

# BÖLÜM 9

## SENKOP VE ANI KARDİYAK ÖLÜM

Ganbar MAMMADOV<sup>1</sup>

### SENKOP

#### Giriş

Senkop Yunanca ‘birlikte’ anlamına gelen syn ve ‘kesilme, ara verme’ anlamına gelen koptein kelimelerinden türemiştir. Senkop, geçici global serebral hipoperfüzyondan kaynaklanan ve spontan iyileşme gösteren geçici bilinç ve postüral tonus kaybıdır. Serebral dolaşımın 6-8 saniye kesilmesi veya dik pozisyonda sistolik arter basıncının kalp seviyesinde 50-60 mmHg'ye, beyin seviyesinde 30-45 mmHg'ye kadar düşmesi geçici bilinç kaybı (TLOC) oluşması için yeterlidir (1, 2). En son önerilen tanımlama, postüral tonus kaybını hariç tutar çünkü bunun senkopu geçici bilinç kaybına (TLOC) sebep olabilecek epileptik nöbetler, hipoglisemi, metabolik bozukluklar, toksik inmeler ve diğer benzer nedenlerden ayırt etmede özel bir değeri yoktur. Senkop, uyarı olmadan aniden ortaya çıkabilir veya öncesinde baş dönmesi, mide bulantısı, terleme, görsel bulanıklık veya tünel görüşü gibi prodromal semptomlar sonrasında da ortaya çıkabilir. Senkop, hafif hastalıktan hayatı tehdit eden ciddi klinik tablolara kadar geniş spektrumda bozuklukların ortaya çıkış bulgusu olabilir.

Serebral perfüzyon basıncı büyük ölçüde sistemik arteriyel basıncı bağlıdır. Sistemik arteriyel basıncın ana bileşeni ise kardiyak debi ve sistemik vasküler dirençtir. Kalp debisi venöz dolu bozukluğu, bradiaritmî veya taşiaritmî, kapak hastalıkları ve kalbin pompa fonksiyonunu bozan diğer nedenlere bağlı bozulabilir. Sıcak ortamlarda vazodilatasyona bağlı veya uzun süreli ayakta durma

<sup>1</sup> Uzm. Dr., Medicalpoint Hastanesi İEU Tıp Fakültesi, Kardiyoloji Kliniği, ganbarmd@gmail.com

## Atletlerde AKÖ

Hipertrofik kardiyomiyopati (HCM) ABD'de < 35 yaş genç atletlerde en yaygın AKÖ nedenidir. Bunu takiben koroner arter anomalileri ve aritmojenik sağ ventriküler kardiyomiyopatisi gelir. Son yıllarda profesyonel düzeyde Futbol oyunlarında ne yazık ki sık ölüm olayları meydana gelmektedir. Bu nedenle, AKÖ olaylarının en aza indirilmesi için atletik ön katılım taraması zorunlu hale getirilmiştir. HCM için kardiyovasküler tarama kişisel ve aileyi öyküsünü, fizik muayene, 12 derivasyonlu istirahat EKG'si, egzersiz EKG'si ve ekokardiyogramı içerir (62).

