Abstract

Evaluation of dose-response associations in internal and external radiotherapy of prostate cancer

Objective: The overall objective of this project is to study multiple aspects of prostate cancer radiotherapy with specific interest in dose-response relationships regarding tumor control and side effects.

Background: Prostate cancer is the most common cancer in men in Sweden. The patients have often long life expectancy. There are several treatment alternatives. Brachytherapy (BT (High or low dose rate HDR/LDR)) and/or external radiotherapy (EBRT) are often some of them. The delivery of high radiation dose to the prostate with minimal irradiation of organs at risk (OAR) is crucial for optimal tumor response with limited side-effects.

Issues/Methods:

1. HDR-BT+EBRT in Lund during 2004-2010
To study treatment results for all patients including lymphedema through medical records and clinical control.

2A. LDR-BT in Lund 2004-2010
To study treatment outcomes through medical records and correlate to dose distribution.
2B. LDR-BT in Sweden until 2012
Analysis of late serious events using PCBaSe, a database for clinical epidemiological research.

3. Late side effect related to the hip/pelvis after EBRT
To study side effects, collected from PCBaSe, in relation to the given radiation doses to hips and pelvis for 490 patients treated with EBRT in Umeå during 1995-2004.

4. Erectile dysfunction after EBRT
To evaluate any dose-response relationship between dose to specific anatomic structures and erectile dysfunction in a cohort of about 500 potent patients with 2–year follow-up from a prospective study of conventionally and hypo-fractionated EBRT for prostate cancer.

Expected and preliminary results:
The first article shows a low rate of lymphedema after treatment. Our second article shows good 5-year outcome after LDR-BT and a significant correlation between D90% and 5-year outcome.

We hope to be able to show that there are few serious late events after LDR-BT, to find a dose-response relationship between dose to specific anatomical structures and erectile dysfunction and a dose-response association between dose to skeleton structures as the hip and diagnosed skeletal events.

Significance and clinical implementation
This thesis will contribute to improved knowledge of dose limits, treatment outcome and side effects after radiation therapy of prostate cancer.
Publications:
