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abstract

Clinical Experience of our 50 Consecutive Patients Treated on Pakistan First MR-Linac: Workflow Optimization and Early Outcomes from a Single Institution

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Clinical Experience of our 50 Consecutive Patients Treated on Pakistan First MR-Linac: Workflow Optimization and Early Outcomes from a Single Institution

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Introduction: The integration of MRI with linear accelerators (MR-Linac) enables adaptive radiotherapy with superior soft tissue visualization. We report on our initial experience treating 50 consecutive patients, assessing clinical workflow, treatment feasibility, and early outcomes.

Methodology: Fifty patients underwent MR-guided radiotherapy on a 1.5T MR-Linac. Patients were selected based on tumor visibility, motion concerns, and potential benefit from online adaptive planning. Treatment sites included [e.g., Brain, Head and Neck, Breast and Chest wall, Esophagus, Lung, Liver, Bladder, Prostate, Rectum, Endometrium. Adaptive strategies (Adapt to Position/Shape) were utilized based on anatomical changes. Clinical workflow parameters, treatment duration, acute toxicity, and initial response were recorded.

Results: All 50 patients completed planned treatment with no grade ≥3 acute toxicity. Median on-couch time was 45 minutes. Adaptive planning was performed in 86% of fractions, reducing PTV margins by an average of 25%. Early indicated high patient comfort and satisfaction. Imaging quality allowed precise gating in 92% of cases. Prostate and rectal tumor cohorts showed promising early biochemical and radiographic responses.

Conclusion: This is Pakistan 1st MR-Linac experience demonstrates the clinical feasibility, safety, and potential benefits of MR-Linac guided adaptive radiotherapy. Ongoing follow-up will assess long-term control and late toxicity. MR-Linac offers a compelling platform for personalized radiotherapy and biologic adaptation. Our findings contribute to real-world evidence supporting wider implementation and refinement of MR-guided radiotherapy.

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