

RADYOTERAPİYE BAĞLI GASTROİNTESTİNAL SİSTEM YAN ETKİLERİNDE BESLENME YÖNETİMİ

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GİRİŞ

İyonizan radyasyonun 1895'te Röntgen tarafından keşfinden sonra gastrointestinal sistem (GIS) üzerinde gelişen olumsuz etkileri 2 yıl sonrasında tanımlanmaya başlanmıştır olup, aynı tedaviye bağlı rektal bölgede gelişen fistül ve striktürler Füth ve Ebeler tarafından 1915'lerde tanımlanmıştır (1,2). Radyoterapi (RT) tedavisi gören hastalarda gelişen sindirim sistemi hasarları vakaların %1-55'inde görülebilmektedir (3).

RT'nin beslenme durumuna etkisi; uygulanan alanın genişliği, uygulama yapılan bölge, uygulama tekniği, tedavi süresi ve kişisel yanıt gibi etmenlere bağlı olarak değişebilmektedir (4). Özellikle baş ve boyun bölgesi kanserlerinde vakaların çoğunda yan etkiler saptanmakta olup (%50-100), genellikle RT alanında olan ve hızlı coğalma karakteri gösteren dokularda (mukoza, kemik iliği, deri) görülmektedir. Bu bölgeye ait yan etkiler; mukozit, yutma güçlüğü, iştah azalması, bulantı, kusma, dişlerde gelişen hasarlanmalar, kilo kaybı, tat ve koku almada değişiklikler olarak görülebilmektedir. Batın ve pelvis bölgесine RT alan hastalarda %0.5-5.2 oranında GIS yan etkileri görülebilmektedir. Bu tedavilerde RT dozu arttıkça, enteropati şiddeti ve sıklığında da artış gözlenmektedir (5).

KLİNİK BULGULAR VE RİSK FAKTORLERİ

RT'ye bağlı doku hasarı, oksidatif stres, inflamasyon, planlı hücre ölümü (apoptoz) ve genetik hasardan oluşan kompleks bir süreçtir. RT'ye bağlı akut toksisite, bölünebilir hücrelerdeki fonksiyon kaybına bağlı olarak tedavi sırasında oluşabilir ve tedaviden sonra 1-2 ay sürebilir. Kronik hasar ise, RT uygulanan organdaki

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önerilmelidir. Hastanın stresle mücadele edebilmesi için gerekli altyapının hazırlanması, psikolojik destek ya da gevşeme tekniklerinden yararlanması amacıyla teşvik edilmelidir (92). Hastanın fiziki çevresinin düzenlenmesi (kokusuz, temiz ortam), rahat kıyafetler, tedavi öncesi dinlenmesine uygun ortam sağlanması, öğünleri azar azar fakat sık aralıklar ile planlamak, besinlerin iyice çiğnenmesi, yeterli sıvı alımının sağlanması hasta konforunu arttıracı faktörler olarak öne çıkmaktadır (5,92). Hastanın ara öğünlerinde yüksek proteinli ya da yüksek kalorili kuruyemişler yemesi konusunda motive edilmelidir. Öğünlerin sunumuna ve görseline önem verilmesi, sakin ve hafif bir müzikli ortam sağlanması, yemek öncesi hafif egzersiz yapılması da hastanın iştahını arttıracı yöntemler arasındadır (93,94). Tüm bu multidisipliner yaklaşılara rağmen yeterli besin alımı sağlanamıyorsa ve hastanın genel durumunun kötüleşmesi halinde girişimsel yöntemler (İntravenöz ya da enteral yol) ile beslenmenin sürdürülmesi gerekebilir (95).

Sonuç olarak; kanser hastalarına verilen tedavi kadar takiplerdeki gelişen semptomların yönetimi de hastaların kısa ve uzun süreli yaşam kalitesini önemli ölçüde etkilemektedir. RT'ye bağlı hasarı önlemede temel nokta; yeni gelişen teknolojileri kullanarak tümörde tedavi etkinliğini sağlamırken, çevre sağlıklı dokuların maksimum oranda korunmasıyla gelişebilecek yan etkilerin azaltılmasıdır. Beslenmenin amacı, kanser tanısı konulmasından itibaren makro ve mikro besin öğelerinin yeterli miktarda alımı için uygun programların oluşturulmasıdır. Beslenme ve diyetin düzenlenmesi multidisipliner yaklaşımla sağlanmalıdır.

