

COVID-19 & D-DIMER

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ABSTRACT

■ Covid-19 is caused by Sars CoV- 2, and has now been identified as a global pandemic. The COVID-19 infection can lead to thrombotic complications. D-dimer has been used as a biomarker in COVID-19 during its early stages to prevent and manage thrombosis. Elevated D-dimer levels have been found in patients with COVID-19. In this research effort, we have tried to understand what D-dimer is, establish it as a biomarker, the role of D-dimer in COVID-19 patients, changes in D-dimer with age and anticoagulation.

INTRODUCTION

- The COVID-19 infection can lead to thrombotic complications. D-dimer can be used as a biomarker in COVID-19 during its early stages to prevent and manage thrombosis.
- Elevated D-dimer levels have been found in patients with COVID-19. D-dimer is commonly elevated in patients with COVID-19. D-dimer levels correlate with disease severity and are a reliable prognostic marker for in-hospital mortality in patients admitted for COVID-19. Various studies have been put forth on different cutoff values for D-dimer to predict morbidity and mortality. In this research effort, we have tried to understand what D-dimer is, establish it as a biomarker, the role of D-dimer in COVID-19 patients, changes in D-dimer with age and anticoagulation.

WHAT IS D-DIMER?

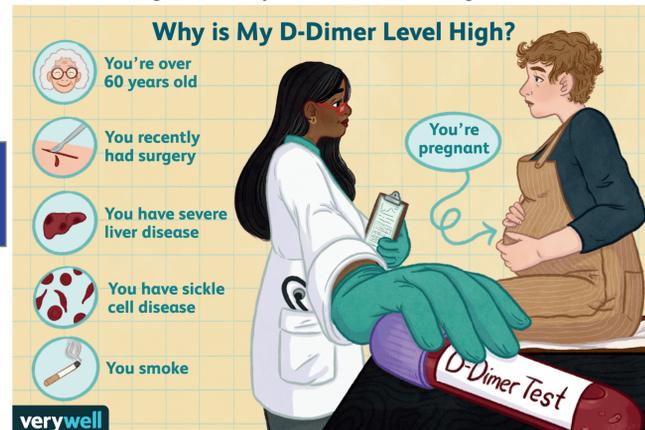
- D-dimer is a small protein fragment present in the blood after a blood clot is degraded by fibrinolysis.
- A normal D-dimer is considered less than 0.50.
- A positive D-dimer value is 0.50 or greater.
- Measuring the level of D-dimer gives a good clinical correlation in certain ongoing illnesses.
- In the early stages of COVID-19 illness, studies have shown an increase in D-dimer levels in the blood.
- In COVID-19 patients, underlying illnesses such as diabetes, cancer, stroke, and pregnancy may cause D-dimer levels to rise.
- D-dimer levels may increase with age, and can also be frequently at high levels in hospitalized patients.

D-DIMER AS A BIOMARKER

- A biomarker is a biological substance found in blood or other body fluids which tells us more about the underlying disease or condition.
- It can also provide information about the response to a particular treatment.

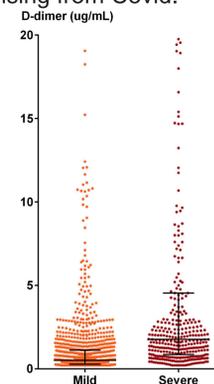
D-DIMER AS A BIOMARKER

- Since the Coronavirus can cause thrombotic disorders, D-dimer could be used as a biomarker in that aspect as well.
- In COVID-19, elevated D-dimer is a possible biomarker for poor prognosis, and the ideal D-dimer cutoff value for D-dimer being unhealthy is around 500 mcg/L.



D-DIMER IN COVID PATIENTS

- Covid-19 can cause different types of illness including fatal thrombotic and respiratory diseases.
- D-dimers are a type of biomarker that can be used as a test for thrombotic diseases.
- Several studies have shown that the D-dimer value on admission can be used as an accurate biomarker for Covid-19, and in the early stages, there can be a nearly 3 to 4 fold increase in the D-Dimer levels which is linked to a poor prognosis.
- The D-dimer levels thus can be used to detect several different thrombotic complications arising from Covid.
- Scatter plots of D-dimer levels in the mild and severe groups. Fifty eight data points are outside the axis limit as 13 patients in the mild group and 45 patients in the severe group have D-dimer values over the upper limit of measuring range (>21 µg/ml).



