

BÖLÜM 27

COVID-19 PANDEMİSİNDE KARDİYOLOJİK YAKLAŞIM VE KARDİYAK SONUÇLARI

Fatih AKKAYA¹
Mehmet FİLİZ²

Giriş

Coronavirüsler zarflı ve tek iplikli RNA virüsleridir. Bütün virüsler gibi konakçıları enfekte ederken o hücrenin bazı bileşenlerini kullanarak kendisini kopyalar ancak RNA virüslerinin diğerlerinden farkı RNA replikasyonu sürecinde hataları düzeltemezler. Böylece her hata beraberinde yeni bir mutasyonu getirerek farklı türleri enfekte etme yeteneği gibi yeni özellikler katabilir. Hastalığın etki mekanizmasını anlayabilmek ve uygun tedaviler geliştirebilmek için virüsün hayat döngüsünü bilmek gerekir. SARS-CoV-2, “membran ilişkili glikoprotein anjiotensin dönüştürücü enzim 2 (ACE2)” reseptörüne bağlanır. Henüz “dipeptidilpeptidaz 4 (DPP4)” ya da “aminopeptidaz N (APN)” gibi diğer coronavirüs reseptörlerine bağlandığı henüz gösterilmemiştir. SARS-CoV-2 enfeksiyonu virüs yüzeyindeki sivri proteinlerin insan ACE2 reseptörüne bağlanması sonucu oluşmaktadır. ACE2 esas olarak tip 2 alveolar hücrelerde üretilmektedir ve virüsün giriş kapısını oluşturmaktadır. Yoğun olarak kalp dokusunda da bulunan ACE2, hipertansiyon (HT), konjestif kalp yetersizliği ve ateroskleroz gibi renin-angiotensin sisteminin aktivasyonu sonucu oluşan

anjiotensin II’nin olumsuz etkilerini azaltır. ACE2, renin-angiotensin-aldosteron sisteminde (RAAS) görevli bir transmembran proteindir. Vazokonstriktör etkisi olan anjiotensin II’nin, vazodilatatör etkisi olan anjiotensin 1-7’e dönüşmesini sağlar.

İnsanlarda ACE2 proteini özellikle tip 2 pnömositler olmak üzere miyokard, gastrointestinal sistem (GIS), kemik iliği, böbrek, epitel hücreleri ve dalak dahil pek çok dokuda bulunması SARS-CoV-2’nin neden çoklu organ hasarı ile seyrettiğini açıklayan nedenlerden biri olarak görülebilir (1).

Coronavirüsler, enfekte kişiler tarafından damlacık yoluyla insandan insana bulaşabilir. SARS-CoV-2 enfeksiyonu asemptomatik veya hafif semptomlarla seyredebildiği gibi hem pulmoner hem de sistemik inflamasyona yol açarak otoimmün yanıtın da etkisi ile ARDS, akut kardiyak hasar, embolizm ve çoklu organ yetersizliği gibi geniş yelpazede seyredebilen ölümcül sonuçlara neden olabilmektedir. Vakaların çoğu asemptomatik seyrete de komorbiditesi yüksek hastalar kritik evreye ilerleyebilir. Bu hastalar oldukça kötü seyrettiğinden inflamasyon ve sekonder organ tutulumunun değerlendirilmesi çok

¹ Dr. Öğr. Üyesi Fatih AKKAYA Ordu Üniversitesi Tıp Fakültesi Kardiyoloji AD. drfatihakkaya@gmail.com

² Arş. Gör. Dr. Mehmet FİLİZ Ordu Üniversitesi Tıp Fakültesi Kardiyoloji AD. dr.mehmetfiliz@gmail.com



uzun dönem kardiyovasküler sistem sağlığı açısından kalp sağlığını korumada genel beslenme ilkelerine uyulması, düzenli egzersiz yapılması, yaşam koşullarının optimalizasyonu ve düzenli kardiyoloji vizitleri önem arz etmektedir. COVID-19 hastalığının akut ve kronik dönem klinik seyri açısından bu alanda yapılacak bir çok klinik çalışmaya ihtiyaç duyulmaktadır.

