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OriginalResearch Article

Coagulopathy in Covid-19 patients an observational institutional study at MGMMC, Indore

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Abstract-

Introduction- Corona virus disease 2019 (COVID-19), first identified in Wuhan, China in December of 2019, has become a worldwide pandemic. It was declared by (WHO) World health organization as Public health emergency on 30th January 2020. Although respiratory compromise is the cardinal feature of the disease, early studies have suggested that elevated circulating D-dimer levels are associated with mortality,1, 2 suggesting a distinct coagulation disorder associated with COVID-19

Materials And Methods- All patients aged ≥18 years with confirmed COVID-19 (defined as a positive SARS-CoV-2 reverse-transcriptase polymerase chain reaction test by nasopharyngeal/oropharyngeal swab or sputum specimen) were included in the study. The incidence of bleeding and thrombotic events in COVID-19 patients was assessed. Pulmonary embolism (PE) and deep vein thrombosis (DVT) were confirmed radiographically. Results of 6 routinely drawn coagulation-based laboratory parameters (PT, international normalized ratio [INR], activated partial thromboplastin time [aPTT], D-dimer, fibrinogen, and platelet count), 2 laboratory measures of inflammation (C-reactive protein [CRP], and erythrocyte sedimentation rate [ESR]), were evaluated and compared between patients with thrombotic complications (composite of venous thromboembolism, arterial thromboembolism, and clinically significant non-vessel thrombotic complications), patients with bleeding complications, and patients without bleeding or thrombotic complications.

Result- In this study, we report the haemostatic manifestations and bleeding and thrombotic complications of 100 COVID-19 patients. In a population managed with standard doses of prophylactic anticoagulation, we found a radiographically confirmed venous thromboembolic rate of 4.8% (7.6% in critically ill patients)

Conclusion- In conclusion, we observed that COVID-19 was associated with similar rates of thrombosis and bleeding as seen in hospitalized patients with similar degrees of critical illness. Elevated D-dimer levels at initial presentation predicted bleeding complications, thrombotic complications, critical illness, and death. Beyond D-dimer, thrombosis was primarily associated with inflammatory markers rather than coagulation parameters.

We additionally found that elevations in D-dimer on admission predicted critical illness and death, as well as bleeding and thrombotic complications. Inflammatory markers, including CRP and ESR, were also associated with thrombosis.

Keywords- PE**(**Pulmonary embolism), DVT(deep vein thrombosis), INR(international normalized ratio), aPTT(activated partial thromboplastin time), CRP (C-reactive protein) and ESR(erythrocyte sedimentation rate.

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1. INTRODUCTION

Corona virus disease 2019 (COVID-19), first identified in Wuhan, China in December of 2019, has become a worldwide pandemic. It was declared by (WHO) World health organization as Public health emergency on 30th January 2020. Although respiratory compromise is the cardinal feature of the disease, early studies have suggested that elevated circulating D-dimer levels are associated with mortality,1, 2 suggesting a distinct coagulation disorder associated with COVID-19

2. MATERIALSANDMETHODS

This study was conducted in the Department of Pathology, Mahatma Gandhi Memorial Medical College and M.Y. Hospital, Indore Madhya Pradesh, India. It is a Observational institutional prospective study in last one year at MY Hospital, Indore for coagulopathy. All patients aged ≥18 years with confirmed COVID-19 (defined as a positive SARS-CoV-2 reverse-transcriptase polymerase chain reaction test by nasopharyngeal/oropharyngeal swab or sputum specimen) were included in the study. The incidence of bleeding and thrombotic events in COVID-19 patients was assessed. Pulmonary embolism (PE) and deep vein thrombosis (DVT) were confirmed radiographically.
Results of 6 routinely drawn coagulation-based laboratory parameters (PT, international normalized ratio [INR], activated partial thromboplastin time [PTT], D-dimer, fibrinogen, and platelet count), 2 laboratory measures of inflammation (C-reactive protein [CRP], and erythrocyte sedimentation rate [ESR]), were evaluated and compared between patients with thrombotic complications (composite of venous thromboembolism, arterial thromboembolism, and clinically significant non-vessel thrombotic complications), patients with bleeding complications, and patients without bleeding or thrombotic complications.

OBSERVATIONSANDRESULTS

Table-1

MARKER	VALUE	NO. OFCASES
D-Dimer(ng/ml)	<1000	02
	1000-2500	01
	>2500	01
PT(sec)	<16	05
	>16	01
aPTT(sec)	<40	04
	>40	01
Fibrinogen(mg/dl)	<450	01
	>450	02
Plateletcount(Lakhs)	<1.5	02
	>1.5	02
CRP(mg/L)	<100	03
	>100	02
ESR(mm/hr)	<40	03
	>40	02

Associationofcoagulationandinflammatoryparametersofstableduringhospitalization.

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Table-2

MARKER	VALUE	NO. OFCASES
D-Dimer(ng/ml)	<1000	13
	1000-2500	18
	>2500	05
PT(sec)	<16	28
	>16	05
aPTT(sec)	<40	19
	>40	09
Fibrinogen(mg/dl)	<450	03
	>450	20
Plateletcount(Lakhs)	<1.5	09
	>1.5	26
CRP(mg/L)	<100	28
	>100	12
ESR(mm/hr)	<40	29
	>40	18

Associationofcoagulationandinflammatoryparametersatinitialpresentationwithcritical illness.

