

## PEDİATRİ VE COVID-19

Mehmet Fatih ORHAN<sup>1</sup>  
Bahri ELMAS<sup>2</sup>

### GİRİŞ

Koronavirüsler, önemli insan ve hayvan patojenleridir. 2019'un sonunda, Çin'in Wuhan şehrinde bir dizi pnömoni vakasının nedeni olarak yeni bir koronavirüs tespit edildi. SARS-CoV-2 olarak adlandırılan yeni koronavirüs hızla yayılarak Çin genelinde bir salgına neden oldu ve ardından küresel bir salgın meydana geldi. Şubat 2020'de Dünya Sağlık Örgütü (DSÖ) hastalığa, 2019 koronavirüs hastalığı anlamına gelen COVID-19 ismini koydu[1]. SARS-CoV-2'nin neden olduğu COVID-19'un çocuklarda yetişkinlere göre daha hafif seyrettiği bilinmektedir[2,3].

Hastalık hakkında ilk yayınlar ağırlıklı olarak yetişkinlere odaklanmıştır. SARS-CoV-2'nin neden olduğu COVID-19 ile ilgili hızla gelişen erişkin veri havuzuna rağmen, çocuk COVID-19 vakaları ile ilgili yeterli veri bulunmamaktadır. Bu nedenle çocuklarda cevap bekleyen birçok soru mevcuttur: Virüsün topluma yayılmasında çocukların rolü tam olarak nedir? Çocuklarda ne derece yay-

gın ve ne kadarı hastanede yatış gerektiriyor? Virüsün eşlik eden kronik rahatsızlıkları olan çocuklar üzerindeki klinik belirtileri ve etkileri nelerdir? COVID-19'u tespit etmek için kullandığımız testlerin çocuklarda doğruluk performansı nedir? Evler, sokaklar ve okullardaki çocukları korumanın en iyi yolu nedir?

Şüphesiz tüm bunlara cevap bulabilmek için pediatrik COVID-19 ile ilgili mevcut bilgileri gözden geçirmek gereklidir. Bu bölümün amacı da bu konuda 2020 yılında öğrendiklerimizi pediatrist gözüyle derlemektir.

### Etiyoloji

Koronavirüs (CoV)'ler geniş zarflı, tek sarmallı, zoonotik RNA virüsleri ailesidir. Dört CoV insanlar arasında yaygın olarak dolaşır: HCoV-229E, -HKU1, -NL63 ve -OC43. Bununla birlikte, CoV'ler hızla mutasyona uğrayabilir ve yeniden birleşerek hayvanlardan insanlara yayılabilen yeni CoV'lere yol açabilir. Yeni CoV'lerden şiddet-

<sup>1</sup> Doktor Öğretim Üyesi, Sakarya Üniversitesi Tıp Fakültesi Çocuk Hematolojisi ve Onkolojisi BD, forhan@sakarya.edu.tr

<sup>2</sup> Doçent Doktor, Sakarya Üniversitesi Tıp Fakültesi Çocuk Sağlığı ve Hastalıkları AD, bahrielmaz@gmail.com

en alt seviyede olmalıdır. Plato basıncı düşük olmalı ancak yeterli PEEP ve driving basıncı maksimum 15 cmH<sub>2</sub>O olacak şekilde devam edilmelidir. Solunum hızı; pH>7,25 ve FiO<sub>2</sub><%60 olacak şekilde ayarlanmalıdır. Bu hastalarda açma manevralarının uygulanması önerilmemektedir[69]. Düşük komplianslı akciğer hasarı olan hastalarda ise akciğer koruyucu ventilasyon stratejileri izlenmelidir [74]. Basınç kontrollü modda tidal volüm 4-6 mL/kg ve PEEP 10 cmH<sub>2</sub>O'dan başlanıp 12 cmH<sub>2</sub>O basınca kadar çıkılabilir[75]. Plato basıncı <30 cmH<sub>2</sub>O, FiO<sub>2</sub><%60, inspiriyum zamanı yaşa uygun ve solunum sayısı pH>7,25 olacak şekilde ayarlanmalıdır. pH>7,20 olacak şekilde PCO<sub>2</sub> takibi yapılarak permisif hiperkapni önerilmektedir. Hedef oksijen satürasyonu %93-96 olarak belirlenmelidir[76].

