

Bölüm 36

CORONAVİRUS ENFEKSİYONU VE KARDİYOYASKÜLER HASTALIKLAR



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GİRİŞ

Koronavirüsler geçmişte basit soğuk algınlığına sebep olan virüsler olarak düşünülürken, Çin'de 2002 yılında görülen ciddi Akut Solunum Sendromu Coronavirus (SARS-CoV) salgını, Suudi Arabistan'da 2012 yılında görülen Ortadoğu Solunum Sendromu Coronavirus (MERS-CoV) salgını ile düşünceler değişti (1). Çin' de 2019 yılında başlayıp, Dünya Sağlık Örgütü (DSÖ) tarafından "Ciddi Akut Solunumsal Sendrom-Coronavirus-2" (SARS-CoV-2) olarak isimlendirilen ve 11 Mart 2020'de pandemi olarak ilan edilen COVID-19 (CoronaVirus Disease-2019) hastalığı ile aslında ne kadar önemli virüsler oldukları anlaşıldı (2-3).

Coronavirüsler (CoV'ler), Coronaviridae ailesi, Orthocoronavirinae alt ailesi içinde yer alır. Orthocoronavirinae alt ailesi içinde Alfa, Beta, Gama ve Delta olmak üzere dört cins vardır (4-5). Alfa ve Beta koronavirüsler insanları enfekte eder, SARS-CoV-2 Betacoronavirus cinsi içinde yer alan ve insanları enfekte eden yedinci koronavirüsler (6).

SARS-CoV-2 genomu (30 kb boyutunda), 4 yapısal protein ve en az 10 yapısal olmayan proteinden oluşan RNA virüsüdür (7-8-9) . Dört yapısal

protein; Spike (S), yüzey glikoproteini Matris (M) proteini, Zarf (E) proteini ve Nükleokapsid (N) proteininden oluşur. SARS-CoV2'nin S proteinin hücre yüzeyi reseptörü, anjiyotensin dönüştürücü enzim 2 (ACE2)dir (10). ACE2 en fazla kalp, ince bağırsak, testis, böbrekler, tiroid ve yağ dokusunda endotel ve epitel hücrelerinin yüzeyinde yaygın olarak bulunur (11-12).

COVID-19'un semptomları ve klinik gelişimi, asemptomatikten mekanik ventilasyon gerektiren ciddi solunum yetmezliğine kadar geniş bir yelpazedir (13). Sık görülen semptomlar arasında ateş, öksürük, nefes darlığı, kas ağrıları, ishal, koku kaybı, tat kaybı ve yorgunluk sayılabilir (14). Daha az sıklıkta şiddetli akut solunum sıkıntısı sendromu (ARDS), kardiyovasküler hastalıklar (KVH), yaygın damar içi pıhtılaşma (DIC) ve çoklu organ yetmezliği görülür(2,14-15-16).

HASTALIĞIN KLİNİK FAZLARI

Birinci faz ilk 7 gün içinde ortaya çıkar; üst solunum yolu enfeksiyonu ve gastrointestinal belirtiler gibi spesifik olmayan semptomlar mevcuttur. Koku ve tat kaybı eşlik edebilir. Vakaların yaklaşık %80'ini oluşturur ve şifa ile sonuçlanır (13).

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Sosyal mesafe ve kişisel hijyen gibi enfeksiyon önleme ve kontrol önlemleri, bu küresel salgının yönetiminin temel taşı olmaya devam ediyor.

