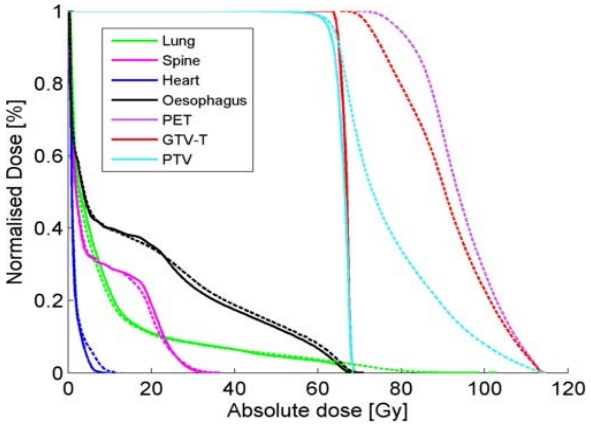
Results: Dose-volume-histogram data for the standard (solid) and escalated (dashed) arms for one patient is presented (Figure 1). Centres entering the NARLAL2 trial must successfully pass a workshop evaluation on delineation, PET determination, treatment planning, and IGRT strategy. Additionally, all participating centres should expect to enrol ≥5 patients/year, use 4D-CT and PET, inverse treatment planning, daily online match on soft tissue, and have an adaptive treatment strategy. Planning and treatment of the initial two patients within each centre are thoroughly investigated by a small QA work group consisting of 2 clinical oncologists and 4 physicists. Furthermore, every six month each centre will be visited by an external oncologist in order to ensure that guidelines are still followed throughout the duration of the trial.



Conclusion: The NARLAL2 trial started patient accrual in January 2015 based on this extensive QA work.

EP-1933

End-to-end dosimetric audit – comparison of TLD and lithium formate EPR dosimetry

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Purpose or Objective: The purpose of the study was to compare a lithium formate dosimetry system with a lithium fluoride TL dosimetry system as used in a solid phantom developed for remote end-to-end audits of advanced radiotherapy treatments, such as IMRT and VMAT. This type of inter-dosimeter comparison is of benefit for better understanding of advantages and limitations in the use of these dosimeters in remote audit programs for radiotherapy.

Material and Methods: A phantom was designed by a multinational coordinated research group (Coordinated Research Project E24018) with the intention to be used for remote end-to-end audits of advanced radiotherapy treatment (IMRT and VMAT). The phantom is made of polystyrene and includes solid water volumes representing a target region (PTV) and an organ at risk (OAR) with two measurement points in each. For an audit, the phantom is to be loaded with either TLD or EPR dosimeters and sent to external clinics to be treated using their local procedure for IMRT or VMAT. Dimensions of the active volume of the dosimeters used were: 20 mm length and 3 mm diameter for TLD, 5 mm height and 4.5 mm diameter for the EPR dosimeter. In addition, gafchromic film is used in the audit but this is not a subject of the current study. Irradiations were performed using VMAT technique and the doses determined by the TLDs and EPR dosimeters were compared with the TPS calculated doses.

Results: The absorbed dose determined by the EPR and TL dosimeters agreed within 2% with the TPS calculated doses in the PTV. In the OAR the discrepancy was larger; the dose determined by the EPR system was 3% lower compared to the TPS dose while the dose determined by the TLD was 5% higher than the TPS dose. The dose difference in the OAR was expected to be larger due to the steep dose gradients in this region over the dosimeter volume and the phantom positioning uncertainties involved.

Conclusion: Both dosimetry systems agree with the TPS calculated doses within 2% in the PTV and 5% in the OAR. This study shows that both dosimetry systems give results acceptable for this application and can be used for remote dosimetry audits of IMRT or VMAT. The EPR dosimeters have higher resolution due to their smaller size. This is an advantage of the EPRs over the TLDs since it is possible to resolve dose gradients to a higher extent.

EP-1934

Event reporting and learning in radiotherapy: evaluation over 4 years

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Purpose or Objective: Radiotherapy is one of the primary treatment options in cancer management. Radiotherapy is recognised as one of the safest areas of modern medicine; however, when errors occur, the consequences for the patient can be significant.

The rapid development of new technology has significantly changed the way in which radiotherapy is planned and delivered. Quality and safety programs in radiotherapy have been recommended by international bodies, such ESTRO and AAPM.

The purpose of this work is twofold: to report on the long-term use of an event reporting and learning system in an RT department to record and classify events, and to compare a restricted access system to an open-access system

Material and Methods: A voluntary web-based safety information database for RT was designed for reporting individual events in RT and was clinically implemented in 2011. An event was defined as any occurrence that could have, or had, resulted in a deviation in the intended delivery of cancer care. The aim of the reporting systemm was to encourage process improvement in patient care and safety.

During the RT process, when something goes wrong and results in event, it is initially recorded and reported within the RT Department. Initially only the management group registered events. From June 2012 all team at RT Department (radiation oncologist, radiation therapists, medical physicists, nurses, technicians, dosimetrists, medical secretary) can directly register events. All events were analyzed inside a management group who selected and proposed actions to be taken.

Results: We analyzed events from 2011 to 2014 for 6108 patients who have undergone radiation treatment at our hospital. Over this period of time 298 events were reported. After the event reporting system became open access (June 2012), the registered number of events increased significally: from 22 in 2011 to 44 in 2012, 120 in 2013 and 112 in 2014. The spectrum of reported deviations extendent from minor workflow issues to errors in treatment delivery.

The distribution of the professional who registered the event was: