



A New Method for Energy Saving on Wireless Sensor Network Based on Clustering Method

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Keywords
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Physiological
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examination.

Abstract

The large spread of viral hepatitis and the infection of many age groups, young people and the elderly in conditions of lack of awareness of the seriousness of this disease, it would have been better to shed light on this disease. Samples were collected from patients suffering from hepatitis B virus after diagnosing the disease using the ELISA device, where the number of infected reached 20 patients. In contrast, samples were collected from 20 others who were not infected as a control, Many physiological tests were performed, including WBC count , CRP ,GOT ,GPT and alkaline phosphatase The concentrations of interleukin 10 and 2 were measured using an ELISA device and compared with the control. Result there was an increase in the number of white blood cells, which reached 9480 cells per ml in the infected when compared to the control group, which had 4700 cells per ml. The concentration of C-reactive protein in the infected was also higher, at 24 mg/ml, indicating that viral hepatitis has an effect on some physiological variables. compared to the control 6 mg / 100 ml, as well as for the other variables GOT and GPT, there was a rise in their concentrations when compared to the control , the effect of viral hepatitis on interleukin 2 and 10 concentrations, which increased to 10. 24 and 10. 5 in each case, respectively, when compared to control 2, 5, indicating that infection of liver cells with this virus stimulated immune cells to secrete these immunocytokines as part of an immune response.

Article History

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1. Introduction

Hepatitis is a dangerous liver illness caused by the hepatitis B virus. It is spread by contact with infected blood (HBV) (Zhang et al., 2021). Hepatitis B infection can develop chronic in certain persons, which implies that it lasts for longer than six months in some cases. When you have a chronic hepatitis B infection, you increase your chances of having liver failure (He et al., 2021). Despite the severity of hepatitis B's signs and symptoms, the vast majority of people who catch the virus

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recover fully. Infants and children are more likely than the general population to get chronic (long-term) hepatitis B infection (Abd El-Fattah, 2021; Ye et al, 2022). Hepatitis B infection can be avoided with vaccination, however there is no cure for the condition at the moment (Omran et al., 2021). Additionally, if you are infected with hepatitis B, taking certain precautions will help prevent the disease from spreading to others (Czaja, 2021; Shen et al, 2021). Hepatitis B signs and symptoms can range in severity from mild to severe (Ghanm et al., 2021; Li et al., 2021). They typically manifest between one and four months after infection, but may manifest as early as the second week, depending on the person. Certain individuals, often young toddlers, may exhibit no signs or symptoms (Hassanien, 2021) the act of sexual activity. If you have unprotected sexual contact with an infected individual, your chance of developing hepatitis B infection rises. The virus can be transmitted to you if a person's blood, saliva, sperm, or vaginal secretions come into contact with your body (Mostafa et al., 2021). Exchange needles. Hepatitis B virus spreads rapidly when contaminated needles and syringes are used (Şenol et al., 2021). By exchanging intravenous drug paraphernalia with others, you may increase your risk of developing hepatitis B (Ali et al., 2021). A mother's bond with her fetus. Pregnant women who are infected with the hepatitis B virus during their pregnancy can transmit the illness on to their unborn offspring. Vaccination, on the other hand, can practically always protect newborns from viral infection (Wungu et al., 2021). If you are pregnant or want to become pregnant, discuss the possibility of getting tested for hepatitis B with your doctor (Hussein and Mahseen, 2021).

2. Methodology

Samples were collected from patients suffering from hepatitis B virus after diagnosing the disease using the ELISA device, where the number of infected reached 20 patients. In contrast, samples were collected from 20 others who were not infected as a control.

2.1. Physiological parameters

Many physiological tests were performed, including WBC count , CRP ,GOT ,GPT and alkaline phosphatase.

2.2. Immunological tests

The concentrations of interleukin 10 and 2 were measured using an ELISA device and compared with the control.