KAYNAKLAR

- Ekim M, Er ZC, Alagha S, Relationship Between COVID-19 And Venous Thromboembolism. *Gevher Nesibe Journal of Medical&Health Sciences* ISSN 2717-7394. ArrivalDate: 04.08.2020|Published Date: 22.10.2020 2020, Vol: 5, Issue: 8 pp: 53-60 DoiNumber: <http://dx.doi.org/10.46648/gnj.102>
- 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 Feb 7.
- Zhu N, Zhang D, Wang W, et al. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med*. 2020;382:727-33.
- Banerjee A, Kulcsar K, Misra V Batsandcoronaviruses. *Viruses*. 2019;11 doi: 10.3390/v11010041.
- Yang D, Leibowitz JL. The structure and functions of coronavirus genomic 3' and 5' ends. *Virus Res*. 2015;206:120-133. doi: 10.1016/j.virusres.2015.02.025.
- Shereen MA, Khan S, Kazmi A. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *J Adv Res* 2020;24:91-8.
- Ramaiah A, Arumugaswami V. In sights into cross-species evolution of novel human coronavirus 2019-nCoV and defining immunedeterminants for vaccinated development. *bioRxiv*. 2020 Jan 30 doi: 10.1101/2020.01.29.925867.
- Chan JF, Kok KH, Zhu Z, Genomic characterization of the 2019 novel human-pathogenic coronavirus isolate from a patient with atypical pneumonia after visiting Wuhan. *Emerg Microbes Infect*. 2020;9:221-236. doi: 10.1080/22221751.2020.1719902.
- Wu A, Peng Y, Huang B. Genome composition and divergence of the novel coronavirus (2019-nCoV) originating in China. *Cell Host Microbe*. 2020;27:325-328. doi: 10.1016/j.chom.2020.02.001.
- Erdős EG. Angiotensin I converting enzyme. *Circulation Research*. 1975;36(2):247-55
- Li M-Y, Li L, Zhang Y. Expression of the SARS-CoV-2 cell receptor gene ACE2 in a wide variety of human tissues. *Infectious diseases of poverty*. 2020;9:1-7.
- Lonsdale J, Thomas J, Salvatore M, et al. The genotype-tissue expression (GTEx) project *Nature genetics*. 2013;45(6):580.
- Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China. *JAMA*. 2020;323:1239-42.
- 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;395:1054-1062. doi: 10.1016/S0140-6736(20)30566-3.
- 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. doi: 10.1016/S0140-6736(20)30183-5.
- Xu, Shi L, Wang Y. et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. *Lancet Respir. Med*. 2020;8:420-422. doi: 10.1016/S2213-2600(20)30076-X.
- Ye Q, Wang B, Mao J. The pathogenesis and treatment of the 'Cytokine Storm' in COVID-19. *J Infect* 2020;80:607-13
- Chen D, Li X, Song Q, Hypokalemia and clinical implications in patients with coronavirus disease 2019 (COVID-19). *medRxiv* 2020. <https://doi.org/10.1101/2020.02.27.20028530>.
- Klauegger A, Strobl B, Regl G, Identification of a coronavirus hemagglutinin-esterase with a substrate specificity different from those of influenza C virus and bovine coronavirus. *J. Virol*. 1999;73(5):3737-43. doi: [10.1128/JVI.73.5.3737-3743.1999](http://dx.doi.org/10.1128/JVI.73.5.3737-3743.1999)
- Wu F, Zhao S, Yu B, et al. A new coronavirus associated with human respiratory disease in China, *Nature*. 2020;579(7798):265-9. doi: [10.1038/s41586-020-2008-3](http://dx.doi.org/10.1038/s41586-020-2008-3)
- Perlman S, Dandekar AA. Immunopathogenesis of coronavirus infections: implications for SARS. *Nat. Rev. Immunol*. 2005;5(12):917-27. doi: [10.1038/nri1732](http://dx.doi.org/10.1038/nri1732)
- Du Y, Tu L, Zhu P, et al. Clinical Features of 85 Fatal Cases of COVID-19 from Wuhan: A Retrospective Observational Study. *Am. J. Respir. Crit. Care Med*. (2020). doi: [10.1164/rccm.202003-0543OC](http://dx.doi.org/10.1164/rccm.202003-0543OC) [Epub ahead of print].
- Wang C, Xie J, Zhao L, et al. *Aveolar macrophage activation and cytokine storm in the pathogenesis of severe COVID-19*. 2020 doi: 10.21203/rs.3.rs-19346/v1.
- Zheng HY, Zhang Mi, Yang CX, et al. Elevated dexamethasone levels and reduced functional diversity of T cells in peripheral blood may predict severe progression in COVID-19 patients. *Cell Mol Immunol*. 2020;17(5):541-543. doi: 10.1038/s41423-020-0401-3.
- Lulu Ma, MD, Kaicheng Song, MD, and Yuguang Huang, MD. COVID-19 and Cardiovascular Complications J Cardiothorac Vasc Anesth. 2021 Jun; 35(6): 1860-1865**
- Deshotel MR, Xia H, Sriramula S, Lazartigues E, Angiotensin II mediates angiotensin converting enzyme type internalization and degradation through an angiotensin II type I receptor-dependent mechanism. *Hypertension*. 2014;64:1368-75.
- Xiong T.Y, Redwood S, Prendergast B. Coronaviruses and the cardiovascular system: acute and long-term implications. *Eur Heart J*. 2020
- Li B, Yang J, Zhao F. Prevalence and impact of cardiovascular metabolic diseases on COVID-19 in China. *Clin Res Cardiol*. 2020
- Andrew M. South, Debra I. Diz, and X Mark C. Chappell. COVID-19, ACE2, and the cardiovascular consequences. *Cardiovascular Sciences Center, Wake Forest School of Medicine, Winston-Salem, North Carolina*

