



ONKOLOJİK TEDAVİYE BAĞLI ARİTMİLERDE TANI VE TEDAVİ YAKLAŞIMLARI

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Kanser tedavisine maruz kalan hastaların tedavi öncesi bir aritmi hastalığı olabilir, tedavi sırasında ve tedaviden hemen sonra gelişebilir. Genel bir yönetim olmamakla beraber her hastaya farklı yaklaşılmalı, antiaritmik ilaçları ya da cihaz tedavisini (implante edilebilir, harici giyilebilir kardiyoverter defibrilatörler)¹ uygularken, kardiyolojik ve onkolojik olarak yaşam beklentisi, yaşam kalitesi göz önünde bulundurulmalıdır.

1. AKUT TEDAVİ

Bir disritmi yönetimindeki en önemli bileşen, hastanın hemodinamik stabilitesini hızlı bir şekilde değerlendirmektir. Acil serviste aritmilerin akut yönetimi, hava yolunu korumak, oksijen sağlamak, intravenöz erişim sağlamak, ilk laboratuvar çalışması için kan örnekleri toplamak, hastayı bir kardiyak monitöre bağlamak ve 12 derivasyonlu bir elektrokardiyografi (EKG) almakla başlar. Bir sonraki önemli adım, herhangi bir endişe verici belirti ve semptomu belirlemektir. Bunlar arasında akut göğüs rahatsızlığı, nefes darlığı ve değişen zihinsel durum bulunur. Bir taşiaritmiye bağlı olarak bu semptomlardan herhangi biri ile başvuran hastalar için, elektriksel kardiyoversiyon endike olabilir. Benzer şekilde, şiddetli bradiaritmiler, dopamin gibi atropin veya inotropolarla acil tedavi gerektirebilir. Bu müdahalelere rağmen hasta semptomatik kalırsa epinefrin kullanılabilir. Açıkça geri dönüşümlü bir etiyolojisi olmayan hastalarda, hemodinamik stabiliteyi korumak için transkutanöz veya transvenöz pacemaker takılması gerekebilir. Nispeten stabil hemodinamisi olan hastalar için, sürekli kardiyak izleme yoluyla klinik yanıtı değerlendirirken, spesifik bir tanı koymaya ve aritminin altında yatan nedeni tedavi etmeye odaklanılmalıdır. Altta ya-

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Radyoterapi sonrasında

- Hastalara CIED izlem-takip önerilir

Düşük risk içeren hastalar:

- * Son radyoterapi fraksiyonundan sonraki ilk haftada ve 1,3 ve 6. aylarda CIED kontrolü teknisyen aracılığıyla yapılır.

Orta risk içeren hastalar :

- * Teknisyen aracılığıyla haftalık CIED sorgulanması

Yüksek risk içeren hastalar:

- * Her radyoterapi tedavisinden sonraki 24 saat içinde CIED'i kontrolü

* Kalp pili inhibisyonu <40 vuru / dakika ile içsel ritim eksikliği

Pacing hızını sıfırlama hızından daha yüksek bir hıza programlayın. Hastanın RT seansı sonunda nabızı programlanan hızdan düşükse, sıfırlama gerçekleşmiş olabilir.

CIED = Kardiyak implante edilebilir elektronik cihaz. AED = Otomatik harici defibrilatör.

ICD = Implante edilebilir kardiyak defibrilatör. EKG = Elektrokardiyografi. Gy = Gri. RT = radyoterapi. MV= Megavoltlar

KAYNAKLAR

1. Priori SG, Blomstrom-Lundqvist C, Mazzanti A, Blom N, Borggrefe M, Camm J, Elliott PM, Fitzsimons D, Hatala R, Hindricks G, Kirchhof P, Kjeldsen K, Kuck KH, Hernandez-Madrid A, Nikolaou N, Norekval TM, Spaulding C, Van Veld- huisen DJ. 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: the Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC). Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC). Eur Heart J 2015;36:2793–2867.
1. Al-Khatib SM, et al. 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. Circulation. 2017; <https://doi.org/10.1161/cir.0000000000000548>.
2. January CT, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. 2014;64:e1–e76 <https://doi.org/10.1016/j.jacc.2014.03.022>.
3. Lenihan DJ, Kowey PR. Overview and management of cardiac adverse events associated with tyrosine kinase inhibitors. Oncologist 2013;18:900–908.
4. Strevel EL, Ing DJ, Siu LL. Molecularly targeted oncology therapeutics and prolongation of the QT interval. J Clin Oncol 2007;25:3362–3371.
5. Drew BJ, et al. Prevention of torsade de pointes in hospital settings: a scientific statement from the American Heart Association and the American College of Cardiology Foundation. Circulation. 2010;121:1047–60. <https://doi.org/10.1161/circulationaha.109.192704>.
6. Frendl G, et al. 2014 AATS guidelines for the prevention and management of perioperative atrial fibrillation and flutter for thoracic surgical procedures. J Thorac Cardiovasc Surg. 2014;148:e153–93. <https://doi.org/10.1016/j.jtcvs.2014.06.036>.
7. Fernando HC, Jaklitsch MT, Walsh GL, Tisdale JE, Bridges CD, Mitchell JD, Shrager JB. The Society of Thoracic Surgeons practice guideline on the prophylaxis and management of atrial fibrillation associated with general thoracic surgery: executive summary. Ann Thorac Surg. 2011;92:1144–52. <https://doi.org/10.1016/j.athoracsur.2011.06.104>.

