

BAB 5

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Berdasarkan dari kajian pustaka pada 5 artikel ilmiah terkait efektivitas dan efek samping penggunaan Remdesivir pada pasien COVID- 19 yang dilaksanakan mulai dari bulan Januari 2022-Maret 2022 dapat disimpulkan bahwa :

1. Remdesivir (1x200 mg) i.v efektif dalam menurunkan CRP, D-Dimer, dan Feritin sekitar 52% pada penelitian yang dilakukan Qureshi *et al.*, 2021 dan 68,7% pada penelitian yang dilakukan Alsayed *et al.*, 2021 serta memiliki waktu pemulihan yang lebih singkat.
2. Remdesivir (1x200 mg) i.v dapat menurunkan GFR hingga 21 ml/menit/1,73m², peningkatan AST >5 batas atas normal dan ALT >3 batas atas normal dan terjadi peningkatan kreatinin dari 1,52 mg/dL menjadi 3,45 mg/dL.

5.2 Saran

1. Perlu dilaksanakan penelitian lebih lanjut terkait efektivitas Remdesivir pada pasien yang dirawat di Rumah Sakit dengan kondisi yang parah untuk mengetahui respon klinis
2. Perlu dilaksanakan kajian literatur dengan memperluas database yang digunakan sehingga artikel ilmiah yang digunakan semakin banyak
3. Perlu dilakukan penyesuaian dosis pada pasien COVID-19 yang memiliki gangguan disfungsi organ ginjal dan hati

DAFTAR PUSTAKA

- Abdelnabi R, Foo CS, Kaptein SJF, Zhang X, Langendries L, Vangeel L, et al. Molnupiravir (EIDD-2801) inhibits SARS-CoV2 replication in Syrian hamsters model. *bioRxiv*. 2020 Dec 10;2020.12.10.419242.
- Aung, H. H., Sivakumar, A., Gholami, S. K., Venkateswaran, S. P., & Gorain, B. (2019). An Overview of the Anatomy and Physiology of the Lung. *Nanotechnology-Based Targeted Drug Delivery Systems for Lung Cancer*, 1-20.
- Bangash MN, Patel J, Parekh D. COVID-19 and the liver: little cause for concern. *Lancet Gastroenterol Hepatol*. 2020; published online March 20. DOI: 10.1016/S2468-1253(20)30084-4.
- Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, Hohmann E, Chu HY, Luetkemeyer A, Kline S, Lopez de Castilla D, Finberg RW, Dierberg K, Tapson V, Hsieh L, Patterson TF, Paredes R, Sweeney DA, Short WR, Touloumi G, Lye DC, Ohmagari N, Oh MD, Ruiz-Palacios GM, Benfield T, Fätkenheuer G, Kortepeter MG, Atmar RL, Creech CB, Lundgren J, Babiker AG, Pett S, Neaton JD, Burgess TH, Bonnett T, Green M, Makowski M, Osinusi A, Nayak S, Lane HC; ACTT-1 Study Group Members. Remdesivir for the Treatment of Covid-19 - Final Report. *N Engl J Med*. 2020 Nov 5; **383(19)**:1813-1826. doi: 10.1056/NEJMoa2007764. Epub 2020 Oct 8. PMID: 32445440; PMCID: PMC7262788.
- Berhandus, C., Ongkowijaya, J. A., & Pandelaki, K. (2021). Hubungan kadar vitamin D dan kadar C-reactive protein dengan klinis pasien coronavirus disease 2019. *e-CliniC*, **9(2)**.
- Bohn, M. K., Hall, A., Sepiashvili, L., Jung, B., Steele, S., & Adeli, K. (2020). Pathophysiology of COVID-19: mechanisms underlying disease severity and progression. *Physiology*, **35(5)**: 288-301.
- Buckland, M. S., Galloway, J. B., Fhogartaigh, C. N., Meredith, L., Provine, N.M., Bloor, S., ... & Thaventhiran, J. E. (2020). Treatment of COVID-19 with remdesivir in the absence of humoral immunity: a case report. *Naturecommunications*, **11(1)**, 1-11.

