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In the first article, Farr et al. present their findings on the feasibility and long-term efficacy of a granulomatous slack skin disease (GSSD) treatment with combined high-energy photon and proton beams. A GSSD patient with abdominal disease was recommended for treatment. In addition to photons and electrons, high-energy protons delivered with advanced planning techniques and patient positioning were used. The patient was irradiated to a total dose of 40 Gy by using 20 Gy matched photon and electrons followed by 20 Gy equivalent protons delivered by using innovative range compensation and patient positioning. The authors conclude that treatment of GSSD with protons is feasible. The range and narrow penumbra properties of the proton beam provided an ideal capability to match fields accurately to cover large volumes while also sparing underlying normal tissues.

In the next paper Hudson et al. present their study to assess the feasibility of radiographer-led verification of cone beam computerised tomographic (CT) images (CBCT) for patients with solitary lung tumours treated with stereotactic body radiotherapy (SBRT). CBCT setup images of 20 patients from the first fraction of each patient were retrospectively registered by therapeutic radiographers. The displacements recorded were compared with the clinical oncologist's original online match. The time taken by radiographers to verify the CBCT images was also recorded. The authors conclude that therapeutic radiographers are able to verify CBCT images for thorax SBRT with results comparable with the 'gold standard' clinical oncologists' match; however, additional training will be provided for online verification. The time taken was within acceptable limits.

The authors of the next paper undertake research into the use of hyperbaric oxygen for long-term complications of radiation cystitis. Authors Ferreira et al. report on the long-term efficacy of hyperbaric oxygen therapy (HBOT)

on radiation-induced cystitis. They performed a retrospective analysis of 70 patients diagnosed with radiation cystitis submitted to HBOT between 2007 and 2013. Diagnosis was based on clinical symptoms, signs and cystoscopic appearance. The results of the study highlight the safety and long-term benefits of HBOT on haemorrhagic radiation cystitis and in other distressful bladder symptoms.

In the next article, Anvari et al. study the dosimetric properties of fluoroscopic electronic portal imaging device (EPID) for transit dosimetry. The aim of this work was to evaluate dose response of a commercially available fluoroscopic electronic portal imaging device to 6 MV photon beam for transit dosimetry applications. Properties studied included warm up time, build-up thickness evaluation, dose history, linearity, stability and short- and long-term reproducibility of EPID response, as well as field size dependence.

Pixel value matrices of electronic portal images in DICOM format were analysed in central and eight off axis points using customised written codes in Matlab. In order to do this, nine 26×26 pixel matrices were selected as regions of interest, the regions represented by these arrays were 1×1 and $0.65 \times 0.65 \text{ cm}^2$ at the EPID and isocentre level, respectively.

Necessary warm up time for stable operation of EPID is 30 minutes, and there is no need for extra build-up layer to increase the dose response. Linearity tests indicate CCD camera of EPID saturates at 50 cGy level, and does not have linear relationship with dose. Reproducibility and stability of the measurements were excellent and the detector showed same signal with a maximum deviation of $<0.3\%$ both in short- and long terms. Results of dosimetric evaluation have shown the TheraView fluoroscopic EPID can be used for transit dosimetry purposes. However, energy, integration time of image acquisition mode and field size correction should be taken into account.

In the next paper, Chojnacka et al. undertake a comparative study of the plan quality between volumetric modulated arc therapy (VMAT) and 3D conformal therapy (3DCRT) for the treatment of selected representative childhood neoplasms were performed. During the year 2013, 44 children with neoplasms were irradiated using VMAT. The 3DCRT plans were created retrospectively and compared with the VMAT plans for four tumour locations. The conformity parameters, dose volume histograms for target volume and organs at risk, number of monitor units and time used to deliver the single fraction were evaluated and compared for each plan.

In addition, for patients with brain tumour the comparison of different arcs configuration was made. The authors conclude that VMAT could be preferred technique for treating childhood neoplasms, especially when the complex-shaped target volume is localised close to the critical structures. The non-coplanar arcs arrangement could be the method of choice in the reirradiated patients and in these with laterally located brain tumours. Experimental measurements and Monte Carlo modelling of the XSTRAHL 150 superficial X-ray therapy unit.

In the next paper, Fayez Hammad Al-Ghorabie presents his study to investigate if it is possible to reproduce experimentally measured data for the XSTRAHL 150 superficial X-ray unit with simulations using the BEAMnrc Monte Carlo code.