8. Johnstone C, Rich SE. Bleeding in cancer patients and its treatment: a review. *Ann Palliat Med*. 2018; 7(2): 265– 73.
9. Avvisati G, Tirindelli MC, Annibali O. Thrombocytopenia and hemorrhagic risk in cancer patients. *Crit Rev Oncol Hematol*. 2003; 48(Suppl): S13– 6.
10. Shatzel JJ, Olson SR, Tao DL, McCarty OJT, Danilov AV, DeLoughery TG. Ibrutinib-associated bleeding: pathogenesis, management and risk reduction strategies. *J Thromb Haemost*. 2017; 15(5): 835– 47.
11. Tullemans BME, Heemskerk JWM, Kuijpers MJE. Acquired platelet antagonism: off-target antiplatelet effects of malignancy treatment with tyrosine kinase inhibitors. *J Thromb Haemost*. 2018; 16(9): 1686– 99.
12. Steinberg BA, Peterson ED, Kim S, Thomas L, Gersh BJ, Fonarow GC, et al. Use and outcomes associated with bridging during anticoagulation interruptions in patients with atrial fibrillation: findings from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF). *Circulation*. 2015; 131(5): 488– 94.
13. Douketis JD, Spyropoulos AC, Kaatz S, Becker RC, Caprini JA, Dunn AS, et al. Perioperative bridging anticoagulation in patients with atrial fibrillation. *N Engl J Med*. 2015; 373(9): 823– 33.
14. Vedovati MC, Giustozzi M, Verdecchia P, Pierpaoli L, Conti S, Verso M, et al. Patients with cancer and atrial fibrillation treated with doacs: a prospective cohort study. *Int J Cardiol*. 2018; 269: 152– 7.
15. Hart RG, Pearce LA, Aguilar MI. Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation. *Ann Intern Med*. 2007; 146(12): 857– 67.
16. Hutten BA, Prins MH, Gent M, Ginsberg J, Tijssen JG, Buller HR. Incidence of recurrent thromboembolic and bleeding complications among patients with venous thromboembolism in relation to both malignancy and achieved international normalized ratio: a retrospective analysis. *J Clin Oncol*. 2000; 18(17): 3078– 83.
17. Rose AJ, Sharman JP, Ozonoff A, Henault LE, Hylek EM. Effectiveness of warfarin among patients with cancer. *J Gen Intern Med*. 2007; 22(7): 997– 1002.
18. Noble SI, Finlay IG. Is long-term low-molecular-weight heparin acceptable to palliative care patients in the treatment of cancer related venous thromboembolism? A qualitative study. *Palliat Med*. 2005; 19(3): 197– 201.
19. Connolly SJ, Ezekowitz MD, Yusuf S, Eikelboom J, Oldgren J, Parekh A, et al. Dabigatran versus warfarin in patients with atrial fibrillation. *N Engl J Med*. 2009; 361(12): 1139– 51.
20. Patel MR, Mahaffey KW, Garg J, Pan G, Singer DE, Hacke W, et al. Rivaroxaban versus warfarin in nonvalvular atrial fibrillation. *N Engl J Med*. 2011; 365(10): 883– 91.
21. Ruff CT, Giugliano RP, Braunwald E, Hoffman EB, Deenadayalu N, Ezekowitz MD, et al. Comparison of the efficacy and safety of new oral anticoagulants with warfarin in patients with atrial fibrillation: a meta-analysis of randomised trials. *Lancet*. 2014; 383(9921): 955– 62.
22. Chen ST, Hellkamp AS, Becker RC, Berkowitz SD, Breithardt G, Fox KAA, et al. Efficacy and safety of rivaroxaban versus warfarin in patients with Nonvalvular atrial fibrillation and a history of cancer: observations from ROCKET AF. *Eur Heart J Qual Care Clin Outcomes*. 2019; 5(2): 145– 52.
23. Melloni C, Dunning A, Granger CB, Thomas L, Khouri MG, Garcia DA, et al. Efficacy and safety of apixaban versus warfarin in patients with atrial fibrillation and a history of cancer: insights from the ARISTOTLE trial. *Am J Med*. 2017; 130(12): 1440– 8.e1.
24. Fanola CL, Ruff CT, Murphy SA, Jin J, Duggal A, Babilonia NA, et al. Efficacy and safety of edoxaban in patients with active malignancy and atrial fibrillation: analysis of the ENGAGE AF-TIMI 48 trial. *J Am Heart Assoc*. 2018; 7(16): e008987.
25. Shah S, Norby FL, Datta YH, Lutsey PL, MacLehose RF, Chen LY, et al. Comparative effectiveness of direct oral anticoagulants and warfarin in patients with cancer and atrial fibrillation. *Blood Adv*. 2018; 2(3): 200– 9.

