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Effect of Smoking on D-dimer Level at COVID-19 Patients

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Abstract

Background: COVID-19 are a type of virus. There are many different kinds, and some cause disease. COVID-19 identified in 2019, SARS-CoV-2. It attaches to cells there, begins to multiply and moves into lung tissue . D-dimer is one of the protein fragments produced when a blood clot gets dissolved in the body. It is normally undetectable or detectable at a very low level unless the body is forming and breaking down blood clots.

Objective of the Study: It's show effect of smoking on D-dimer level in COVID-19 patients.

Materials and Methods: The current study done in Al-Yarmook Teaching Hospital, was included 20 cases of smoking COVID-19 patients and 20 cases of non smoking COVID-19 patients, all of subject's age were 40-60 years . This study depend on collect of plasma sample used sodium citrate tubes by Elisa method to measure D-dimer level in all cases.

Results: This study shows significant elevation of D-dimer in smoking COVID-19 group compare with non smoking COVID-19 group.

Conclusion: The current study demonstrate effect of smoking on D-dimer level in COVID-19 patients.

Keywords: COVID-19, Nicotine, D-dimer and smoking

Introduction

Corona viruses (COVID-19) are a family of viruses that can cause respiratory illness in humans. They get their name, "corona" from the many crown-like spikes on the surface of the virus. Severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and the common cold are examples of corona viruses that cause illness in humans. COVID-19 enters human body through the mouth, nose or eyes (directly from the airborne droplets or from transfer of the virus from hands to face)[1]. The virus travels to the back of your nasal passages and mucous membrane in the back of your throat. It attaches to cells there, begins to multiply and moves into lung tissue. From there, the virus can spread to other body tissues. The symptoms and signs of Covid-19 are fever or chills, cough, shortness of breath or difficulty breathing, headaches and others. There are many factor consider as risk for contracting COVID-19 are:

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travel to area with ongoing active spread, contact with infected person and people over age 60 who have pre-existing medical conditions or a weakened immune system. COVID-19 complications may include Acute Respiratory Failure, Pneumonia, Acute Liver Injury and others, but the risk complication is Blood Clots or Disseminated Intravascular Coagulation (DIC).[2]

When COVID-19 infection the body's blood-clotting response doesn't work right. Abnormal clots form, which can lead to internal bleeding or organ failure. The recent studies found that nearly a third of people COVID-19 who enter intensive care unit (ICU) had blood clots in patients' legs (deep vein thrombosis (DVT)), lungs (pulmonary embolism (PE)) or arteries[3].

When a blood vessel or tissue is injured and begins to bleed, a process called hemostasis is initiated by the body to create a blood clot to limit and eventually stop the bleeding. This process produces threads of a protein called fibrin, which crosslink together to form a fibrin net. That net, together with platelets, helps hold the forming blood clot in place at the site of the injury until it heals. Once the area has had time to heal and the clot is no longer needed, the body uses an enzyme called plasmin to break the clot (thrombus) into small pieces so that it can be removed. The fragments of the disintegrating fibrin in the clot are called fibrin degradation products (FDP), which consist of variously sized pieces of cross linked fibrin. One of the final fibrin degradation products produced is D-dimer, which can be measured in a blood sample when present. The level of D-dimer in the blood can significantly rise when there is significant formation and breakdown of fibrin clots in the body[4].

D-dimer is one of the protein fragments produced when a blood clot gets dissolved in the body. It is normally undetectable or detectable at a very low level unless the body is forming and breaking down blood clots. Then, its level in the blood can significantly rise. This test detects D-dimer in the blood. There are several factors and conditions associated with inappropriate blood clot formation. One of the most common is deep vein thrombosis (DVT), which involves clot formation in veins deep within the body, most frequently in the lower legs[5].

Tobacco which contains nicotine is usually smoked in cigarettes. It is also smoked in cigars and pipes. There are numerous forms of smokeless tobacco including chewing tobacco, and wet and dry[6]. Figure 1.

Figure 1: The cigarettes

The Nicotine is a stimulant drug (chemical formula: $C_{10}H_{14}N_2$) that speeds up the messages travelling between the brain and body. Figure 2.

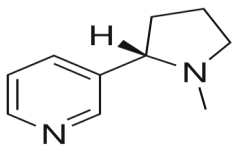

Figure 2: The chemical structure of nicotine

It is the main psychoactive ingredient in tobacco products .Tar and carbon monoxide (a toxic gas) are also released when tobacco is burned, such as when it's smoked. The smoking have well documented negative effects on health such as stroke , blindness, cataracts (eye diseases) pneumonia various respiratory diseases (shortness of breath, asthma, coughing fits) and others[7].

Material and Methods

The current study depended on collection tow groups of 20 smoker cases with COVID-19 infection (SCC-19I) and 20 non smoker cases with COVID-19 infection (NSCC-19I). All these groups not have any other diseases and the age were 40-60 years of both genders, smoking duration was 20 years and all cases classified as Moderate infection . This study measured done in Al- Yarmook technical hospital – Iraq . This study measured plasma level of D-dimer

after drawing blood and treated with sodium citrate. This parameters were measured by ELISA technique.

Statistic analysis in current study was use the t-test method to show different in D-dimer level between SCC-19I group and NSCC-19I group. The t-test method used mean ± standard deviation (SD) and P-value (>0.05 significant value).

Results

This study compare between SCC-19I group and NSCC-19I group by used plasma D-dimer level. The study results shown significant deference between two groups according to plasma D-dimer level. This study result presented elevated of plasma D-dimer level at SCC-19I group when compare with NSCC-19I group. Shown Table 1.

Table 1: Comparison of plasma D-Dimer level between SCC-19I and NSCC-19I groups according to Mean +deviation Standard (SD) by T- test statistic method.

Parameter	SCC-19I (No.20 cases)	NSCC-19I (No.20 cases)	p-value
D-dimer (ng/ml)	623 ± 3.1	547 ± 2.6	<0.05

Discussion

COVID-19 are a type of virus. There are many different kinds, and some cause disease. COVID-19 identified in 2019, SARS-CoV-2. The virus travels to the back of your nasal passages and mucous membrane in the back of your throat. It attaches to cells there, begins to multiply and moves into lung tissue. COVID-19 has caused a pandemic of respiratory illness that can lead to many complication ,commonly is coagulation defect to product various blood clots [8] .The blood clotting is a rapid process, during which a protein called fibrinogen converts into fibrin. Fibrin forms a network that functions as the backbone of the clot, providing mechanical strength called cross linkage. Fibrinogen is the major plasma protein coagulation factor. Low plasma fibrinogen concentrations are associated with an increased risk of bleeding due to impaired primary and secondary hemostasis.

D-dimer is a fibrin degradation product, a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis. It is so named because it contains two D fragments of the fibrin protein joined by a cross-link. D-dimer concentration may be determined by a blood test to help diagnose thrombosis[9].

This result study demonstrate elevate of plasma D-dimer level in SCC-19I group when compare with NSCC19I group, this elevation due to smoking . The smoking individual already has high level of nicotine that cause elevate of fibrinogen , fibrinogen convert to fibrin then form fibrin cross linkage that cause blood clots . D-dimer act as parameter to evaluation clotting state in patients. This study agree with Açık DY and et. al. 2020, that showed effect of smoking on fibrinogen[10].

This study also agree with MENEKSE E and et. al. 2021, that explain elevated of D-dimer in COVID-19infection[11].

Conclusion

The present study conclude shown effect smoking on blood clotting by measured plasma D-dimer level as indicate in COVID-19 patients.

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Ethical clearance: Yes

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