## KAYNAKLAR

1. Wieling W, Thijss RD, van Dijk N, Wilde AA, Benditt DG, van Dijk JG. Symptoms and signs of syncope: a review of the link between physiology and clinical clues. *Brain* 2009;132:2630–2642.
2. van Dijk JG, Thijss RD, van Zwet E, Tannemaat MR, van Niekerk J, Benditt DG, Wieling W. The semiology of tilt-induced reflex syncope in relation to electroencephalographic changes. *Brain* 2014;137:576–585.
3. Grubb BP, Karabin B. Syncope: evaluation and management in the geriatric patient. *Clin Geriatr Med.* 2012;28(4):717-728.
4. Ruwald MH, Hansen ML, Lamberts M, et al. The relation between age, sex, comorbidity, and pharmacotherapy and the risk of syncope: a Danish nationwide study. *Europace.* 2012;14(10):1506-1514.
5. Guillardner S, Langada V, Popp S, Heppner HJ, Mang H, Christ M. Patients with syncope in a German emergency department description of patients and processes. *Deutsches Arzteblatt Int.* 2012;109(4):58-65.
6. Mosqueda-Garcia R, Furlan R, Tank J, Fernandez-Violante R. The elusive pathophysiology of neurally mediated syncope. *Circulation* 2000;102:2898–2906.
7. Morillo CA, Eckberg DL, Ellenbogen KA, Beightol LA, Hoag JB, Tahvanainen KU, Kuusela TA, Diedrich AM. Vagal and sympathetic mechanisms in patients with orthostatic vasovagal syncope. *Circulation* 1997;96:2509–2513.
8. Mitro P, Kirsch P, Valocik G, Murin P. A prospective study of the standardized diagnostic evaluation of syncope. *Europace.* 2011;13(4):566-571.
9. Alboni P, Brignole M, Menozzi C, et al. Diagnostic value of history in patients with syncope with or without heart disease. *J Am Coll Cardiol.* 2001;37(7):1921-1928.
10. Freeman R, Wieling W, Axelrod FB, Benditt DG, Benarroch E, Biaggioni I, Cheshire WP, Chelimsky T, Cortelli P, Gibbons CH, Goldstein DS, Hainsworth R, Hilz MJ, Jacob G, Kaufmann H, Jordan J, Lipsitz LA, Levine BD, Low PA, Mathias C, Raj SR, Robertson D, Sandroni P, Schatz I, Schondorff R, Stewart JM, van Dijk JG. Consensus statement on the definition of orthostatic hypotension, neurally mediated syncope and the postural tachycardia syndrome. *Clin Auton Res* 2011;21:69–72.
11. Fedorowski A, Melander O. Syndromes of orthostatic intolerance: a hidden danger. *J Intern Med* 2013;273:322–335.
12. Shiba C, Lipsitz LA, Biaggioni I. ASH position paper: evaluation and treatment of orthostatic hypotension. *J Clin Hypertens (Greenwich)* 2013;15:147–153.

13. Mathias CJ, Mallipeddi R, Bleasdale-Barr K. Symptoms associated with orthostatic hypotension in pure autonomic failure and multiple system atrophy. *J Neurol* 1999;246:893-898.
14. Olshansky B, Sullivan RM. Syncope in patients with organic heart disease. *Cardiac Electrophysiol Clin*. 2013;5(4):495-509.
15. Bhat PK, Pantham G, Laskey S, Como JJ, Rosenbaum DS. Recognizing cardiac syncope in patients presenting to the emergency department with trauma. *J Emerg Med*. 2014;46(1):1-8.
16. Silverstein MD, Singer DE, Mulley AG, Thibault GE, Barnett GO. Patients with syncope admitted to medical intensive care units. *JAMA*. 1982;248(10):1185-1189.
17. Davis S, Westby M, Pitcher D, Petkar S. Implantable loop recorders are cost-effective when used to investigate transient loss of consciousness which is either suspected to be arrhythmic or remains unexplained. *Europace*. 2012;14(3):402-409.
18. Kapoor WN, Karpf M, Wieand S, Peterson JR, Levey GS. A prospective evaluation and follow-up of patients with syncope. *N Engl J Med*. 1983;309(4):197-204.
19. Al-Khatib SM, Stevenson WG, Ackerman MJ, Bryant WJ, Callans DJ, Curtis AB, 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. *Journal of the American College of Cardiology*. 2018; 72: 1677-1749.
20. Hindricks G, Lenarczyk R, Kalarus Z, Döring M, Shamloo AS, Dagres N. Prevention of sudden cardiac death by the implantable cardioverter-defibrillator. *Polish Archives of Internal Medicine*. 2018; 128: 764-770.
21. Myerburg RJ, Junttila MJ. Sudden cardiac death caused by coronary heart disease. *Circulation*. 2012; 125: 1043-1052.
22. Priori SG, Blomström-Lundqvist C, Mazzanti A, Blom N, Borggreve M, Camm J, et al. 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). *European Heart Journal*. 2015; 36: 2793-2867.
23. Eckart RE, Shry EA, Burke AP, McNear JA, Appel DA, Castillo-Rojas LM, et al. Sudden death in young adults: an autopsy-based series of a population undergoing active surveillance. *Journal of the American College of Cardiology*. 2011; 58: 1254-1261.
24. Savopoulos C, Ziakas A, Hatzitolios A, Delivoria C, Kounanis A, Mylonas S, et al. Circadian rhythm in sudden cardiac death: a retrospective study of 2,665 cases. *Angiology*. 2006; 57: 197-204.
25. Hagnäs MJ, Lakka TA, Kurl S, Rauramaa R, Mäkkilä TH, Savonen K, et al. Cardiorespiratory fitness and exercise-induced ST segment depression in assessing the risk of sudden cardiac death in men. *Heart*. 2017; 103: 383-389.
26. Kurl S, Mäkkilä TH, Rautaharju P, Kiviniemi V, Laukkanen JA. Duration of QRS complex in resting electrocardiogram is a predictor of sudden cardiac death in men. *Circulation*. 2012; 125: 2588-2594.
27. Laukkanen JA, Laukkanen T, Khan H, Babar M, Kunutsor SK. Combined effect of sauna bathing and cardiorespiratory fitness on the risk of sudden cardiac deaths in caucasian men: a longterm prospective cohort study. *Progress in Cardiovascular Diseases*. 2018; 60: 635-641.
28. Adabag AS, Luepker RV, Roger VL, Gersh BJ. Sudden cardiac death: epidemiology and risk factors. *Nature Reviews Cardiology*. 2010; 7: 216-225.
29. Magi S, Lariccia V, Maiolino M, Amoroso S, Gratteri S. Sudden cardiac death: focus on the genetics of channelopathies and cardiomyopathies. *Journal of Biomedical Science*. 2017; 24: 56.

