Rotating Shield Brachytherapy (RSBT) for Cervical Cancer

A step-shot rotating shield brachytherapy (RSBT) treatment planning system (TPS) was developed. The radiation intensity was modulated by the dwell time at each emission. The radiation area is modulated by emission angle (180°, 45° used). The dwell time was optimized in our TPS through a gradient based linear least square optimizer, with dose constraint OAR according to recommendations of group of the European Society for Therapeutic Radiology and Oncology (GEC ESTRO), that D2cc ≤ 75 Gy3 for rectum and sigmoid, D2cc ≤ 90 Gy3 for bladder. The dose distribution was calculated with mTG-43 equation and escalated as external beam radiation therapy (EBRT) plus BT times fraction number (5). The intracavitary (IC) and intracavitary plus interstitial (IC + IS) BT was simulated in the same TPS without shield. The treatment outcome for 5 patients selected based tumor size and tandem location are illustrated as following:

Figure 1: DVH comparison of 180°, 45° RSBT to IC and IC+IS BT
Figure 2: One slice dose distribution of 180°, 45° RSBT to IC and IC+IS BT