- Cai H. Sex difference and smoking predisposition in patients with COVID-19. *Lancet Respir Med.* 2020; published online March 11. DOI: 10.1016/S2213-2600(20)30117-X
- CDC. Influenza antiviral drug baloxavir marboxil [Internet]. 2020 [cited 2021 Mar 29].
- CDC. Influenza antiviral medications: Clinician summary [Internet]. 2021[cited 2021 Mar 29].
- Chandwani A, Shuter J. Lopinavir/ritonavir in the treatment of HIV-1 infection:A review. *Ther Clin Risk Manag.* 2008 Oct;4(5):1023–33.
- Chen J, Qi T, Liu L, Ling Y, Qian Z, Li T, et al. Clinical progression of patientswith COVID-19 in Shanghai, China. *J Infect.* 2020; published online March 19. DOI: 10.1016/j.jinf.2020.03.004.
- Devaux CA, Rolain JM, Colson P, Raoult D. New insights on the antiviral effects of chloroquine against coronavirus: What to expect for COVID-19? *Int J Antimicrob Agents.* 2020 May 1;55(5):105938.
- Diaz JH. Hypothesis: angiotensin-converting enzyme inhibitors and angiotensin receptor blockers may increase the risk of severe COVID-19. *J Travel Med* 2020; published online March 18. DOI: 10.1093/jtm/taaa041
- European Society of Cardiology. Position Statement of the ESC Council on Hypertension on ACE Inhibitors and Angiotensin Receptor Blockers [Internet]. 2020 [updated 2020 March 13; cited 2020 March 22]. Available from: [https://www.escardio.org/Councils/Council-on-Hypertension-\(CHT\)/News/position-statement-of-the-esc-council-on-hypertension-on-ace-inhibitors-and-ang](https://www.escardio.org/Councils/Council-on-Hypertension-(CHT)/News/position-statement-of-the-esc-council-on-hypertension-on-ace-inhibitors-and-ang)
- Fang L, Karakiulakis G, Roth M. Are patients with hypertension and diabetes mellitus at increased risk for COVID-19 infection? *Lancet Respir Med.* 2020; published online March 11. DOI: 10.1016/S2213-2600(20)30116-8.
- Frediansyah, A., Tiwari, R., Sharun, K., Dhama, K., & Harapan, H. (2021). Antivirals for COVID-19: A critical review. *Clinical Epidemiology and global health,* 9, 90-98
- Gao K, Nguyen DD, Wang R, Wei G. Machine intelligence design of

- 2019-nCoV drugs.bioRxiv. [PrePrint] 2020.
- Ginanjar E, et al. Pedoman Standar Perlindungan Dokter Di Era Covid-19. Ikatan Dokter Indonesia. 2020.
- Good SS, Moussa A, Zhou XJ, Pietropaolo K, Sommadossi J-P. Preclinical evaluation of AT-527, a novel guanosine nucleotide prodrug with potent, pan-genotypic activity against hepatitis C virus. PLOS ONE. 2020 Jan 8;15(1):e0227104.
- Grein, J., Ohmagari, N., Shin, D., Diaz, G., Asperges, E., Castagna, A., ... & Flanigan, T. (2020). Compassionate use of remdesivir for patients with severe Covid-19. *New England Journal of Medicine*, 382(24), 2327-2336.
- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *New Engl J Med*. 2020; published online February 28. DOI: 10.1056/NEJMoa2002032.
- Gunardi, W. D. (2021). Pemeriksaan Diagnosis Laboratorium COVID-19:Keterbatasan dan Tantangannya Saat Ini. *Jurnal Kedokteran Meditek*, 27(2): 173-182.
- Handayani, D., Hadi, D. R., Isbaniah, F., Burhan, E., & Agustin, H. (2020). Corona virus disease 2019. *Jurnal Respirologi Indonesia*, 40(2): 119-129.
- Hoffmann M, Kleine-Weber H, Krüger N, Müller M, Drosten C, Pöhlmann S. The novel coronavirus 2019 (2019-nCoV) uses the SARS-1 coronavirus receptor ACE2 and the cellular protease TMPRSS2 for entry into target cells. bioRxiv. [PrePrint] 2020.
- Hopkins J. Coronavirus COVID-19 Global Cases by The Centre for Systems Science and Engineering (CSSE). ArcGIS. 2021. Diakses pada tanggal 22 Februari 2021.
- 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.
- Hussain Alsayed, H. A., Saheb Sharif-Askari, F., Saheb Sharif-Askari, N., Hussain, A. A. S., Hamid, Q., & Halwani, R. (2021). Early administration of remdesivir to COVID-19 patients associates with higher recovery rate and lower need for ICU admission: A retrospective cohort study. *PloS one*, 16(10),

