Radiotherapy Guideline for Breast Cancer

中山醫學大學附設醫院 放射腫瘤科

(2024.09 Version 10.0)

RT indication

- For whole breast radiotherapy:
  - DCIS s/p lumpectomy
  - any stage of breast cancer s/p BCS except for metastatic breast cancers
- For chest wall irradiation
  - Locally advanced stage (tumor > 5cm) or positive surgical lymph nodes s/p mastectomy
- For regional nodal irradiation...
  - cN+ without axillary lymph node dissection/sentinel lymph node sampling
  - locally advanced stage (tumor > 5cm) or any positive surgical lymph nodes
- For tumor bed boost indication
  - Age <50 y/o
  - cN+
  - High grade histology
  - Close margins (<= 2 mm), especially if > 1 focus
  - Margins postive
  - Triple negative subtype
  - Her2 + subtypes
  - T2-T3 tumor size
  - Extensive LVI or PNI or EIC

Simulation and immobilization

- CT-based simulation (maximum 5 mm slice thickness) is required.
- Patients may be simulated with a supine position
- Mark the surgical scar if possible prior to simulation
- Mark the mid-axillary line and mid-sternal line for simulation if necessary
- Immobilization devices
  - Vacuum cushion

Field design and treatment volume

- IMRT preferred
- Target of whole breast RT：cover the entire breast tissue, not including the pectoris muscles or intercostal muscles

- Target of chest wall RT: cover the entire chest wall, including the intercostal muscles and pectoris muscles
- Target of regional nodal areas:
  - Supraclavicular lymph nodes
  - Infraclavicular lymph nodes
  - Axillary lymph nodes, level II and III
  - Internal mammary chain lymph nodes

Dose prescriptions for fractionated radiotherapy

- 45-50.4 Gy at 1.8-2 Gy/fx; in 25-28 fractions patients not undergoing breast reconstruction may alternatively receive 40 Gy at 2.67 Gy/fx or 42.5 Gy at 2.66 Gy/fx.
- Boost: 10-16 Gy at 1.8 to 2.0 Gy/fx total 5-8 fractions.in 25-28fxs.
- Ultra-hypofraction WBRT of 26 – 28.5 Gy in 5 fractions may be considered for selected pts over 50 yrs following BCS.

Constraints for organ at risk

- Total lung: V20 <15% (Whole breast RT only)
- Total lung: V20 <25% (Whole breast/ Chest wall + Regional node)
- Heart: Dmean < 8-10 Gy for left side, Dmean< 5Gy for right side breast

Patient Selection Criteria for Intra-Operative Radiotherapy

- Suitable candidate: age > 45 and tumor < 3 cm and clinical lymph node negative

Radiotherapy for Intra-Operative Radiotherapy

- Single dose 20Gy/Fx
- Keep 1 cm away from skin
- Treatment is automatically abandoned if positive lymph node diagnosed during the surgery

Reference

- NCCN Practice Guidelines in Oncology, 2024
- Perez and Brady's : Principles and Practice of Radiation Oncology, 7th ed, 2018
- Patient selection for accelerated partial-breast irradiation (APBI) after breast-conserving surgery: Recommendations of the Groupe Européen de Curiethérapie-European Society for Therapeutic Radiology and Oncology
  (GEC-ESTRO) breast cancer working group based on clinical evidence (2009), Polgar et al., Radiotherapy and Oncology 94 (2010) 264–273

- Smith, Benjamin D., et al. "Accelerated partial breast irradiation consensus statement from the American Society for Radiation Oncology (ASTRO)." *International Journal of Radiation Oncology* Biology* Physics* 74.4 (2009): 987-1001.Perez and Brady's : Principles and Practice of Radiation Oncology, 6th ed, 2013
- Smith, Benjamin D., et al. "Radiation therapy for the whole breast: executive summary of an American Society for Radiation Oncology (ASTRO) evidence-based guideline." Practical radiation oncology 8.3 (2018): 145-152.
- Alternatively, 26 Gy in 5 daily fractions over one week may be considered, though data beyond 5 years for local relapse or toxicity are not yet available for this regimen. [Murray Brunt A, Haviland JS, Wheatley DA, et al. Hypofractionated breast radiotherapy for 1 week versus 3 weeks (FAST-Forward): 5-year efficacy and late normal tissue effects results from a multicentre, non-inferiority, randomised, phase 3 trial. Lancet 2020;395:1613-1626.]
- Brunt AM, Haviland JS, Sydenham M, et al. Ten-year results of FAST: A randomized controlled trial of 5-fraction whole-breast radiotherapy for early breast cancer. J Clin Oncol 2020;38:3261-3272.