

## In this issue

The first original paper in this issue is by Frackrell, Kirby, Sanghera and Hartley, who undertake a study into the effect of silver sulfadiazine and zinc oxide creams on dose distribution during radiotherapy. The use of metallic containing creams to prevent and treat radiodermatitis is controversial and lacking evidence base. The authors compare the dose effect of two metallic based skin creams, which could be used for treating radiodermatitis, to a control. Universal containers of Silver Sulfadiazine cream, zinc oxide cream and aqueous cream were examined using a CT scanner to assess their electron densities relative to water. Secondly, each cream was exposed to 100 kV and 6 MV photons. The relative doses were measured using an X-ray chamber. The results found the relative electron density measured was similar for the silver sulfadiazine and aqueous creams. Zinc Oxide was 40% higher. The relative dose measurements showed that Silver Sulfadiazine behaved in a similar way to aqueous cream. However, zinc oxide cream exhibited a dose difference of 11.0% in kV photons and -4.1% in MV photons. The authors concluded that the application of Silver Sulfadiazine appears unlikely to bring about significant changes in the dose distribution when compared to aqueous during MV or kV radiotherapy. Zinc oxide cream however, brought about more significant dose changes.

In the next paper, Gillan et al., present their study on the feasibility and interprofessional collaboration (IPC) outcomes of a team-based simulation event for radiation medicine trainees. The study included Radiation therapy (RTT), medical physics (MP), and radiation oncology (RO) trainees in a single academic department were eligible. Five high-fidelity cases were rotated in three 105-minute timeslots. A pre/post survey design evaluated satisfaction and interprofessional perceptions. Scales included the Readiness for Interprofessional Learning Scale (RIPLS), UWE Entry Level Interprofessional Questionnaire

(UWEIQ), Trainee Test of Team Dynamics, and Collaborative Behaviours Scale (CBS). The authors concluded team-based simulation is feasible in RM, appearing to facilitate interprofessional competency-building in high-acuity clinical situations, reflecting positive perceptions of IPC.

In the third article, Aaron et al. undertake a study to quantify the effect of breathing motion on post mastectomy radiotherapy with 3D tangents and intensity modulated radiotherapy (IMRT). Patients trained for breath hold underwent routine free breathing (FB) CT simulation for radiotherapy as well as additional CT scans with breath held at end of normal inspiration (NI scan) and expiration (NE scan) for study. The FB scan was used to develop both tangents and IMRT plans. To simulate breathing, each plan was copied and applied on NI and NE scans. The respiratory parameters of the patients as well as the dosimetric data with both the plans were analysed. The authors conclude that dosimetric coverage of chest wall is sensitive to breathing motion for IMRT technique when compared to standard tangents, especially in patients with large tidal volume.

In the paper by Chamunyonga, Kellini and Kumar, the authors undertake an analysis of an inter-centre, web-based radiation oncology peer review case conference. Peer review programs in radiation oncology are used to facilitate the process and evaluation of clinical decision-making. However, web-based peer review methods are still uncommon. This study analysed an inter-centre, web-based of peer review case conference as a method of facilitating decision making process in radiation oncology. A benchmark form designed based on the ASTRO targets for radiation oncology peer review. This was used for the evaluating content of the peer review case presentations on forty cases selected from three participating radiation oncology centres. A scoring system was used for comparison of data and a

survey was conducted to analyze the experiences of radiation oncology professionals who attended the web-based peer review meetings in order to identify priorities for improvement. The results in this study suggest that simple inter-centre web-based peer review case conferences are a feasible technique for peer review in radiation oncology. Limitations such as data security and confidentiality can be overcome by use of appropriate structure and technology. To drive the issues of quality and safety a step further, small radiotherapy departments may need to consider web-based peer review case conference as part of their routine quality assurance practices.

