

Study finds adaptive IGRT for bladder preservation clinically feasible

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A prospective study examining a trimodality treatment approach in localized bladder cancer cases using adaptive image-guided, intensity-modulated radiation therapy (IG-IMRT) found that the bladder preservation rate at three years was 83 percent.

Approximately 150,000 people worldwide die every year as a result of urinary [bladder cancer](#). Patients with moderately advanced bladder cancer typically undergo surgery with removal of the bladder resulting in the use of an external urine bag. The trimodality plan, which consists of the transurethral resection of the bladder tumor (TURBT), IG-IMRT and chemotherapy, was developed as a bladder conservation protocol to preserve bladder function with good oncological outcomes.

"Adaptive IGRT [with] plan-of-the-day approach for bladder preservation is clinically feasible, with good oncological outcomes and low rates of acute and late toxicities. Dose escalation is safe and possibly improves outcomes in bladder preservation," said Vedang Murthy, MD, radiation oncology, Tata Memorial Centre, Mumbai, India and lead author of the study, "Clinical Outcomes With Dose-Escalated Adaptive Radiation Therapy for Urinary Bladder Cancer: A Prospective Study," published in the *International Journal of Radiation Oncology * Biology * Physics* (Red Journal).

"With adaptive IGRT, increasing the dose becomes possible, and serious side effects may be kept low, ensuring a good quality of life for our [patients](#)," Dr. Murthy said.

The study looked at 44 patients between August 2008 and August 2014. Thirty nine (88 percent) patients were male and five (11 percent) were female, ranging in ages from 55 to 72. Eighty-eight percent of patients had stage 2 disease. Patients underwent maximal safe resection of [bladder tumor](#) and concurrent platinum-based chemotherapy, and those with large tumors were offered induction chemotherapy.

RT planning was done using either three (n=34) or six (n=10) non-concentrically grown planning target volumes (PTV). Patients received 64 Gy in 32 fractions to the whole bladder and 55 Gy to the pelvic nodes. If appropriate, they received a simultaneous integrated boost to the tumor bed to 68 Gy. Daily megavoltage imaging was used to find the most appropriate PTV encompassing bladder for the particular day with the plan-of-the-day approach.

At six to ten weeks post-treatment, all patients had a complete response. The study had a median follow-up of 30 months. Overall survival at the last follow up was 77 percent (34 patients). Among those who died, three died from comorbidities and were disease free at the time of death.

The three-year locoregional control (LRC), disease-free survival and overall survival (OS) rates were 78 percent, 66 percent and 67 percent, respectively. Rates of LRC and OS were better in patients who received dose escalation. Acute and late Radiation Therapy Oncology Group (RTOG) grade 3 genitourinary toxicity was seen in five (11 percent) and two (four percent) patients, respectively. No acute or late RTOG grade 3 or higher gastrointestinal toxicity occurred.

"Adaptive RT (ART) further helps in reduction of doses to normal tissues and improves accuracy of delivery," Dr. Murthy said. "These procedures, in theory, should result in less acute and late toxicity, while allowing for dose escalation to gross tumor to improve outcomes."

"Although a number of investigators have conceived and developed a variety of ART techniques, there are few clinical outcome data to validate this dosimetric concept. The present proof-of-concept prospective study was conducted with the aim of establishing the safety, efficacy, and feasibility of IG-IMRT-based ART in clinical practice," he said.

More follow-up with larger groups of patients is needed to establish the novel technique as the standard, Dr. Murthy said, but results from the study have shown the possibilities of ART in bladder cancer patients.

"These results provide proof of concept of using adaptive IGRT in the clinic," Dr. Murthy said. "This will hopefully lead to more and more suitable patients undergoing [bladder](#) preservation around the world."

Provided by American Society for Radiation Oncology

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