guidelines, the practitioner's area of expertise and competence, and the overarching framework of the treatment of cancer. NMPs within our cancer centre run independent clinics to review and treat patients who require the support and management of radiotherapy treatment related conditions and toxicities before, during and after their course of radiotherapy treatment. NMPs work in close liaison with other healthcare professionals to ensure safe and effective treatment is prescribed and administered to patients to manage common radiotherapy toxicities and complications such as skin reactions, oral mucositis, pain, diarrhoea, constipation and emesis.

Results

The introduction of NMPs supports the delivery of a seamless review service within this Cancer Centre. This benefits the patient by improving the patient pathway, reducing the need for repeated assessment and review, enhancing patient care, supporting the multi-disciplinary team and using the skills of the workforce more effectively. Since June 2017 NMP prescribing practice has averaged upwards of 10 prescriptions a week equating to a minimum saving of 3 hours of oncologist time otherwise spent in consultation and prescribing activity.

Conclusion

NMPs can provide a more holistic approach to patient care, a smoother patient pathway, provide improved accessibility to appropriately prescribed medication and release pressures on the oncologists' workload.

EP-2210 Building a respiratory synchronization model in the CK System during the RT session of liver metas

K. Szczepanik[1], A. Grzadziel[2], B. Jochymek[1], D. Bodusz[1], E. Telka[1], M. Kijonka[3]

[1]Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Radiotherapy, Gliwice, Poland; [2]Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Planning Radiotherapy and Brachytherapy, Gliwice, Poland; [3]Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Medical Physics, Gliwice, Poland

Purpose or Objective

The aim of this work is to show the building of a respiratory model used for radioablation of liver metastases using tracing of implanted markers using the Synchrony Respiratory Tracking System.

Material and Methods

The CyberKnife system (Accuray Inc., Sunnyvale, CA) enables irradiation of patients using the internal markers tracking method with respiratory synchronization.

The patients who are qualified for radioablation of liver metastases are implanted with 3 markers. After preparing the external stabilization, performing the CT (the patient should wear the Synchrony Tracking Vest) and performing the treatment plan in the MultiPlan system, and than can start irradiation. The process of preparing the patient for treatment includes the implementation of an individual external stabilizer and treatment planning based on the CT examination in the Synchrony Tracking Vest System. To build a respiratory model, it is necessary to put on the Synchrony Tracking Vest patient's vest and attach to it three external markers (Tracking Markers), whose movement, consistent with the patient's breathing movements, is recorded by means of X - ray lamps.After locating external and internal markers, it is possible to start building a breathing model. This is done using the Synchrony Respiratory Tracking System. The respiratory model is built on the basis of 6-8 verification imagines.

Results

Irradiation of metastases to respiratory organs (including the liver) using the Synchrony System enables precise treatment of the appropriate radiation dose with the saving of healthy tissues. Continuous control of the patient's position and correlation of the respiratory movements with the motion of the accelerator head are the main advantages of the Synchrony Respiratory Tracking System of the CyberKnife System.

Conclusion

Irradiation of metastases to respiratory organs (including the liver) using the Synchrony System enables precise treatment of the appropriate radiation dose with the saving of healthy tissues. Continuous control of the patient's position and correlation of the respiratory movements with the motion of the accelerator head are the main advantages of the Synchrony Respiratory Tracking System of the CyberKnife System.

EP-2211 Impact of virtual learning environment on students' satisfaction, engagement, recall and retention

E. Ryan[1*], C. Poole[1]

[1]TCD Division of Radiation Therapy, Radiation Therapy, Dublin, Ireland

Purpose or Objective

Virtual Learning Environments (VLEs) were introduced to progress students from passive to active learners. Active learning promotes the critical thinking skills essential for the transfer/use of classroom-acquired knowledge into the clinical setting. Virtual reality forms an increasingly vital component of clinical skills development in a range of disciplines.

Material and Methods

A randomised control trial was conducted with students randomly attending one of two teaching sessions about radiation therapy. Both sessions were identical except a VLE was used in the second talk with the first being solely didactic. Anonymous questionnaires were distributed. Two weeks after the talks, participants were required to complete the same knowledge questionnaire to determine retention. Mann-Whitney, means, standard deviations and chi-squared tests were employed according to data characteristics. Qualitative data (open-ended questions) was analysed thematically.

Results

Virtual learning seemed to significantly improve students' satisfaction/engagement and recall (n40). The student group taught using the VLE had higher mean scores for retention compared to the didactic group however this was not statistically significant. Students' learning styles seemed to have no effect on their satisfaction/engagement and ease of learning. Three key themes emerged from the qualitative data, (1) the visuals were good/helpful, (2) the talk was informative, and (3) more detail/visuals were required.

Conclusion

Incorporating virtual learning into education suggests an enhanced student experience with increased levels of engagement, satisfaction and recall. This study adds to and supports current research which illustrates there is a role for VLEs in teaching. Future research is required to determine if VLEs produce a long-term impact on student's retention of knowledge.

EP-2212 Piloting an educational framework for the enhanced role of RTTs in MRI-guided adaptive radiotherapy

C. Eccles[1], J. Webb[1], A. Flynn[1], A. McWillianm[2], A. Sanneh[1], M. Van Herk[2], A. Choudhury[2], M. Aznar[2]

[1]The Christie, Radiotherapy, Manchester, United Kingdom; [2]University of Manchester, Radiotherapy Related Research, Manchester, United Kingdom

Purpose or Objective

To develop and implement a framework to support the enhanced role RTTs delivering MRI-guided adaptive radiotherapy.