KAYNAKLAR

1. Walsh D. Deep tissue traumatism from roentgen ray exposure. Br Med J 1897;2:272.
2. Füth H, Ebeler F. Röntgen und Radium therapie des uteruskarzinoms. Zentralbl Gynekol 1915;39:217.
3. Tözün N, Gençosmanoğlu R, Tahan V, et al. 52. Bölüm, Ülseratif kolit dışı kolitler. (30.07.2019 tarihinde <http://www.tkrcd.org.tr/en/KRveAnalBolgeHastalıkları/645-658.pdf> adresinden ulaşmıştır).
4. Tosun HD, Köksal G. Kanserde kaşeksi ve beslenme. Beslenme ve Diyet Dergisi 2012;40(1):59-68.
5. Bayır B. Radyoterapiye başlayan kanser hastalarına verilen beslenme eğitiminin malnütrisyonu önlemeye ve azaltmaya etkisi. Yüksek Lisans Tezi. İnönü Üniversitesi Sağlık Bilimleri Enstitüsü, Malatya, 2013.
6. Brush J, Lipnick SL, Phillips T, et al. Molecular mechanisms of late normal tissue injury. Semin Radiat Oncol 2007;17:121-30.
7. Çehreli R. Kanserli Hastalarda Beslenme. XIII. TPOG Ulusal Pediatric Kanser Kongresi, Hemşire Programı 2004;1:179-181.
8. Trott A, Byhardt R, Stetz J, et al. Common Toxicity Criteria: Version 2.0. An improved reference for grading the acute effects of cancer treatment: impact on radiotherapy. Int J Radiat Oncol Biol Phys. 2000;47(1):13-47.

8. Peterson DE, Bensadoun RJ, Roila F. Management of oral and gastrointestinal mucositis: ESMO Clinical Recommendations. Ann Oncol. 2011;22(6):7884.
9. Schindler A, Denaro N, Russi EG, et al. Dysphagia in head and neck cancer patients treated with radiotherapy and systemic therapies: literature review and consensus. Crit Rev Oncol Hematol 2015;96:372-84.
10. Nguyen NP, Moltz CC, Frank C, et al. Evolution of chronic dysphagia following treatment for head and neck cancer. Oral Oncol 2006;42:374-80.
11. Hasleton PS, Carr N, Schofeld PF. Vascular changes in radiation bowel disease. Histopathology 1985; 9:517.
12. Uptodate 2017. Overview of gastrointestinal toxicity of radiation therapy. (30.07.2019 tarihinde <https://www.uptodate.com/contents/overview-of-gastrointestinal-toxicity-of-radiation-therapy> adresinden ulaşılmıştır).
13. Hauer-Jensen M, Denham JW, Andreyev HJN. Radiation enteropathy-pathogenesis, treatment and prevention. Nat. Rev. Gastroenterol. Hepatol. 2014;11:470-479.
14. Yan K, Chia L, Li X, et al. The intestinal stem cell markers Bmi1 and Lgr5 identify two functionally distinct populations. Proc. Natl. Acad. Sci. 2012;109:466-471.
15. Kim C, Yang VW, Bialkowska AB. The Role of Intestinal Stem Cells in Epithelial Regeneration Following Radiation-Induced Gut Injury. Curr. Stem Cell Rep. 2017;3:320-332.
16. Jain G, Scolapio J, Wasserman E, et al. Chronic radiation enteritis: a ten-year follow-up. J Clin Gastroenterol. 2002;35(3):214-7.
17. Andreyev J. Gastrointestinal complications of pelvic radiotherapy: are they of any importance? Gut 2005;54:1051-4.
18. NCI homepage: National Cancer Institute; 2014 [2014 March 7]. (30.07.2019 tarihinde <http://www.cancer.gov/> adresinden ulaşılmıştır).
19. Radiation enteritis. Bethesda (MD): National Cancer Institute; 2014. (30.07.2019 tarihinde <http://www.cancer.gov/dictionary?cdrid=446535> adresinden ulaşılmıştır).
20. Tagkalidis PP, Tjandra JJ. Chronic radiation proctitis. ANZ J Surg 2001;71:230.
21. Düzenli T, Demirci H. Radyasyon Enterokoliti. Güncel Gastroenteroloji Derg 2017;21(4):337-44.
22. Baglan KL, Frazier RC, Yan D, et al. The dose-volume relationship of acute small bowel toxicity from concurrent 5-FU-based chemotherapy and radiation therapy for rectal cancer. Int J Radiat Oncol Biol Phys. 2002;52(1):176-83.
23. Chon BH, Loeffler JS. The effect of nonmalignant systemic disease on tolerance to radiation therapy. Oncologist 2002;7:136.
24. Song DY, Lawrie WT, Abrams RA, et al. Acute and late radiotherapy toxicity in patients with inflammatory bowel disease. Int J Radiat Oncol Biol Phys 2001;51:455.
25. Lin A, Abu-Isa E, Griffith KA, et al. Toxicity of radiotherapy in patients with collagen vascular disease. Cancer 2008;113:648.
26. Gunnlaugsson A, Kjellén E, Nilsson P, et al. Dose-volume relationships between enteritis and irradiated bowel volumes during 5-fluorouracil and oxaliplatin based chemoradiotherapy in locally advanced rectal cancer. Acta Oncol 2007;46:937.