3. Result

Table 1. The effect of hepatitis B virus infection on some physiological variables

Dependent Variable: concentration			
clinical case patient	physiological parameter	Mean	Std. Deviation
	WBC count	9480.00	460.435
	CRP	24.00	4.183
	GOT	90.00	6.124
	GOT	93.60	5.683
	alkaline phosphatase	90.60	7.956
	Total	1955.64	3844.453
control	WBC count	4700.00	273.861
	CRP	6.60	.894
	GOT	12.80	.837
	GOT	13.40	4.336
	alkaline phosphatase	19.40	3.507
	Total	950.44	1916.709

Symptoms do not always manifest themselves in patients; for example, in young toddlers, symptoms are only seldom observed. Symptoms emerge in people within 3 months of contracting the illness. A high body temperature, exhaustion, and lethargy, as well as nausea and vomiting, are common symptoms of this illness. Other symptoms include pains in the joints, yellowing of the skin, and yellowing of the eyes and skin pigmentation (yellowness). According to the findings in Table 1, there was an increase in the number of white blood cells, which reached 9480 cells per ml in the infected when compared to the control group, which had 4700 cells per ml. The concentration of C-reactive protein in the infected was also higher, at 24 mg/ml, indicating that viral hepatitis has an effect on some physiological variables. compared to the control 6 mg / 100 ml, as well as for the other variables GOT and GPT, there was a rise in their concentrations when compared to the control.

Table 2. ANOVA table of effect of hepatitis B virus infection on some physiological variables

Dependent Variable: concentration					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	454367781.100 ^a	9	50485309.010	1757.948	.000
Intercept	105566262.100	1	105566262.100	3675.921	.000
case	12630338.000	1	12630338.000	439.801	.000
parameter	397202370.900	4	99300592.730	3457.744	.000
case * parameter	44535072.200	4	11133768.050	387.689	.000
Error	1148732.800	40	28718.320		
Total	561082776.000	50			
Corrected Total	455516513.900	49			

Because there are no symptoms associated with chronic hepatitis B infection, many persons who have the virus are unaware that they are infected. Despite the fact that there are no symptoms, the virus can still be detected in the bloodstream. The first signs of hepatitis C may occur 30 years after the infection, and the liver progressively becomes destroyed over the course of those years. When symptoms develop, they are comparable to those of an acute sickness, but they suggest that the liver disease has progressed to an advanced state. Over the course of their lives, 15 percent to 20 percent of patients with chronic hepatitis B will develop

major liver disorders, such as liver damage, cirrhosis, liver failure, and liver cancer, among other things. Worldwide, about 600,000 people die each year as a result of illnesses connected to liver disease caused by the hepatitis B virus, according to the World Health Organization. There were significant differences between patients and non-infected patients, as well as significant differences between physiological variables compared with control, in the results of the analysis of variance for the effect of viral hepatitis on some physiological variables, as shown in Table 2. There was also a significant difference between the interaction between variables and the pathological condition, as shown in Table 2. is evident in the table of analysis of variance, and this may be interpreted as His assessment of the virus's action on liver cells, which resulted in a high quantity of liver enzymes in the bloodstream.

Table 3. The effect of hepatitis B virus infection on some immunological variables

Descriptive Statistics			
Dependent Variable: concentration pg./ml			
clinical case	immunological test	Mean	Std. Deviation
patient	interleukin 2	10.13	6.289
	interleukin 10	24.10	1.524
	Total	15.72	8.527
control	interleukin 2	2.20	.837
	interleukin 10	5.50	1.080
	Total	4.40	1.882
Total	interleukin 2	8.15	6.459
	interleukin 10	14.80	9.628
	Total	11.48	8.765

Cytokines, one of the earliest forms of cytokines to be characterized, are a category of molecules (proteins, glycoproteins, and peptides) released by immune system cells that act as messengers between cells and have an influence on other types of cells, including other immune cells. Initially, it was believed that the first kind of interleukin was one of the variables responsible for stimulating high temperatures, regulating lymphocyte activity, increasing the amount of immune cells generated by the bone marrow, and causing bone joint damage. This was then amended to incorporate other characteristics such as bone joint damage. Interleukin I exists in two separate forms, alpha and beta, and both are released prior to inflammation as a type of active immune response. It is generated by a variety of cells, including macrophages, monocytes, and fibroblasts. Additionally, these types increase the concentration of adhesion factors on endothelial cells, promoting the migration of white blood cells that attack pathogenic organisms to the site of injury, and stimulate the thermoregulation centers in the hypothalamus gland, resulting in an increase in body temperature, referred to as "fever." Increased body temperature helps the immune system fight infection and illness. This is demonstrated in Table 2 by the effect of viral hepatitis on interleukin 2 and 10 concentrations, which increased to 10.24 and 10.5 in each case, respectively, when compared to control 2, 5, indicating that infection of liver cells with this virus stimulated immune cells to secrete these immunocytokines as part of an immune response.