Material and Methods
A team of MRI radiographers and RTTs was assembled to realise radiotherapy treatments on a hybrid MRI-linear accelerator (MR-Linac) and to pilot a program of learning, for safe, effective MR-Linac based research and treatment. We followed a scoping exercise to determine a framework of knowledge, skills and competence required for the enhanced role of RTTs working in MRI-guided adaptive radiotherapy. A gap analysis and survey of existing educational programs that could bridge gaps in knowledge were undertaken. Where no didactic or practical programs were available an in-house program was developed to fulfill the framework requirements. The program includes directed self-study, didactic and practical competency- based experiences.
Results
From the scoping exercise it was determined the framework should include: a) MRI safety and screening, b) MR image formation/acquisition, c) MRI image interpretation, d) multi-modality image registration, e) radiotherapy specific imaging needs (e.g., geometric fidelity), f) MRI safe patient positioning, g) target and normal tissue segmentation and/or segment manipulation, and h) treatment plan evaluation. The survey of existing educational programs found a) several UK- based higher education institutions (HEIs) with suitable courses offering graduate level modules in MRI physics and clinical applications, that include basic MRI safety, with some including MRI-based anatomy, b) an international peer-to-peer MRinRT program and c) online MRI/multi-modality anatomical atlases that are suitable for inclusion in this framework of blended learning. All HEI programs included knowledge assessments, however, it was decided online-based learning and MRI screening should be appraised as competencies gained through practical experience. Formal programs in the specific imaging and positioning for radiotherapy were lacking, therefore tutorials and practical competencies will be developed to teach and assess this body of knowledge and skills. To date 12 tutorials are available, each with a question-based assessment, and competency profile to be included in each learner's portfolio of evidence. To embed competence in image registration, segmentation, and treatment plan assessment, practical tutorials and inter-observer variability studies supplemented by interdisciplinary discussions with clinicians and physicists experienced in treatment planning are planned.
Conclusion
The safe, effective realisation of MRI-linear accelerator technologies requires an enhanced RTT portfolio, a formal framework for which does not yet exist in the UK. Using a scoping exercise and gap analysis, we have been able to define a preliminary framework for a blended learning experience that is currently being piloted in our institution. Following the pilot, a mixed method model will be used to evaluate its effectiveness and inform the program's evolution.

EP-2213 An evaluation of radiotherapy students' perceptions of research and evidence-based practice
S. Ketterer[1]
[1]*University of Liverpool, Department of Radiotherapy-School of Health Sciences, Liverpool, United Kingdom*

Purpose or Objective
Engagement with research is recognised as a pre-requisite for professional registration as a therapy radiographer. Educational programmes have an obligation to support and develop autonomous and reflective thinking, and evidence-based practice, as modern careers in radiotherapy require active engagement in research, and the generation of primary research data, in order to challenge the current evidence base and to optimise approaches to both treatment delivery and patient care. This study aims to evaluate how all three year groups within a radiotherapy undergraduate degree course perceive the role of research within their future clinical practice, and looks to identify any changing attitudes of students to research as they progress through their undergraduate studies. A further objective is to examine if there are particular learning interventions that maximise student engagement with research.
Material and Methods
A qualitative approach was adopted with students from all three years of an undergraduate BSc Radiotherapy programme invited to participate in individual year group focus group sessions. Each session was audio recorded, transcribed into an anonymous script, and subjected to thematic analysis.
Results
A total of 17 students participated. Students recognised research as part of the role of a therapy radiographer, but did not always explicitly identify research activities within day-to-day work. Each year group had a strong focus on current academic research tasks, for example dissertation projects. Some could see the benefits of laying foundations in research methodology, although this was generally seen as an arduous process. Motivation and excitement around research had been observed in the clinical setting, but students felt this was largely amongst a minority of staff. There were multiple references to utilisation of practical, interactive, "real-world" examples in order to make research learning more relevant.
Conclusion
The evidence-based nature of radiotherapy was welcomed, but only a minority of students appeared eager to accept active research involvement as part of their future roles. The challenge for educators, which emerged, is to inject excitement for research into the academic setting, so students feel ownership of and immersed in the topic, and can develop positive attitudes towards continuous questioning of practice to carry forward into the clinical environment.

Electronic Poster: RTT track: Risk management/quality management

EP-2214 Assessing the evidence for proton therapy in prostate cancer
T. Chan[1], P.W. Tan[1], J.I. Tang[1]
[1]*The National University Cancer Institute- Singapore NCIS, Radiation Oncology, Singapore, Singapore*

Purpose or Objective
Proton beam therapy (PBT) has evolved significantly with respect to its use in prostate cancer. Pencil beam scanning, an advanced technique of PBT is often used in many centers. Growing interest and controversy regarding its use has resulted in PBT being closely scrutinized. The plethora of evidence suggests that PBT is effective and safe for early stage prostate cancer. However, it is still unknown whether the theoretical dosimetric advantages of PBT translate into meaningful clinical improvements over routine intensity-modulated radiation therapy, which is commonly used for this patient group.
Material and Methods
A systematic search using MEDLINE/PubMed and MeSH headings was used to identify articles addressing RT techniques with for early stage prostate cancer. The headings were prostate cancer, radiation therapy, proton therapy and intensity modulated radiation therapy. Eligible articles include articles about 1) prostate cancer RT; 2) RT associated toxicities; 3) advances in treatment delivery and 4) published in an English language peer-reviewed journal. Articles were excluded if they provided