KAYNAKLAR

1. Hamming I, Timens W, Bulthuis ML, Lely AT, Navis G, van Goor H. Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. *The Journal of Pathology*. 2004;203:631-7
2. Clerkin KJ, Fried JA, Raikhelkar J, et al. Coronavirus Disease 2019 (COVID-19) and Cardiovascular Disease [published online ahead of print, 2020 Mar 21]. *Circulation*. 2020; 10.1161/CIRCULATIONAHA.120.046941
3. Guo T, Fan Y, Chen M, et al. Cardiovascular Implications of Fatal Outcomes of Patients With Coronavirus Disease 2019 (COVID-19). *JAMA Cardiol*. 2020
4. Arentz M, Yim E, Klaff L, Lokhandwala S, Riedo FX, Chong M, et al. Characteristics and outcomes of 21 critically ill patients with COVID-19 in Washington State. *JAMA*. 2020; DOI: 10.1001/jama.2020.4326
5. Oudit GY, Kassiri Z, Jiang C, et al. SARS coronavirus modulation of myocardial ACE2 expression and inflammation in patients with SARS. *Eur J Clin Invest*. 2009;39:618-25
6. Ding Y, He L, Zhang Q, et al. Organ distribution of severe acute respiratory syndrome (SARS) associated coronavirus (SARS-CoV) in SARS patients: implications for pathogenesis and virus transmission pathways. *The Journal of Pathology*. 2004;203:622-30
7. Ding Y, Wang H, Shen H, et al. The clinical pathology of severe acute respiratory syndrome (SARS): a report from China. *The Journal of Pathology*. 2003;200:282-9
8. Guillemin L. Virus-induced systemic vasculitides: new therapeutic approaches. *Clin Dev Immunol*. 2004;11:227-31
9. Udell JA, Zawi R, Bhatt DL, et al. Association between influenza vaccination and cardiovascular outcomes in high-risk patients: a meta-analysis. *JAMA*. 2013;310:1711-20.
10. Chapman AR, Shah AS, Lee KK, et al. Long Term Outcomes in Patients With Type 2 Myocardial Infarction and Myocardial Injury. *Circulation*. 2018;137:1236-45
11. Tang N, Li D, Wang X, Sun Z. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. *J Thromb Haemost*. 2020;18:844-7
12. Rezaee-Zavareh MS, Tohidi M, Sabouri A, Ramezani-Binabaj M, Sadeghi-Gahrodi M, Einollahi B. Infectious and coronary artery disease. *ARYA Atheroscler*. 2016;12(1):41-9.
13. Kwong JC, Schwartz KL, Campitelli MA, et al. Acute myocardial infarction after laboratory confirmed influenza infection. *N Engl J Med*. 2018;378(4):345-53
14. Chen T, Wu D, Chen H, et al. Clinical characteristics of 113 deceased patients with coronavirus disease 2019: retrospective study. *BMJ*. 2020;2:m1091. doi:10.1136/bmj.m1091
15. Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients with 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA*. 2020;323(11):1061-9.
16. Pinto MDS. Coronavirus disease 2019 (COVID-19): Coronary artery disease issues. up to date. <https://www.uptodate.com/contents/coronavirus-disease-2019-COVID-19-coronary-artery-disease-issues>. Published 2020.
17. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395(10229):1054-62.
18. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497-506.
19. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese center for disease control and prevention. *JAMA*. 2020;323(13):1239-42
20. Lippi G, Plebani M. Laboratory abnormalities in patients with COVID-2019 infection. *Clin Chem Lab Med*. 2020.
21. Shi S, Qin M, Shen B, et al. Association of Cardiac Injury With Mortality in Hospitalized Patients With COVID-19 in Wuhan, China. *JAMA Cardiol*. 2020. Doi:10.1001/jamacardio.2020.0950.
22. Ukena M, Kindermann F, Mahfoud J, et al. Diagnostic and prognostic validity of different biomarkers in patients with suspected myocarditis. *Clin Res Cardiol*. 2014;103(9):743-51.
23. Felker GM, Boehmer JP, Hruban RH, et al. Echocardiographic findings in fulminant and acute myocarditis. *J Am Coll Cardiol*. 2000;36(1):227-32
24. Inciardi RM, Lupi L, Zaccaro G, et al. Cardiac involvement in a patient with coronavirus disease 2019 (COVID-19). *JAMA Cardiol*. 2020. Doi:10.1001/jamacardio.2020.1096.
25. Caforio AL, Pankuweit S, Arbustini E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Disease. *Eur Heart J*. 2013;34(33):2636-48
26. Yang X, Yu Y, Xu J, et al. Clinical Course and Outcomes of Critically Ill Patients with SARS-CoV-2 Pneumonia in Wuhan, China: A Single-centered, Retrospective, Observational Study. *Lancet Respir Med*. 2020 doi:10.1016/S2213-2600(20)30079-5
27. World Health Organization, Clinical Management of Severe Acute Respiratory Infection When Novel Coronavirus (nCoV) Infection is Suspected, WHO, 2020
28. McNamara DM, Holubkov R, Starling RC, Dec GW,