e0258643

- Ison MG, Portsmouth S, Yoshida Y, Shishido T, Mitchener M, Tsuchiya K, et al. Early treatment with baloxavir marboxil in high-risk adolescent and adult outpatients with uncomplicated influenza (CAPSTONE-2): A randomised, placebo-controlled, phase 3 trial. *Lancet Infect Dis.* 2020 Oct 1; **20(10)**:1204–14.
- Khaedir Y. Perspektif Sains Pandemi Covid-19: Pendekatan Aspek Virologi dan Epidemiologi Klinik. MAARIF: Universitas Indonesia. 2020.
- Khanal, P. (2020). Remdesivir for COVID-19 treatment: mechanism OF action, synthesis, and clinical trials. *J PHARM PHARM SCI.*
- Łagocka R, Dziedziejko V, Kłos P, Pawlik A. Favipiravir in therapy of viral infections. *J Clin Med.* 2021 Jan; **10(2)**:273.
- Levani, Y., Prasty, A. D., & Mawaddatunnadila, S. (2021). Coronavirus Disease 2019 (COVID-19): Patogenesis, Manifestasi Klinis dan Pilihan Terapi. *Jurnal Kedokteran dan Kesehatan*, **17(1)**: 44-57.
- Liang W, Guan W, Chen R, Wang W, Li J, Xu K, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol.* 2020; **21(3)**:335-7.
- Li G, Fan Y, Lai Y, Han T, Li Z, Zhou P, et al. Coronavirus infections and immune responses. *J Med Virol.* 2020; **92(4)**:424– 32.
- Liu, X., Liu, C., Liu, G., Luo, W., & Xia, N. (2020). COVID-19: Progress in diagnostics, therapy and vaccination. *Theranostics*, **10(17)**, 7821.
- Li X, Geng M, Peng Y, Meng L, Lu S. Molecular immune pathogenesis and diagnosis of COVID-19. *J Pharm Anal* [Internet]. 2020; **10(2)**:102–8.
- Lukito, J. I. (2020). Tinjauan Antivirus untuk Terapi COVID-19. *Cermin Dunia Kedokteran*, **47(7)**: 340-345.
- Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *Lancet.* 2020; **395**:565-74.
- Magagnoli J, Narendran S, Pereira F, Cummings TH, Hardin JW, Sutton SS, et al. Outcomes of hydroxychloroquine usage in United States

