



Research Paper

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Effect Of COVID -19 On Children and Teens Patients with Chronic Liver Disease and Determination Concentration of Liver Enzymes and Vitamin D3 In Pediatric Teaching Hospital in Iraq.

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CitationRazoqi, R. A. (2024). Effect Of COVID -19 On Children and Teens Patients with Chronic Liver Disease and Determination Concentration of Liver Enzymes and Vitamin D3 In Pediatric Teaching Hospital in Iraq. *Indiana Journal of Agriculture and Life Sciences*, 4(3), 1-6.**Abstract:** The global pandemic caused by novel Corona virus (SARS-CoV-2) disease (COVID-19) is a major threat to the general population and for patients with chronic hepatitis C. we report data concerning SARS CoV-2 infection in children and teens with chronic liver disease (CLD). Hepatitis C is caused by infection with hepatitis C virus (HCV). The virus is passed from person to person through contact with blood infected with HCV the children get the liver disease (hepatitis C) not just only happens in adult too. Most kids get it when they are newborns but teens who inject illicit drugs or have unsafe contact, if pregnant and have hepatitis C you can pass the virus that causes the disease to your baby during childbirth whether their deliver vaginally or through a C-section.**Keywords:** SARS-CoV-2, COVID-19, Chronic,liver,disease,(CLD), Hepatitis,C,(HCV), Children, Teens, Global,pandemic, Infection**Copyright © 2024The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0).**INTRODUCTION**

Chronic HCV infection leads to a progressive disease, with 10%-20% of infected patients developing cirrhosis and approximately 7% of adult patients with cirrhosis progressing to hepatocellular carcinoma. Data reporting liver disease progression in the pediatric population infected with HCV are limited. This progression is usually described as a mild disease in children and adolescents; however, severe cases have also been described occasionally. Liver fibrosis and inflammation in children suffering from CHC is a time-dependent process, with approximately 2% of infected children developing advanced liver disease during childhood. In the case of vertical HCV transmission, the progression of liver disease may occur at a younger age than in children infected horizontally in the later years of life, resulting in severe liver disease in their teens or in young adulthood. Thus, effective antiviral treatment in children with CHC could prevent the development of end-stage liver disease, cirrhosis, and hepatocellular carcinoma in young adults. In the December 2019, an outbreak of novel coronavirus (severe acute respiratory infection syndrome coronavirus 2 SARS CoV-2, previously 2019-nCoV) started in Wuhan, China, and has since become a global threat to human health. The number of confirmed cases of 2019 coronavirus disease (COVID-19) situation report 41 most of these patients are in Wuhan. Many cases of COVID-19 are acute and resolve quickly. In Iraq 561771 was registered in

Baghdad al-Karkh health Directorate 320 cases in children and teens (male and female), (1 day to 16 years) from January to September 2021 most of them suffer from chronic hepatitis C and liver disease registered in Child Central Teaching Hospital in Baghdad.

MATERIAL AND METHOD

In this study it has been developed through examination to assess the Alanine transaminase enzyme (ALT), Aspartate transaminase enzymes (AST), alkaline phosphatase enzyme (ALK), lactate dehydrogenase phosphate enzyme (LDHP), total serum Bilirubin, direct serum bilirubin, High sensitive C-reactive protein (hsCRP), VIT. D3, ferritin, serum electrolyte {sodium (Na), potassium (K), Chloride (Cl)}, in children and teens with chronic liver disease as assay to measure concentration of in serum by using Atellica CH 1300 for biochemistry and 930 for hormones Analyzer (DALTA TRED). Samples were analyzed by (ATELLICA 1300) analyzer system for bio chemistry, and by (ATELLICA 930) analyzer for hormones from January to September 2021 and reported this data in (ILS) from department in laboratory and this result was correlation between chronic hepatic disease on COVID-19 and the results very high liver enzyme (GOT, GPT, ALK, LDH) and mild elevated Total serum Bilirubin and Direct serum bilirubin, very elevated hs.C-reactive protein and ferritin, severe low vitamin D3 and ferritin, imbalance in electrolyte result (very low potassium and elevated

Sodium and Chloride) normal result of serum blood sugar, blood urea nitrogen and serum creatinine . All these result examinations were reported in patient's serum in hematology unit and emergency room in Child Central Teaching Hospital in Baghdad.

