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Acute Toxicity, Patient-Reported Outcomes, and Radiological Evaluation Following MR-Guided Dose-Escalated Short Course Radiotherapy (SCRT) to the Pelvis

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Abstract
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Abstract

Objectives:

SCRT delivering 25Gy in 5# over one week is a standard of care in metastatic rectal cancer and is supported by international guidelines [1]. In patients with limited metastatic burden, a dose-escalated approach may improve long-term local control without surgery.
MR-guided radiotherapy on the MRIdian platform may enable safe dose escalation through reduced margins, daily plan adaptation, real-time target tracking and automated beam gating [2].

Methods:

Our group has developed a novel IRB approved protocol for delivery of MR-guided, daily adaptive, dose escalated SCRT with optional simultaneous integrated boost (SIB) (30Gy to the primary, and 35Gy to involved node(s). Patient inclusion criteria include metastatic disease, stage T1-T4a, no definite CRM involvement on staging MRI, and no contraindications to MRI.
Acute toxicity assessment is carried out at 2 and 4 weeks using CTCAE v4. EORTC Q30 QLQ are completed at baseline and at 6 weeks post treatment. Minimum important difference (MID) in QoL is defined as 10 or more. Response assessment is mandated at 6-8 weeks using standardised MRI pelvis with functional sequences.

Results:

Two patients were successfully treated with daily adaptation at every fraction. A homogenous dose distribution was observed for PTV_3000 and PTV_2500, and a peaked dose distribution for PTV_3500 (140% max). All mandatory OAR constraints were met. Daily image review revealed a significant variation Din the GTVp position.
The treatment was well tolerated and completed successfully. Patient 1 experienced G1 fatigue and patient 2 experienced G2 proctitis. No G3 toxicity was recorded. No significant deterioration was observed in QoL scores. Both patients achieved a complete radiological response on MRI.

Conclusion(s):

Dose-escalated MR-guided daily adaptive SCRT appears feasible. The oncological benefits of this approach need to be awaited but early radiological response data appears encouraging.