Bazı hastalar wheezing veya alt hava yolu obstrüksiyon bulguları ile başvurabilirler. Gerekli ise bu bulgular için bronkodilatör ve magnezyum sülfat (50 mg/kg 30 dakikadan uzun sürede infüzyon) kullanılabilir[69]. Refrakter hipoksemi olduğu düşünülen hastalara prone pozisyonu, inhale nitrik oksid, yüksek frekanslı ossilatuar ventilasyon ve ECMO tedavileri denenebilir[69,77]. COVID-19'lu pediyatrik vakaların weaning ve ekstübasyon protokolleri diğer kritik hastalarda olduğu gibidir[78].

### Akılda kalması gerekenler

- COVID-19 çocuklarda erişkinlere göre daha hafif seyirlidir
- Yaşlara göre sıklığı değişmekle birlikte ateş, öksürük ve baş ağrısı en sık semptomlardır
- Tanıda SARS-CoV-2 PCR testi standart yöntemdir
- Erişkinlerden farklı olarak lenfopeni çocuklarda daha az sıklıkla görülmekte olup prognozla ilişkisi net değildir
- Trombositopeni ve D-dimer yüksekliği kötü prognoz ile ilişkilidir
- Toraks BT'de etrafında halo bulgusu ile birlikte görülen konsolidasyonlar pediyatrik COVID-19 için tipik işaretlerdir

- MIS-C genellikle enfeksiyondan 2-4 hafta sonra, sıklıkla 5 yaş üstü çocuklarda inatçı ateş ve hiperinflamasyon ile birlikte tekli veya çoklu organ disfonksiyonu ile karakterize bir tablodur
- Pediyatrik COVID-19 tedavisi büyük ölçüde destekleyici olup tedavide kullanılacak ilaç ve yöntemlerle ilgili bilimsel kanıt düzeyi yeterli veri bulunmamaktadır

### KAYNAKÇA

1. WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. Available: <https://www.who.int/director-general/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020>.
2. Streng A, Hartmann K, Armann J, Berner R, Liese JG. COVID-19 in hospitalized children and adolescents: A systematic review on published case series (as of 31.03.2020) and first data from Germany., *Monatsschr Kinderheilkd.* 2020;168: 615–627. doi:10.1007/s00112-020-00919-7.
3. Zimmermann P, Curtis N. Coronavirus infections in children including COVID-19: An overview of the epidemiology, clinical features, diagnosis, treatment and prevention options in children., *Pediatr Infect Dis J.* 2020;39: 355–368. doi:10.1097/INF.0000000000002660.
4. Bialek S, Gierke R, Hughes M, McNamara LA, Plishvili T, Skoff T. Coronavirus Disease 2019 in Children — United States, February 12–April 2, 2020., *MMWR Morb Mortal Wkly Rep.* 2020;69: 422–426. doi:10.15585/mmwr.mm6914e4.
5. 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 - Journal of the American Medical Association.* 2020. pp. 1239–1242. doi:10.1001/jama.2020.2648.
6. So W. South Korea: COVID-19 cases by age | Statista. In: Age distribution of coronavirus (COVID-19) cases in South Korea as of November 20, 2020. Available: <https://www.statista.com/statistics/1102730/south-korea-coronavirus-cases-by-age/>.
7. CDC COVID Data Tracker. In: Demographic Trends of COVID-19 cases and deaths in the US reported to CDC. 2020. Available: <https://covid.cdc.gov/covid-data-tracker/#demographics>.

