

Press release

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Basic information

Name: Oscar Casares-Magaz
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Department of: Clinical Medicine

Main supervisor: Professor, PhD, Ludvig Paul Muren

Title of dissertation: Image-based Biological Modelling in Radiotherapy of Prostate Cancer

Date for defence: 12 April 2028 at (time of day): 14.00 Place: Aarhus University Hospital - Patologisk Auditorium, Nørrebrogade 44, bygning 18, 8000 Aarhus C

Press release (Danish)

Image-based Biological Modelling in Radiotherapy of Prostate Cancer

Et nyt Ph.D.-projekt med fokus på brugen af medicinske billeder, taget under strålebehandling i patienter med prostatakræft, til at undersøge individuelle estimater af tumorkontrol og induceret toksicitet. Projektet er udført af Oscar Casares-Magaz som forsvarer sin afhandling d. 12/4-2018.

Formålet med stråleterapi er at kontrollere kræftsygdomme ved at give høje doser af stråling til tumoren samtidig med, at dosis til det raske væv og risikoorganer minimeres mest muligt. I forbindelse med prostatakræft, som er den mest hyppige form for kræft hos mænd, har moderne højpræcisions stråleterapi gjort det muligt at øge dosis til tumor endnu mere end hidtil, hvilket giver mulighed for øget tumorkontrol. Dog er rektum og blære stadig den begrænsende faktor pga. risikoen for induceret toksicitet ifbm. stålebehandlingen.

Studierne i denne Ph.D.-afhandling udnyttede patient specifik information fra medicinske billeder og inkluderede dette i modeller til at forudsige prognoser og risikoen for toksicitet. Det er blevet påvist, at billedbaseret information, fra radiobiologi til bevægelsesmønstre, har potentialet til at øge præcisionen i hvordan individuelle terapeutiske vinduer defineres. Endvidere har artiklerne i denne Ph.D.-afhandling præsenteret forskellige metoder til at udlede patient specifik information på baggrund af aktuelle billedtagningsteknikker. Samtidig har det åbnet op for nye muligheder til at tage hensyn til ændringer i risikoorganers biomekaniske egenskaber, og deres relation til den givne dosis og risiko for induceret toksicitet.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 12/4-2018 kl. 14 i Patologisk Auditorium, Aarhus Universitet, Nørrebrogade 44, bygning 18, Aarhus. Titlen på projektet er "Image-based Biological Modelling in Radiotherapy of Prostate Cancer". Yderligere oplysninger: Ph.d.-studerende Oscar Casares-Magaz, e-mail: oscar.casares@oncology.au.dk, tlf. 2233 1935.

Bedømmelsesudvalg: påfør de tre medlemmer af udvalget med navn, titel og arbejdssted

Press release (English)

Image-based Biological Modelling in Radiotherapy of Prostate Cancer

A new PhD project focused on the use of medical imaging acquired during the radiotherapy course of prostate cancer to explore individualized estimations of tumor control and induced-toxicity. The project was carried out by Oscar Casares-Magaz, who is defending his dissertation on 12/4-2018.

The overall aim of radiotherapy is to control cancer disease by delivering a high dose of radiation to the tumor while at the same time minimizing the dose delivered to the surrounding organs, the so-

called organs at risk. In the setting of prostate cancer, the most frequent cancer disease amongst men, modern high-precision radiotherapy has allowed for dose escalation to the tumor, which has the potential to improve tumor control. However, doses to the rectum and bladder are still the limiting factors due to the risk of developing treatment-induced toxicity.

The studies included in this Ph.D. thesis exploited the benefit of patient-specific image-based information to be included in models to predict prognosis and toxicity risk. Image-based information, from radiobiology to motion patterns, has been demonstrated to potentially increase accuracy in the definition of individual therapeutic window. Additionally, the papers included in this Ph.D. thesis presented different methods using current image acquisitions to derive patient-specific information, while also opened a new avenue to account for changes in organs at risk biomechanical properties and its relation with dose delivered and risk of induced toxicity.

The defence is public and takes place on 12/4-2018 at 14.00h in the Patologisk Auditorium, Aarhus University Hospital, Nørrebrogade 44, building 18, Aarhus. The title of the project is Image-based Biological Modelling in Radiotherapy of Prostate Cancer . For more information, please contact PhD student Oscar Casares-Magaz, email: oscar.casares@oncology.au.dk, Phone +45 2233 1935.

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