- Loh E, Torre-Amione G, Gass A, Janosko K, Tokarczyk T, Kessler P, et al. Controlled trial of intravenous immunoglobulin in recent-onset dilated cardiomyopathy. *Circulation*. 2001;103:2254–2259. doi: 10.1161/01.cir.103.18.2254
29. Maron BJ, Udelson JE, Bonow RO, Nishimura RA, Ackerman MJ, Estes NA 3rd, Cooper LT Jr, Link MS, Maron MS; American Heart Association Electrocardiography and Arrhythmias Committee of Council on Clinical Cardiology, Council on Cardiovascular Disease in Young, Council on Cardiovascular and Stroke Nursing, Council on Functional Genomics and Translational Biology, and American College of Cardiology. Eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities: Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis: a scientific statement from the American Heart Association and American College of Cardiology. *Circulation*. 2015;132:e273–e280. doi: 10.1161/CIR.0000000000000239
30. Tardif JC, Kouz S, Waters DD, et al. Efficacy and safety of low-dose colchicine after myocardial infarction. *NEngl J Med*. 2019;381(26):2497–2505. doi:10.1056/NEJMoa1912388
31. Deftereos S, Giannopoulos G, Angelidis C, et al. Anti-inflammatory treatment with colchicine in acute myocardial infarction: a pilot study. *Circulation*. 2015;132(15):1395–1403. doi:10.1161/CIRCULATIONAHA.115.017611
32. Effect of Colchicine vs Standard Care on Cardiac and Inflammatory Biomarkers and Clinical Outcomes in Patients Hospitalized With Coronavirus Disease 2019: The GRECCO-19 Randomized Clinical Trial. Spyridon G. Deftereos, MD, PhD¹; Georgios Giannopoulos, MD, PhD²; Dimitrios A. Vrachatis, MD, MSc, PhD³ et al
33. Valentina O. Puntmann, MD, PhD; M. Ludovica Carerj, MD; Imke Wieters, MD; Masia Fahim et al. Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered From Coronavirus Disease 2019 (COVID-19). *JAMA Cardiol*. 2020; 5 (11): 1265–1273. doi: 10.1001/jamacardio.2020.3557
34. Sabrina Kopp, Sebastian Go, Thomas Jansen et al. Evidence of SARS-CoV-2 mRNA in endomyocardial biopsies of patients with clinically suspected myocarditis tested negative for COVID-19 in nasopharyngeal swab. Philip Wenzel. *Cardiovascular Research*, Cilt 116, Sayı 10, 1 Ağustos 2020, Sayfalar 1661–1663,
35. Qi Wu, Lina Zhou, Xin Sun et al. Altered Lipid Metabolism in Recovered SARS Patients Twelve Years after Infection. *SciRep* 7, 9110 (2017)