RESULT

The result in this study was very clear in 320 patients with chronic liver disease were have covid-19 and 320 negative patients, male were 205 patients and female were 115 patients. Elevated enzyme of liver (ALT) as a Table (1) and figure (1).

Table 1. Mean ± SD of ALT in Serum levels in children and teens of chronic liver and hepatitis C with COVID -19 (p=0.000)

ALT	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Control	22.3590	7.26740	20.0032	24.7148	8.00	35.00
ALT of Hepititis C	254.7612	347.55807	169.9851	339.5373	26.00	1640.00

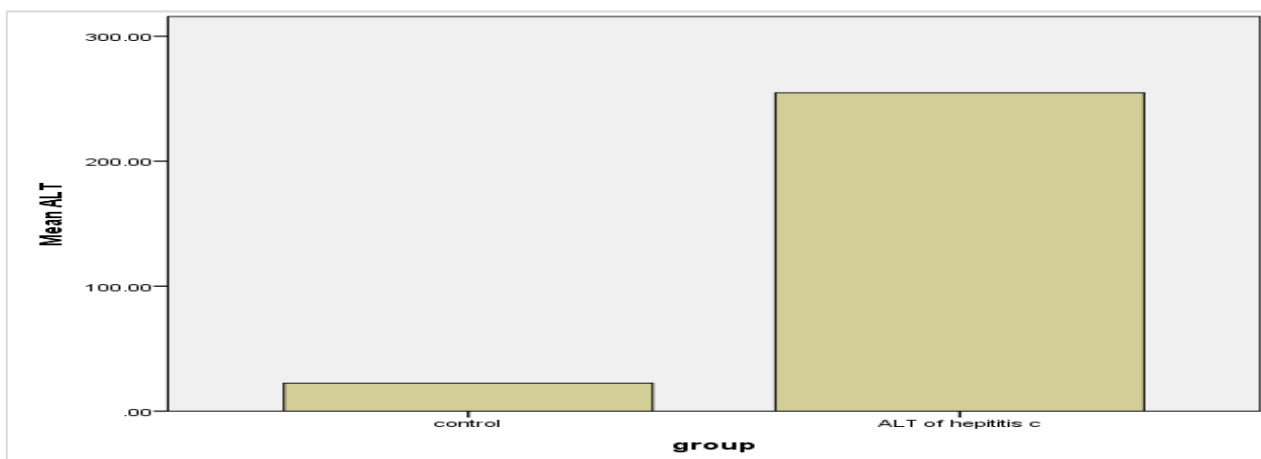


Figure 1. Concentration ALT in serum children and teens of chronic liver disease and hepatitis C with COVID -19 as statistical SPSS v. 20.

Elevated AST enzyme in patients with COVID-19 as a Table (2) and figure (2).

Table 2. Mean ± SD of AST levels in Serum children and teens of chronic liver and hepatitis C with COVID -19 (p=0.000).

AST	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Control	22.9500	7.55864	20.9974	24.9026	8.00	37.00
AST of Hepititis C	299.8852	428.81344	190.0610	409.7095	37.00	1929.00

