

BÖLÜM 23

MEME KORUYUCU CERRAHİ SONRASI RADYOTERAPİ UYGULAMALARI

Hilal ALKİŞ¹

GİRİŞ

Meme kanserinin lokal ve bölgesel tedavisinde cerrahi ve radyoterapi (RT) önemli rol oynamaktadır. Özellikle erken evre meme kanserlerine cerrahi yaklaşımında meme koruyucu cerrahi (MKC) önemli bir yere sahiptir, mastektomi ile karşılaşıldığından anlamlı sağkalım farkının olmaması bu yaklaşımı desteklemektedir (1). RT uygulanmasının kontrendike olmadığı meme kanserli hastalarda MKC'ye adjuvan RT eklenmesi lokal ve bölgesel nüks oranlarını azaltmaktadır (2, 3). MKC sonrası tüm meme işinlaması (TMI) ile yüksek riskli hastalarda tümör yatağına boost uygulanması lokal kontrolün sağlanmasına önemli katkı sağlamaktadır (4-6).

MEME KORUYUCU CERRAHİ SONRASI RADYOTERAPİ

Tüm Meme İşinlaması

Meme koruyucu cerrahi sonrası lokal kontrolde tamamlayıcı yaklaşım TMI (\pm boost) veya akselere parsiyel meme işinlamasıdır (7, 8). TMI, konvansiyonel ve hipofraksiyonel olarak uygulanabilmektedir (9-11). Hipofraksiyonel RT'nin invaziv meme kanseri tedavisinde etkin olduğu yapılan çalışmalarda bildirilmiştir (7, 9, 10). Duktal karsinoma in situ (DKİS) tanılı hastalarda da konvansiyonel işinlama ile hipofraksiyonel RT arasında lokal nüks açısından fark olmadığı raporlanmıştır

¹ Dr. Öğr. Üyesi, Marmara Üniversitesi Tıp Fakültesi, Radyasyon Onkolojisi AD.
Shilal.alkis@marmara.edu.tr

Hipofraksiyon RT ile 15-16 fraksiyonda 40-42,5 Gy genç hastalar da dahil olmak üzere meme hastalarında etkili ve güvenlidir. Her iki yaklaşım arasında yan etki ve toksisite açısından bir fark ortaya konmamıştır. Yüksek riskli olan hastalarda tümör yatağına 60-66 Gy veya biyolojik eşdeğer dozu kullanılarak boost uygulanması lokal kontrolü artırmaktadır.