3. DISCUSSION& CONCLUSION-

In this study, we report the haemostatic manifestations and bleeding and thrombotic complications of 100 COVID-19 patients. In a population managed with standard doses of prophylactic anticoagulation, we found a radiographically confirmed venous thromboembolic rate of 4.8% (7.6% in critically ill patients). D-dimer of 1001 to 2500 ng/mL had an odds ratio (OR) for thrombotic complications of 3.04 (95% CI, 1.26-7.31), and a D-dimer >2500 ng/mL had an OR of 6.79 (95% CI, 2.39-19.30; P < .001). Thrombocytopenia (platelet count <150 × 109/L) and elevations in D-dimer >2500 ng/mL at initial presentation were also predictive of bleeding complications during hospitalization (in multivariable analysis, for platelet count <150 × 109/L: OR, 2.90; 95% CI, 1.05-7.99; and for D-dimer >2500 ng/mL: OR, 3.56; 95% CI, 1.01-12.66). Elevations in D-dimer, CRP, ESR, ferritin, procalcitonin, and high-sensitivity cardiac troponin at initial presentation were predictive of critical illness during hospitalization in multivariable analysis. Elevations in D-dimer, PT, activated PTT, fibrinogen, CRP, ESR, and procalcitonin at initial presentation were predictive of death during hospitalization in multivariable analysis.

In conclusion, we observed that COVID-19 was associated with similar rates of thrombosis and bleeding as seen in hospitalized patients with similar degrees of critical illness. Elevated D-dimer levels at initial presentation predicted bleeding complications, thrombotic complications, critical illness, and death. Beyond D-dimer, thrombosis was primarily associated with inflammatory markers rather than coagulation parameters. We additionally found that elevations in D-dimer on admission predicted critical illness and death, as well as bleeding and thrombotic complications. Inflammatory markers, including CRP and ESR, were also associated with thrombosis.

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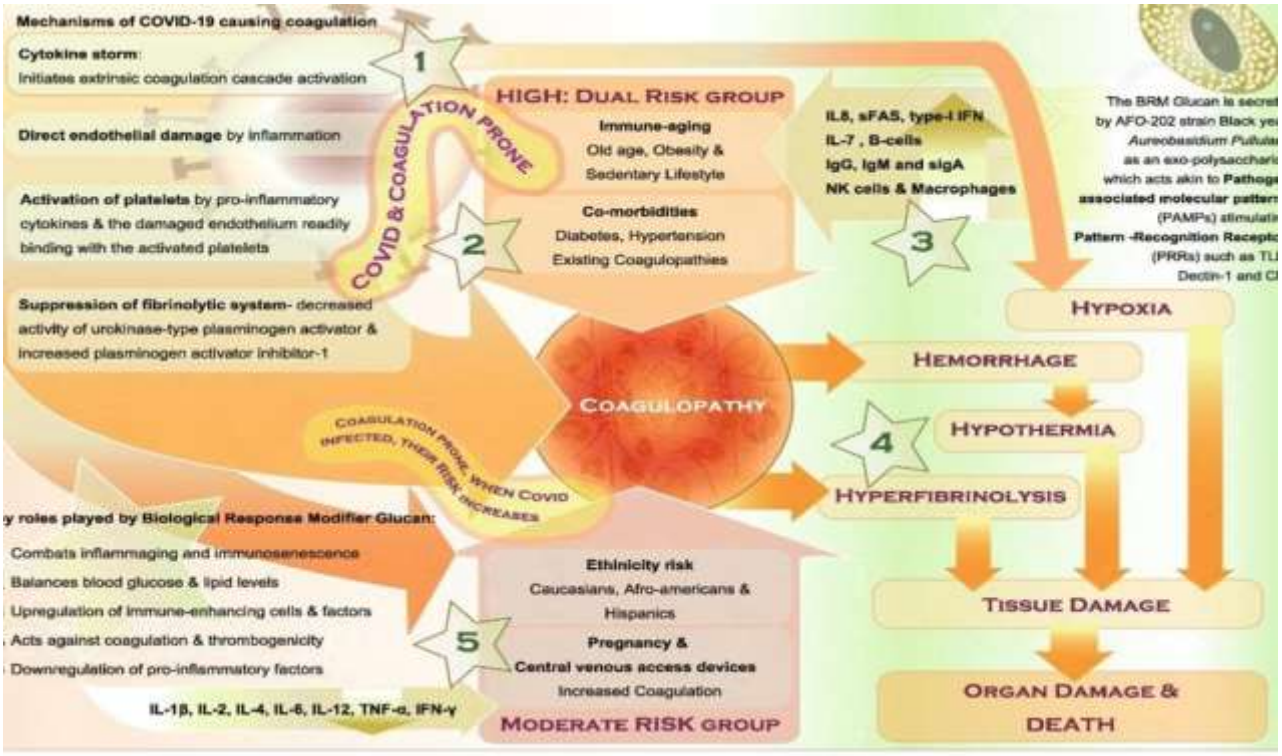

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