The experimental procedure applied in this study included experimental measurements of different X-ray spectra, half-value layers, percentage depth dose and beam profiles. Monte Carlo modelling of the XSTRAHL 150 unit was performed with BEAMnrc code. The validity of the model was checked by comparing the theoretical calculations with experimental measurements. The author concludes that the results of this study provide information about particles' interaction in different kV and filter combinations. This information is useful for X-ray tube design and development of new target/filter combinations to improve beam quality in superficial X-ray radiotherapy. The data presented may provide a base for comparison and a

reference for other or potential new users of the XSTRAHL 150 X-ray unit.

In the first of the three literature reviews, Soprun, Sale and Knight present their systematic review to determine and summarise the literature on prostatic seeds stability by investigating seed marker migration and loss in prostate cancer patients.

PubMed and ScienceDirect databases were used to locate papers on the stability of gold seed markers in prostate patients treated with external beam radiation therapy. The search found 3,238 articles and ten articles were selected and reviewed based on inclusion and exclusion criteria for the scope of this literature review.

The authors conclude that seed stability within the prostate has been proven, with most authors reporting minimal migration within a 2.0 mm threshold and minimal loss of seeds. Although individual cases can have significant migration and loss, if marker migration exceeds the 2.0 mm threshold, a protocol is required to deal with both non-significant and significant migration.

In the second of the literature reviews, Marone and Tran review the mechanisms of action and clinical applications for cytotoxic agents and radiation therapy. The purpose of this review is to present theoretical frameworks behind the chemoradiation paradigm and to describe current chemoradiation practices in radiation oncology.

A review was conducted using the US National Library of Medicine, National Institutes of Health database (PubMed) using the following search keywords: chemoradiation, spatial cooperation, chemotherapeutic agents, pharmacokinetics, anti-vascular agents, tumour vasculature and tumour hypoxia. The authors conclude that current research has reported several rationales for the beneficial combination of radiation and chemotherapy to eradicating oncological diseases. Mechanisms of action and biological approaches are showing that concurrent treatments, as well as novel agents such as antivasular and anti-angiogenic agents may benefit improved treatment outcomes by reducing micro hypoxic environments in tumours. In addition, chemotherapy administered in tandem with

radiation enhances cell-killing effects by targeting the cell cycle.

In the next paper, Hutchinson and Bridge undertake a literature review to establish whether the use of a passive or active technique of planning target volume (PTV) definition and treatment methods for non-small cell lung cancer (NSCLC) deliver the most effective results. This literature review assesses the advantages and disadvantages in recent studies of each, while assessing the validity of the two approaches for planning and treatment. A systematic review of literature focusing on the planning and treatment of radiation therapy to NSCLC tumours. Different approaches that have been published in recent articles are subjected to critical appraisal in order to determine their relative efficacy. The authors conclude that 4DCT is superior to 3DCT, with the passive free-breathing (FB) approach for PTV delineation and treatment optimal. Departments should use a combination of MIP with visual confirmation ensuring coverage for stage 1 disease. Stages 2–3 should be delineated using ten-phase overlaid. Stereotactic and gated treatments for early stage disease should be used accordingly; FB-IMRT (intensity-modulated radiation therapy) is optimal for latter stage disease.

In the first of three case studies, Sheu, Wilson and Carpenter report a case of a patient with mediastinal PEComa, who presented with symptoms concerning for superior vena cava syndrome syndrome,

was deemed to be inoperable, and thus was treated exclusively with chemoradiation therapy.

In the next case study, Shaikh, Ehya and Turaka present a case study of a patient with small cell lung cancer metastatic to the submandibular gland.

In the third of the case studies, Kataria et al. report a case of solitary parotid metastasis from carcinoma urinary bladder in a patient who was successfully treated with SBRT using Cyber-Knife radiotherapy.

In the first of two technical notes, Laycock et al. present a detailed report of their experience towards the production of radiotherapy treatment shells on 3D printers using data derived from DICOM CT and magnetic resonance imaging: this was a preclinical feasibility study.

In the second technical note, Syed Farouq Akber presents a new approach to cancer treatment.

To complete this issue is a book review, undertaken by David Green. The book titled *Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy* edited by Stanley H. Benedict, David J. Schlesinger, Steven J. Goetsch and Brian D. Kavanagh, published by CRC Press, Taylor & Francis Group.

Professor Angela Duxbury