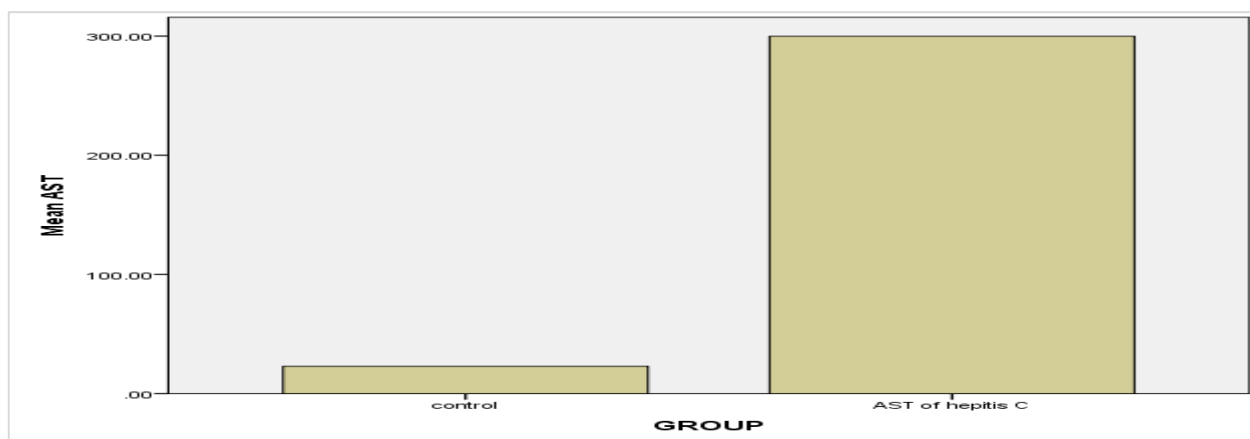


Figure 2. Concentration AST in serum children and teens of chronic liver disease and hepatitis C with COVID -19 As statistical SPSS v. 20.

Elevated ALK enzyme in patients with COVID-19 as a Table (3) and figure (3)

Table 3. Mean \pm SD of ALK. Levels in Serum children and teens of chronic liver and hepatitis C with COVID -19 (p=0.000).

ALK	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Control	105.9048	22.75161	100.1748	111.6347	71.00	147.00
ALK of Hepatitis C	310.5472	184.53586	259.6828	361.4116	120.00	713.00

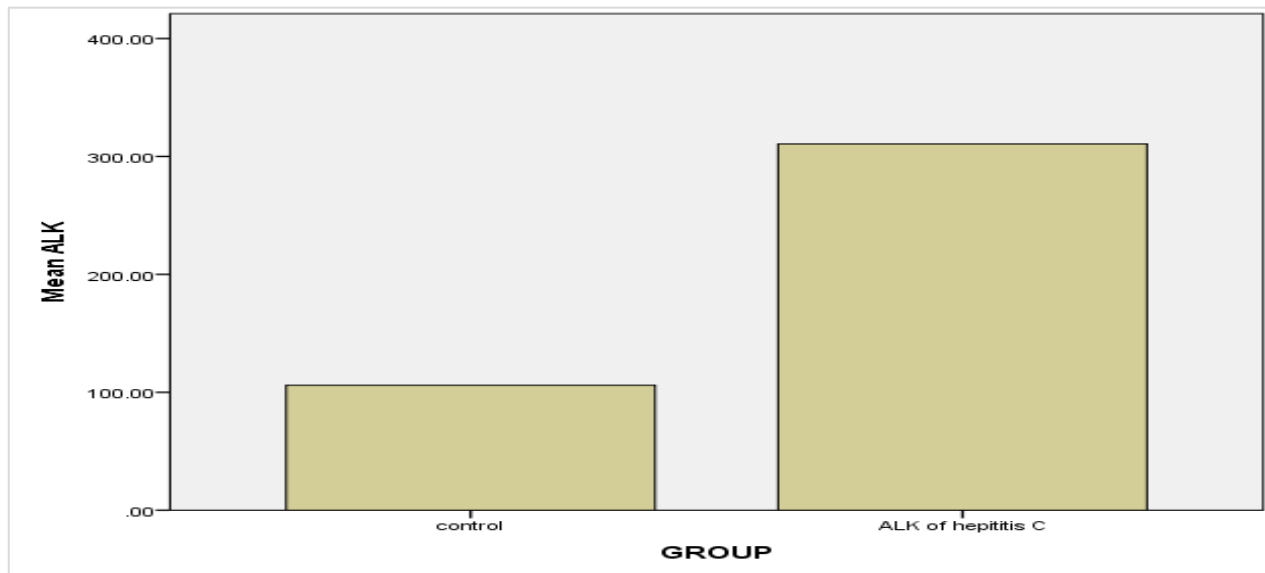


Figure 3. Concentration ALK in serum children and teens of chronic liver disease and hepatitis C with COVID -19 As statistical SPSS v. 20.

Elevated LDH enzyme in patients with COVID-19 as a Table (4) and figure (4)

Table 4. Mean \pm SD of LDHP. Levels in Serum children and teens of chronic liver and hepatitis C with COVID -19 (p=0.000).

