

## BÖLÜM 18

### APENDİKS VERMİFORMİS TÜMÖRLERİ

Ayhan AÇLAN<sup>1</sup>

#### GİRİŞ

Apendiks neoplazmaları, değişen malign potansiyel sergileyen heterojen bir tümör grubunu içerir. Son yıllarda insidansı bir milyon kişi başına altı vaka ile nadir görülen tümörlerdir.<sup>(1)</sup> Apendiks neoplazmalarının prognozu ağırlıklı olarak tümör tipine ve derecesine bağlıdır ve uzun süreli sağkalım %10 ile %90 arasında değişmektedir.<sup>(2)</sup>

Apendiks neoplazmalarının beş ana histopatolojik alt tipi vardır: non-epitelyal tümörler olan nöroendokrin tümörler (NET), epitelyal tümörler olan müsinöz neoplazmalar, goblet hücreli adenokarsinomlar (GHA), kolonik tip (müsinöz olmayan) adenokarsinomlar ve taşlı yüzük hücreli adenokarsinomlar.

Apendiks neoplazmalarının tanı ve tedavisi, histopatolojik ve moleküler özelliklerine ilişkin anlayışımız geliştikçe giderek daha farklı hale geldi. Örneğin, daha önce “goblet hücreli karsinoidler” olarak adlandırılan neoplazmalar, “goblet hücreli adenokarsinom” olarak yeniden adlandırılmıştır, çünkü bu tümörlerin nöroendokrin bileşeninin daha az önemli olduğu anlaşılmıştır. Ayrıca, apendiksin primer ve metastatik müsinöz neoplazmalarının biyolojilerini daha iyi yansıtmak için daha spesifik evreleme ve derecelendirme sistemleri geliştirilmiştir.

Primer apendiks tümörlerinin apendiks ile sınırlı olduklarında preoperatif olarak teşhis edilmesi zordur. Apendektomi örneklerinin yaklaşık %1’inde bulunan tümörler, sıklıkla akut apandisit andırır tablo ile karşımıza çıkar.<sup>(3)</sup> İntraoperatif olarak tanı genellikle belirsiz kalır. Cerrah maligniteden şüphelense bile, ilişkili inflamasyon kesin intraoperatif tanıyı engelleyebilir. Sonuç olarak, çoğu apendiks kanseri vakası ameliyat sonrası teşhis edilir.

---

<sup>1</sup> Arş. Gör. Dr., Adnan Menderes Üniversitesi Tıp Fakültesi, Tıbbi Onkoloji AD., ayhan.aclan@adu.edu.tr

AA için sistemik kemoterapi önerilir, ancak eklere özel kılavuzlar yoktur. Üst düzey verilerin olmaması nedeniyle, AA'lı hastalar için öneriler kolon kanseri için tedavi algoritmalarını takip eder. Apendikse sınırlı metastatik olmayan ve lenf nodu tutulumu olmayan hastaların sistemik tedaviye ihtiyacı yoktur. Tamamen rezeke edilmiş lokalize tümörleri olan ve lenf nodu tutulumu olan hastalar, bir floropirimidin/oksalipatin ikilisi ile adjuvan kemoterapiden fayda görebilir. Metastatik hastalığı olan hastalar, metastatik kolorektal kanser için kullanılanlara benzer sistemik rejimler almalıdır.

## **SONUÇ**

Apendiks tümörleri için kemoterapi seçeneklerindeki nüansları tanımlayan küçük seriler vardır. Çoğu, fluorourasil, platin ve irinotekan kombinasyonu ile rejimleri kullanır. EGFR inhibitörlerinin apendiks KRAS wild tip tümörler üzerinde kolorektal tümörlere göre daha az etkiye sahip olduğu öne sürülmüştür. EGFR inhibitörleri, sol taraflı tümörleri olan hastalarda sağ taraflı tümörlere kıyasla daha fazla fayda göstermiştir ancak apendiks tümörleri genellikle bu çalışmaların dışında tutulmuştur. AA'nın belirli sistemik rejimlere daha olumlu yanıt verebilecek hedeflenebilir yönlerini anlamak için daha fazla çalışmaya ihtiyaç vardır.