26. Raskob GE, van Es N, Verhamme P, Carrier M, Di Nisio M, Garcia D, et al. Edoxaban for the treatment of cancer-associated venous thromboembolism. *N Engl J Med.* 2018; 378(7): 615– 24.
27. Khorana AA, Noble S, Lee AYY, Soff G, Meyer G, O'Connell C, et al. Role of direct oral anticoagulants in the treatment of cancer-associated venous thromboembolism: guidance from the SSC of the ISTH. *J Thromb Haemost.* 2018; 16: 1891– 4.
28. Vrontikis, A.; Carey, J.; Gilreath, J.A.; Halwani, A.; Stephens, D.M.; Sweetenham, J.W. Proposed algorithm for managing Ibrutinib-related atrial fibrillation. *Oncology (US)* 2016, 30, 970–974
29. Shah, S.; Norby, F.L.; Datta, Y.H.; Lutsey, P.L.; MacLehose, R.F.; Chen, L.Y.; Alonso, A. Comparative effectiveness of direct oral anticoagulants and warfarin in patients with cancer and atrial fibrillation. *Blood Adv.* 2018, 2, 200–209.
30. Xiang, E.; Ahuja, T.; Raco, V.; Cirrone, F.; Green, D.; Papadopoulos, J. Anticoagulation prescribing patterns in patients with cancer. *J. Thromb. Thrombolysis* 2018, 45, 89–98.
31. Lee, Y.J.; Park, J.K.; Uhm, J.S.; Kim, J.Y.; Pak, H.N.; Lee, M.H.; Sung, J.H.; Joung, B. Bleeding risk and major adverse events in patients with cancer on oral anticoagulation therapy. *Int. J. Cardiol.* 2016, 203, 372–378.
32. Friberg, L.; Skeppholm, M.; Terént, A. Benefit of anticoagulation unlikely in patients with atrial fibrillation and a CHA2DS2-VASc score of 1. *J. Am. Coll. Cardiol.* 2015, 65, 225–232.
33. Kalin R, Stanton MS. Current clinical issues for MRI scanning of pacemaker and defibrillator patients. *Pacing Clin Electrophysiol: PACE.* 2005;28:326–8. <https://doi.org/10.1111/j.1540-8159.2005.50024.x>.
34. Indik JH, et al. 2017 HRS expert consensus statement on magnetic resonance imaging and radiation exposure in patients with cardiovascular implantable electronic devices. *Heart Rhythm.* 2017;14:e97–e153. <https://doi.org/10.1016/j.hrthm.2017.04.025>.
35. Nazarian S, et al. Safety of magnetic resonance imaging in patients with cardiac devices. *N Engl J Med.* 2017;377:2555–64. <https://doi.org/10.1056/NEJMoa1604267>
36. Russo RJ, et al. Assessing the risks associated with MRI in patients with a pacemaker or defibrillator. *N Engl J Med.* 2017;376:755–64. <https://doi.org/10.1056/NEJMoa1603265>.
37. Epstein AE, DiMarco JP, Ellenbogen KA, et al. ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the ACC/AHA/NASPE 2002 Guideline Update for Implantation of Cardiac Pacemakers and Antiarrhythmia Devices): developed in collaboration with the American Association for Thoracic Surgery and Society of Thoracic Surgeons. *Circulation.* 2008;117:e350–408.
38. Mond HG, Proclemer A. The 11th world survey of cardiac pacing and implantable cardioverter-defibrillators: calendar year 2009—a World Society of Arrhythmia's project. *Pacing Clin Electrophysiol.* 2011;34:1013–27.
39. Crossley GH, Poole JE, Rozner MA, et al. The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: facilities and patient management this document was developed as a joint project with the American Society of Anesthesiologists (ASA), and in collaboration with the American Heart Association (AHA), and the Society of Thoracic Surgeons (STS). *Heart Rhythm.* 2011;8:1114–54.
40. Gomez DR, Poenisch F, Pinnix CC, et al. Malfunctions of implantable cardiac devices in patients receiving proton beam therapy: incidence and predictors. *Int J Radiat Oncol Biol Phys.* 2013;87:570–5.
41. Zweng A, Schuster R, Hawlicek R, Weber HS. Life-threatening pacemaker dysfunction associated with therapeutic radiation: a case report. *Angiology.* 2009;60:509–12.

