Proposal: Project and Master Thesis 2015

(For students in Biophysics and Medical Technology)

Radiation therapy of cervical cancer: Challenges due to organ motion when using advanced radiation delivery techniques.

The use of advanced radiation delivery techniques (in external radiation therapy) allows generating treatment plans with highly conformal dose distribution to the target volume thus reducing the dose to surrounding healthy tissues.

A patient's radiation treatment plan is based on the anatomy of the patient defined by a CT-scan taken prior to the treatment. During the course of the radiation therapy treatment the anatomy of the patient may change and thus differ from the one observed at the initial CT-scan. Such changes in the anatomy can potentially result in an under dosage to the tumor and/or over dosage to the healthy tissue.

In order to avoid missing the target throughout the radiotherapy course, margins can be applied to the tumor, increasing the total volume treated. For patients with minor internal motions this can result in parts of normal tissue being irradiated to unnecessary high doses giving a suboptimal treatment.

Introducing treatment adaptation (changing the radiation treatment plan delivered to a patient during a course of radiotherapy) may contribute to increase the accuracy of the dose delivered to the target without increasing the margins applied to the tumor.

In the actual work the radiation treatment for cervical cancer patients which have been irradiated at St. Olavs Hospital will be retrospectively studied. The work will focus on the potential improvement of the given treatment when introducing different adaptive strategies. This will be done by comparing the patient's anatomy given by the planning CT with the anatomy observed from CT scans taken throughout the treatment course.

The aim of the study is to propose a robust adaptive strategy that can improve the precision of the accumulated dose delivered to patients with cervical cancer.

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