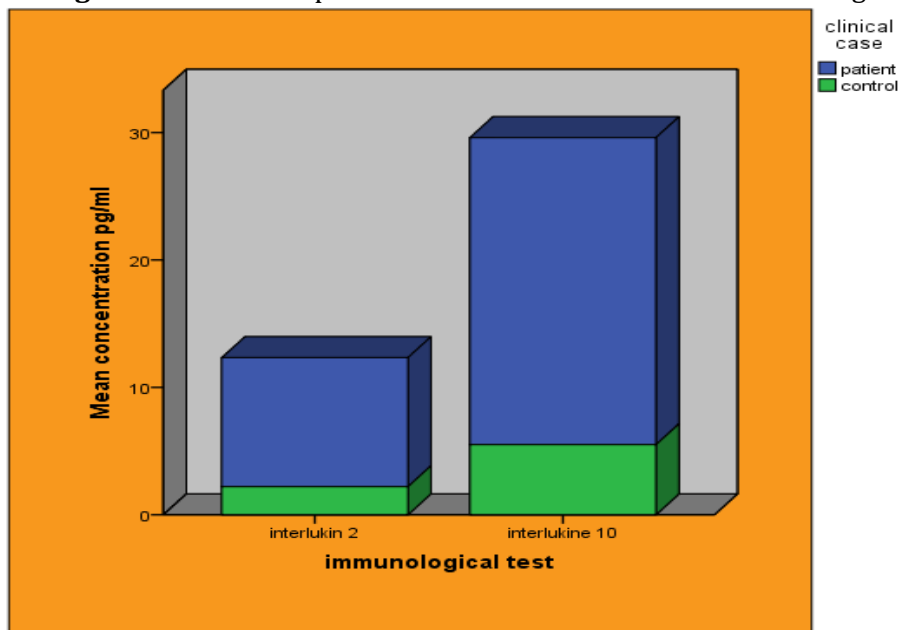
Table 4. ANOVA table of effect of hepatitis B virus infection on some immunological variables

Dependent Variable: concentration pg/ml					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2408.042 ^a	3	802.681	49.149	.000
Intercept	3768.010	1	3768.010	230.721	.000
case	1508.610	1	1508.610	92.374	.000
parameter	638.867	1	638.867	39.119	.000
case * parameter	243.810	1	243.810	14.929	.000
Error	587.933	36	16.331		
Total	8263.000	40			
Corrected Total	2995.975	39			

R Squared = .804 (Adjusted R Squared = .787)

Table 4 Analysis of variance for the effect of viral hepatitis infection on interleukin-2. 10 Where there were significant differences between treatments and control, and there were significant differences for the interaction between the variables and the pathological condition as shown in Figure 1.

