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Study of some liver functions for non-infected with COVID-19 virus and those vaccinated with Pfizer, AstraZeneca and Sinopharm in Babil Governorate

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Abstract---The study included determining the extent of the effect of common vaccines for the Corona virus (COVID-19) on the liver functions of people who were not previously infected with the virus. Whether vaccinated or not with Corona virus (COVID-19) vaccines, and of both sexes regardless, their total number was 280 people. 70 samples of Pfizer vaccine, 70 Sinopharm, and 70 AstraZeneca. In addition to 70 samples for the control group for ages between (18-70) years. During the period from October 2021 to the end of April 2022, The highest value of liver function readings (GOT, GPT) was recorded. Those vaccinated with Pfizer were (24.4 and 25.1). However, respectively, the lowest value was recorded for those vaccinated with Sinopharm, which was (22.9 and 23.9). Whilst the highest value for liver function readings (TSB and ALP) was recorded for those vaccinated with AstraZeneca which was (0.8 and 169.1). By comparing the results to the control group between the vaccinated and the non-vaccinated, as well as between the type of vaccine, there were no significant differences and high statistically significant effects that prevented the use of these vaccines against the Corona virus (COVID-19), which are safe and have no side effects on liver functions.

Keywords---liver, COVID-19, Pfizer, AstraZeneca, Sinopharm.

Introduction

During the month of December 2019, the Coronavirus (COVID-19), previously known as (SARS-CoV-2), was first identified in the Chinese city of Wuhan and

then spread to all countries (Zhou *et al.*, 2020). The world has witnessed the largest pandemic during the twenty-first century so far (Ahammad & Lira, 2020), and medical options were needed to mitigate this current epidemic (Palma *et al.*, 2020). December 2020 was the date of approval by the World Health Organization to use the first A vaccine against (Covid-19), which is (Pfizer), which the American company Pfizer and the German Biontech participated in, and then other vaccines followed. During December 2020, deployment of the first UK-approved SARS-CoV-2 vaccine (BNT162b2 mRNA vaccine) began, followed by an adenovirus vector vaccine ChAdOx1 nCoV-19 on January 4, 2021. (Hyams *et al.*, 2021).

Liver Function

The liver is a vital organ with many important metabolic activities, and plays a major role in the metabolism of carbohydrates, fats and proteins. It also stores many substances, including iron, glycogen, and vitamins, and is considered the natural organ of detoxification as it is affected by toxins that lead to the disruption of many functions (Vander *et al.*, 2001). Abnormal liver functions often indicate that something is wrong with the liver. The Aspartate aminotransferase (AST): symbolized by GOT, is present in high concentrations in the heart, liver, skeletal muscle, kidneys, and red blood cells, and the destruction of these tissues leads to an increase in its level in the plasma (Thomas, 2019). Knowing the presence of permanent chronic hepatitis. The alanine aminotransferase ALT (GPT) is a cellular enzyme more specific to the liver due to its high concentration in liver tissue. This enzyme is also found in different tissues of the human body, such as the heart, kidneys, and skeletal muscles, but in lower concentrations, and because of its high concentration in the liver, any injury to liver cells causes it to be excreted in abundance into the blood circulation (Al-Shamaa *et al.*, 2017).

Alkaline phosphatase (ALP): This enzyme is one of the enzymes that hydrolyze phosphate at high pH. It is found in tissues, and it is in high concentrations in the osteoblast, hepatic bile duct, intestinal walls and the placenta (Zilva *et al.*, 1994). Total Serum Bilirubin: It is a yellow-orange pigment resulting from the hydrolysis of various heme-containing proteins, especially from the catabolism of hemoglobin (Cappellini & Swinkels, 2017). High levels of bilirubin in plasma are very important in the diagnosis of many diseases, especially liver-related diseases (Méndez-Sánchez *et al.*, 2019). This study aims to assess the liver functions of those vaccinated with Pfizer, AstraZeneca and Sinopharm and the extent of the effect of these common coronavirus (COVID-19) vaccines on the liver functions of people not previously infected with the virus from those vaccinated and not vaccinated with Corona virus vaccines and of both sexes, and it includes -: Aspartate Transaminase (AST) and Alanine Transaminase (ALT) enzyme activity, Alkaline Phosphatase (ALP) enzyme activity, and Total Serum Bilirubin (TSB) measurement in serum of vaccinated and unvaccinated people.

Materials and working methods

Collection of Samples

This study was conducted during a period of time that started from October 2021 to the end of April 2022, and the number of study samples amounted to 280

blood samples from people vaccinated with vaccines, Pfizer, AstraZeneca, Sinopharm and a control group not infected with COVID-19 virus and not vaccinated (70 samples). For each vaccine (males and females) within my age range between (18-70) years, samples were collected from hospitals (Musayyib, Alexandria, Al-Seddah) and their health centers, then the samples were taken to private laboratories to conduct analyzes within the province of Babylon . Blood samples were collected by drawing venous blood and placed in tubes that did not contain an anticoagulant, then the sera were separated by centrifugation for 5 minutes at a rate of 3000 cycles/min. The serum was withdrawn from other blood components and transferred to the Abendrov tubes. The information of each sample was recorded on it and kept frozen at a temperature of -20°C until use.

Biochemical Tests

Self-operating devices were used to conduct biochemical tests

Statistical analysis

The results were expressed as the mean $\pm$ standard deviation, and the results were statistically analyzed using the statistical program (SPSS) according to the availability of its latest version (SPSS V28-2021).