42. Mouton J, Haug R, Bridier A, et al. Influence of high-energy photon beam irradiation on pacemaker operation. *Phys Med Biol*. 2002;47:2879–93.
43. Rodriguez F, Filimonov A, Henning A, et al. Radiation-induced effects in multiprogrammable pacemakers and implantable defibrillators. *Pacing Clin Electrophysiol*. 1991;14:2143–53.
44. Hurkmans CW, Scheepers E, Springorum BG, Uiterwaal H. Influence of radiotherapy on the latest generation of implantable cardioverter-defibrillators. *Int J Radiat Oncol Biol Phys*. 2005;63:282–9.
45. Kapa S, Fong L, Blackwell CR, et al. Effects of scatter radiation on ICD and CRT function. *Pacing Clin Electrophysiol*. 2008;31:727–32.
46. Hurkmans CW, Kneijens JL, Oei BS, et al. Management of radiation oncology patients with a pacemaker or ICD: a new comprehensive practical guideline in The Netherlands. Dutch Society of Radiotherapy and Oncology (NYRO). *Radiat Oncol*. 2012;7:198.
47. Elders J, Kunze-Busch M, Jan Smeenk R, Smeets JL. High incidence of implantable cardioverter defibrillator malfunctions during radiation therapy: neutrons as a probable cause of soft errors. *Europace*. 2013;15:60–5.
48. Uiterwaal GJ, Springorum BG, Scheepers E, et al. Interference detection in implantable defibrillators induced by therapeutic radiation therapy. *Neth Hear J*. 2006;14:330–4.
49. Gossman MS, Wilkinson JD, Mallick A. Treatment approach, delivery, and follow-up evaluation for cardiac rhythm disease management patients receiving radiation therapy: retrospective physician surveys including chart reviews at numerous centers. *Med Dosim*. 2014;39:320–4.
50. Grant JD, et al. Radiotherapy-induced malfunction in contemporary cardiovascular implantable electronic devices: clinical incidence and predictors. *JAMA Oncol*. 2015;1:624–32. <https://doi.org/10.1001/jamaoncol.2015.1787>.
51. Marbach JR, Sontag MR, Van Dyk J, Wolbarst AB. Management of radiation oncology patients with implanted cardiac pacemakers: report of AAPM Task Group No. 34. American Association of Physicists in Medicine. *Med Phys*. 1994;21:85–90.
52. Solan AN, Solan MJ, Bednars G, Goodkin MB. Treatment of patients with cardiac pacemakers and implantable cardioverter-defibrillators during radiotherapy. *Int J Radiat Oncol Biol Phys*. 2004;59:897–904.
53. Lester JF, Evans LM, Yousef Z, et al. A national audit of current cardiac device policies from radiotherapy centres across the UK. *Clin Oncol (R Coll Radiol)*. 2014;26:45–50.
54. Scientific B. Therapeutic radiation and implantable device systems. In: http://www.bostonscientific.com/content/dam/bostonscientific/quality/education-resources/english/ACL_Therapeutic_Radiation_20120925.pdf: 2012.
55. Medical SJ. Effects of therapeutic radiation on St. Jude Medical implantable cardiac rhythm devices. . In: <http://www.sjm.com/~media/pro/resources/emi/med-dental/fl-therapeutic-r...> 2013.
56. Brambatti M, Mathew R, Strang B, et al. Management of patients with implantable cardioverter-defibrillators and pacemakers who require radiation therapy. *Heart Rhythm*. 2015;12:2148–54.
57. Crossley GH, Poole JE, Rozner MA, et al. The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the perioperative management of patients with implantable defibrillators, pacemakers and arrhythmia monitors: facilities and patient management this document was developed as a joint project with the American Society of Anesthesiologists (ASA), and in collaboration with the American Heart Association (AHA), and the Society of Thoracic Surgeons (STS). *Heart Rhythm*. 2011;8:1114–54.
58. Makkar A, Prisciandaro J, Agarwal S, et al. Effect of radiation therapy on permanent pacemaker and implantable cardioverter-defibrillator function. *Heart Rhythm*. 2012;9:1964–8.