In the next paper, Kandasamy et al., evaluate the interfraction variation in interstitial High Dose Rate (HDR) brachytherapy. To assess the positional displacement of catheter during the fractions and the resultant impact on dosimetry. Although brachytherapy continues to be a key cornerstone of cancer care, it is clear that treatment innovations are needed to build on this success and ensure that brachytherapy continues to provide quality care for patients. The dosimetric advantages offered by High Dose Rate (HDR) brachytherapy to the tumor volume rely on catheter positions being accurately reproduced for all fractions of treatment. In this study 66 patients treated over a period of 22 months were considered. All the patients underwent CT scan and 3D planning were done. Brachytherapy treatment was delivered by HDR afterloading system. On completing the last fraction, CT scan was repeated and replanning done. The variation in position of the implanted applicators and its impact on dosimetric parameters were analyzed using both the plans. Conclusions drawn are that interfraction errors occur frequently in interstitial HDR brachytherapy. If no action is taken it will result in a significant risk of geometrical miss and overdose to the organs at risk. It is not recommended to use a single plan to deliver all the fractions. Imaging is recommended before each fraction and decision on replanning is to be taken.

The authors of the next paper pose the question—how do patients receiving radiotherapy in a Dutch hospital value their time? Authors Portrait et al., investigate patients' preferences regarding reducing time involved in non-palliative

radiotherapy care. 142 Dutch patients were included in the study. Using a contingent valuation survey, they measured the proportion of patients who preferred to reduce their patients' time, splitting it into five different categories and, for those who did, whether and how much they were willing to pay for this to happen. The results found about 50% of the patients preferred to reduce their time waiting for admission by one week and their travel time by half. 20% and 62% wanted to reduce their waiting time by half and their treatment time from 20 to 5 minutes, respectively. 36% preferred to be treated seven instead of five days a week. 20% of those wishing to reduce their patients' time were willing to pay and their mean willingness to pay (WTP) ranged from £0.32 to £18.1 per hour's reduction of their time. Half of the patients seem to assess their patients' time as reasonable. The other half preferred to reduce it, but only about 20% of them were willing to pay for it to happen and their mean WTP was low.

In the paper by Puchades et al., authors investigate the accuracy of AAA dose calculation algorithm for Rapid Arc Volumetric Modulated Technique (VMAT) in the presence of anatomical heterogeneities in the pelvic region. An anthropomorphic phantom was used to simulate a prostate case, delineating Planning Target Volumes (PTVs) and Organs at Risk (OARs). VMAT plans were optimized in Eclipse (v10.0) treatment planning system (TPS). The dose distributions were calculated by the AAA dose calculation algorithm. 49 thermoluminescent dosimeters (TLD) were inserted into the anthropomorphic phantom and dose measurements were compared with the predicted TPS doses. They found AAA is a reliable dose calculation for the treatment with VMAT in the anatomy of the pelvis.

In the article by Bridge et al., authors aimed to determine the potential role and guidelines for implementation of skill-based peer mentoring for radiotherapy planning education. After four weekly mentoring sessions, both Year 3 mentors and Year 2 mentees were invited to complete a short online questionnaire relating to the impact of the initiative. The tool contained a mixture of Likert-style questions concerning student enjoyment

and perceived usefulness of the initiative as well as more qualitative open-questions that gathered perceptions of the peer mentoring process, implementation methods and potential future scope. Several key discussion themes related to benefits to each stakeholder group, challenges arising, improvements and potential future directions. There were high levels of enjoyment and perceived value of the mentoring from both sides with 100% of respondents enjoying the experience. The informal format encouraged further learning, while mentors reported acquisition of valuable skills and gains in knowledge. In conclusion, peer mentoring has a valuable and enjoyable role to play in radiotherapy planning training and helps consolidate theoretical understanding for experienced students. An informal approach allows for students to adopt the most appropriate mentoring model for their needs while providing them with a free space to engender additional discussion.

In the next paper, Bridge and Burrage present an undergraduate radiotherapy student's experiences of remote access to University treatment planning software in place of onsite practical learning. With clinical sites increasingly utilising telemedicine there is interest in educational applications of this technology. This was an unplanned study with the student initiating remote access; additional tutor support was provided as requested. Subsequent discussion between the tutor and student formed the basis for the presented findings. The findings indicate, educational remote access to treatment planning software is logistically feasible, although strict guidelines and formal tutor support is vital. Remote access can alleviate pressure on facilities and improve student time efficiency. Controlled and supported provision of remote access to planning software could enhance on-site practical teaching sessions for more mature independent learners. Further cohort-wide studies could clarify advantages, disadvantages and possible role of remote access for radiotherapy planning education.