- veterans hospitalized with COVID- 19. *Med N Y N*. 2020 Dec 18;1(1):114-127.e3.
- Mahendro, D. S. (2021). Penggunaan Antivirus untuk COVID-19. *Cermin Dunia Kedokteran*, 48(7): 419-422.
- nstiati, Darmayani IGAAPS, Marzuki JE, Angelia F, William, Siane A, et al. Antiviral treatment of COVID-19: A clinical pharmacology narrative review. *Med J Indones*. 2020 Jul 18;29(3):332-45.
- Pardo J, Shukla AM, Chamarthi G, Gupte A. The journey of remdesivir: From Ebola to COVID-19. *Drugs Context*. 2020 May22;9:1-9.
- Pasquini, Z., Montalti, R., Temperoni, C., Canovari, B., Mancini, M., Tempesta, M., ... & Barchiesi, F. (2020). Effectiveness of remdesivir in patients with COVID-19 under mechanical ventilation in an Italian ICU. *Journal of Antimicrobial Chemotherapy*, 75(11): 3359-3365.
- Penyusun, T. (2020). Protokol Tatalaksana COVID-19. *Jakarta: PDPI, PERKI, PAPDI, PERDATIN, IDAI*, 50.
- Perhimpunan Dokter Paru Indonesia, 2020, *Pedoman Tata Laksana Covid-19* Edisi 3, Jakarta: Perhimpunan Dokter Paru Indonesia.
- Prevention CfDCa. Interim US Guidance for Risk Assessment and Public Health Management of Persons with Potential Coronavirus Disease 2019 (COVID-19) Exposures: Geographic Risk and Contacts of Laboratory- confirmed Cases [Internet]. 2020 [updated 2020 March 7; cited 2020 March 20]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/php/risk-assessment.html>.
- Pshenichnaya N, Bulgakova V, Selkova E, Maleyev V, Lvov N, Leneva I, et al. Umifenovir in treatment of influenza and acute respiratory viral infections in outpatient care. *Int J Infect Dis*. 2019 Feb 1;79:103.
- Purwaniati, P., & Asnawi, A. (2020). Target Kerja Obat Covid-19. *JurnalFarmagazine*, 7(2): 30-42.
- Qureshi, Q. H., Ashraf, T., Rehman, K., Khosa, M. K., & Akash, M. S. H. (2021). Therapeutic interventions of remdesivir in diabetic and nondiabetic COVID-19 patients: a prospective observational study conducted on Pakistani population. *Journal of Medical Virology*, 93(12), 6732-6736.

- Rejo, R., Iswahyuni, S., Sunaryati, S. S. H., Widiyanto, A., Darmayanti, A. T., & Atmojo, J. T. (2021). Efek Remdesivir pada Pasien Covid-19. *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, **11**(2): 247-254.
- Ridwan, M., Suhar, A. M., Ulum, B., & Muhammad, F. (2021). Pentingnya Penerapan Literature Review pada Penelitian Ilmiah. *Jurnal Masohi*, **2**(1), 42-51.
- Rostami, M., & Mansouritorghabeh, H. (2020). D-dimer level in COVID-19 infection: a systematic review. *Expert review of hematology*, **13**(11), 1265-1275.
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun*. 2020; published online March 3. DOI:10.1016/j.jaut.2020.102433.
- Shakir, A., Bhasin, N., Swami, R., Mehta, K., Sinha, S., Ali, S. S., & Bansode, J. (2021). Renal and Hepatic Outcomes after Remdesivir Therapy in Coronavirus Disease-2019- Positive Patients with Renal Dysfunction at Baseline or after Starting Therapy. *Saudi Journal of Kidney Diseases and Transplantation*, **32**(4), 1034.
- Sheahan TP, Sims AC, Zhou S, Graham RL, Pruijssers AJ, Agostini ML, et al. An orally bioavailable broad-spectrum antiviral inhibits SARS-CoV-2 in human airway epithelial cell cultures and multiple coronaviruses in mice. *SciTransl Med* [Internet]. 2020 Apr 6 [cited 2021 May 11]
- Singh, A. K., Singh, A., Singh, R., & Misra, A. (2020). Remdesivir in COVID-19: a critical review of pharmacology, pre-clinical and clinical studies. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, **14**(4):641-648.
- Sisay M. 3CLpro inhibitors as a potential therapeutic option for COVID-19: Available evidence and ongoing clinical trials. *Pharmacol Res*. 2020 Jun; **156**:104779.
- Srinivas, P., Sacha, G., & Koval, C. (2020). Antivirals for COVID-19. *Cleveland Clinic journal of medicine*.
- Susilo, A., Rumende, C. M., Pitoyo, C. W., Santoso, W. D., Yulianti, M., Herikurniawan, H., ... & Yunihastuti, E. (2020). Coronavirus disease 2019: Tinjauan literatur terkini. *Jurnal Penyakit Dalam*