LDHP	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
CONTROL	163.5410	33.14442	155.0523	172.0297	90.00	244.00
LDHP of Hepatitis C	357.8070	194.54566	306.1871	409.4269	110.00	1160.00

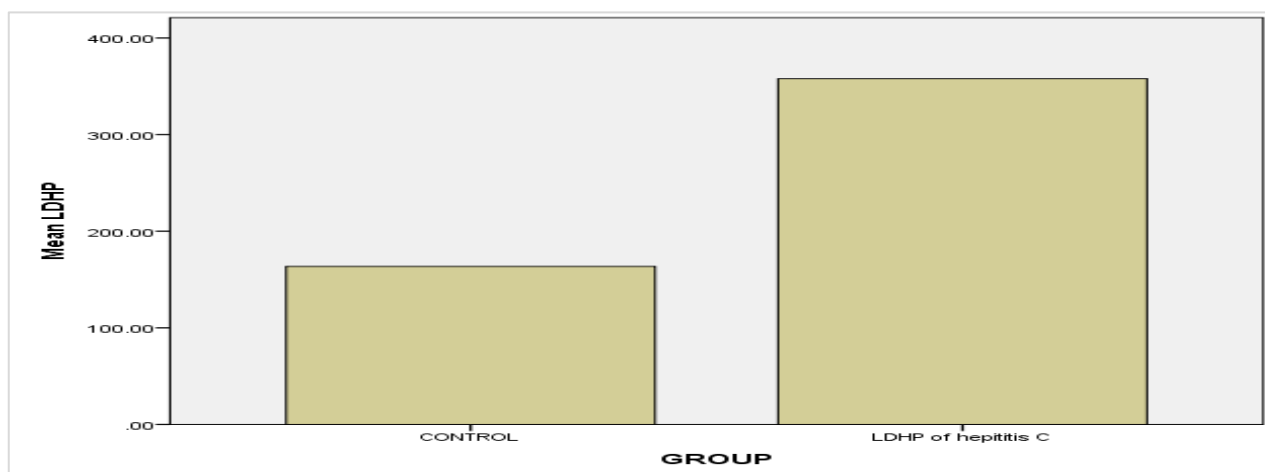


Figure 4. Concentration LDHP in serum children and teens of chronic liver disease and hepatitis C with COVID -19 As statistical SPSS v. 20.

Mild elevated in (T.SB, D.Bil) because we're take more of medicine or have chronic hepatitis C for long term or when the infected with COVID -19.

Also, a significant decreased in the results was observed in vitamin D3 as Table (5) and figure (5) in all patients were have COVID -19 ($p=0.000$).

Table 5. Mean \pm SD of VIT D3. Levels in Serum children and teens of chronic liver and hepatitis C with COVID -19 Vitamin

	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
control	24.2590	3.47464	23.3691	25.1489	18.00	32.00
Vitamin D3 of Patient with Hepatitis C	13.7719	5.18216	12.4559	15.0880	5.20	27.00



Figure 5. Concentration Vit D3 in serum children and teens of chronic liver disease and hepatitis C with COVID -19 As statistical SPSS v. 20.

DISSECTION

The term liver disease covers the diagnosis of various liver disease including chronic liver disease or chronic hepatitis C (CHC) or cirrhosis and liver cancer¹. Overall liver disease causes approximately two million deaths worldwide each year partly due to complication caused by cirrhosis and the rest due to viral hepatitis and liver carcinoma². The main feature that patients with liver disease have in common is advanced cirrhosis a condition in which chronic liver disease or chronic inflammation can scar tissue of the liver thus preventing self-health and impaired liver function the induced of cirrhosis a late-stage liver disease, in Iraq observed the child patients with COVID-19 by X-ray or CT scan to both of lungs and diagnosed by abnormal to both of lunges and liver. Such as liver function test such as liver enzymes and total bilirubin. As previously noted, the main entry point of SARSCoV2 to human cells is through angiotensin-converting enzyme 2 receptor, which appears predominately in the respiratory tract.