Vidal-Casariego A, Calleja-Fernández A, Cano-Rodríguez I, et al. Effects of oral glutamine during abdominal radiotherapy on chronic radiation enteritis: a randomized controlled trial. Nutrition 2015;31:200-204.

27. Hauer-Jensen M. Late radiation injury of the small intestine. Clinical, pathophysiologic and radiobiologic aspects. A review. Acta Oncol 1990;29:401.
28. Chitapanarux I, Chitapanarux T, Traisathit P, et al. Randomized controlled trial of live lactobacillus acidophilus plus bifidobacterium bifidum in prophylaxis of diarrhea during radiotherapy in cervical cancer patients. Radiat Oncol 2010;5:31.
29. Wedlake L, Shaw C, Whelan K, et al. Systematic review: The efficacy of nutritional interventions to counteract acute gastrointestinal toxicity during therapeutic pelvic radiotherapy. Ali-

- ment Pharmacol Ther 2013;37(11):1046-1056.
- 30. Odelli C, Burgess D, Bateman L, et al. Nutrition support improves patient outcomes, treatment tolerance and admission characteristics in oesophageal cancer. Clin Oncol R Coll Radiol 2005;17:639-45.
 - 31. Isenring EA, Capra S, Bauer JD. Nutrition intervention is beneficial in oncology outpatients receiving radiotherapy to the gastrointestinal or head and neck area. Br J Cancer 2004;91:447-52.
 - 32. Khalid U, McGough C, Hackett C, et al. A modified inflammatory bowel disease questionnaire and the Vaizey Incontinence questionnaire are more sensitive measures of acute gastrointestinal toxicity during pelvic radiotherapy than RTOG grading. Int J Radiat Oncol Biol Phys 2006;64:1432-41.
 - 33. van den Berg MG, Rasmussen-Conrad EL, Wei KH, et al. Comparison of the effect of individual dietary counselling and of standard nutritional care on weight loss in patients with head and neck cancer undergoing radiotherapy. Br J Nutr 2010;104:872-7.
 - 34. Bozzetti F, Cozzaglio L, Gavazzi C, et al. Nutritional support in patients with cancer of the esophagus: impact on nutritional status, patient compliance to therapy, and survival. Tumori 1998;84:681-6.
 - 35. Paccagnella A, Morello M, Da Mosto MC, et al. Early nutritional intervention improves treatment tolerance and outcomes in head and neck cancer patients undergoing concurrent chemoradiotherapy. Support Care Cancer 2010;18:837-45.
 - 36. Fietkau R, Iro H, Sailer D, et al. Percutaneous endoscopically guided gastrostomy in patients with head and neck cancer. Recent Results Cancer Res 1991;121:269-82.
