

In this issue

To start this issue, Dr Mark Trombetta, one of the Editorial Board members, writes an editorial on the subject of hypofractionated breast irradiation in the United States: Changing the paradigm through ‘Socialized’ data. Mark explains the changes that are occurring in practice. Traditional radiotherapy training in the management of breast cancer for patients in the United States favoured standard fractionation regimens of 180–200 cGy per fraction due to perceived cosmetic difficulties thought to be associated with larger daily fractions. Currently a complete paradigm shift is ongoing in the United States with many radiation oncologists adopting the hypofractionated regimens long used in Canada and Europe.

The subject of breast cancer continues in the first three original papers, in the first paper, Mc Partland, Nice, Soo and Menna; present their research into the dosimetric benefits of deep inspirational breath holding for left-sided breast cancer – the experience from the patient’s perspective. The dosimetric benefits of deep inspiration breath hold (DIBH) in reducing cardiac dose are well documented; however reports on the patient’s personal experience with this technique are limited. The purpose of this research was to investigate DIBH from the patient’s perspective and to provide recommendations to further improve the patient experience.

A questionnaire was used to record the patient’s comprehension of DIBH instructions and preparation for treatment. Levels of comfort, confidence and technical challenge were also recorded and an open-format question allowed patients to provide suggestions to improve the DIBH experience. The authors concluded, the majority of patients reported a strong level of comprehension and preparation that allows them to confidently perform DIBH as planned.

Establishment of a dedicated treatment team, consistent patient instructions, regular feedback and an opportunity to rehearse DIBH can help increase patient confidence and reduce anxiety

In the second paper, Lee et al., present their study on QuickStart Radiotherapy: An Inter-professional Approach to Expedite Radiotherapy Treatment in Early Breast Cancer. This study aimed to develop an expedited radiotherapy (RT) process and evaluate its time savings in women requiring whole breast RT.

An inter-professional RT team streamlined the CT simulation and treatment pathway for a ‘QuickStart’ process. Target delineation was performed by an advanced practice radiation therapist and approved by the radiation oncologist (RO) for planning.

Automated breast planning software was used for treatment planning and standard quality checks were performed. To assess time savings, the initial 25 QuickStart patients were matched with women who underwent whole breast simulation on the same day (+ / –3 days), treated using the conventional process.

The authors conclude that, through inter-professional team efforts and the application of automated planning software, they have achieved a process that significantly decreases patient wait-times while maintaining the quality of whole breast RT.

In the third paper on the subject of breast cancer, Cobos et al., undertake a retrospective study to determine the clinical impact of delaying initiation of radiotherapy in patients with breast cancer.

There is no consensus on how long the start of radiotherapy can be delayed after surgery

without a negative impact on survival. The authors conducted a retrospective study of 278 patients with stage 0–II breast cancer, all of whom were treated with surgery and radiotherapy, those at stages I–II also receiving chemotherapy. Patients were followed-up for five years after diagnosis to assess disease-free and overall survival.

The independent variable was the delay in starting radiotherapy, assessed by two criteria: time since the last treatment, considered acceptable if ≤ 6 weeks, and time since surgery, considered acceptable if ≤ 7 months, these cut-offs being used to categorise patients into two groups according to the length of delay.

The authors conclude that delaying the start of radiotherapy more than 6 weeks after last treatment or 7 months after surgery does not seem to have a negative impact on disease-free or overall survival.

In the next paper, Yousefnia, Zolghadri, Jalilian and Naseri, present their paper on the preliminary absorbed dose evaluation of two novel ^{153}Sm bone-seeking agents for radiotherapy of bone metastases. The amount of energy deposited on any organ by ionizing radiation termed absorbed dose, plays an important role in evaluating the risks associated with the administration of radiopharmaceuticals. In this research work, the absorbed dose received by human organs for ^{153}Sm -TTHMP and ^{153}Sm -PDTMP was evaluated based on bio distribution studies on Syrian rats. ^{153}Sm -TTHMP and ^{153}Sm -PDTMP were successfully prepared with radiochemical purity of higher than 99%. The bio distribution of the complexes was investigated within the Syrian rats up to 48 h post injection. The human absorbed dose of the complexes was estimated by the radiation dose assessment resource method. The authors conclude that, according to the considerable bone absorbed dose against the insignificant absorbed dose of non-target organs, these complexes can be used as potential bone pain palliative agents in clinical applications.

The next two papers are on the subject of radiotherapy for non-small cell lung cancer. In the first paper, Peter Maungwe and Crispen Chamunyonga, present their research on a

dosimetric retrospective planning study comparing Volumetric Arc Therapy (VMAT) and Stereotactic Body Radiotherapy (SBRT) treatment plans for Non-Small Cell Lung Cancer (NSCLC). Five randomly selected early stage lung cancer patients were included in the study. For each patient, four plans were created: SBRT plan and three VMAT plans using different optimisation methodologies. A total of twenty different plans were evaluated. The dose parameters of dose conformity results, and target dose constraints results were compared for these plans.