However, this enzyme is also found in a small percentage of hepatocytes (2.6%) and (59.7 %) of bile duct epithelial cells, allowing the virus to infect these cells and impair liver function. Besides the common finding related to COVID-19 and atypical pneumonia, elevated initial levels of alanine aminotransferase, decreased albumin level indicate liver dysfunction associated with higher mortality³. Referring to recently published research on topic, patients with severe COVID-19 indicating possible liver damage. In addition to sever respiratory symptoms the main effect of COVID-19 infection at the cellular level in child patients showed some form of depolarization or activation of specialized type of immune cell, hepatocyte macrophages (increased proportion of M1 pro inflammatory and M2-suppressive macrophage) which could play a role in development of infection COVID-19 virus. There is also needing long time to eliminate the virus and recover from it. Moreover, a weekend immune system is a pivotal factor that makes it difficult to combat COVID-19 in patients with liver disease. When people with liver disease develop

¹ Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., ... & Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*, 395(10223), 497-506.

² Kumar, D., Michaels, M. G., Morris, M. I., Green, M., Avery, R. K., Liu, C., ... & Humar, A. (2010). Outcomes from pandemic influenza A H1N1 infection in recipients

of solid-organ transplants: a multicentre cohort study. *The Lancet infectious diseases*, 10(8), 521-526.

³ Forster, P., Forster, L., Renfrew, C., & Forster, M. (2020). Phylogenetic network analysis of SARS-CoV-2 genomes. *Proceedings of the National Academy of Sciences*, 117(17), 9241-9243.

COVID-19 especially those with autoimmune liver disease, children's patients who had liver hepatitis C who are on immunosuppressive treatments they are at increased risk of liver cancer. The severity of corona virus 2019 infection is determined by the presence of pneumonia, severe acute respiratory distress syndrome (SARS-CoV-2), myocarditis microvascular thrombosis and or cytokine storms, all of which involve underlying inflammation.

A principle defense against uncontrolled inflammation, and against viral infection in general is provide T regulatory lymphocytes (T REGS)⁴. T REGS level have been reported to be low many COVID-19 children and teens patients and can increased vit. D3 by supplementation. Low vit. D3 levels have been associated with an increase in inflammation cytokines and significantly increased risk of pneumonia and viral upper respiratory tract infections⁵. Vit. D3 deficiency is associated with an increase in thrombotic episodes, which are frequently observed in covid -19 vitamin D3 deficiency has been found to occur more frequently in patients with severity COVID-19, if Vit. D3 dose in fact reduced the severity of COVID-19 in regard to pneumonia /ARDS inflammation, inflammatory of cytokines and thrombosis, it is our opinion that supplement would offer a relatively easy option to decrease the impact of the pandemic. develop symptoms to meet the criteria for severe disease course. Elevated LDH enzyme values were found to be associated with an increase odds of severe COVID-19 outcomes in all patient with chronic hepatic disease. Tests that measure the concentration of LDH in the blood are commonly used to monitor tissue damage associated with wide range of disorder including liver disease. The increase of LDH reflect tissue/cell destruction and is regarded as a common sign of tissue/cells damage, such as the pneumonia induced by SARS-CoV-2. we also know that serum LDH has been identified as an important biomarker for the activity and severity of idiopathic pulmonary fibrosis. More specifically in patients with severe pulmonary interstitial disease, these increase of LDH is significant and is one of the most important prognostic markers of lung injury⁶.

CONCLUSION

In this study it was been observed elevated liver enzyme (ALK, AST, APT, LDH, T.B, D.B) in serum chronic hepatic disease and chronic hepatitis C with COVID-19 and deficiency observed in the same VIT, D3 in serum of patients.

⁴ Dhochak, N., Singhal, T., Kabra, S. K., & Lodha, R. (2020). Pathophysiology of COVID-19: why children fare better than adults?. *The Indian Journal of Pediatrics*, 87, 537-546.

⁵ Singh, S., & Khan, A. (2020). Clinical characteristics and outcomes of coronavirus disease 2019 among patients with preexisting liver disease in the United

RECOMMENDATION

The pediatricians specializing in hematology recommended vaccinating children and teens with liver disease and chronic hepatitis C in order to enhance their immunity and prevent them from being infected for the second time with corona virus.

Giving children and teens VIT.D3 enhance their immunity and reduce symptoms of infection.

