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Short Communication

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### Systemic precipitation of underlying arterial thrombosis in COVID-19 infected patients

Dr. Harsha Narkhede<sup>1</sup>, Dr. Poonam Bharambe<sup>2</sup>, Dr. Dipanjali Mahanta<sup>\*3</sup>

<sup>1</sup>Associate Professor, YCM Hospital, Pimpri, Pune 18, Maharashtra, India.

<sup>2</sup>Assistant Professor, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune 18, Maharashtra, India.

<sup>3</sup>Resident Anaesthesiology, Dr.D.Y.Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune 18, Maharashtra, India.

\*Corresponding Author: Dr. Dipanjali Mahanta

Email id: dipanjali mahanta@gmail.com

#### ABSTRACT

Pandemic COVID-19 has brought forward a wide array of organ-specific and systemic disorders, one such being raised susceptibility towards development of systemic coagulopathies (venous, arterial or microvascular thrombi), which often contributes to the high incidence of thrombotic complications, such as deep venous thrombosis, pulmonary embolism, associated with common thrombotic arterial complications (eg, limb ischemia, ischemic stroke, myocardial infarction) in critically ill patients. A similar picture also seems to have been painted in our cases discussed below, whereby underlying SARS CoV 2 infection has predisposed patients to hypercoagulability-related disorders including thrombosis and other fatal vascular events. Making the start of prompt antithrombotic prophylaxis are necessary to ensure better recovery in both the pre-operative and post operative period and regular re-evaluation of basic investigations (PT-INR, aPTT, D-Dimer) to ensure timely action for any change, enabling optimal patient care and recovery.

**Keywords:** COVID-19; SARS-CoV-2; Thrombosis; Venous Thromboembolism

#### INTRODUCTION

The pandemic COVID-19 has brought forward a wide array of organ-specific and systemic disorders, both related to its predecessor SARS and some novel to itself. Though many researches are still going on with regards to extrapolation of inherent mechanisms and subsequent treatment, many grey areas still remain. One such feature being raised susceptibility towards development of systemic coagulopathies (venous, arterial or microvascular thrombi) in COVID-19 infected patients- symptomatic or otherwise. ACE2 expressed in host target cells, particularly alveolar

epithelial type II cells is the site of adhesion of this virus. In later stages of infection, when viral replication accelerates, epithelial-endothelial barrier integrity gets compromised. In addition, SARS-CoV-2 also infects pulmonary capillary endothelial cells, accentuating the inflammatory response and triggering an influx of monocytes and neutrophils. Inflamed lung tissues and pulmonary endothelial cells may result in microthrombi formation and contribute to the high incidence of thrombotic complications, such as deep venous thrombosis, pulmonary embolism<sup>[2]</sup>, with common thrombotic arterial complications (eg, limb ischemia, ischemic stroke, myocardial infarction) in critically ill patients.

A similar picture is also seen to have been painted in cases discussed below, albeit the COVID-19 positive status in the first and last two cases was diagnosed postoperatively. We can make a safe presumption that subclinical COVID-19 infection most likely had precipitated the acute onset of ischaemic stroke and right sided hemiparesis in those cases, with no other underlying risk factors for the same. Whereas, the rest cases are middle aged males, two of them with known comorbidity (Type II DM) were brought to our hospital with complaints of acute onset chest pain or AMI (acute myocardial infarction), with no previous history of similar complaints in the past, which can also be assumed to have been precipitated by underlying SARS CoV 2 infection which is known for predisposing patients to hypercoagulability-related disorders including thrombosis and even fatal vascular events.

Additionally, platelets play an eminent role in primary hemostasis. The adhesion of platelets to subendothelial collagen and von Willebrand factor, and the subsequent aggregation of platelets via fibrinogen cross-bridging, is the basis for initial hemostatic plug formation after vascular disruption. Platelets are also the hemostatic element primarily involved in arterial thrombotic diseases, and to a lesser degree in the development of venous thrombosis<sup>[3]</sup>. The majority of anaesthetic agents, including intravenous induction agents, volatile anaesthetics, and local anaesthetics, have been reported to inhibit platelet function as reported by various studies. The magnitude of this inhibitory

effect tends to vary amongst different agents. Hence it remains possible that an anaesthetic regimen with potent antiplatelet actions could lead to bleeding complications in a patient who is genetically predisposed, whose environment contains additional haemorrhagic risk factors (e.g., hemodilution, anticoagulants), or who is undergoing a procedure that involves a high risk for bleeding complications (e.g., neurosurgery)

At the same time the start of prompt antithrombosis prophylaxis are necessary to ensure better recovery in both the pre-operative and post operative period and regular re-evaluation of basic investigations (PT-INR, aPTT, D-Dimer) to ensure timely action for any changes enables optimal patient care and recovery.

