

Integrated Pelvic Exenteration, Intraoperative Implantation of Saline-filled Prosthesis for Bowel Protection, and Pelvic Side Wall SBRT for Advanced, Recurrent Endometrial Cancer

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Abstract

Objectives: To describe an integrated approach for the radical resection of an advanced, recurrent pelvic malignancy with temporary implantation of a bowel displacement system in order to facilitate pelvic side wall stereotactic body radiosurgery (SBRT) in the early postoperative period.

Methods: The subject of this study is a 58 yr patient with an isolated central pelvic and side wall recurrence of an endometrial cancer 9 years after prior hysterectomy and 50.4 Gy pelvic radiation therapy. Type 2 total pelvic exenteration (vaginectomy, cystectomy, coloproctectomy) was performed with distal ileectomy, functional end-to-end ileocolic anastomosis, urinary diversion (ileal conduit) and end colostomy. A microscopically positive surgical margin of resection was determined intraoperatively; consequently, a commercially available saline breast implant (500 cc) was implanted within the pelvis for bowel protection from pelvic side wall irradiation. CT simulation was done on postoperative day 5. The SBRT treatment plan consisted of a volumetric arc therapy (VMAT) plan consisting of 3 arcs. Image guidance consisted of orthogonal kV matching, cone beam CT prior to each treatment, and 6 degree freedom robotic couch. Treatments were administered on postoperative days 6-8 to a dose of 21 Gy in 3 fractions. Implant was removed immediately following the final fraction. For the purposes of comparison of the identical treatment plan in the absence of the bowel displacement system, the anatomy of a control patient matched for size and surgery but without a displacement system was transferred onto the SBRT treatment plan and DVH statistics compared.

Results: The bowel displacement system was well tolerated during the SBRT treatments. The removal was uncomplicated. DVH analysis indicates that the target volume was 123 cc and the treatment volume was 116.7 cc. The SBRT plan yielded 93% coverage, D100 17.7 Gy, D90 21.2 Gy and Dmax 24 Gy (114%). Dosimetric comparison with the matched control indicates that in the absence of the bowel displacement system the mean bowel dose would have risen from 1.6 Gy to 6.7 Gy, the maximal bowel dose from 14.3 Gy to 24 Gy, the D(.3cc) from 9.9 Gy to 23.1 Gy, the D90 from 0.24 Gy to 3.7 Gy and D20 from 3.5 Gy to 8.9 Gy.

Conclusions: We describe a novel approach for pelvic side wall SBRT integrating radical surgical resection, a bowel displacement system, and VMAT. Compared to a matched control case, the

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Abstract

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bowel displacement system is estimated to significantly diminish bowel doses without the addition of significant toxicity.