The authors conclude that SBRT and VMAT are radiotherapy approaches which increase doses to small tumour targets without increasing doses to the organs at risk. Though VMAT offers an alternative to SBRT for NSCLC and the potential advantage of VMAT is the reduced treatment times over SBRT. The statistical results show that there was no significant difference between the SBRT and VMAT optimised plans in terms of dose conformity and organ at risk sparing.

The next paper by Ghosal et al., presents the results of using radical hypo-fractionated radiotherapy for the treatment of Non-Small-Cell Lung Cancer using 52.5–55 Gy in 20 fractions at the North Wales Cancer Centre. Radical hypo-fractionated thoracic radiotherapy is the most commonly used radiotherapy schedule for inoperable Non-Small-Cell Lung Cancer (NSCLC) in the UK despite a lack of level I evidence to support its use. The purpose of this study was to supplement existing published retrospective data with a mature data series and provide further evidence to support the use of this schedule in routine clinical practice.

A retrospective analysis was undertaken of all inoperable NSCLC cases treated with radical hypofractionated radiotherapy with or without induction chemotherapy in the North Wales Cancer Treatment Centre between 2001 and 2011.

The authors conclude that the growing body of evidence for this schedule, confirming survival outcomes comparable to internationally accepted results, is sufficient to support its future use in inoperable NSCLC.

In the next paper, Elith, Dempsey and Warren-Forward, undertake a comparison of the acute toxicities using moderate hypo-fractionated Intensity Modulated Radiation Therapy (IMRT) or Volumetric Modulated Arc Therapy (VMAT) for the treatment of early stage prostate cancer. This study compared the acute toxicities reported during radiotherapy treatment using either Intensity Modulated Radiation Therapy (IMRT) or Volumetric Modulated Arc Therapy (VMAT) to deliver a moderate hypo-fractionated treatment for early stage prostate cancer.

Acute toxicities are routinely reported at the clinical site for all patients using the Common Terminology Criteria for Adverse Events (CTCAE). Toxicity assessment is performed on day one of treatment, then once weekly thereafter. The recorded toxicities of 40 cases treated with 5-field IMRT, and 32 cases treated using VMAT were retrospectively compared. All cases were prescribed 73.68 Gy in 28 fractions. Eight symptoms were assessed; diarrhoea, proctitis, fatigue, pain, dermatitis, urinary frequency, urinary retention and urinary tract pain.

The research reported here is one of the first publications to demonstrate that VMAT is associated with decreased toxicities compared with IMRT for the treatment of early stage prostate cancer.

In the next paper, Franc, Delemos and Jones, present their research on the overall and disease-free survival outcomes of patients receiving intensity modulated radiation therapy (IMRT) with PET-CT - based planning for cancers of the head and neck (HNC). Combined modality treatment regimens have provided modest gains in loco-regional control rates of cancers of the head and neck, and intensity modulated radiation therapy (IMRT) has gained widespread use. The methodology for determining contours of the gross tumor volume (GTV) in the radiation treatment plan is often based on combined anatomic and metabolic data from PET-CT. This study aimed to retrospectively evaluate the overall survival and disease-free survival outcomes of patients with HNC who received definitive intensity

modulated radiation therapy (IMRT) with or without chemotherapy, planned with PET-CT.

1200 patients underwent treatment for HNC during the study period, from January 1st, 2002 to December 31st, 2010. Of those, 261 cases had evaluable data that met the inclusion criteria for the study. The incidence and timing of locoregional recurrence, distant metastatic disease, new primary malignancies, and death were evaluated retrospectively. Overall and disease-free survival (survival to time of first recurrence) were determined by the life table method. Incidence of distant metastatic disease and additional cancers were also studied. Overall and disease-free survival outcomes of a large cohort of HNC patients treated with definitive IMRT radiotherapy following treatment planning with PET-CT shows a similar high level of disease control and mortality rate as previously published outcome studies of shorter terms and/or smaller numbers of patients.

The final original article, is the first in a series of JRP interviews with individuals who have, and are recognised for, an expert knowledge in their subject area in radiotherapy and oncology. The first interview is titled: Advanced Practice in Radiotherapy and Oncology and is based on an interview with Angie Eddy, MSc, Senior Lecturer and Course Leader for the MSc Advanced Practice in Radiotherapy and Oncology at Sheffield Hallam University, Sheffield, UK.

To complete this issue, there are two case studies and two technical notes. The first case study by Surega et al. is on High Dose Rate Brachytherapy planning in management of Hilar Cholangiocarcinoma. The second case study is on an interesting case of recurrent malignant proliferating trichilemmal tumour of the scalp by Reddy et al.

The first of the technical notes is by Padilla-Cabal et al., on Monte Carlo calculations of an Elekta Precise SL-25 photon beam model. The second technical note is by Vicente Puchades Puchades et al., on the importance of collimator angle error in volumetric modulated arc therapy.

Professor Angela Duxbury