Using heat to control the release of drugs in cancer

SP-0539
Using heat to control the release of drugs in cancer
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Abstract not received

SYMPOSIUM: CLINICAL EXPERIENCE AND CURRENT EVIDENCE (INCL. PLANNING STUDIES) FOR PROTON THERAPY

SP-0540
The level of evidence for proton therapy
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Abstract not received

SP-0541
Evidence- re-imbursement vs. patient-demand based proton therapy
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Abstract not received

SP-0542
Clinical experience and evidence for proton therapy of paediatric cancer patients
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Proton beam therapy seems to offer significant advantages over conventional techniques especially for the pediatric cohort and the number of children being treated with proton therapy for solid tumors is increasing rapidly throughout the world. There have been multiple dosimetric studies clearly demonstrating that protons decrease the irradiated volume and therefore the dose to the developing normal tissues compared with photon techniques while showing excellent outcome in the pediatric population. As in paediatric malignancies survival rates have increased considerably, from 0-20% until the 50ies up to about 80% today, quality of life (QoL) and late sequelae have become a major concern in pediatric cancer survivors. Therefore, proton therapy was understood as a tool potentially reducing the risk for secondary malignancy induction as well as for late effects. As children are particularly sensitive to radiation injury, they seem to be the cohort taking the greatest potential benefit from sparing dose to normal tissue. Today, local treatment with proton beam in CNS tumors or sarcomas is a common choice to be offered to the pediatric cohort in Europe and in US whenever available.

It is suggested from early reports, that secondary cancer incidence may be reduced by 50% when using proton therapy. Additional early data was published on neurocognitive functioning and quality of life, both suggesting favourable outcome after proton beam therapy. Still, prospective data are limited, cohorts are small and observation times not sufficient, especially when looking at very young children being treated with proton beam therapy.

In conclusion, proton beam therapy is a promising tool to explore particularly in the pediatric cohort to reduce the risk for late effects and secondary malignancies; however, due to limited availability up to now, clinical experience of proton therapy in childhood cancer is still limited. Therefore, all pediatric programs should be accompanied by prospective evaluations of late effects and QoL to gather more information on optimal use of proton therapy. Due to small number of patients and ethical considerations, randomized data will be hardly available even on the long term in children. Still, more clinical data will be emerging to quantify the clinical benefit of proton beam therapy with regard to a decrease in late effects while maintaining excellent cancer control rates.

PROFFERED PAPERS: PHYSICS 11: OUTCOME MODELLING

OC-0543
Patient-specific in vitro measurements of SF2 and Tpot - how well do they predict the tumour control probability?
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Purpose/Objective: The aim of this study is to investigate the predictive value of the modelled tumour control probability (TCP) based on BED calculations using individual measurements of in vitro radiosensitivity (SF2) and potential doubling time (Tpot) for head and neck (H&N) cancer patients versus literature-based average radiobiological parameters.

Materials and Methods: Tumour radiosensitivity, measured in vitro on primary biopsies and expressed as surviving fraction of cells following an acute exposure of 2 Gy (SF2), Tpot and tumour size were determined for 46 H&N cancer patients. All patients were treated with external beam radiotherapy and 28 patients also received brachytherapy. For each patient TCP was calculated using a Poisson-LQ model based either on the patient-specific radiobiological parameters or literature-based average radiobiological parameters (α=0.3 Gy⁻¹ and Tpot=3 days). The predicted TCP values for the two sets of parameters were compared with the actual outcome for the patients in terms of local control.

Results: The average radiobiological parameters lead to a large underestimation of TCP as the predicted TCP was below 10% for the majority of the patients that actually presented local control. When tumour specific parameters were used, the majority of the patients with local control had a predicted TCP larger than 90%. A Receiver Operating Characteristic (ROC) curve analysis was also performed for assessing the predictive values of the two methods for calculating the TCP. The corresponding ROC curves are shown in Figure 1.