Indonesia, **7(1)**: 45-67.

- Tanjung, M. S., & Sitepu, R. (2021). EPIDEMIOLOGI DESKRIPTIF CORONAVIRUS DISEASE 2019 (COVID-19) DI INDONESIA PADA TAHUN 2020. *Ibnu Sina: urnal Kedokteran dan Kesehatan-Fakultas Kedokteran Universitas Islam Sumatera Utara*, **20(2)**: 179-191.
- Tan Q, Duan L, Ma Y, Wu F, Huang Q, Mao K, et al. Is oseltamivir suitable for fighting against COVID-19: In silico assessment, in vitro and retrospective study. *Bioorganic Chem*. 2020 Nov; **104**:104257.
- van Laar, S. A., de Boer, M. G., Gombert-Handoko, K. B., Guchelaar, H. J., Zwaveling, J., & LUMC-Covid-19 research group. (2021). Liver and kidney function in patients with Covid-19 treated with remdesivir. *British journal of clinical pharmacology*, **87(11)**, 4450-4454.
- Vargas-Vargas, M., & Cortés-Rojo, C. (2020). Ferritin levels and COVID-19. *Revista Panamericana de Salud Pública*, **44**, e72.
- Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. *Lancet*. 2020; **395(10223)**:4703.
- Wang J, Zhou M, Liu F. Exploring the reasons for healthcare workers infected with novel coronavirus disease 2019 (COVID-19) in China. *J Hosp Infect*. 2020; published online March 5. DOI: 10.1016/j.jhin.2020.03.002.
- Wang, Y., Zhang, D., Du, G., Du, R., Zhao, J., Jin, Y., ... & Wang, C. (2020). Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial. *The lancet*, **395(10236)**, 1569-1578.
- WHO Indonesia. Corona Virus Disease 2019 (COVID-19) – Situation Report 40. Diakses pada tanggal 27 Januari 2021.
- World Health Organization. Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases. Geneva: World Health Organization; 2020.
- World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). Geneva: World Health Organization; 2020.
- Wijaya, W. S., Devantoro, M. R., & Anggriani, H. A. (2021). Stroke

- Large Vessel Occlusion pada Serologi COVID-19 Positif. *SCRIPTA SCORE Scientific Medical Journal*, **2(2)**:145-55.
- Xia Y, Jin R, Zhao J, Li W, Shen H. Risk of COVID-19 for cancer patients. *Lancet Oncol*. 2020; published online March 3. DOI: 10.1016/S1470-2045(20)30150-9.
- Yavuz S, Ünal S. Antiviral treatment of COVID-19. *Turk J Med Sci*. 2020 Apr 21; **50(SI-1)**:611–9.
- Yuliana, Y. (2020). Corona virus diseases (Covid-19): Sebuah tinjauan literatur. *Wellness And Healthy Magazine*, **2(1)**:187-192.
- Yusra, Y., & Pangestu, N. (2020). Pemeriksaan Laboratorium pada Coronavirus Disease 2019 (COVID-19). *Medica Hospitalia: Journal of Clinical Medicine*, **7(1A)**, 304-319.
- Zhang T, Wu Q, Zhang Z. Probable Pangolin Origin of SARS-CoV-2 Associated with the COVID-19 Outbreak. *Curr Biol [Internet]*. 2020; **30(7)**:134