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30. Ishiyama Y, Gallagher P E, Averill DB, et al. Upregulation of angiotensin converting enzyme 2 after myocardial infarction by blockade of angiotensin II receptors. *Hypertension*. 2004;43(5):970–6
 31. Klimas J, Olvedy M, Ochodnicka Mackovicova K, et al. Perinatally administered losartan augments renal ACE2 expression but not cardiac renin Mas receptor in spontaneously hypertensive rats. *Journal of Cellular and Molecular Medicine*. 2015;19(8):1965–74.
 32. Chaubey SK, Sinha AK, Phillips E, Transient cardiac arrhythmias related to lopinavir/ritonavir in two patients with HIV infection. *Sex Health* 2009;6:254–7.
 33. Mitra RL, Greenstein SA, Epstein LM. An algorithm form analyzing QT prolongation in coronavirus disease 2019 (COVID-19) patients treated with either chloroquine or hydroxychloroquine in conjunction with azithromycin: Possible benefits of intravenous lidocaine. *Heart Rhythm Case Rep*. 2020;6(5):244–248. doi: 10.1016/j.hrcr.2020.03.016.
 34. Rosenberg ES, Dufort EM, Udo T, et al. Association of treatment with hydroxychloroquine or azithromycin with in-hospital mortality in patients with COVID-19 in New York state. *JAMA*. 2020;323(24):2493–2502. doi: 10.1001/jama.2020.8630.
 35. Inciardi RM, Lupi L, Zaccone G, et al. Cardiac Involvement in a Patient With Coronavirus Disease 2019 (COVID-19). *JAMA Cardiol*. 2020;5:1–6. <https://doi.org/10.1001/jamacardio.2020.1096>.
 36. Guo T, Fan Y, Chen M, et al. Cardiovascular Implications of Fatal Outcomes of Patients with Coronavirus Disease 2019 (COVID-19). *JAMA Cardiol*. 2020;5:1–8.
 37. Buzon J, Roignot O, Lemoine S, et al. Takotsubo Cardiomyopathy Triggered by Influenza A Virus. *Intern Med* 2015;54:2017–9
 38. Li Y, Liu T, Liu M, et al. Electrocardiographic abnormalities in patients with COVID-19. *Chin J Arrhythmia (in Chinese)* 2020 doi: 10.3760/cma.j.cn.113859-20200302-20200044.
 39. Peng YD, Meng K, Guan HQ, et al. Clinical characteristics and outcomes of 112 cardiovascular disease patients infected by 2019-nCoV. *Zhonghua Xin Xue Guan Bing Za Zhi*. 2020;48(6):450–455. doi: 10.3760/cma.j.cn.112148-20200220-00105.
 40. Thygesen K, Alpert JS, Jaffe AS, et al. Executive group on behalf of the Joint European Society of Cardiology (ESC)/American College of Cardiology (ACC)/American Heart Association (AHA)/World Heart Federation (WHF) Task Force for the Universal Definition of Myocardial Infarction. *Fourth Universal Definition Myocardial Infarction Glob Heart* 2018;13:305–38
 41. Klok FA, Kruip MJHA, van der Meer NJM, et al. Incidence of thrombotic complications in critically ill ICU patients with COVID-19. *Thromb Res* 2020;191:145–7
 42. Guan WJ, Ni ZY, Hu Y, et al; China Medical Treatment Expert Group for COVID-19. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* 2020;382:1708–20.
 43. Ünüvar A. COVID-19 ve koagülopati. *Sağlık Bilimlerinde İleri Araştırmalar Dergisi*. 2020, 3 (Suppl.1): S53–S62.
 44. COVID-19 (SARS-CoV-2 enfeksiyonu) Antisitokin-Antiinflamatuvar Tedaviler, Koagülopati T.C. SAĞLIK BAKANLIĞI 7 Kasım 2020 Bilimsel Danışma Kurulu Çalışması
 45. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020 Feb 15;395(10223):507–513. doi: 10.1016/S0140-6736(20)30211-7. Epub 2020 Jan 30. PMID: 32007143; PMCID: PMC7135076
 46. Özbalcı D, Süleyman Demirel Üniversitesi İç Hastalıkları Anabilim Dalı, Hematoloji Bilim Dalı. Antikoagulant-Therapy in COVID-19. *Med J SDU / SDÜ Tıp Fak Derg u* 2021:(özel sayı-1):37-45 doi: 10.17343/sdutfd.899521
 47. Wiersinga WJ, Rhodes A, Cheng AC. Pathophysiology, transmission, diagnosis, and treatment of coronavirus disease 2019 (COVID-19): A review. *JAMA* 2020;324(8):782–93.
 48. Manolis AS, Manolis AA, Manolis TA, COVID-19 Infection and Cardiac Arrhythmias. *Trends Cardiovasc Med* 2020;30(8):451–60.
 49. Bansal M. Cardiovascular disease and COVID-19. *Diabetes Metab Syndr* 2020;14(3):247–50.