## **KAYNAKLAR**

1. Turaga KK, Pappas SG, Gamblin T. Importance of histologic subtype in the staging of appendiceal tumors. *Ann Surg Oncol.* 2012;19:1379-1385.
2. McCusker ME, Coté TR, Clegg LX, et al. Primary malignant neoplasms of the appendix: a population-based study from the surveillance, epidemiology and end-results program, 1973-1998. *Cancer.* 2002;94:3307-3312.
3. Connor SJ, Hanna GB, Frizelle FA. Appendiceal tumors: retrospective clinicopathologic analysis of appendiceal tumors from 7,970 appendectomies. *Dis Colon Rectum.* 1998;41:75-80.
4. Moris D, Tsilimigras DI, Vagios S, et al. Neuroendocrine neoplasms of the appendix: a review of the literature. *Anticancer Res.* 2018;38:601-611.
5. Shaw PA. The topographical and age distributions of neuroendocrine cells in the normal human appendix. *J Pathol.* 1991;164:235-239.
6. Mullen JT, Savarese DM. Carcinoid tumors of the appendix: a population-based study. *J Surg Oncol.* 2011;104:41-44.
7. Moertel CG, Weiland LH, Nagorney DM, et al. Carcinoid tumor of the appendix: treatment and prognosis. *N Engl J Med.* 1987;317:1699-1701.
8. Boudreaux JP, Klimstra DS, Hassan MM, et al; North American Neuroendocrine Tumor Society (NANETS). The NANETS consensus guideline for the diagnosis and management of neuroendocrine tumors: well-differentiated neuroendocrine tumors of the jejunum, ileum, appendix, and cecum. *Pancreas.* 2010;39:753-766.
9. Pape UF, Perren A, Niederle B, et al; Barcelona Consensus Conference participants. ENETS Consensus Guidelines for the management of patients with neuroendocrine neoplasms from the jejunum-ileum and the appendix including goblet cell carcinomas. *Neuroendocrinology.* 2012;95:135-156.
10. Zheng M, Li T, Li Y, et al. Survival profile and prognostic factors for appendiceal mixed neuroendocrine non-neuroendocrine neoplasms: a SEER population-based study. *Front Oncol.* 2020;10:1660.

11. Elias D, David A, Sourrouille I, et al. Neuroendocrine carcinomas: optimal surgery of peritoneal metastases (and associated intra-abdominal metastases). *Surgery*. 2014;155:5-12.
12. Goéré D, Passot G, Gelli M, et al. Complete cytoreductive surgery plus HIPEC for peritoneal metastases from unusual cancer sites of origin: results from a worldwide analysis issue of the Peritoneal Surface Oncology Group International (PSOGI). *Int J Hyperthermia*. 2017;33:520-527.
13. Rinke A, Müller HH, Schade-Brittinger C, et al; PROMID Study Group. Placebo-controlled, double-blind, prospective, randomized study on the effect of octreotide LAR in the control of tumor growth in patients with metastatic neuroendocrine midgut tumors: a report from the PROMID Study Group. *J Clin Oncol*. 2009;27:4656-4663.
14. Rinke A, Wittenberg M, Schade-Brittinger C, et al; PROMID Study Group. Placebo-controlled, double-blind, prospective, randomized study on the effect of octreotide LAR in the control of tumor growth in patients with metastatic neuroendocrine midgut tumors (PROMID): results of long-term survival. *Neuroendocrinology*. 2017;104:26-32.
15. Aplin ME, Pavel M, Ćwikła JB, et al; CLARINET Investigators. Lanreotide in metastatic enteropancreatic neuroendocrine tumors. *N Engl J Med*. 2014;371:224-233.
16. Pavel ME, Hainsworth JD, Baudin E, et al; RADIANT-2 Study Group. Everolimus plus octreotide long-acting repeatable for the treatment of advanced neuroendocrine tumours associated with carcinoid syndrome (RADIANT-2): a randomised, placebo-controlled, phase 3 study. *Lancet*. 2011;378:2005-2012.
17. Strosberg J, El-Haddad G, Wolin E, et al; NETTER-1 Trial Investigators. Phase 3 trial of <sup>177</sup>Lu-Dotatate for midgut neuroendocrine tumors. *N Engl J Med*. 2017;376:125-135.
18. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology. Neuroendocrine and Adrenal Tumors. Version 2.2020.
19. Davison JM, Choudry HA, Pingpank JF, et al. Clinicopathologic and molecular analysis of disseminated appendiceal mucinous neoplasms: identification of factors predicting survival and proposed criteria for a three-tiered assessment of tumor grade. *Mod Pathol*. 2014;27:1521-1539.
20. Ang CS, Shen JP, Hardy-Abeloos CJ, et al. Genomic landscape of appendiceal neoplasms. *JCO Precis Oncol*. 2018;2:1-18.
21. Liao X, Vavinskaya V, Sun K, et al. Mutation profile of high-grade appendiceal mucinous neoplasm. *Histopathology*. 2020;76:461-469.
22. Nishikawa G, Sekine S, Ogawa R, et al. Frequent GNAS mutations in low-grade appendiceal mucinous neoplasms. *Br J Cancer*. 2013;108:951-958.
23. Ritterhouse LL, Vivero M, Mino-Kenudson M, et al. GNAS mutations in primary mucinous and non-mucinous lung adenocarcinomas. *Mod Pathol*. 2017;30:1720-1727.
24. an MC, Basturk O, Brannon AR, et al. GNAS and KRAS mutations define separate progression pathways in intraductal papillary mucinous neoplasm-associated carcinoma. *J Am Coll Surg*. 2015;220:845-854.e1.
25. Chicago Consensus Working Group. The Chicago consensus on peritoneal surface malignancies: management of appendiceal neoplasms. *Cancer*. 2020;126:2525-2533.
26. Canbay E, Ishibashi H, Sako S, et al. Preoperative carcinoembryonic antigen level predicts prognosis in patients with pseudomyxoma peritonei treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. *World J Surg*. 2013;37:1271-1276.
27. González-Moreno S, Sugarbaker PH. Right hemicolectomy does not confer a survival advantage in patients with mucinous carcinoma of the appendix and peritoneal seeding. *Br J Surg*. 2004;91:304-311.
28. Halabi HE, Gushchin V, Francis J, et al. Prognostic significance of lymph node metastases in patients with high-grade appendiceal cancer. *Ann Surg Oncol*. 2012;19:122-125.
29. Choudry MH, Pai RK, Bartlett DL. Mucinous Appendiceal Tumors. In Morita SY, Balch CM, Klimberg V, et al, (eds). *Textbook of Complex General Surgical Oncology*. New York, NY: McGraw-Hill; 2018;1281-1292.
30. Bijelic L, Kumar AS, Stuart OA, et al. Systemic chemotherapy prior to cytoreductive surgery and HIPEC for carcinomatosis from appendix cancer: impact on perioperative outcomes and