This study suggests that measuring plasma ACE2 is potentially valuable in predicting COVID-19 outcomes, further ACE2 could be a link between COVID-19 illness severity and its established risk hypertension, preexisting heart disease and pre-existing kidney disease.

Determination concentration of IL-6, Procalcitonin, in serum and D.dimer in blood of patients with chronic hepatic disease.

REFERENCES

1. Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., ... & Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*, 395(10223), 497-506.
2. Kumar, D., Michaels, M. G., Morris, M. I., Green, M., Avery, R. K., Liu, C., ... & Humar, A. (2010). Outcomes from pandemic influenza A H1N1 infection in recipients of solid-organ transplants: a multicentre cohort study. *The Lancet infectious diseases*, 10(8), 521-526.
3. Forster, P., Forster, L., Renfrew, C., & Forster, M. (2020). Phylogenetic network analysis of SARS-CoV-2 genomes. *Proceedings of the National Academy of Sciences*, 117(17), 9241-9243.
4. Dhochak, N., Singhal, T., Kabra, S. K., & Lodha, R. (2020). Pathophysiology of COVID-19: why children fare better than adults?. *The Indian Journal of Pediatrics*, 87, 537-546.
5. Singh, S., & Khan, A. (2020). Clinical characteristics and outcomes of coronavirus disease 2019 among patients with preexisting liver disease in the United States: a multicenter research network study. *Gastroenterology*, 159(2), 768-771.
6. Di Giorgio, A., Nicastro, E., Arnaboldi, S., Montini, O., Di Stasio, F., D'Antiga, L., ... & Camelli, V. (2021). Health status of children with chronic liver disease during the SARS-CoV-2 outbreak: results from a multicentre study. *Clinics and Research in Hepatology and Gastroenterology*, 45(2), 101610.

States: a multicenter research network study. *Gastroenterology*, 159(2), 768-771.

⁶ Di Giorgio, A., Nicastro, E., Speziani, C., De Giorgio, M., Pasulo, L., Magro, B., ... & D'Antiga, L. (2020). Health status of patients with autoimmune liver disease during SARS-CoV-2 outbreak in northern Italy. *Journal of hepatology*, 73(3), 702-705.

7. Di Giorgio, A., Nicastro, E., Speziani, C., De Giorgio, M., Pasulo, L., Magro, B., ... & D'Antiga, L. (2020). Health status of patients with autoimmune liver disease during SARS-CoV-2 outbreak in northern Italy. *Journal of hepatology*, 73(3), 702-705.
8. Heinz, N., Griesemer, A., Kinney, J., Vittorio, J., Lagana, S. M., Goldner, D., ... & Martinez, M. (2020). A case of an infant with SARS-CoV-2 hepatitis early after liver transplantation. *Pediatric Transplantation*, 24(8), e13778.
9. Morand, A., Roquelaure, B., Colson, P., Amrane, S., Bosdure, E., Raoult, D., ... & Fabre, A. (2020). Child with liver transplant recovers from COVID-19 infection. A case report. *Archives de Pédiatrie*, 27(5), 275-276.
10. Doná, D., Torres Canizales, J., Benetti, E., Cananzi, M., De Corti, F., Calore, E., ... & ERN TransplantChild. (2020). Pediatric transplantation in Europe during the COVID-19 pandemic: early impact on activity and healthcare. *Clinical transplantation*, 34(10), e14063.
11. Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., ... & Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The lancet*, 395(10223), 497-506.
12. Tan, C., Huang, Y., Shi, F., Tan, K., Ma, Q., Chen, Y., ... & Li, X. (2020). C-reactive protein correlates with computed tomographic findings and predicts severe COVID-19 early. *Journal of medical virology*, 92(7), 856-862.
13. Chen, G., Wu, D. I., Guo, W., Cao, Y., Huang, D., Wang, H., ... & Ning, Q. (2020). Clinical and immunological features of severe and moderate coronavirus disease 2019. *The Journal of clinical investigation*, 130(5), 2620-2629.
14. Tao, R. J., Luo, X. L., Xu, W., Mao, B., Dai, R. X., Li, C. W., ... & Xu, J. F. (2018). Viral infection in community acquired pneumonia patients with fever: a prospective observational study. *Journal of thoracic disease*, 10(7), 4387.