

Press release

Please fill in this form and return it to graduateschoolhealth@au.dk in Word format no later than three weeks prior to your defence.

Basic information

Name: Monica Serban Email: monica.serban@oncology.au.dk Phone: +15149935256

Department of: Clinical Medicine

Main supervisor: Professor, Ph.D. Kari Tanderup

Title of dissertation: Image guided brachytherapy in cervix cancer: Optimising technique, applicators, and treatment planning

Date for defence: November 20th 2020 at (time of day): 15:00 Place: Virtual defence via Zoom

Press release (Danish)

Billedstyret brachyterapi i livmoderhalskræft: Optimering af teknik, applikatorer og behandlingsplanlægning

Standard behandlingen af lokal avanceret livmoderhalskræft er en kombination af ekstern strålebehandling, brachyterapi (BT) og konkomitant kemoterapi. BT repræsenterer en vigtig komponent i behandlingen, og bidrager med ca. halvdelen af den totale perifere dosis til tumor. Det prospektive, observationelle multicenter EMBRACE I studie havde til formål at evaluere MR-billedvejledt adaptiv BT (MR-IGABT) i behandlingen af livmoderhalskræft med inklusion af 1416 patienter. Formålet med denne ph.d. er at evaluere den forbedrede behandling af lokal avanceret livmoderhalskræft opnået ved MR-IGABT med forskellig intrakavitær/interstitiel (IC/IS) teknik samt individualiseret dosis optimering tilpasset patientens anatomi/tumor. Der er udarbejdet fire projekter til evaluering af: 1) "overall treated volumes" ved klinisk relevante dosis niveauer med IGABT sammenlignet med volumina ved standard loading (SDL-IC) 2) betydningen af anvendt applikator og teknik på target og normalvævs doser 3) den dosimetriske betydning af kombineret IC/IS BT herunder parallelle/skrå nåle anvendt hos patienter med ekstensiv parametrie/vaginal sygdom 4) en metode til etablering af vaginal "dose-surface maps" (DSMs) og nye "dose-spatial descriptors" til prædiktering af vaginal morbiditet. Øget stråledosis til target samt mere konform stråledosis fordeling opnået med MR-IGABT. Patienter behandlet med tandem og ring havde en bedre terapeutisk ratio og konform stråledosis fordeling end patienter behandlet med tandem og ovoid applikator. Tillæg af nåle øgede markant dosis til target og reducerede dosis til normalvæv for begge applikator typer. Anvendelsen af IC/IS teknik og parallelle/skrå nåle sikret den excellente dosis til target og D2cm3 til normalvæv. Intrauterin/vaginal loading blev reduceret sammenlignet med SDL-BT ved forskydning til nålene og forsigtig loading i hovedparten af dwell positionerne. DSMs viste at spatial information og dose-surface metrics forekom superior til nuværende rapportering af vaginal punkt-doser anvendt i klinisk praksis. Projektet er gennemført af Monica Serban, der forsvare det d. 20/11/2020.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 20/11 kl. 15.00 via Zoom. Adgang til forsvaret forgår via link, som kan fremsendes ved henvendelse til Monica Serban via nedenstående kontaktoplysninger. Titlen på projektet er "Image guided brachytherapy in cervix cancer: Optimising technique, applicators, and treatment planning". Yderligere oplysninger: Ph.d.-studerende Monica Serban, e-mail: monica.serban@oncology.au.dk, tlf. +15149935256.

Bedømmelsesudvalg:

Åsa Carlsson Tedgren, Associate Professor, PhD, Medical Radiation Physics and Nuclear Medicine
Karolinska University Hospital, Sweden

Ann Klopp, Associate Professor, MD, PhD, Department of Radiation Oncology, MD Anderson Cancer
Center Houston, Texas, United States

Sune Jespersen, Professor, PhD, Center of Functionally Integrative Neuroscience (CFIN), Denmark

Press release (English)

Image guided brachytherapy in cervix cancer: Optimising technique, applicators, and treatment planning

The standard treatment for locally advanced cervical cancer (LACC) is a combination of external beam radiotherapy (EBRT), brachytherapy (BT), and concomitant chemotherapy. BT represents an important component of the treatment, as it accounts for about half of the total peripheral dose to the tumour. The EMBRACE I study aimed to benchmark magnetic resonance image-guided adaptive BT (MR IGABT) in LACC as a prospective observational multicentre study, with 1416 patients enrolled. The goal of this PhD was to investigate the improvements achieved in the LACC treatment by MR-IGABT along with intracavitary/interstitial (IC/IS) techniques and individualized dose optimization approaches specific to each patient anatomy/tumour. Four projects were conducted to investigate: (1) the overall treated volumes by clinically relevant dose levels with IGABT and compare to the standard loading (SDL-IC) volumes; (2) the influence of applicator and technique type on target and organs at risk (OARs) doses; (3) the dosimetric performance of combined IC/IS BT including parallel/oblique P/O-needles in patients with extensive parametrial/vaginal disease; (4) a methodology for generating vaginal dose-surface maps (DSMs) and new dose-spatial descriptors for prediction of vaginal morbidity. Increased target doses and dose conformity were achieved with MR-IGABT. Patients treated with tandem&ring had a more favorable therapeutic ratio and conformal dose distribution than patients treated with tandem&ovoids applicators. For both applicators, the addition of needles considerably increased target and decreased OAR doses. The use of IC/IS technique and P/O-needles ensured excellent target dose and OARs D2cm3. Intrauterine/vaginal loadings were reduced compared to SDL-BT and shifted into needles, by gentle loading in the majority of dwell positions. DSMs showed that spatial information and dose-surface metrics seem to be superior to dose-point, as current clinical practice for vaginal dose reporting. The project was carried out by Monica Serban, who is defending her dissertation on 20/11/2020.

The defence is public and takes place on 20/11 at 3 pm on Zoom. The title of the project is "Image guided brachytherapy in cervix cancer: Optimising technique, applicators, and treatment planning". For more information and for access to Zoom, please contact PhD student Monica Serban, email: monica.serban@oncology.au.dk, Phone +15149935256.

Assessment committee:

Åsa Carlsson Tedgren, Associate Professor, PhD, Medical Radiation Physics and Nuclear Medicine Karolinska University Hospital, Sweden

Ann Klopp, Associate Professor, MD, PhD, Department of Radiation Oncology, MD Anderson Cancer Center Houston, Texas, United States

Sune Jespersen, Professor, PhD, Center of Functionally Integrative Neuroscience (CFIN), Denmark

Permission

By sending in this form:

- I hereby grant permission to publish the above Danish and English press releases.
- I confirm that I have been informed that any applicable inventions shall be treated confidentially and shall under no circumstances whatsoever be published, presented or mentioned prior to submission of a patent application, and that I have an obligation to inform my head of department and the university's Patents Committee if I believe I have made an invention in connection with my work. I also confirm that I am not aware that publication violates any other possible holders of a copyright.