30. de Luna AB, Coumel P, Leclercq JF. Ambulatory sudden cardiac death: mechanisms of production of fatal arrhythmia on the basis of data from 157 cases. *American Heart Journal*. 1989; 117: 151-159.
31. Sanchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. *Annals of Translational Medicine*. 2016; 4: 256.
32. Rizzo S, Carturan E, De Gaspari M, Pilichou K, Thiene G, Bassi C. Update on cardiomyopathies and sudden cardiac death. *Forensic Sciences Research*. 2019; 4: 202-210.
33. Henriques de Gouveia RHAM, Corte Real Gonçalves FMA. Sudden cardiac death and valvular pathology. *Forensic Sciences Research*. 2019; 4: 280-286.
34. Wever EFD, Robles de Medina EO. Sudden death in patients without structural heart disease. *Journal of the American College of Cardiology*. 2004; 43: 1137-1144.
35. Koplan BA, Stevenson WG. Ventricular tachycardia and sudden cardiac death. *Mayo Clinic Proceedings*. 2009; 84: 289-297.
36. Bui AH, Waks JW. Risk stratification of sudden cardiac death after acute myocardial infarction. *Innovations in Cardiac Rhythm Management*. 2018; 9: 3035-3049.
37. Dhalla NS, Adameova A, Kaur M. Role of catecholamine oxidation in sudden cardiac death. *Fundamental & Clinical Pharmacology*. 2010; 24: 539-546.
38. Tomaselli GF, Zipes DP. What causes sudden death in heart failure? *Circulation Research*. 2004; 95: 754-763.
39. Miron A, Lafreniere-Roula M, Steve Fan C, Armstrong KR, Dragulescu A, Papaz T, et al. A validated model for sudden cardiac death risk prediction in pediatric hypertrophic cardiomyopathy. *Circulation*. 2020; 142: 217-229.
40. Aro AL, Kenttä TV, Huikuri HV. Microvolt T-wave Alternans: where are we now? *Arrhythmia & Electrophysiology Review*. 2016; 5: 37-40.
41. Alba AC, Gaztañaga J, Foroutan F, Thavendiranathan P, Merlo M, Alonso-Rodriguez D, et al. Prognostic value of late gadolinium enhancement for the prediction of cardiovascular outcomes in dilated cardiomyopathy. *Circulation: Cardiovascular Imaging*. 2020; 13: e010105.
42. Winkel BG, Larsen MK, Berge KE, Leren TP, Nissen PH, Olesen MS, et al. The prevalence of mutations in KCNQ1, KCNH2, and SCN5A in an unselected national cohort of young sudden unexplained death cases. *Journal of Cardiovascular Electrophysiology*. 2012; 23: 1092-1098.
43. Priori SG, Napolitano C, Memmi M, Colombi B, Drago F, Gasparini M, et al. Clinical and molecular characterization of patients with catecholaminergic polymorphic ventricular tachycardia. *Circulation*. 2002; 106: 69-74.
44. Viswanathan SK, Sanders HK, McNamara JW, Jagadeesan A, Jahangir A, Tajik AJ, et al. Hypertrophic cardiomyopathy clinical phenotype is independent of gene mutation and mutation dosage. *PLoS ONE*. 2017; 12: e0187948.
45. Mazzanti A, Maragna R, Faragli A, Monteforte N, Bloise R, Memmi M, et al. Gene-specific therapy with mexiletine reduces arrhythmic events in patients with long QT syndrome type 3. *Journal of the American College of Cardiology*. 2016; 67: 1053-1058.
46. Kontos MC, Diercks DB, Ho PM, Wang TY, Chen AY, Roe MT. Treatment and outcomes in patients with myocardial infarction treated with acute-blocker therapy: results from the American College of Cardiology's NCDR(\*). *American Heart Journal*. 2011; 161: 864-870.
47. Piccini JP, Berger JS, O'Connor CM. Amiodarone for the prevention of sudden cardiac death: a meta-analysis of randomized controlled trials. *European Heart Journal*. 2009; 30: 1245-1253.
48. Waldo AL, Camm AJ, deRuyter H, Friedman PL, MacNeil DJ, Pauls JF, et al. Effect of d-sotalol on mortality in patients with left ventricular dysfunction after recent and remote myocardial infarction The cardiac arrhythmia suppression trial. *Lancet*. 1996; 348:7-12.