 - 37. Tyldesley S, Sheehan F, Munk P, et al. The use of radiologically placed gastrostomy tubes in head and neck cancer patients receiving radiotherapy. Int J Radiat Oncol Biol Phys 1996;36:1205-9.
 - 38. Lee JH, Machtay M, Unger LD, et al. Prophylactic gastrostomy tubes in patients undergoing intensive irradiation for cancer of the head and neck. Arch Otolaryngol Head Neck Surg 1998;124(8):871-5.
 - 39. Isenring E, Zabel R, Bannister M, et al. Update of the evidence based guidelines for the nutritional management of patients receiving radiation therapy and/or chemotherapy. Nutr Diet 2013;70:312-24.
 - 40. Head and Neck Steering Committee, 2007. (30.07.2019 tarihinde <https://www.cancer.gov/about-nci/organization/ccct/steering-committees/nctn/head-neck> adresinden ulaşılmıştır).
 - 41. Ravasco P, Monteiro-Grillo I, Vidal PM, et al. Dietary counseling improves patient outcomes: a prospective, randomized, controlled trial in colorectal cancer patients undergoing radiotherapy. J Clin Oncol 2005;23:1431-8.
 - 42. Ravasco P, Monteiro-Grillo I, Marques Vidal P, et al. Impact of nutrition on outcome: a prospective randomized controlled trial in patients with head and neck cancer undergoing radiotherapy. Head Neck 2005;27:659-68.
 - 43. Clarke RE, Tenorio LM, Hussey JR, et al. Hyperbaric oxygen treatment of chronic refractory radiation proctitis: a randomized and controlled double-blind crossover trial with long-term follow-up. Int J Radiat Oncol Biol Phys. 2008;72(1):134-43.
 - 44. Regimbeau JM, Panis Y, Gouzi JL, et al. Operative and long term results after surgery for chronic radiation enteritis. Am J Surg. 2001;182(3):237-42.
 - 45. Paccagnella A, Morassutti I, Rosti G. Nutritional intervention for improving treatment tolerance in cancer patients. Current Opinion in Oncology 2011;23:322-330.
 - 46. Gündogdu, H. (2001). Cerrahi hastada beslenme destegi. Ergüney S, Çiçek Y. (Çeviri ed) In: Güncel cerrahi tedavi. İstanbul, Avrupa Tip K, 1040-1044.
 - 47. Bozzetti F. Nutritional support in patients with oesophageal cancer. Support Care Cancer 2010;18(2): 41-50.
 - 48. Nayel H, el-Ghoneimy E, el-Haddad S. Impact of nutritional supplementation on treatment delay and morbidity in patients with head and neck tumors treated with irradiation. Nutrition 1992;8:13-8.
 - 49. Lewis SL, Brody R, Touger-Decker R, et al. Feeding tube use in patients with head and neck

