Radiotherapy Guideline for Esophageal Cancer

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RT indication

- Neoadjuvant CCRT
  - Clinically > T3 or clinically N positive
- Definitive CCRT
  - Clinically inoperable status, including poor performance status/poor surgical candidate, or locally advanced inoperable stage, such as T4 or N3
  - Cervical or cervicothoracic esophageal carcinomas, poor surgical candidate
- Adjuvant RT/CCRT
  - R1or R2 resection
  - Pathologically positive lymph nodes, pT3 / pT4 status.

Simulation and immobilization

- CT-based simulation (preferring 3-5 mm slice thickness with contrast) is required.
- Patients may be simulated with a supine position
- Immobilization devices
  - Vacuum cushion
  - Thermoplastic mask with headrest for cervical portion if necessary

Field design and treatment volume

- IMRT (intensity-modulated radiotherapy) is strongly encouraged; VMAT (volumetric-modulated arc therapy) may further improve conformity and normal tissue sparing. Advanced techniques such as TomoTherapy or Radixact may be used if available.
  - GTV: primary tumor and involved regional lymph nodes as identified
  - CTV: the areas at risk for microscopic disease defined as the primary tumor plus a 3-4 cm expansion superiorly and inferiorly along the length of the esophagus and cardia and a 1 cm radial expansion; coverage of elective nodal regions should be considered
  - Elective treatment of node bearing regions depends upon the location of the primary tumor in the esophagus
    - Cervical esophagus: treat the bilateral supraclavicular nodes
    - Proximal third of the esophagus: treat peri-esophageal lymph nodes and bilateral supraclavicur lymph nodes

- Middle third of the esophagus: treat peri-esophageal lymph nodes, sup. Ant. Mediastinal lymph nodes, consider including bilateral Supraclavicular lymph nodes and or celiac trunk lymph nodes
- Distal third of esophagus and the gastro-esophageal junction: peri-esophageal lymph nodes, lesser curvature lymph nodes in the situation of distal lesions, and the celiac axis

Dose prescriptions

- Neoadjuvant CCRT
  - Gross tumor 45-50.4 Gy (1.8-2 Gy/day)
  - Regional lymph nodes 45-50.4 Gy (1.8-2 Gy/day)
- Definitive CCRT
  - Gross tumor 50-66 Gy (1.8-2 Gy/day); 60-70 Gy (1.8-2 Gy/day) if cervical or cervicothoracic esophageal carcinomas
  - Elective nodal areas 45-50 Gy
- Adjuvant RT/CCRT
  - Gross residual tumor 50-66 Gy (1.8-2 Gy/day)
  - Regional lymph nodes and tumor bed 45-50.4 Gy (1.8-2 Gy/day)

Constraints for organ at risk

- Spinal cord: Dmax<45 Gy
- Lung (combined lung): V20 <30%
- Heart: V45 <67%
- Liver: Dmean< 25 Gy
- Kidney (bilateral): V20 <32%

Reference

- NCCN Practice Guidelines in Oncology, 2024
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