KAYNAKLAR

1. van Dongen JA, Bartelink H, Fentiman IS, et al. Randomized clinical trial to assess the value of breast-conserving therapy in stage I and II breast cancer, EORTC 10801 trial. *J Journal of the National Cancer Institute. Monographs.* 1992;(11):15-18.
2. Ford HT, Coombes RC, Gaze JC, et al. Long-term follow-up of a randomised trial designed to determine the need for irradiation following conservative surgery for the treatment of invasive breast cancer. *Annals of Oncology.* 2006;17(3): 401-408. doi: 10.1093/annonc/mdj080
3. Recht A. Breast Cancer: Stages I-II. In: Joel ET, Robert LF, Jeff MM (eds.) *Gunderson & Tepper's Clinical Radiation Oncology.* 5th ed. Philadelphia: Elsevier; 2021. p. 1324-1341.
4. Early Breast Cancer Trialists' Collaborative G, Darby S, McGale P, Correa C, et al. Effect of radiotherapy after breast-conserving surgery on 10-year recurrence and 15-year breast cancer death: meta-analysis of individual patient data for 10,801 women in 17 randomised trials. *The Lancet.* 2011;378(9804): 1707-1716. doi: 10.1016/S0140-6736(11)61629-2
5. Nilsson C, Valachis A. The role of boost and hypofractionation as adjuvant radiotherapy in patients with DCIS: a meta-analysis of observational studies. *Radiotherapy and Oncology.* 2015;114(1): 50-55. doi: 10.1016/j.radonc.2015.01.001
6. Smith BD, Bellon JR, Blitzblau R, et al. Radiation therapy for the whole breast: Executive summary of an American Society for Radiation Oncology (ASTRO) evidence-based guideline. *Practical Radiation Oncology.* 2018;8(3): 145-152. doi: 10.1016/j.prro.2018.01.012
7. Smith BD, Arthur DW, Buchholz TA, et al. Accelerated partial breast irradiation consensus statement from the American Society for Radiation Oncology (ASTRO). *International Journal of Radiation Oncology, Biology, Physics.* 2009;74(4): 987-1001. doi: 10.1016/j.ijrobp.2009.02.031
8. Fisher B, Anderson S, Bryant J, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. *The New England Journal of Medicine.* 2002;347(16): 1233-1241. doi: 10.1056/NEJMoa022152
9. Group ST, Bentzen SM, Agrawal RK, Aird EG, et al. The UK Standardisation of Breast Radiotherapy (START) Trial A of radiotherapy hypofractionation for treatment of early breast cancer: a randomised trial. *The Lancet Oncology.* 2008;9(4): 331-341. doi: 10.1016/S1470-2045(08)70077-9
10. Group ST, Bentzen SM, Agrawal RK, Aird EG, et al. The UK Standardisation of Breast Radiotherapy (START) Trial B of radiotherapy hypofractionation for treatment of early breast cancer: a randomised trial. *The Lancet.* 2008;371(9618):1098-1107. doi: 10.1016/S0140-6736(08)60348-7
11. Fisher B, Bauer M, Margolese R, Poisson R, et al. Five-year results of a randomized clinical trial comparing total mastectomy and segmental mastectomy with or without radiation in the treatment of breast cancer. *The New England Journal of Medicine.* 1985;312(11): 665-673. doi: 10.1056/NEJM198503143121101
12. Lalani N, Paszat L, Sutradhar R, et al. Long-term outcomes of hypofractionation versus conventional radiation therapy after breast-conserving surgery for ductal carcinoma in situ of the breast. *International Journal of Radiation Oncology, Biology, Physics.* 2014;90(5): 1017-1024. doi: 10.1016/j.ijrobp.2014.07.026