However, these are only few such cases highlighting underlying thrombotic complications in a COVID-19 infected patient (Table 1), many more instances are required to be studied for designating a proper line of treatment against thrombotic complications in such patients in the future for a more holistic COVID-19 patient care.

The following seven case reports (Fig: Table 1) shares such a scenario and the steps taken with regards to its management.

### Declaration of interests

None

### Funding sources

None.

**Table 1: Tabular representation of studied cases:**

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7
Baseline characteristic s (age, sex, medical history)	60 years Male	57 year Male Type 2 DM	45 year Male	40 year Male Type 2 DM	50 year Male	57 years, Female Rheumatoid arthritis	38 year, Male Hypertension
Antithrombotic treatment at the time of arterial events	No	No	No	No	No	No	No
Covid infection: Diagnosis:	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,	RT-PCR for SARS Cov2 positive,
Treatment:	Intubation on vasopressors	Yes, Non-rebreather mask	Yes, Non-rebreather mask	Yes, Non-rebreather mask	Yes, Non-rebreather mask	Intubation & on vasopressors	Intubation & on vasopressors

Arterial thrombosis Thrombus localisation	complete occlusion of left internal carotid artery and poor re-canalisation of left middle cerebral artery on MR-Angiography	NA	NA	NA	NA	partial thrombosis of superior mesenteric artery and few of its branches on the right side with dilatation of multiple small bowel loops	MRI angiography large right MCA and ACA territory infarct in right femoral, temporal and parietal lobes, right ganglio-capsular region and anterior thalamus.
Days from disease onset to thrombotic event	2	0	0	0	0	7	3
Symptomatology at the time of diagnosis	acute onset right sided weakness, deviation of left angle mouth and inability to speak	severe chest pain since one day, retrosternal in origin and associated with sweating. Diagnosed as ACS/STEMI/AWMI-evolved/DM	retrosteral left sided chest pain, radiating to left arm and associated with sweating . Diagnosed with IWMI	complaints of retrosternal chest pain, radiating to neck and back, associated with sweating since last 12 hours. diagnosed with ACS/IWMI-evolved/DM	with complaints severe chest pain since one day, retrosternal in origin and associated with sweating Diagnose d with ACS/IWMI-evolved	complaints of pain over abdomen and constipation since 1 week	complaints of giddiness and left sided hemiparesis since 3 days and GCS 4/15
Imaging exam	CT Brain (plain) MRI Angiography	No	No	No	No	CECT abdomen and pelvis	MRI Angiography
Treatment	emergency left decompressive craniotomy under general anaesthesia	Medical	Medical	Medical	Medical	emergency exploratory laparotomy	decompressive craniotomy
VTE associated	No	No	No	No	No	Pulmonary embolism	No

## REFERENCES

- [1]. P. J. McKenzie, H. Y. Wishart, I. Gray AND G. Smith et al, Effectsofanesthetictechniqueondeep vein thrombosis: A Comparison of Subarachnoid and General Anaesthesia. *Br. J. Anaesth.* (1985), 57, 853-857.
- [2]. Bon-Wook Koo, Hyo-Seok Na, Young-Tae Jeon, Jung-Won Hwang, and Sang-Hwan Do. The influence of propofol and sevoflurane on hemostasis: a rotational thromboelastographic study. *Anesth Pain Med* 2014; 9: 292-297.
- [3]. Platelets, Perioperative Hemostasis, and Anesthesia. *Anesthesiology*, V 96, No 5, May 2002.
- [4]. F.A. Klok, M.J.H.A. Kruipb, N.J.M. van der Meer et al. Incidence of thrombotic complications in critically ill ICU patients with COVID-19. *Thrombosis Research* 191 (2020) 145–147.
- [5]. Coagulation abnormalities and thrombosis in patients with COVID-19. May 11, 2020, [https://doi.org/10.1016/S2352-3026\(20\)30145-9](https://doi.org/10.1016/S2352-3026(20)30145-9).
- [6]. Wei Shi, JiagaoLv, Li Lin. Coagulopathy in COVID-19: Focus on vascular thrombotic events. *Journal of Molecular and Cellular Cardiology* (2019), <https://doi.org/10.1016/j.yjmcc.2020.07.003>.
- [7]. Marco Marietta,ValeriaColuccio, Mario Luppi et al.COVID□19, coagulopathy and venous thromboembolism: more
- [8]. questions than answers. *Internal and Emergency Medicine* July 2020. <https://doi.org/10.1007/s11739-020-02432-x>.