Methods: A qualitative survey consisting of eight questions was composed and distributed to approximately twenty departments throughout Switzerland. The survey was addressed to and completed by the lead RTT of each department. Responses were collected over a period of 3 weeks.
Results: Fifteen of the twenty departments responded to the survey. Of the fifteen respondents, three had responded by email and the remaining twelve responded directly to the survey. Of the three email respondents, one stated that their department did not perform SRT treatments at present and therefore was excluded. Findings suggested that the majority of participating departments require an RO present for SRT matches, with some departments only requiring an RO if the match is complicated and one department not requiring an RO at all. Approximately 54% agreed with this workflow and 46% thought it could be improved. Such improvements included more RTT training and building trust within the team. The majority (85%) agreed that more RTT training/specialisation is required for more SRT responsibility, however the majority (58%) would not consider creating a specialised SRT RTT role in their department. Only one department had already implemented this new role.
Conclusions: Advancing the role of RTTs in Switzerland faces many dominant challenges. The most prominent being RTT education and training discrepancies which could influence the trust between the RO and RTTs within a department. Solutions may include RTT advanced practice, further RTT training e. g. ESTRO courses and continuous professional development. Time and resources will need to be allocated to RTTs by lead RTTs to overcome the aforementioned challenges which may require the redistribution/restructuring of workflow within departments on an individual needs basis.

Evaluation of an AI-based automatic segmentation solution for pelvis T2-weighted MRI used in daily online re-planning at Unity MR-Linac

Type: Technicians

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Aims: Manual re-contouring of target and organ-at-risks (OARs) on pelvis magnetic resonance imaging (MRI) is labor-intensive and time-consuming process in the online MR-guided treatment workflow. Aim of this study is to validate the new Pelvis T2 MR model available in the release 1.2.4 of MVision AI Contour+ segmentation service to speed-up and standardize the online adaptive MR-Linac workflow.
Methods: Segmentations of OARs structures were performed on pre-treatment full field-of-view T2-3D sequences acquired at the 1.5 T Unity MR-Linac (Elekta) for 10 prostate cancer patients previously treated at the HRC Hospital. The region-of-interest included prostate, seminal vesicles, bladder, rectum and penile bulb. Automatic contours were created by the Contour+ Pelvis T2 MR auto-segmentation model (MVision AI) trained on limited field-of-view prostate T2w-MRIs[1]. The DICE score (DSC) and surface-DICE 2 mm (S-DICE2) were used to assess the similarity between the manual and auto-segmented contours (MVision AI Verify workspace). For the qualitative evaluation, seven RTTs assessed the automatic contours and performed corrections when necessary and the time required for manual correction was recorded.
Results: The AI model achieved respectively a mean DSC of 0.91 for the bladder, 0.89 for the rectum, 0.85 for prostate, 0.70 for seminal vesicles and 0.79 for the penile bulb. Mean surface DICE-2 mm metric, less sensitive to ROI volume, was in the range of 0.8 (seminal vesicles) to 0.94 (bladder). In total, 88% of the contours were rated to be clinically acceptable, 9% to require minor and 3% major manual adjustments. Manual correction times were respectively 2 and 10 min for minor and major corrections.
Conclusions: The MVision pelvis MR T2 AI-model was successfully validated for T2 3D series used for MR-guided radiotherapy on the 1.5 T MR-Linac system. The model can automatically generate OARs contours with the need of minor corrections (3%) on the clinically employed sequences improving overall efficiency of the adaptive workflow. Prostate and seminal vesicles can also be used to initially speed-up target creation.

Overview of AI implementaion in radiation oncology focusing on RTTs practice

Type: Technicians

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Aims: The main aim of this study is to create an overview of AI implementation in ptient management in radiation oncology with a focus on RTT practice. The secondary objectives encompass the identification of implementation's opportunities and barriers, as well as the assessment of their impact on patient care and the role of RTTs.
Methods: A rapid review has been realized on pubmed and google scholar during May and June 2023. Used keywords and Mesh terms are: "artificial intelligence, machine learning, radiotherapy/radiation therapy/radiation oncology, implementation and radiation therapist technician/RTT".
Included publications in French and English published between 2018 and 2023 have been categorized in 4 categories following the patient pathway in radiation therapy treatment (evaluation, treatment preparation, treatment and completion).
Results: Data about authors, date of publication, country, implementation phase, opportunities and barriers, AI type, data sources and impact on patient care have been synthesized in a table. AI tools are clinically implemented in the four steps of patient care in radiation-oncology. Treatment preparation is the most documented phase regarding implementation of AI tools with automatic segmentation and contouring, autoplanning and synthetic-CT generation. Treatment evaluation and adaptation seems to be the most promising perspective with clinical outcome prediction, dose-response modeling and adaptation. The biggest barrier is the lack and quality of data. Primary results show that education regarding fundamental AI knowledge, safety and data management are the main impacts on RTT practices.
Conclusions: Artificial intelligence is currently extensively utilized in radiotherapy departments globally with a significant impact on RTTs practice. While numerous potential advancements are under investigation, addressing the issue of limited data remains the primary obstacle in ensuring the external validity of these tools for clinical implementation.

Development of an in-house solution for correct and efficient documentation of patient positioning at planning CT

Type: Technicians

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Aims: A risk analysis performed in our radio-oncology department at the Kantonsspital Aarau in January 2022 showed that the documentation of the patient setup notes at planning-CT (PLCT) by the RTT was not always very accurate and easy to read. This could lead to confusion or maybe even a mistake when setting up the patient for treatment. This resulted in a project to create an easy to use program to enter standardized setup notes using the Varian ARIA record and verify system.