8. S. C., Italy: coronavirus cases by age | Statista. In: Distribution of coronavirus cases in Italy as of December 16, 2020, by age group. Available: <https://www.statista.com/statistics/1103023/coronavirus-cases-distribution-by-age-group-italy/>.
9. Dong Y, Dong Y, Mo X, Hu Y, Qi X, Jiang F, et al. Epidemiology of COVID-19 among children in China. *Pediatrics*. 2020;145. doi:10.1542/peds.2020-0702.
10. Wu Q, Xing Y, Shi L, Li W, Gao Y, Pan S, et al. Coinfection and other clinical characteristics of COVID-19 in children. *Pediatrics*. 2020;146. doi:10.1542/peds.2020-0961.
11. de Lusignan S, Dorward J, Correa A, Jones N, Akinyemi O, Amirthalingam G, et al. Risk factors for SARS-CoV-2 among patients in the Oxford Royal College of General Practitioners Research and Surveillance Centre primary care network: a cross-sectional study. *Lancet Infect Dis*. 2020;20: 1034–1042. doi:10.1016/S1473-3099(20)30371-6.
12. Hobbs C V., Martin LM, Kim SS, Kirmse BM, Haynie L, McGraw S, et al. Factors Associated with Positive SARS-CoV-2 Test Results in Outpatient Health Facilities and Emergency Departments Among Children and Adolescents, Aged <math>\leq 18</math> Years — Mississippi, September–November 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69: 1925–1929. doi:10.15585/mmwr.mm6950e3.
13. Jiehao C, Jin X, Daojiong L, Zhi Y, Lei X, Zhenghai Q, et al. A case series of children with 2019 novel coronavirus infection: Clinical and epidemiological features. *Clin Infect Dis*. 2020;71: 1547–1551. doi:10.1093/cid/ciaa198.
14. Qiu H, Wu J, Hong L, Luo Y, Song Q, Chen D. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China.; an observational cohort study. *Lancet Infect Dis*. 2020;20: 689–696. doi:10.1016/S1473-3099(20)30198-5.
15. Cui Y, Tian M, Huang D, Wang X, Huang Y, Fan L, et al. A 55-day-old female infant infected with 2019 novel coronavirus disease: Presenting with pneumonia, liver injury, and heart damage., *J Infect Dis*. 2020;221: 1775–1780. doi:10.1093/infdis/jiaa113.
16. Hoang A, Chorath K, Moreira A, Evans M, Burmeister-Morton F, Burmeister F, et al. COVID-19 in 7780 pediatric patients: A systematic review. *EClinicalMedicine*. 2020;24. doi:10.1016/j.eclinm.2020.100433.
17. Zachariah P, Johnson CL, Halabi KC, Ahn D, Sen AI, Fischer A, et al. Epidemiology, Clinical Features, and Disease Severity in Patients with Coronavirus Disease 2019 (COVID-19) in a Children's Hospital in New York City, New York., *JAMA Pediatr*. 2020;174. doi:10.1001/jamapediatrics.2020.2430.
