Quality in the implementation of stereotactic radiotherapy services on a national scale

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The group of medical physics experts in radiation oncology in the Czech Republic is formed by representatives from hospitals, service companies, National Radiation Protection Institute (NRPI), and regulatory body. All members were asked to make the estimates for values of O (occurance), S (severity), D (detectability), and RPN (risk priority number) used in the FMEA for IMRT process. Although there exist examples of these values published in literature, the analysis was performed to estimate independently the most appropriate and valid values corresponding to the national conditions, practices, and experience. Results from analysis of radiotherapy accidents was taken into account which NRPI performs on request of the regulatory body. The hospitals must report the most serious accidents to the regulatory body, but were asked to report also less serious accidents and near misses, which was voluntary based to cover accidents that happened in the Czech Republic in the period 2012 - 2017. The results from this analysis were used to modify and validate estimates of values for FMEA.

Results

Published values in AAPM TG 100 were confronted with the estimates based on experience of Czech physicists. The contribution shows differences in identification of the most hazardous steps on IMRT process tree. In total, more than 230 accidents in radiotherapy were evaluated. The most series accidents in radiotherapy in the Czech Republic in previous years have been caused by software failures which was not included in 10 highest ranked failures by AAPM TG 100. The description of these most serious accidents caused mainly by data transfer and Record and Verify System failures will be included. The most frequent accidents in previous years were related to incorrect patient positioning, choice of incorrect treatment plan, and patient identification.

Conclusion

The contribution shows the results from performed analysis and helps local physicists to adopt legislative requirements. It also shows an effective way by grouping physicists to form an official body in the country to enable cooperation between professionals on the national level which is benefit especially in small countries where enough experts are not available to form different working groups. The results will be published in form of the national recommendation by the regulatory body and it is expected that particular departments will implement the method considering local conditions.

EP-2100 Quality in the implementation of stereotactic radiotherapy services on a national scale

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Purpose or Objective

Icon Group operates a network of 20 radiotherapy centres (Icon Cancer Centres) across Australia. A nationwide project was launched to implement a safe, high quality stereotactic radiotherapy programme, based on the extensive experience within our network already, for a variety of stereotactic radiotherapy (SRT) and stereotactic body radiotherapy (SBRT) treatment techniques including lung, liver, cranial, and oligo -metastases. The aim of this initiative was to provide these advanced treatments closer to patients in the community setting resulting in reduced travel time for treatment and associated financial and personal burden.

Material and Methods

Within the 20 Icon Cancer Centres, a mix of software and hardware exists including Varian, Elekta, Brainlab, and RaySearch. Staffing across the network had varied levels of clinical and technical experience. Implementation was achieved using national multi-disciplinary project teams that developed a template for implementation to be used by other centres within our network. These project teams also developed draft clinical guidelines, which were then disseminated to wider staff groups for refinement. An endorsement program within a clinical governance structure was developed to facilitate implementation of a stereotactic service at a new Icon Cancer Centre. Endorsement for a centre to provide a specific stereotactic service involved the centre providing evidence of equipment commissioning, technique documentation (clinical and technical), staff training, and competency assessments.

The endorsement process is governed by national stereotactic “clinical streams”, which are in-house physician led groups comprised of a mix of both senior and junior physicians, as well as key technical staff. To assist commencing junior physicians and to provide opportunities for learning and skill development, a mentorship program and national virtual stereotactic chart round was established and held weekly. To ensure quality control in treatment planning, a virtual treatment planning model was set up. This consisted of a mix of dedicated treatment planning staff, as well as remote planners, all operating within a virtual treatment planning room environment.

Results

To date, national clinical guidelines have been written for cranial metastases SRT, lung SBRT, liver SBRT, and bony/oligometastatic SBRT. To complement these guidelines, a series of national work instructions covering simulation, planning, and treatment processes have also been developed, and are based on what software / hardware is available on site. Stereotactic radiotherapy has been implemented in 13 of our centres. To date, 51 cases have been presented within our chart round.

Conclusion

Thus far, stereotactic radiotherapy services have been implemented at Icon Cancer Centres across Australia. Compliance with approved documents is monitored by the clinical streams via the endorsement programme and chart rounds, to ensure quality in stereotactic services on a national scale.

EP-2101 Evaluation of the feasibility of performing markerless tracking for lung SBRT patients

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Purpose or Objective

Tumor tracking based on fiducial markers using the VERO SBRT system uses a correlation model to estimate internal tumor position based on external surrogate motion. Previous studies in our department showed already the feasibility and accuracy of performing this marker-based tracking. The drawback of this technique is the implantation use of a marker as a surrogate for the tumor motion, as majority of patients are not eligible for marker implementation due to risk of pneumothorax in COPD patients and anatomical challenges. That is why we wanted to implement a less invasive technique eligible for a larger variety of patients using state of the art imaging. In this study, we want to report on the first simulation of a markerless real-time tumor tracking solution based on the Vero SBRT gimbaled Linac system for treatment of lung tumors.

Material and Methods

Twenty previously treated patients with a marker-based tracking were used to analyze the feasibility of markerless tracking. In these fluoroscopic images, the marker was erased in the image in order to analyze the markerless