AARHUS UNIVERSITY

Press release

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Basic information

Name: Erik Buch Jørgensen Email: erikbuchjorgensen Phone: 22218265

Department of: Clinical Medicine

Main supervisor: Jacob Johansen

Title of dissertation: In vivo dosimetry based source tracking and 3D dose reconstruction for treatment verification in afterloading brachytherapy

Date for defence: 12-11-2021 at (time of day): 14:00 Place: Aarhus University Hospital, Palle Juul-Jensens Boulevard 99, entrance C, level 1, Auditorium C114-101, DK-8200 Aarhus N.

Press release (Danish)

Validering af leveret dosis under strålebehandlingsformen brachyterapi ved hjælp af tidsopløst dosismålinger.

Brachyterapi er en kræftbehandlingsform, hvor små kilder af radioaktivt materiale placeres inde i patienten for derved at bestråle kræftcellerne direkte. Dette giver en meget lokaliseret levering af stråling, og derved kan man minimeres stråling til det raske væv. På et punkt er der dog mulighed for at forbedring: Det eksisterende udstyr til at overvåge, at den leverede dosis er den samme som den planlagte, er for upræcist og kan ikke levere brugbare oplysninger tids nok til at det kliniske personale kan nå at reagere på det. I et nyt ph.d.-projekt anvendes en ny form for teknologi, tidsopløst scintillatorbaseret realtids dosimetri, til at løse det ovenstående problem. Igennem projektet er det blevet vist hvordan denne nye teknologi kan bruges til præcist at bestemme om den radioaktive kilde er placeret korrekt inde i patienten. Derefter er konsekvensen af eventuelle positionelle afvigelser blevet undersøgt ved at udregne den strålingsdosis som er blevet afsat i både kræftcellerne og risikoorganerne. Et nyt dosimetri system som anvender denne teknologi er også blevet karakteriseret og implementeret i klinikken. Resultaterne er sammenfattet i et nyt ph.d.-projekt fra Aarhus Universitet, Health. Projektet er gennemført af Erik Buch Jørgensen der forsvarer det d. 12-11.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 12/11 kl. 14 i auditorium C114-101, Aarhus Universitetshospital, Palle Juul-jensens Boulevard 99, indgang C, level 1, DK-8200 Aarhus N. Deltagelse i forsvaret kan også forgå virtuelt igennem zoom-linket: https://aarhusuniversity.zoom.us/j/61573194823. Titlen på projektet er ”In vivo dosimetry based source tracking and 3D dose reconstruction for treatment verification in afterloading brachytherapy”. Yderligere oplysninger: Ph.d.-studerende Erik Buch Jørgensen, e-mail: erikbuchjorgensen@gmail.com, tlf. +4522218265

Bedømmelsesudvalg:

Ole Lajord Munk, associate professor (chairman and moderator of the defence), Aarhus University Dept. of Clinical Medicine Aarhus, Denmark

Frank-André Siebert , professor, Head of Dept. of Medical Physics, Klinik für Strahlentherapie (Radioonkologie) Kiel, Germany

Patrick Pittet., senior research engineer, Institut des Nanotechnologies de Lyon (INL) - Villeurbanne, France

Press release (English)

Using time-resolved dosimetry to validate the delivered dose during brachytherapy

Brachytherapy is a cancer treatment where small radioactive sources are inserted into the patient to irradiate the tumour. This gives a highly localised delivery of the dose which effectivly spares the normal tissue around the tumour. However, there is a potential to improve the treatment even further: The existing equipment to monitor that the delivered dose is equal to the planned dose is imprecise and the information cannot be delivered fast enough for the clinical personal to react on it. In a new ph.d.-project a technology is applied to solve this problem: time-resolved real-time scintillator based dosimetry.
During this project it was shown how this new technology can be used to accuratly determine whether the radioactive source is correctly placed inside the patient. The consequences of observed deviations in source positions were investigate by calculating the dose administered to the tumour and organs at risk. Furthermore, a new dosimetry system was characterised and implemented in the clinic. The results are summarised in a new ph.d-project from Aarhus University, Health. The project was carried out by Erik Buch Jørgensen, who is defending his dissertation on the 12th of November.

The defence is public and takes place on the 12/11 at 2 PM i auditorium C114-101, Aarhus Universitetshospital, Palle Juul-jensens Boulevard 99, entrance C, level 1, DK-8200 Aarhus N. The defence can also be attended virtually using zoom: https://aarhusuniversity.zoom.us/j/61573194823. The title of the project is "In vivo dosimetry based source tracking and 3D dose reconstruction for treatment verification in afterloading brachytherapy". For more information, please contact PhD student Erik Buch Jørgensen, email: erikbuchjorgensen@gmail.com, Phone +45 22218265.

Assessment committee:

Ole Lajord Munk, associate professor (chairman and moderator of the defence), Aarhus University Dept. of Clinical Medicine Aarhus, Denmark

Frank-André Siebert , professor, Head of Dept. of Medical Physics, Klinik für Strahlentherapie (Radioonkologie) Kiel, Germany

Patrick Pittet., senior research engineer, Institut des Nanotechnologies de Lyon (INL) - Villeurbanne, France

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