- short-term survival. *Gastroenterol Res Pract.* 2012;2012:163284.
31. Blackham AU, Swett K, Eng C, et al. Perioperative systemic chemotherapy for appendiceal mucinous carcinoma peritonei treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. *J Surg Oncol.* 2014;109:740-745.
  32. Shapiro JF, Chase JL, Wolff RA, et al. Modern systemic chemotherapy in surgically unresectable neoplasms of appendiceal origin: a single-institution experience. *Cancer.* 2010;116:316-322.
  33. Arai H, Baca Y, Battaglin F, et al. Molecular characterization of appendiceal goblet cell carcinoma. *Mol Cancer Ther.* 2020;19:2634-2640.
  34. Holt N, Grønbaek H. Goblet cell carcinoids of the appendix. *ScientificWorldJournal.* 2013;2013:543696.
  35. Boudreaux JP, Klimstra DS, Hassan MM, et al; North American Neuroendocrine Tumor Society (NANETS). The NANETS consensus guideline for the diagnosis and management of neuroendocrine tumors: well-differentiated neuroendocrine tumors of the jejunum, ileum, appendix, and cecum. *Pancreas.* 2010;39:753-766.
  36. Mahteme H, Sugarbaker PH. Treatment of peritoneal carcinomatosis from adenocarcinoid of appendiceal origin. *Br J Surg.* 2004;91:1168-1173.
  37. Cashin P, Nygren P, Hellman P, et al. Appendiceal adenocarcinoids with peritoneal carcinomatosis treated with cytoreductive surgery and intraperitoneal chemotherapy: a retrospective study of in vitro drug sensitivity and survival. *Clin Colorectal Cancer.* 2011;10:108-112.
  38. Yu HH, Yonemura Y, Hsieh MC, et al. Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for appendiceal goblet cell carcinomas with peritoneal carcinomatosis: results from a single specialized center. *Cancer Manag Res.* 2017;9:513-523.
  39. Pape UF, Perren A, Niederle B, et al; Barcelona Consensus Conference participants. ENETS Consensus Guidelines for the management of patients with neuroendocrine neoplasms from the jejunum-ileum and the appendix including goblet cell carcinomas. *Neuroendocrinology.* 2012;95:135-156.
  40. AlMasri S, Nassour I, Kowalsky SJ, et al. The role of adjuvant chemotherapy in non-metastatic goblet cell carcinoid of the appendix: an 11-year experience from the National Cancer Database. *Ann Surg Oncol.* Epub 2020 Nov 24.
  41. Overman MJ, Asare EA, Compton CC, et al. Appendix: Carcinoma. In Amin MB (ed). *AJCC Cancer Staging Manual*, 8th Ed. New York, NY: Springer; 2017.
  42. Nash GM, Smith JD, Tang L, et al. Lymph node metastasis predicts disease recurrence in a single-center experience of 70 stages 1-3 appendix cancers: a retrospective review [published correction appears in *Ann Surg Oncol.* 2015;22(suppl 3):S1613]. *Ann Surg Oncol.* 2015;22:3613-3617.
  43. Lieu CH, Lambert LA, Wolff RA, et al. Systemic chemotherapy and surgical cytoreduction for poorly differentiated and signet ring cell adenocarcinomas of the appendix. *Ann Oncol.* 2012;23:652-658.
  44. Tokunaga R, Xiu J, Johnston C, et al. Molecular profiling of appendiceal adenocarcinoma and comparison with right-sided and left-sided colorectal cancer. *Clin Cancer Res.* 2019;25:3096-3103.
  45. Raghav K, Shen JP, Jácome AA, et al. Integrated clinico-molecular profiling of appendiceal adenocarcinoma reveals a unique grade-driven entity distinct from colorectal cancer. *Br J Cancer.* 2020;123:1262-1270.
  46. National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology. Colon Cancer.* Version 1.2021.
  47. Aziz O, Jaradat I, Chakrabarty B, et al. Predicting survival after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for appendix adenocarcinoma. *Dis Colon Rectum.* 2018;61:795-802.
  48. Grotz TE, Overman MJ, Eng C, et al. Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for moderately and poorly differentiated appendiceal adenocarcinoma: survival outcomes and patient selection. *Ann Surg Oncol.* 2017;24:2646-2654.