18. Stokes EK, Zambrano LD, Anderson KN, Marder EP, Raz KM, El Burai Felix S, et al. Coronavirus Disease 2019 Case Surveillance — United States, January 22–May 30, 2020., *MMWR Morb Mortal Wkly Rep*. 2020;69: 759–765. doi:10.15585/mmwr.mm6924e2.
19. Umut S, Bartu Saryal S. *Türk Toraks Derneği Çocuklarda Toplumda Gelişen Pnömoni Tanı ve Tedavi Uzlaşma Raporu*. 2009. Available: [www.toraks.org.tr](http://www.toraks.org.tr).
20. T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü COVID-19 (SARS-COV-2 Enfeksiyonu) Çocuk Hasta Yönetimi ve Tedavi, *Bilimsel Danışma Kurulu Çalışması 2020*, Ankara., <https://covid19.saglik.gov.tr/Eklenti/38596/0/covid-19rehbercocukhastayonetimivedavipdf.pdf>.
21. Çavdaroğlu PD, Elmas B, Özdemir Ö, Orhan F, Tarihi G. Evaluation of Electrocardiographic Changes and Laboratory Parameters in Pediatric COVID-19. *Sak Med J*. 2020;10: 541–548. doi:10.31832/smj.784180.
22. Sevimli Dikicier B, Yıldız M. COVID 19 Enfeksiyonu: Dermatolojik bulgu var mı? *Journal of Biotechnology and Strategic Health Research*. 2020. pp. 135–139. doi:10.34084/bshr.722598.
23. Orhan MF, Büyükavcı M. COVID-19'un Tanı ve Tedavi Sürecinde Hematolojik Parametreler. *J Biotechnol Strateg Heal Res*. 2020;4: 123–127. doi:10.34084/bshr.718051.
24. Ünüvar A. COVID-19 ve Koagülopati. *Sağlık Bilimlerinde İleri Araştırmalar Dergisi*. İstanbul: İstanbul Üniversitesi; 2020. pp. 53–62.
25. Devicioğlu Ö. COVID-19 ve Hemofagositik Lenfositiositoz. *Sağlık Bilimlerinde İleri Araştırmalar Dergisi*. İstanbul: İstanbul Üniversitesi; 2020. pp. 49–52.
26. Morris SB, Schwartz NG, Patel P, Abbo L, Beauchamps L, Balan S, et al. Case Series of Multisystem Inflammatory Syndrome in Adults Associated with SARS-CoV-2 Infection -United Kingdom and United States, March-August 2020., *MMWR Morb Mortal Wkly Rep*. 2020;69: 1450-1456. doi:10.15585/mmwr.mm6940e1.
27. Godfred-Cato S, Bryant B, Leung J, Oster ME, Conklin L, Abrams J, et al. COVID-19-Associated Multisystem Inflammatory Syndrome in Children-United States, March-July 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69: 1074-1080. doi:10.15585/mmwr.mm6932e2.
28. Küçük Biçer B, İlhan MN. COVID-19'un Çocukların Sağlığı Üzerine Etkisi. *Gazi Sağlık Bilimleri Dergisi*. Gazi Üniversitesi; 2020. pp. 103–111.
29. Qu JM, CAO B, Chen RC (2021). COVID-19 The Essentials of Prevention and Treatment (First Edit.). Cambridge: Elsevier Inc.

