ABSTRACT

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Radiotherapy: Brightness and darkness in the era of immunotherapy.

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The introduction of immunotherapy into cancer treatment has radically changed clinical management of tumors. However, only a minority of patients (approximately 10 to 30%) exhibit long-term response to monotherapy with immunotherapy. Moreover, there are still many cancer types, including pancreatic cancer and glioma, which are resistant to immunotherapy. Due to the immunomodulatory effects of radiotherapy, the combination of radiotherapy and immunotherapy has achieved better therapeutic effects in a number of clinical trials. However, radiotherapy is a double-edged sword in the sense that it also attenuates the immune system under certain doses and fractionation schedules, not all clinical trials show improved survival in the combination of radiotherapy and immunotherapy. Therefore, elucidation of the interactions between radiotherapy and the immune system is warranted to optimize the synergistic effects of radiotherapy and immunotherapy. In this review, we highlight the dark side as well as bright side of radiotherapy on tumor immune microenvironment and immune system. We also elucidate current status of radioimmunotherapy, both in preclinical and clinical studies, and highlight that combination of radiotherapy and immunotherapy attenuates combinatorial effects in some circumstances. Moreover, we provide insights for better combination of radiotherapy and immunotherapy.

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