D-DIMER IN COVID CONDITIONS

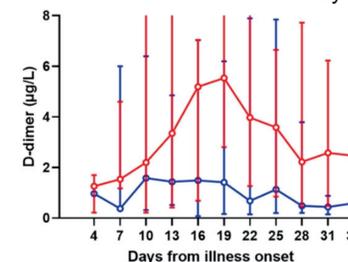
- There is a very significant difference in D-dimer values between mild, moderate and severe COVID-19 patients. The D-dimer value increases with the severity of COVID-19.

D-DIMER IN NON-COVID PATIENTS

- Even if a patient does not have Covid-19, determination of D-dimer levels in the blood is still very important.
- Estimation of D-dimer levels can be used to test for different types of blood clots, such as deep vein thrombosis or pulmonary embolism, which are the common complications of COVID-19, which can be fatal.
- The symptoms of deep vein thrombosis include leg swelling, leg pain or tenderness, and leg redness.
- The symptoms of pulmonary edema can include trouble breathing, coughing, spitting up blood, palpitations, and many more.
- If the patient displays any of these symptoms, then D-dimer levels can predict the severity of the problem at hand.
- Overall, levels of D-dimer can be a very helpful tool in maintaining health and managing thrombosis.

COMPARISON BETWEEN D-DIMER VALUES IN COVID-19 AND NON-COVID-19 PATIENTS

- D-dimer levels are very useful in managing the progress of various illnesses.
- D-dimer levels can be used to detect blood clots, whether they may be caused by the Covid-19 virus.
- In patients with Covid-19 induced thrombosis D-dimer levels are at a very high level, especially in severe cases.
- In most cases, a normal level of D-dimer can exclude pulmonary embolism.
- It has been observed that a very small number of Covid-19 patients have normal D-dimer levels.
- In Covid-19 patients, the D-dimer can be used early on to track the progressions of the disease and can also be used to predict some of the effects that may come later on.



D-DIMER AND ANTICOAGULANTS

- Patients with an abnormal D-dimer level 1 month after the discontinuation of anticoagulation have a significant incidence of recurrent venous thromboembolism, which is reduced by the resumption of anticoagulation.
- Testing of D-dimer levels may play a role in the assessment of the need for prolonged anticoagulation.

D-DIMER IN NON-COVID CONDITIONS

- D-dimer levels rise after thrombotic events.
- These events include trauma, infection, surgery, heart disease, and pregnancy.
- The levels can then decrease if the thrombus gets resolved or increase if it spreads further.
- The D-dimer level is thus frequently used to rule out the possibility of recent thrombosis in people who have a low pretest risk.
- In addition, the D-dimer test is used to find if the patient has any blood clotting disorders, such as DVT, or PE.
- The higher the D-dimer level is, the worse is the case of thrombosis.

SUMMARY & CONCLUSIONS

- Covid is an illness with a wide clinical spectrum including thrombosis. Our research shows that the D-dimer level serves as a valuable biomarker for potentially predicting prognosis and mortality in hospitalized Covid patients. The levels of D-dimer are elevated in patients with COVID-19, and with age. Patients with an abnormal D-dimer level 1 month after the discontinuation of anticoagulation have a significant incidence of recurrent venous thromboembolism, which is reduced by the resumption of anticoagulation. Testing of D-dimer levels thus plays a significant role in the assessment of patients with COVID-19 and the need for prolonged anticoagulation.

FUTURE RESEARCH

- In the future, we plan to conduct research on why the discrepancy of VTE protocols in the outpatient setting exists and determine methods to improve upon VTE thromboprophylaxis in this setting.

ACKNOWLEDGEMENTS

- We would like to thank Drs. Gargi Shikhare and Atul Laddu, our mentors, our parents, and the GTF Board, for their help and encouragement with this poster.

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