30. Li W, Liu L, Chen L, Shang S. Evaluation of a Commercial Colloidal Gold Assay for Detection of Influenza A and B Virus in Children's Respiratory Specimens. *Fetal Pediatr Pathol.* 2020; 39(2):93-98. doi: 10.1080/15513815.2019.1639088.
31. Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, et al. Detection of SARS-CoV-2 in Different Types of Clinical Specimens. *JAMA.* 2020;323(18):1843-4. doi:10.1001/jama.2020.3786.
32. Loeffelholz MJ, Tang YW. Laboratory diagnosis of emerging human coronavirus infections - the state of the art. *Emerg Microbes Infect.* 2020;9(1):747-756. doi: 10.1080/22221751.2020.1745095.
33. Centers for Disease Control and Prevention. Interim Guidelines for COVID-19 Antibody Testing. 07/09/2020 tarihinde [https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antibody-tests-guidelines.html?deliveryName=USCDC\\_2067-DM29085](https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antibody-tests-guidelines.html?deliveryName=USCDC_2067-DM29085), adresinden ulaşılmıştır.
34. Cheng MP, Yansouni CP, Basta NE, Desjardins M, Kanjilal S, Paquette K, et al. Serodiagnostics for Severe Acute Respiratory Syndrome-Related Coronavirus 2: A Narrative Review. *Ann Intern Med.* 2020;173(6):450-60. doi:10.7326/M20-2854.
35. Rostad CA, Chahroudi A, Mantus G, Lapp SA, Teherani M, Macoy L, et al. Quantitative SARS-CoV-2 Serology in Children With Multisystem Inflammatory Syndrome (MIS-C). *Pediatrics.* 2020:e2020018242. doi:10.1542/peds.2020-018242.
36. Henry BM, Benoit SW, de Oliveira MHS, Hsieh WC, Benoit J, Ballout RA, et al. Laboratory abnormalities in children with mild and severe coronavirus disease 2019 (COVID-19): A pooled analysis and review., *Clin Biochem.* 2020 Jul; 81:1-8. doi: 10.1016/j.clinbiochem.2020.05.012.
37. Üstündağ G, Yılmaz Çiftdoğan D. COVID-19 tanımlı çocuklarda laboratuvar ve görüntüleme bulguları. *Tepecik Eğit. ve Araşt. Hast. Dergisi.* 2020;30(Ek sayı):85-9.
38. Lippi G, Plebani M. The critical role of laboratory medicine during coronavirus disease 2019 (COVID-19) and other viral outbreaks. *Clin Chem Lab Med.* 2020;19:/j/cclm.ahead-ofprint/cclm-2020-0240/cclm-2020-0240.xml.
39. Mehta P, McAuley DF, Brown M, Sanchez E, Tattersall RS, Manson JJ. HLH Across Speciality Collaboration, UK. COVID19: consider cytokine storm syndromes and immunosuppression. *Lancet.* 2020;395(10229):1033-4.
40. Lippi G, Plebani M, Henry BM. Thrombocytopenia is associated with severe coronavirus disease 2019 (COVID-19) infections: A meta-analysis. *Clin Chim Acta.* 2020; 506:145-148.
41. Perlman S. Another Decade, Another Coronavirus. *N Engl J Med.* 2020 Feb 20;382(8):760-762.
42. Hasan A, Mehmood N, Fergie J. Coronavirus Disease (COVID-19) and Pediatric Patients: A Review of Epidemiology, Symptomatology, Laboratory and Imaging Results to Guide the Development of a Management Algorithm. *Cureus.* 2020; 31:12(3):e7485.
43. Fan BE. Hematologic parameters in patients with COVID-19 infection. *Am J Hematol.* 2020.
44. Lippi G, Plebani M. Laboratory abnormalities in patients with COVID-2019 infection. *Clin Chem Lab Med.* 2020:/j/cclm.ahead-of-print/cclm-2020-0198/cclm-2020-0198.xml.
45. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet.* 2020;395(10223):497-506.
46. Henry B.M., Lippi G., Plebani M. Laboratory abnormalities in children with novel coronavirus disease 2019. *Clin. Chem. Lab. Med.* 2020 doi: 10.1515/cclm-2020-0272.
47. T. Nguyen Thi Dieu, A. Pham Nhat, T.J. Craig, S. Duong-Quy, Clinical characteristics and cytokine changes in children with pneumonia requiring mechanical ventilation. *J Int Med Res.* 2017;45:1805-1817. doi:10.1177/0300060516672766.
48. Cozzi D, Albanesi M, Cavigli E, Moroni C, Bindi A, Luvarà S, et al. Chest X-ray in new Coronavirus Disease 2019 (COVID-19) infection: findings and correlation with clinical outcome. *Radiol Med.* 2020;125(8):730-7. doi:10.1007/s11547-020-01232-9.
49. Borghesi A, Zigliani A, Masciullo R, Golemi S, Maculotti P, Farina D, et al. Radiographic severity index in COVID-19 pneumonia: relationship to age and sex in 783. *Italian patients. Radiol Med.* 2020;125(5):461-4. doi:10.1007/s11547-020-01202-1.
50. Ferranti JF, Rodriguez IS, Motta E, Johnston C, Carvalho WBB, Delgado AF. Beyond ventilatory support: challenges in general practice and in the treatment of critically ill children and adolescents with SARS-CoV-2 infection., *Rev Assoc Med Bras.* 2020;66(4):521-7.
51. Soldati G, Smargiassi A, Inchingolo R, Buonsenso D, Perrone T, Briganti DF, et al. Proposal for International Standardization of the Use of Lung Ultrasound for Patients With COVID-19: A Simple, Quantitative, Reproducible Method., *J Ultrasound Med.* 2020;39(7):1413-9. doi:10.1002/jum.15285.
52. Çiftçi E, Arga G. (2020). *Çocuklarda COVID-19.* Memikoğlu O, Genç V. (Ed.). COVID-19 içinde (s 127-135). Ankara: Ankara Üniversitesi Basımevi.
53. de Souza WM, Buss LF, Candido DDS, Carrera JP, Li S, Zarebski AE, et al. Epidemiological and clinical characteristics of the COVID-19 epidemic in Brazil.

