heart and lung endothelial cells after irradiation.

Abstract: Radiotherapy of thoracic tumors increases the risk to develop cardiac diseases at later time-points. We compared time kinetics of radiation-induced changes of surface markers related to proliferation, progenitor cell development and inflammation in lung and heart microvascular endothelial cells (ECs). Mice received local thorax irradiation with a single dose of 0, 2 or 8Gy. Following magnetic bead separation and biotin-streptavidin competition, cell surface markers of isolated ECs from the lung and heart were analyzed 5, 10, 15 and 20 weeks after irradiation by flow cytometry. Irradiation with 8Gy resulted in a temporary and differential up-regulation of proliferation markers (HCAM, Integrin ?-3, Endoglin, VE-cadherin, VEGFR-2) on ECs. Mucosialin a progenitor marker increased in lung ECs 15-20 weeks and inflammatory markers (PECAM-1, ICAM-1, ICAM-2, VCAM-1) started to increase 10 weeks after thorax irradiation with 8 Gy. Interestingly, ICAM-1 and VCAM-1 remained up-regulated 20 weeks after irradiation in heart and lung ECs. The persistently elevated expression density of ICAM-1 and VCAM-1 on ECs may suggest that an irradiation at 8 Gy induces late inflammatory responses in heart and lung ECs.