Figure 1. Effect of hepatitis B virus infection on some immunological variables



References

- Abd El-Fattah, M. (2021). Predictive power of Interleukin-28B gene variants for outcome of Hepatitis C Virus genotype 4 in Egyptians: A systematic review and meta-analysis. *Clinics and Research in Hepatology and Gastroenterology*, 45(2), 101480.
- Ali, T., Saxena, R., Rani, I., Sharma, R., More, D., Ola, R., ... & Kaur, J. (2021). Association of interleukin-18 genotypes (- 607C> A) and (- 137 G> C) with the hepatitis B virus disease progression to hepatocellular carcinoma. *Molecular and Cellular Biochemistry*, 476(11), 3923-3933.
- Czaja, A. J. (2021). Immune inhibitory properties and therapeutic prospects of transforming growth factor-beta and interleukin 10 in autoimmune hepatitis. *Digestive Diseases and Sciences*, 1-24.
- Ghanem, S. E., Shebl, N. A. F., El Sayed, I. E. T., Barry, H. M. A., Saad, B. F. & Saad, W. O. (2021). *Asian Pacific Journal of Cancer Prevention*, 22(10), 3203-3210.
- Hassanien, K. S., El-Sayed, E. S. M., Ismail, R. S., Zakarya, Z. M., & Helal, G. K. (2021). Association between interleukin 28B polymorphism and sustained virological response to sofosbuvir plus daclatasvir in chronic hepatitis C genotype 4 Egyptian patients. *Journal of Clinical Pharmacy and Therapeutics*, 46(4), 942-949.
- He, Y., Feng, D., Hwang, S., Mackowiak, B., Wang, X., Xiang, X., ... & Gao, B. (2021). Interleukin-20 exacerbates acute hepatitis and bacterial infection by downregulating I κ B ζ target genes in hepatocytes. *Journal of Hepatology*, 75(1), 163-176.
- Hussein, H. K. & Mahseen, H. A. (2021). Role Of Interleukin-35 In Renal Failure Patients With Hepatitis C Virus. *Turkish Journal of Physiotherapy and Rehabilitation*, 32(3).
- Li, M., Zhuo, Y., Xu, Y., Chen, H., Cheng, Z., & Zhou, L. (2021). Genetic Association of Interleukin-6 Polymorphism (rs1800796) with Chronic Hepatitis B Virus Infection in Chinese Han Population. *Viral Immunology*, 34(4), 267-272.
- Mostafa, A. M., Saafan, H. A., Al-Tawashi, A. S., Kasem, M. H., Alaa, A. M., Eltobgy, M. M., ... & El-Derany, M. O. (2021). Interleukin-17 haplotyping predicts hepatocellular carcinoma in sofosbuvir, pegylated interferon-alpha-2a & ribavirin treated chronic hepatitis C patients. *Virus Research*, 292, 198226.
- Omran, M. M., Mosaad, S., Emran, T. M., Eltaweel, F. M., & Farid, K. (2021). A novel model based on interleukin 6 and insulin-like growth factor II for detection of hepatocellular carcinoma associated with hepatitis C virus. *Journal of Genetic Engineering and Biotechnology*, 19(1), 1-7.
- Shen, Z., Gao, Z., Gu, C., Wu, J., Wang, J., Zhang, J., ... & Liu, J. (2021). Prior transient exposure to interleukin-21 delivered by recombinant adeno-associated virus vector protects mice from hepatitis B virus persistence. *Antiviral Research*, 190, 105076.

- Şenol, A., Alayunt, N. Ö., & Solmaz, Ö. A. (2021). Role of tumor necrosis factor- α , interleukin-1 β , interleukin-6 in liver inflammation in chronic hepatitis B and chronic hepatitis C. *Gülhane Medical Journal*, 63(3), 200-205.
- Wungu, C. D. K., Amin, M., Kholili, U., Prabowo, G. I., Setiawan, P. B., & Handajani, R. (2021). Associations between P53, Transforming Growth Factor Beta-1, and Interleukin-10 Serum Levels with Advanced Liver Disease and Hepatitis B Virus Infection. *Indian Journal of Forensic Medicine & Toxicology*, 15(3), 2842-2848.
- Ye, X. J., Xu, R., Liu, S. Y., Hu, B., Shi, Z. J., Shi, F. L., ... & Ouyang, D. Y. (2022). Taraxasterol mitigates Con A-induced hepatitis in mice by suppressing interleukin-2 expression and its signaling in T lymphocytes. *International immunopharmacology*, 102, 108380.
- Zhang, Q., Yang, L., Liu, S., Zhang, M., & Jin, Z. (2021). Interleukin-35 Suppresses Interleukin-9-Secreting CD4⁺ T Cell Activity in Patients With Hepatitis B-Related Hepatocellular Carcinoma. *Frontiers in immunology*, 12, 645835.

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