- cancer. Head Neck 2014;36:1789-95.
50. Campos AC, Butters M, Meguid MM. Home enteral nutrition via gastrostomy in advanced head and neck cancer patients. Head Neck 1990;12:137-42.
 51. NICE. Nutrition support for adults: oral nutritioon support, enteral tube feeding and parenteral nutrition. NICE guidelines CG32. (30.07.2019 tarihinde <https://www.nice.org.uk/guidance/cg32> adresinden ulaşılmıştır).
 52. Nugent B, Lewis S, O'Sullivan JM. Enteral feeding methods for nutritional management in patients with head and neck cancers being treated with radiotherapy and/or chemotherapy. Cochrane Database Syst Rev 2013 Jan 31;1:CD007904.
 53. Cannaby AM, Evans L, Freeman A. Nursing care of patients with nasogastric feeding tubes. Br J Nurs 2002;11:366-72.
 54. Burkitt P, Carter LM, Smith AB, et al. Outcomes of percutaneous endoscopic gastrostomy and radiologically inserted gastrostomy in patient with head and neck cancer: a systematic review. Br J Oral Maxillofac Surg 2011;49:516-20.
 55. Sakçak İ, Erdem NZ, Yıldız BD, et al. Mide Kanserli Olgularda Malnütrisyonun İmmün, Biyokimyasal, Antropometrik Fonksiyonlara Etkileri. Akademik Gastrontoloji Dergisi 2011;10(2):46-51.
 56. Taşkin F, Çınar S. Onkoloji Hastalarında Beslenme. İ.Ü.F.N. Hem. Derg 2009;17(1):53-60.
 57. Theis VS, Sripadam R, Ramani V, et al. Chronic radiation enteritis. Clin Oncol R Coll Radiol 2010;22:70-83.
 58. Bozzetti F, Santarpia L, Pironi L, et al. The prognosis of incurable cachectic cancer patients on home parenteral nutrition: a multicentre observational study with prospective follow-up of 414 patients. Ann Oncol 2014;25:487-93.
 59. Gavazzi C, Bhoori S, Lovullo S, et al. Role of home parenteral nutrition in chronic radiation enteritis. Am J Gastroenterol 2006;101:374-9.
 60. Kalaiselvan R, Theis VS, Dibb M, et al. Radiation enteritis leading to intestinal failure: 1994 patient-years of experience in a national referral centre. Eur J Clin Nutr 2014;68:166-70.
 61. Klein S, Koretz RL. Nutrition support in patients with cancer: what do the data really show? Nutr Clin Pract 1994;9:91-100.
 62. Henriksson R, Franzen L, Littbrand B. Effects of sucralfate on acute and late bowel discomfort following radiotherapy of pelvic cancer. J Clin Oncol 1992;10:969-75.
 63. Louidice T, Lang J. Treatment of radiation enteritis: A comparison study. Am J Gastroenterol 1983; 78:481-7.
 64. Yayla EM. Mukozite Yönelik Kanıt Dayalı Uygulamalar. Hemşirelikte Eğitim ve Araştırma Dergisi 2017;14(3):223-227.
 65. Lalla RV, Bowen J, Barasch A, et al. MASCC=ISOO Clinical Practice Guidelines for the Management of Mucositis Secondary to Cancer Therapy. Cancer 2014;120(10):1453-1461.
 66. Kokkonen J, Karttunen TJ, Lanning M. Mucosal pathology of the upper gastrointestinal tract associated with intensive chemotherapy in children: vitamin A supplements do not prevent lesions. Paediatr HeamatolOncol 2002;19(3):181-192.
 67. Jahangard-Rafsanjani Z, Gholami K, Hadjibabaie M, et al. The effiacy of selenium in prevention of oral mucositis in patients undergoing hematopoietic SCT: a randomized clinical trial. Bone Marrow Transplant. 2013;48(6):832-836.
 68. Panahi Y, Ala S, Saeedi M, et al. Allopurinol mouth rinse for prophylaxis of fluorouracil-induced mucositis. Eur J Cancer Care 2010;19(3):308-312.
 69. Worthington HV, Clarkson JE, Bryan G, et al. Interventions for preventing oral mucositis for patients with cancer receiving treatment. Cochrane Database Syst Rev. 2011;13(4):1-27.
 70. Puatweepong P, Dhanachai M, Dangprasert S, et al. The efficacy of oral aloe vera for radiation induced mucositis in head and neck cancer patients: a double-blind placebo controlled study. Asian Biomed 2009;3(4):375-382.
 71. Khanal B, Baliga M, Uppal N. Effect of topical honey on limitation of radiation-induced oral mucositis: an intervention study. Int J Oral Maxillofac Surg. 2010;39(12):1181-1185.