- Nat Hum Behav.* 2020;4(8):856-65. doi:10.1038/s41562-020-0928-4.
54. Pan F, Ye T, Sun P, Gui S, Liang B, Li L, et al. Time Course of Lung Changes at Chest CT during Recovery from Coronavirus Disease 2019 (COVID-19). *Radiology.* 2020;295(3):715-21. doi:10.1148/radiol.2020200370.
  55. Li Y, Xia L. Coronavirus Disease 2019 (COVID-19): Role of Chest CT in Diagnosis and Management. *AJR Am J Roentgenol.* 2020;214(6):1280-6. doi:10.2214/AJR.20.22954.
  56. Xia W, Shao J, Guo Y, Peng X, Li Z, Hu D. Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults. *Pediatr Pulmonol.* 2020;55(5):1169-74. doi:10.1002/ppul.24718.
  57. Frerichs I, Amato MB, van Kaam AH, Tingay DG, Zhao Z, Grychtol B, et al. Chest electrical impedance tomography examination, data analysis, terminology, clinical use and recommendations: consensus statement of the TRanslational EIT developmeNt stuDY group., *Thorax.* 2017;72(1):83-93. doi:10.1136/thoraxjnl-2016-208357.
  58. van der Zee P, Somhorst P, Endeman H, Gommers D. Electrical Impedance Tomography for Positive End-Expiratory Pressure Titration in COVID-19-related Acute Respiratory Distress Syndrome., *Am J Respir Crit Care Med.* 2020;202(2):280-4. doi:10.1164/rccm.202003-0816LE.
  59. Whittaker E, Bamford A, Kenny J, Kaforou M, Jones CE, Shah P, et al. Clinical Characteristics of 58 Children With a Pediatric Inflammatory Multisystem Syndrome Temporally Associated With SARS-CoV-2., *JAMA.* 2020;324(3):259-69. doi:10.1001/jama.2020.10369.
  60. Centers for Disease and Control and Prevention (CDC). Information for Healthcare Providers about Multisystem Inflammatory Syndrome in Children (MIS-C). Available from: <https://www.cdc.gov/mis-c/hcp/index.html>.
  61. Kabeerdoss J, Pilania RK, Karkhele R, Kumar TS, Danda D, Singh S. Severe COVID-19, multisystem inflammatory syndrome in children, and Kawasaki disease: immunological mechanisms, clinical manifestations and management., *Rheumatol Int.* 2020 Nov 21:1-14. doi: 10.1007/s00296-020-04749-4.
  62. Feldstein LR, Rose EB, Horwitz SM, Collins JP, Newhams MM, Son MBF et al. Multisystem inflammatory syndrome in US Children and adolescents. *N Engl J Med* 2020;383(4):334-346.
  63. Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M et al. An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study. *Lancet* 2020; 395(10239):1771-1778.
  64. Pouletty M, Borocco C, Ouldali N, Caseris M, Basmaci R, Lachaume N et al. Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 mimicking Kawasaki disease (Kawa-COVID-19): a multicentre cohort., *Ann Rheum Dis* 2020;79(8):999-1006.
  65. Belhadjer Z, Méot M, Bajolle F, Khraiche D, Legendre A, Abakka S et al. Acute heart failure in multisystem inflammatory syndrome in children (MIS-C) in the context of global SARS-CoV-2 pandemic., *Circulation.* 2020 doi:10.1161/CIRCULATIONAHA.120.048360.
  66. Singh VK, Mishra A, Singh S, Kumar P, Singh M, Jagannath C, et al. Emerging Prevention and Treatment Strategies to Control COVID-19. *Pathogens.* 2020;9(6):501. doi:10.3390/pathogens9060501.
  67. COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. *National Institutes of Health.* 02/01/2021 tarihinde <https://files.covid19treatmentguidelines.nih.gov/guidelines/covid19treatmentguidelines>, adresinden ulaşılmıştır.
  68. Arsoy HEM, Özdemir Ö. Current Therapeutic Interventions for COVID-19. *Bezmialem Science* 2020;8(Supplement 3):105-16.
  69. Carlotti APCP, de Carvalho WB, Johnston C, Gilio AE, de Sousa Marques HH, Ferranti JF et al. Update on the diagnosis and management of COVID-19 in pediatric patients., *Clinics (Sao Paulo).* 2020; 30:75:e2353. doi: 10.6061/clinics/2020/e2353.
  70. Henderson LA, Canna SW, Friedman KG, Gorelik M, Lapidus SK, Bassiri H, et al. American College of Rheumatology Clinical Guidance for Multisystem Inflammatory Syndrome in Children Associated With SARS-CoV-2 and Hyperinflammation in Pediatric COVID-19.; Version 1. *Arthritis Rheumatol.* 2020;10.1002/art.41454. doi:10.1002/art.41454.
  71. Raouf S, Nava S, Carpati C, Hill NS. How I Do It: High Flow, Noninvasive ventilation and Awake (Nonintubation) Prone in Patients with Coronavirus Disease 2019 with Respiratory Failure., *Chest.* 2020;158(5):1992-2002. doi:10.1016/j.chest.2020.07.013.
  72. Agarwal A, Basmaji J, Muttalib F, Granton D, Chaudhuri D, Chetan D, et al. High-flow nasal cannula for acute hypoxemic respiratory failure in patients with COVID-19.; systematic reviews of effectiveness and its risks of aerosolization, dispersion, and infection transmission. *Can J Anaesth.* 2020;67(9):1217-48. doi:10.1007/s12630-020-01740-2.
  73. Ferioli M, Cisternino C, Leo V, Pisani L, Palange P, Nava S. Protecting healthcare workers from SARS-CoV-2 infection: practical indications. *Eur Respir Rev.* 2020;29(155):200068. doi:10.1183/16000617.0068-2020.

