

Radiotherapy Guideline for Rectal Cancer

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RT indication

- **Neoadjuvant radiotherapy/chemoradiotherapy**
 - Clinical T3-4, N0, M0
 - Clinical any T, N1-2
 - Resectable synchronous metastases
- **Adjuvant radiotherapy/chemoradiotherapy**
 - s/p transabdominal resection
 - ◆ Pathological T3, N0, M0
 - Pathological any T, N1-2
- **Positive surgical margin**
- **Unresectable/inoperable**

Simulation and immobilization

- CT-based simulation (maximum 5 mm slice thickness and preferring 2.5-3 mm slice thickness) is required.
- Patients may be simulated with a supine/ prone position
- Immobilization devices
 - Vacuum cushion
 - Body fix
- Positioning and other techniques to minimize the volume of small bowel in the fields should be encouraged.

Field design and treatment volume

- **2D treatment planning**
 - ◆ 4-field technique (AP/PA/right/left lateral)
 - ◆ 3-field technique (PA/ right/left lateral)
 - Superior ➔ the L4/L5 interspace—usually in the mid-L5 vertebral body.
 - Distal
 - ◆ Preoperative ➔ 5 cm below palpable tumor
 - ◆ Postoperative ➔ 5 cm below the best estimate of the preoperative tumor bed and (if an APR has been performed) below the perineum.
 - Anterior and posterior portals ➔ at least a 1.5-cm margin on the pelvic brim.
 - Lateral treatment portals
 - ◆ Anterior ➔ at least 4 cm anterior to the rectum

- ◆ Posterior → encompass the entire sacrum
 - A radiopaque marker should be placed at the posterior aspect of the anus to make certain that blocks in the posterior-inferior aspect of the portal do not impinge on targeted portions of anorectum
- **3D-CRT/IMRT treatment planning**
 - Initial CTV
 - ◆ Tumor bed or macroscopic disease with an approximately 2-cm margin in mesentery and within the course of the large bowel
 - ◆ Presacral space, perineum (for post-APR cases).
 - ◆ Internal iliac nodes, distal common iliac nodes.
 - ◆ The external iliac nodes should be covered for lesions extending to the dentate line/anal canal.
 - In general, the PTV is created by adding a margin of 1-1.5 cm to the CTV
- Boost → tumor or tumor bed with 2 cm margin

Dose prescriptions

- Pelvic portals/CTV → 45-50 Gy in 25-28 fractions to the pelvis.
- Boost → 5.4-9 Gy
- Short-course RT → 25 Gy in 5 fractions to rectal gross tumor

Constraints for organ at risk

- Bladder: V45 <50%
- Small intestine: V45 <195 cc
- Femoral head: V45 < 5%

Reference

- NCCN Practice Guidelines in Oncology, 2023
- Perez and Brady's : Principles and Practice of Radiation Oncology, 7th ed, 2018
- K.S. Clifford Chao. Practical Essentials of Intensity Modulated Radiation Therapy, 2nd ed, 2005
- Eric K. Hansen, Handbook of Evidence-Based Radiation Oncology, 2018
- Jane Dobbs, Ann Barrett. Practical Radiotherapy Planning, 4th ed, 2009