

## AbstractID: 7208 Title: Impact of Organ Motion on IMRT Dose Distributions for Patients with Cancer of the Cervix

### **Purpose:**

To investigate IMRT for treatment of cervical cancer and the need for adaptive treatment strategies. To use deformable dose registration to assess the effect of organ motion on dose.

### **Method and Materials:**

Eight women with IB-IVA cervix cancer were retrospectively selected. All patients had initial CT and MRI prior to treatment, and weekly MRI during external beam radiotherapy. Gross tumor volume, bladder, rectum, sigmoid, cervix, upper vagina, uterus and bilateral parametria regions were contoured on all MR. Clinical target volumes for tumor (HRCTV), pelvic nodes (nodeCTV) and vessels were contoured on the baseline MR. For each patient two IMRT treatments were planned; Large Margin (LM) using 20mm margin for HRCTV (except inferiorly) and Small Margin (SM) using 5mm. For nodeCTV, 5mm margin was used. Surface-mesh representations of the ROIs were propagated and conformed to corresponding contours from the weekly datasets. Meshes were exported to a research software, where the effect of organ motion was assessed by deformable dose registration.

### **Results:**

Simulated treatment delivery, with deformable dose accumulation, showed that five out of eight patients would have achieved clinically approved target coverage from both LM and SM. For three patients, target coverage was unacceptable with SM. For one of those three, LM managed to fulfill target coverage. For all patients, SM showed better OAR protection than LM.

### **Conclusion:**

The effect of organ motion on delivered dose has been studied by numerical simulation, showing that a large margin of 20mm cannot guarantee target coverage. For a majority of the patients, the smaller margin was enough to achieve full target coverage, this with enhanced OAR protection. This suggests large gain from more advanced patient specific margin recipes and adaptive treatment delivery.

### **Conflict of Interest:**

This research was sponsored by RaySearch Laboratories, where some of the authors are employees and stock owners.