72. Mutluay Yayla E, Izgü N, Özdemir L, et al. Sage tea-thyme-peppermint hydrosol oral rinse reduces chemotherapy-induced oral mucositis: a randomized controlled pilot study. *Complement Ther Med.* 2016; 27:58-64.
73. MacDonald N, Easson AM, Mazurak VC, et al. Understanding and managing cancer cachexia. *J Am Coll Surg* 2003;197:143-161.
74. Rodemann HP, Bamberg M. Cellular basis of radiation-induced fibrosis. *Radiother Oncol* 1995;35:83-90.
75. Rodrigues Rocha B, Meirelles Gombar F, Maria Barcellos L, et al. Glutamine supplementation prevents collagen expression damage in healthy urinary bladder caused by radiotherapy. *Nutrition* 2011;27:809-15.
76. Bellon G, Chaqour B, Wegrowski Y, et al. Glutamine increases collagen gene transcription in cultured human fibroblast. *Biochimica et Biophysica Acta* 1995;1268:311-23.
77. Bellows CF, Jaffe BM. Glutamine is essential for nitric oxide synthesis by murine macrophages. *J Surg Res* 1999;86:213-9.
78. Savarese DM, Savy G, Vahdat L, et al. Prevention of chemotherapy and radiation toxicity with glutamine. *Cancer Treat Rev* 2003;29:501-13.
79. Klimberg K, Souba WW, Dolson DJ, et al. Prophylactic glutamine protects the intestinal mucosa from radiation injury. *Cancer* 1990;66:62-8.
80. Wang H, Lai LJ, Chan YL, et al. Epigallocatechin-3-gallate effectively attenuates skeletal muscle atrophy caused by cancer cachexia. *Cancer Lett* 2011;305:40-49.
81. Andreyev HJ. Gastrointestinal problems after pelvic radiotherapy: the past, the present and the future. *Clin Oncol R Coll Radiol* 2007;19:790-9.
82. Demers M, Dagnault A, Desjardins J. A randomized double-blind controlled trial: impact of probiotics on diarrhea in patients treated with pelvic radiation. *Clin Nutr* 2014;33:761-7.
83. Urbancsek H, Kazar T, Mezes I, et al. Results of a double-blind, randomized study to evaluate the efficacy and safety of *Antibiophilus* in patients with radiation-induced diarrhoea. *Eur J Gastroenterol Hepatol* 2001;13:391-6.
84. Giralt J, Regadera JP, Verges R, et al. Effects of probiotic *Lactobacillus casei* DN-114 001 in prevention of radiation-induced diarrhea: results from multicenter, randomized, placebo-controlled nutritional trial. *Int J Radiat Oncol Biol Phys* 2008;71:1213-9.
85. Salminen E, Elomaa I, Minkkinen J, et al. Preservation of intestinal integrity during radiotherapy using live *Lactobacillus acidophilus* cultures. *Clin Radiol* 1988;39:435-7.
86. Delia P, Sansotta G, Donato V, et al. Use of probiotics for prevention of radiation-induced diarrhea. *World J Gastroenterol* 2007;13:912-5.
87. Weiner JP, Wong AT, Schwartz D, et al. Endoscopic and non-endoscopic approaches for the management of radiation-induced rectal bleeding. *World J Gastroenterol* 2016;22(31):6972-86.
88. Delbar C, Benor D. Impact of Nursing Intervention on Cancer Patients' Ability to Cope. *Cancer Nursing* 2001;77(19):57-75.
89. Moore SR, Johnson NW, Pierce AM, et al. The epidemiology of mouth cancer: a review of global incidence. *Oral Diseases* 2000;6:65-74.
90. Özbaş A. Radyoterapi Sonucu Gelişen Semptomlarda Bakım. *Hemşirelik Dergisi* 2003;13(50):57-73.
91. Nabil S, Samman N. Incidence and prevention of osteoradionecrosis after dental extraction in irradiated patients: a systematic review. *Int J Oral Maxillofac Surg* 2011;40(3):229-43.
92. Ertem G. Jinekolojik Kanserlerde Evde Bakım. *Türk Onkoloji Dergisi* 2010;25(3):124-132.
93. Gondivkar SM, Parikh RV, Gadrial AR, et al. Involvement of viral factors with head and neck cancers. *Oral Oncol* 2011;48(3):195-199.