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Of dogs and humans: Does the number of legs matter in the bench-to bedside translation of spatially fractionated radiotherapy techniques?

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Of the fundamental components of cancer therapy, radiotherapy is by far the one causing the least ecological foot print, compared to surgery and systemic therapy (chemotherapy, immunotherapy). While radiotherapy is mainly a local therapeutic approach, it can help to significantly reduce the requirement for extensive surgery as well as for the need of systemic therapy. From clinical radiotherapy, we already know of the advantages coming with neoadjuvant radiotherapy: besides contributing to the preservation of organ function, it significantly reduces the risks for metastatic disease. Based on the results from in-vitro and pre-clinical studies, spatially fractionated radiotherapy (SFRT) should offer an additional benefit over clinically established broad beam radiotherapy techniques.

Veterinary patients, especially larger and older dogs, develop cancers very similar to human patients. These similarities include tumour size and depth from surface, which are important parameters in medical physics for treatment planning. Radiotherapy is an accepted component of veterinary cancer treatment. Thus, if veterinary trials are conducted to challenge cancer entities considered difficult to treat with currently established irradiation techniques, canine patients and their owners are likely to benefit immediately.

The logistic challenges of irradiating dogs include the necessity of anaesthesia for every single irradiation fraction, similar to irradiation in young children. Therefore, a low number of short neoadjuvant SFRT treatment sessions or even irradiation in one single treatment session (radiosurgery) would be favourable and enhance the quality of the patient's live. Developing treatment schedules with this fact in mind, this will also benefit human patients. SFRT, which has been shown to be a powerful irradiation technique already in first veterinary trials, might become a favourite option in both veterinary and clinical cancer radiotherapy. This and the question of how we can extrapolate from the results obtained in veterinary studies to the potential outcome of clinical studies will be discussed.

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