Results and Discussion

Comparison of liver function with vaccinated and unvaccinated persons

The results of the current study, which are shown in Table (1), Figure (1 and 2) showed the highest value of liver function readings (GOT, GPT) for those vaccinated with Pfizer and it was (24.4 and 25.1), respectively, and the lowest value for those vaccinated with Sinopharm was recorded and it was (22.9 and 23.9) Respectively, while the highest value of liver function readings (TSB and ALP) was recorded for those vaccinated with AstraZeneca and it was (0.8 and 169.1), respectively. By comparing the results with the control group between the vaccinated and the unvaccinated, as well as between the type of vaccine, there were no significant statistical and moral differences and effects at the level of significance ($P < 0.05$). (Where studies have shown that the Pfizer vaccine is safe and effective for the majority of the population, as it provides a high level of protection against the disease and can be licensed for emergency use (Anand & Stahel, 2021), while another study indicated the effectiveness of the Oxford-AstraZeneca (ChAdOx1 nCoV-19 vaccine) as its value The European Medicines Agency (EMA) Pharmacovigilance Risk Assessment Committee on March 18, 2021 declared that it is a safe and effective vaccine that contributes to the control of the COVID-19 pandemic and that the benefits of a vaccine outweigh the risks that can contribute to the control of the COVID-19 pandemic. (Tobaiqy *et al.*, 2021) (Voysey *et al.*, 2021). (As for the Sinopharm vaccine, studies have shown that it is generally safe and widely used to prevent respiratory diseases, as well as other infectious diseases (Al Kaabi *et al.*, 2021).

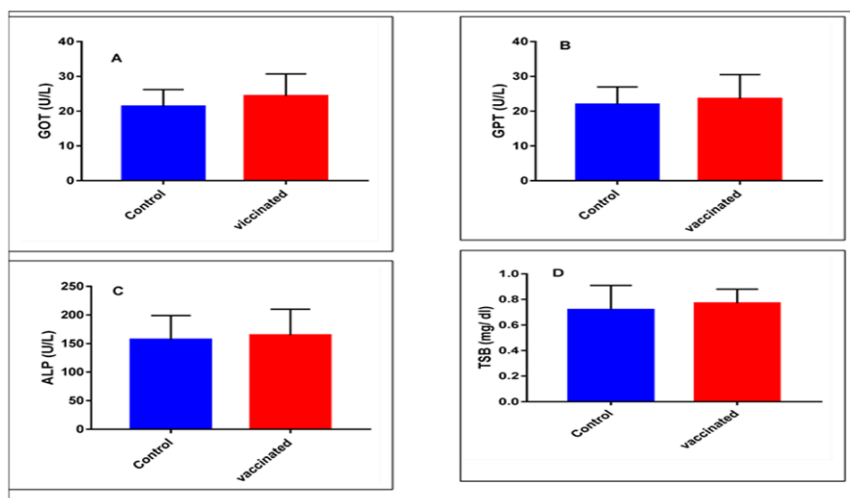


Figure 1. Comparison of the effect of different vaccines on liver function with the control group

Table 1
Shows the effect of the type of vaccine on liver function

Vaccine	GOT		GPT		ALP		TSB	
	Mean± SD	P. value	Mean± SD	P. value	Mean± SD	P. value	Mean± SD	P. value
Control	21.3± 4.8	0.20	21.9 ± 5.0	0.22	157.0 ± 41.8	0.23	0.7 ± 0.1	0.22
AstraZeneca	24.0± 6.3	0.55	23.2 ± 6.9	0.56	169.0 ± 50.6	0.58	0.8 ±0.2	0.57
Pfizer	25.0± 5.0	0.43	24.3 ± 7.9	0.42	163.4 ± 44.4	0.48	0.7 ± 0.1	0.47
Sinopharm	23.8 ± 6.2	0.22	22.9 ± 6.3	0.23	162.4 ± 42.7	0.22	0.7± 0.2	0.25

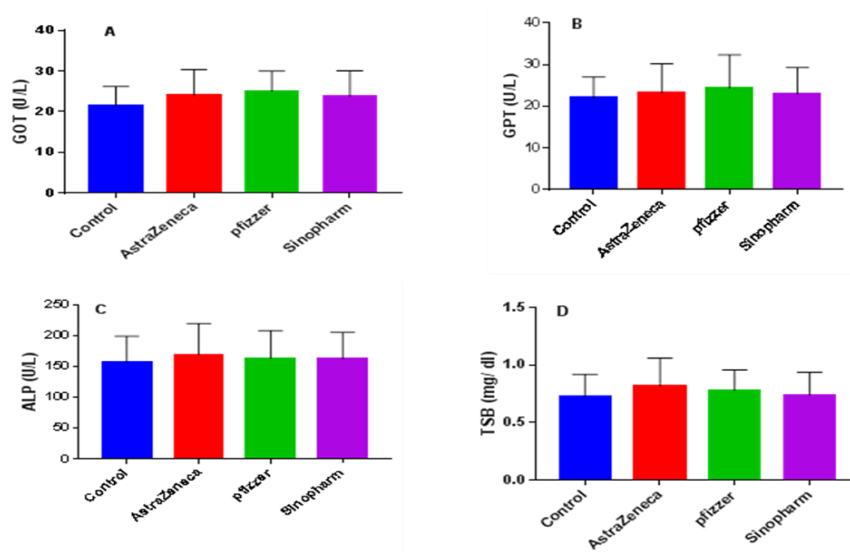


Figure 2. Effect of the type of vaccine on liver function

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