49. Bunch TJ, Mahapatra S, Murdock D, Molden J, Weiss JP, may HT, et al. Ranolazine reduces ventricular tachycardia burden and ICD shocks in patients with drug-refractory ICD shocks. *Pacing and Clinical Electrophysiology*. 2011; 34: 1600-1606.
50. Domanski MJ, Exner DV, Borkowf CB, Geller NL, Rosenberg Y,
51. Pfeffer MA. Effect of angiotensin converting enzyme inhibition on sudden cardiac death in patients following acute myocardial infarction. A meta-analysis of randomized clinical trials. *Journal of the American College of Cardiology*. 1999; 33: 598-604.
52. van Welsenes GH, van Rees JB, Borleffs CJW, Cannegieter SC, Bax JJ, van Erven L, et al. Long-term follow-up of primary and secondary prevention implantable cardioverter defibrillator patients. *EP Europace*. 2011; 13: 389-394.
53. Kuck K, Schaumann A, Eckardt L, Willems S, Ventura R, Delacréta E, et al. Catheter ablation of stable ventricular tachycardia before defibrillator implantation in patients with coronary heart disease (VTACH): a multicentre randomised controlled trial. *Lancet*. 2010; 375: 31-40.
54. Schleberger R, Jularic M, Salzbrunn T, Hacke C, Schwarzl JM, Hoffmann BA, et al. Outcome of catheter ablation of nonreentrant ventricular arrhythmias in patients with and without structural heart disease. *European Journal of Medical Research*. 2020; 25: 4.
55. Ngaage DL, Cale ARJ, Cowen ME, Griffin S, Guvendik L. Early and late survival after surgical revascularization for ischemic ventricular fibrillation/tachycardia. *Annals of Thoracic Surgery*. 2008; 85: 1278-1281.
56. Every NR, Fahrenbruch CE, Hallstrom AP, Weaver WD, Cobb LA. Influence of coronary bypass surgery on subsequent outcome of patients resuscitated from out of hospital cardiac arrest. *Journal of the American College of Cardiology*. 1992; 19: 1435-1439.
57. Lin J-J, Huang C-H, Chen W-J, Chuang P-Y, Chang W-T, Chen W-T, et al. Targeted temperature management and emergent coronary angiography are associated with improved outcomes in patients with prehospital return of spontaneous circulation. *Journal of the Formosan Medical Association*. 2020; 119: 1259-1266.
58. Lemkes JS, Janssens GN, van der Hoeven NW, Jewbali LSD, Dubois EA, Meuwissen M, et al. Coronary angiography after cardiac arrest without ST-segment elevation. *New England Journal of Medicine*. 2019; 380: 1397-1407.
59. Holzer M. Targeted temperature management for comatose survivors of cardiac arrest. *New England Journal of Medicine*. 2010;363: 1256-1264.
60. Lascarrou J, Merdji H, Le Gouge A, Colin G, Grillet G, Girardie P, et al. Targeted temperature management for cardiac arrest with nonshockable rhythm. *New England Journal of Medicine*. 2019;381: 2327-2337
61. Kirkegaard H, Søreide E, Haas I de, Pettilä V, Taccone FS, Arus U, et al. Targeted temperature management for 48 vs 24 hours and neurologic outcome after out-of-hospital cardiac arrest: a randomized clinical trial. *The Journal of the American Medical Association*. 2017; 318: 341-350.
62. Higgins JP, Andino A. Soccer and sudden cardiac death in young competitive athletes: a review. *Journal of Sports Medicine*. 2013;2013: 1-7.