13. National Comprehensive Cancer Network Guidelines. *Invasive Breast Cancer 2022* [updated 20/12/2021]. Available from: <https://www.nccn.org/guidelines/guidelines-detail?category=1&id=1419>. (Accessed 7th April 2022)
14. Horton JK. Locally Advanced and Inflammatory Breast Cancer. In: Joel ET, Robert LF, Jeff MM, (eds.) *Gunderson & Tepper's Clinical Radiation Oncology*. 5th ed. Philadelphia: Elsevier; 2021. p. 1342-1358.
15. Veldeman L, Speleers B, Bakker M, et al. Preliminary results on setup precision of prone-lateral patient positioning for whole breast irradiation. *International Journal of Radiation Oncology, Biology, Physics*. 2010;78(1): 111-118. doi: 10.1016/j.ijrobp.2009.07.1749
16. Kirova YM, Hijal T, Campana F, et al. Whole breast radiotherapy in the lateral decubitus position: a dosimetric and clinical solution to decrease the doses to the organs at risk (OAR). *Radiotherapy and Oncology*. 2014;110(3): 477-481. doi: 10.1016/j.radonc.2013.10.038
17. Moran MS, Truong P. Breast Cancer: Locally Advanced, Part 2. In: Edward CH, David EW, Carlos AP (eds.) *Perez and Brady's principles and practice of radiation oncology*. 7th ed. Philadelphia: Wolters Kluwer; 2019. p. 4347-4418.
18. Remouchamps VM, Letts N, Yan D, et al. Three-dimensional evaluation of intra- and interfraction immobilization of lung and chest wall using active breathing control: a reproducibility study with breast cancer patients. *International Journal of Radiation Oncology, Biology, Physics*. 2003;57(4): 968-978. doi: 10.1016/s0360-3016(03)00710-7
19. Baroni G, Garibaldi C, Scabini M, et al. Dosimetric effects within target and organs at risk of interfractional patient mispositioning in left breast cancer radiotherapy. *International Journal of Radiation Oncology, Biology, Physics*. 2004;59(3): 861-871. doi: 10.1016/j.ijrobp.2004.02.043
20. Joseph K, Warkentin H, Ghosh S, et al. Cardiac-sparing radiation therapy using positioning breast shell for patients with left-sided breast cancer who are ineligible for breath-hold techniques. *Advances in Radiation Oncology*. 2017;2(4): 532-539. doi: 10.1016/j.adro.2017.08.002
21. Keller LMM, Cohen R, Sopka DM, et al. Effect of bra use during radiation therapy for large-breasted women: Acute toxicity and treated heart and lung volumes. *Practical Radiation Oncology*. 2013;3(1): 9-15. doi: 10.1016/j.prro.2012.07.003
22. Pedersen AN, Korreman S, Nystrom H, et al. Breathing adapted radiotherapy of breast cancer: reduction of cardiac and pulmonary doses using voluntary inspiration breath-hold. *Radiotherapy and Oncology*. 2004;72(1):53-60. doi: 10.1016/j.radonc.2004.03.012
23. Lymberis SC, deWyngaert JK, Parhar P, et al. Prospective assessment of optimal individual position (prone versus supine) for breast radiotherapy: volumetric and dosimetric correlations in 100 patients. *International Journal of Radiation Oncology, Biology, Physics*. 2012;84(4): 902-909. doi: 10.1016/j.ijrobp.2012.01.040
24. Offersen BV, Boersma LJ, Kirkove C, et al. ESTRO consensus guideline on target volume delineation for elective radiation therapy of early stage breast cancer, version 1.1. *Radiotherapy and Oncology*. 2016;118(1): 205-208. doi: 10.1016/j.radonc.2015.12.027
25. Paulsson AK, Sherertz T, Park CC. Breast Cancer. In: Erik KH, Mark RI (eds.) *Handbook of Evidence-Based Radiation Oncology*. 3rd ed. Cham: Springer; 2018. p. 343-391.
26. Guttmann DM, Gabriel P, Kennedy C, et al. Comparison of acute toxicities between contemporary forward-planned 3D conformal radiotherapy and inverse-planned intensity-modulated radiotherapy for whole breast radiation. *The Breast Journal*. 2018;24(2): 128-132. doi: 10.1111/tbj.12857
27. Ludwig V, Schwab F, Guckenberger M, et al. Comparison of wedge versus segmented techniques in whole breast irradiation: effects on dose exposure outside the treatment volume. *Strahlentherapie und Onkologie*. 2008;184(6): 307-312. doi: 10.1007/s00066-008-1793-7
28. Coon AB, Dickler A, Kirk MC, et al. Tomotherapy and multifield intensity-modulated radiotherapy planning reduce cardiac doses in left-sided breast cancer patients with unfavorable cardiac anatomy. *International Journal of Radiation Oncology, Biology, Physics*. 2010;78(1): 104-110. doi: 10.1016/j.ijrobp.2009.07.1705