In the paper by Kataria et al., researchers analysed the preliminary results of Cyberknife stereotactic radiotherapy (SBRT) boost in primary head and neck cancer patients among

Indian population. Nine patients of primary head and neck cancer were treated with Cyberknife SBRT boost after IMRT. The median phase 1 IMRT dose was 54 Gy/27 fractions. Histological types included squamous cell carcinoma ( $n = 7$ ) and adenoid cystic carcinoma ( $n = 2$ ). Response was evaluated using positron emission tomography/computed tomography and detailed clinical examination. Results: As a preliminary analysis with median follow up of 8 months (range: 6–19 months), phase 2 median tumor volume of 16.3 cc and a median dose of 5 Gy per fraction, eight patients had loco-regionally stable disease and one had distant metastasis. With objective assessment 5 patients had complete response. Treatment was well tolerated with no grade 3 or more acute toxicities directly related to Cyberknife boost. The authors conclude that the Cyberknife SBRT boost is an attractive option for primary head and neck cancers especially where disease is in close proximity to critical structures hindering radical dose delivery. Future prospective analysis and optimum assessment of total biological effective dose (BED) in a properly selected case might actually benefit the use of Cyberknife SBRT boost.

In the next paper, Anvari et al., evaluate the dosimetric properties of PTW OCTAVIUS detector in and out of irradiation field have been evaluated. The 2D array of ion chambers has the potential to simplify the linear accelerator QA and pre-treatment verification. The evaluation was performed using customized written codes in Matlab and SPSS software for statistical analysis. Based on the measurements and comparisons performed, this system is a reliable and accurate dosimeter for the quality assurance in radiotherapy.

In the paper by Silva et al., authors present their study on the Calypso 4D localisation system. This system gives the possibility to track the tumor during treatment, with no additional ionizing radiation delivered. To monitor the patient continuously an array is positioned above the patient during the treatment. The authors studied various gantry angles, the attenuation effect of the array for 6- and 10 MV and FFF 6- and FFF 10 MV photon beams. Measurements were performed using an ion chamber placed in a slab phantom positioned at the linac isocenter for 6 MV, 10 MV, FFF 6 MV and FFF 10 MV

photon beams. Measurements were performed with and without array above the phantom for  $0^\circ$ ,  $10^\circ$ ,  $20^\circ$ ,  $40^\circ$  and  $50^\circ$  beam angle for a True Beam STx linac, for  $5 \times 5$  and  $10 \times 10$  and  $15 \times 15$  cm<sup>2</sup> field size beams to evaluate the attenuation of the array. A VMAT treatment plan was measured using an ArcCheck with and without the array in the beam path. Attenuation measured values were up to 3%. Attenuation values were between 1%–2% with the exception of the  $30^\circ$ – $50^\circ$  gantry angles which were up to 3.3%. The ratio values calculated in the ArcCheck for RD and AD 10 were both 1.00. The authors conclude attenuation of treatment beam by the Calypso<sup>®</sup> array is within acceptable limits.

The first of two case studies is by Majewski, Wydmanski and Rokicki, who present a case report on the treatment of a patient presenting with orbital metastasis from malignant melanoma.

The second case study is presented by Bourgeois, Dixon and Sing, who report a case of a patient with histiocytic sarcoma diagnosed after excisional biopsy and immunohistochemistry testing.

To complete this issue there are two short communications, in the first paper, Gangopadhyay and Biswas present a short communication on the predictors of early vaginal stenosis during pelvic radiotherapy for locally advanced cervix cancer: A study from a tertiary cancer centre in Eastern India.

In the next short communication, Nama et al., present their findings on the question: does Intensity-modulated Radiotherapy reduce the risk of stress fractures?

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