AbstractID: 1278 Title: MRI-guided treatment of cervical cancer patients; a prospective study of combined external beam radiotherapy and PDR-brachytherapy

In this study we evaluate the coverage of cervical cancer by external beam radiotherapy (EBRT) and PDR-brachytherapy (BT) in a prospective planning study. Tumor regression and organ motion were taken into account by monitoring the tumor during the course of treatment using MRI.

Five patients with advanced cervical cancer were treated with conventional EBRT to the pelvis up to 45 Gy. Additionally, BT was used to administer 17.40 Gy twice using a Fletcher-Suit-Delclos applicator. The first BT session was performed after 30 Gy and the second after 45 Gy EBRT. MRI series were obtained before the start of the treatment, after 30 Gy EBRT and just before the start of each BT application, with the applicator *in situ*. The primary gross tumor volumes (GTVs) were delineated on the MRI data sets and the 3-D dose distributions were calculated.

Initially, the GTVs varied between 42 and 139 cc. After the first 30 Gy EBRT treatment, they decreased on average by 52%. During the first BT application, GTVs coverage by the 95% isodoses was on average 63%. At the end of the treatment series, just before the second BT application, the GTVs were further reduced to 26% of their original volumes, resulting in an overall improvement of the GTV coverage to 84 %.

The BT dose coverage of cervical cancer using Fletcher-Suit-Delclos applicators can be insufficient in case of large tumor volumes and slow regression during the course of treatment. Future work will focus on dose escalations using modern IMRT-boost techniques.