29. Monson JM, Chin L, Nixon A, et al. Is machine energy (4-8 MV) associated with outcome for stage I-II breast cancer patients? *International Journal of Radiation Oncology, Biology, Physics.* 1997;37(5): 1095-1100. doi: 10.1016/s0360-3016(96)00574-3
30. Dzhugashvili M, Pichenot C, Dunant A, et al. Surgical clips assist in the visualization of the lumpectomy cavity in three-dimensional conformal accelerated partial-breast irradiation. *International Journal of Radiation Oncology, Biology, Physics.* 2010;76(5): 1320-1324. doi: 10.1016/j.ijrobp.2009.04.089
31. Oh KS, Kong FM, Griffith KA, et al. Planning the breast tumor bed boost: changes in the excision cavity volume and surgical scar location after breast-conserving surgery and whole-breast irradiation. *International Journal of Radiation Oncology, Biology, Physics.* 2006;66(3): 680-686. doi: 10.1016/j.ijrobp.2006.04.042
32. Tersteeg RJ, Roesink JM, Albregts M, et al. Changes in excision cavity volume: prediction of the reduction in absolute volume during breast irradiation. *International Journal of Radiation Oncology, Biology, Physics.* 2009;74(4): 1181-1185. doi: 10.1016/j.ijrobp.2008.09.056
33. Mc DJ, Haagensen CD, Stout AP. Metastasis from mammary carcinoma to the supraclavicular and internal mammary lymph nodes. *Surgery.* 1953;34(3): 521-542.
34. Moran MS, Haffty BG. Radiation techniques and toxicities for locally advanced breast cancer. *Seminars in Radiation Oncology.* 2009;19(4): 244-255. doi: 10.1016/j.semradonc.2009.05.007
35. Meattini I, Lambertini M, Desideri I, et al. Radiation therapy for young women with early breast cancer: Current state of the art. *Critical Reviews in Oncology/Hematology.* 2019;137: 143-153. doi: 10.1016/j.critrevonc.2019.02.014
36. 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. *Journal of Clinical Oncology.* 2020;38(28): 3261-3272. doi: 10.1200/JCO.19.02750
37. 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. *The Lancet.* 2020;395(10237): 1613-1626. doi: 10.1016/S0140-6736(20)30932-6
38. Bartelink H, Maingon P, Poortmans P, et al. Whole-breast irradiation with or without a boost for patients treated with breast-conserving surgery for early breast cancer: 20-year follow-up of a randomised phase 3 trial. *The Lancet Oncology.* 2015;16(1): 47-56. doi: 10.1016/S1470-2045(14)71156-8
39. Recht A, Pierce SM, Abner A, et al. Regional nodal failure after conservative surgery and radiotherapy for early-stage breast carcinoma. *Journal of Clinical Oncology.* 1991;9(6): 988-996. doi: 10.1200/JCO.1991.9.6.988
40. Bellefqih S, Elmajaoui S, Aarab J, et al. Hypofractionated Regional Nodal Irradiation for Women With Node-Positive Breast Cancer. *International Journal of Radiation Oncology, Biology, Physics.* 2017;97(3): 563-570. doi: 10.1016/j.ijrobp.2016.11.010
41. Haviland JS, Mannino M, Griffin C, et al. Late normal tissue effects in the arm and shoulder following lymphatic radiotherapy: Results from the UK START (Standardisation of Breast Radiotherapy) trials. *Radiotherapy and Oncology.* 2018;126(1): 155-162. doi: 10.1016/j.radonc.2017.10.033
42. Darby SC, Cutter DJ, Boerma M, et al. Radiation-related heart disease: current knowledge and future prospects. *International Journal of Radiation Oncology, Biology, Physics.* 2010;76(3): 656-665. doi: 10.1016/j.ijrobp.2009.09.064
43. Nielsen MH, Berg M, Pedersen AN, et al. Delineation of target volumes and organs at risk in adjuvant radiotherapy of early breast cancer: national guidelines and contouring atlas by the Danish Breast Cancer Cooperative Group. *Acta Oncologica.* 2013;52(4): 703-710. doi: 10.3109/0284186X.2013.765064
44. Liu T, Zhou J, Yoshida EJ, et al. Quantitative ultrasonic evaluation of radiation-induced late tissue toxicity: pilot study of breast cancer radiotherapy. *International Journal of Radiation On-*

- cology, Biology, Physics. 2010;78(3): 811-820. doi: 10.1016/j.ijrobp.2009.08.071
- 45. Walsh N, Rheaume D, Barnes P, et al. Postirradiation morphea: an underrecognized complication of treatment for breast cancer. *Human Pathology*. 2008;39(11): 1680-1688. doi: 10.1016/j.humpath.2008.04.010
 - 46. Verbelen H, Gebruers N, Beyers T, et al. Breast edema in breast cancer patients following breast-conserving surgery and radiotherapy: a systematic review. *Breast Cancer Research and Treatment*. 2014;147(3): 463-471. doi: 10.1007/s10549-014-3110-8