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abstract

Impact of Standardized Bowel Preparation on Dosimetric Outcomes and Treatment Reproducibility in Prostate SIB-IMRT (68 Gy/45 Gy in 25 Fractions)

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Impact of Standardized Bowel Preparation on Dosimetric Outcomes and Treatment Reproducibility in Prostate SIB-IMRT (68 Gy/45 Gy in 25 Fractions)

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Introduction: We wanted to evaluate the impact of a standardized bowel preparation protocol on dosimetric outcomes and treatment reproducibility in prostate cancer patients treated with Simultaneous Integrated Boost (SIB) Intensity-Modulated Radiotherapy (IMRT), prescribing 68 Gy to the prostate (PTV68) and 45 Gy to pelvic lymph nodes (PTV45) in 25 fractions.

Methodology: Ten prostate cancer patients were planned and treated with SIB-IMRT at the Sindh Institute of Urology and Transplantation (SIUT). A standardized bowel preparation protocol—comprising dietary modification, mild laxatives, and daily consistency checks—was implemented before CT simulation and maintained during treatment. IMRT plans prescribed 68 Gy to PTV68 and 45 Gy to PTV45. Dose-volume histogram (DVH) parameters for targets and organs-at-risk (OARs) - rectum, bladder, and femoral heads-were analyzed. Interfractional variations were assessed using daily CBCT to evaluate rectal volume consistency and target position reproducibility.

Results: Patients with good compliance to bowel preparation demonstrated improved rectal consistency and reduced interfractional variation. Mean rectal volume variation decreased by 28%, while rectal V60 and V50 were reduced by 4.2% and 6.5%, respectively. Target coverage remained stable (CTV ≥ 97% coverage by 100% isodose), and dose conformity improved (CI = 1.04 ± 0.03 vs. 1.08 ± 0.05 without preparation). Reproducibility of target localization improved by an average of 2.5 mm in the anterior–posterior direction.

Conclusion: Standardized bowel preparation in prostate SIB-IMRT (68 Gy/45 Gy in 25 fractions) significantly enhances rectal consistency, reduces dose to the rectum, and improves treatment reproducibility. Routine implementation of such protocols can improve dosimetric quality and may reduce gastrointestinal toxicity, supporting a reproducible and patient-safe radiotherapy workflow.

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