74. Pediatric Acute Lung Injury Consensus Conference Group. Pediatric acute respiratory distress syndrome: consensus recommendations from the Pediatric Acute Lung Injury Consensus Conference., *Pediatr Crit Care Med.* 2015;16(5):428-39. doi:10.1097/PCC.0000000000000350.
75. Brower RG, Lanken PN, MacIntyre N, Matthay MA, Morris A, Ancukiewicz M, et al. Higher versus lower positive end-expiratory pressures in patients with the acute respiratory distress syndrome., *N Engl J Med.* 2004;351(4):327-36. doi:10.1056/NEJMoa032193.
76. Palmer E, Post B, Klapaukh R, Marra G, MacCallum NS, Brealey D, et al. The Association between Supraphysiologic Arterial Oxygen Levels and Mortality in Critically Ill Patients. A Multicenter Observational Cohort Study., *Am J Respir Crit Care Med.* 2019;200(11):1373-80. doi:10.1164/rccm.201904-0849OC.
77. Shekar K, Badulak J, Peek G, Boeken U, Dalton HJ, Arora L, et al. Extracorporeal Life Support Organization Coronavirus Disease 2019 Interim Guidelines; A Consensus Document from an International Group of Interdisciplinary Extracorporeal Membrane Oxygenation Providers. *ASAIO J.* 2020;66(7):707-21. doi:10.1097/MAT.0000000000001193.
78. Houzé MH, Deye N, Mateo J, Mégarbane B, Bizouard F, Baud FJ, et al. Predictors of Extubation Failure Related to Aspiration and/or Excessive Upper Airway Secretions. *Respir Care.* 2020;65(4):475-481. doi:10.4187/respcare.07025.