Title: Optimising prostate radiotherapy – improving cure rates and reducing toxicity

Supervisory team: van As, Murray, Hall, Tree

Site: RMH Sutton

Suitable for: Clinical oncology trainees, FRCR preferred.

Building on the successful outputs of our previous CRUK PhD fellow, we would like to expand the impact of our research predicting outcomes from prostate radiotherapy.

Using data from the Phase III PACE B trial, currently in follow up, we will seek to discover predictive factors for radiotherapy toxicity. Determinants of toxicity in five fraction Stereotactic body radiotherapy (SBRT) are not well described. This project will have the advantage of a well curated, high quality dataset, and dose cubes from all patients, giving the successful candidate the ability to discover new dosimetric ways of reducing toxicity of SBRT in the future. This project will also include the first clinical analysis of late toxicity in this pivotal trial, comparing SBRT to standard radiotherapy. This is likely to lead to one or more high impact publications (acute toxicity was published in the Lancet Oncology 2019).

We will integrate this knowledge into a second Phase III trial, the PEARLS trial, funded by CRUK. PEARLS is a randomised phase II/III trial examining the role of more extensive radiotherapy, extending into the para-aortic region, in an attempt to cure patients traditionally considered incurable and to reduce risk of recurrence in patients with pelvic nodal disease. This trial is due to open to recruitment in April 2021, and this research project will complete the developmental work prior to trial opening, including the development of a national consensus outlining guideline, using evidence review, expert consensus and inter-observer variability analysis. The project will analyse the success of these guidelines, as defined by the national quality assurance data, whereby each recruiting centre submit their contours, as per the trial guidelines, for review. Additionally, all patients will have a PSMA-PET/CT prior to recruitment into the trial and patterns of nodal distribution seen in patients recruited to phase II (n=150; over 2.5 years) will be reviewed to inform and potentially update these outlining guidelines.

ProSpare is a rectal obturator which has been developed and evaluated at the Institute of Cancer Research and Royal Marsden Hospital in partnership with Sussex Development Services LLP. This is currently being evaluated in patients receiving post-operative prostate radiotherapy, in the national randomized trial, POPS, which is due to complete recruitment in 2021. Primary endpoint of patient reported EPIC bowel function we will aim to report in 2023 and is likely to lead to a high impact publication. This research project will analyse the dosimetric consequences of ProSpare and significance of anatomical variations to inform development of a “personalised” rectal obturator with 3D-printing. Further work using dosimetry and toxicity data will allow derivation of dose constraints and guidance on profound hypofractionation for post-operative prostate radiotherapy.

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