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which can be fatal in patients with COVID-19. In the meantime, antiplatelet therapy can be prudently administered to critically ill patients with COVID-19 who are at high risk of thromboinflammation but low risk of bleeding. With more studies available in the future, we could then identify the population of patients with COVID-19 most likely to benefit from the use of antiplatelet therapy to prevent the occurrence of arterial or even venous thrombotic events.

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## A new inflammatory-microthrombotic syndrome as an explanation for thrombotic complications in patients with COVID-19



### Un nuevo síndrome inflamatorio-microtrombótico como explicación para las complicaciones trombóticas en pacientes con COVID-19

#### To the Editor,

We have read with great interest the article by King et al.<sup>1</sup> recently published in *Revista Española de Cardiología*. In this article, the authors discuss the higher incidence of thrombotic events in multiple territories and a higher International Society on Thrombosis and Haemostasis (ISTH) disseminated intravascular coagulation (DIC) score in hospitalized patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Although the authors mention that they have not ruled out a pre-existing prothrombotic state, our group, consistent with what the authors described,<sup>2</sup> has proposed a possible role of endothelial injury, complement, and coagulation in the pathogenesis of coronavirus disease 2019 (COVID-19).<sup>3</sup>

Our pathogenic scheme is based on the similarity of certain clinical and histopathologic findings of various entities that have thrombotic microangiopathy in common with COVID-19, and it postulates that the damage induced by this disease has an endothelial origin with 2 pathogenic routes: an inflammatory route, with predominance of the “cytokine storm” component, and a microangiopathic route involving the complement system.<sup>3</sup>

Furthermore, endothelial involvement could lead to platelet activation, thus altering coagulation and causing DIC, as described by the authors of the article. This fact *per se* could increase thrombin and prothrombin and trigger complement activation through C5.<sup>4</sup>

For instance, thrombotic microangiopathy has been reported in a patient with severe COVID-19, indicating a pathogenic relationship between these conditions.<sup>5</sup> The potential role of ADAMTS13 deficiency in serious forms of the disease is another possible factor, as described by Huisman et al.<sup>6</sup> in a recent article.

Additionally, the inflammatory route itself could activate complement through certain neutrophil serine proteases and macrophages.<sup>7</sup> Consequently, we believe that there is a strong relationship between inflammation, complement, thrombotic microangiopathy, and coagulation in the pathogenesis of COVID-19. This may represent a new COVID-19–related inflammatory-microthrombotic syndrome which could explain the authors’ interesting findings.<sup>2–4</sup>

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## Arterial thrombotic complications in hospitalized patients with COVID-19. Response to related letters



### Complicaciones arteriales trombóticas en pacientes hospitalizados con COVID-19. Respuesta a cartas relacionadas

#### To the Editor,

We appreciate the interest shown by Kow et al. in our work.<sup>1</sup> We fully agree with the comment that the lower cardiovascular risk profile in the cohort of patients with coronavirus disease 2019 (COVID-19), as well as the simultaneous thrombosis in different territories, supports the hypothesis of a systemic prothrombotic state in close relation to the inflammatory response associated with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)<sup>1,2</sup>.

Regarding the potential use of prophylactic antiplatelet therapy for its antithrombotic effect and perhaps even, as noted by the authors, its antiviral effect in patients with COVID-19, we recognize that this is an attractive proposal, but currently there is no clear clinical evidence of its usefulness in SARS-CoV-2 infection. There is no doubt about the importance of antiplatelet therapy in patients with arterial thrombotic complications, but its use in patients with high cardiovascular risk without established disease provides minimal benefit and an increased risk of bleeding complications.<sup>3</sup> One might think that with COVID-19 this would be different due to the endothelial dysfunction and inflammatory response it causes, but we must avoid empiricism and not support its de novo use in patients with COVID-19 without a specific cardiovascular reason, except in research studies specifically designed to test its efficacy.

We also thank and congratulate Valga et al.<sup>4</sup> for their recent publication on the role played by endothelial injury, complement, and coagulation in the pathogenesis of coronavirus disease. In our scientific letter,<sup>1</sup> we focused exclusively on the 1.8% (n = 38) of COVID-19 positive patients with arterial thrombotic complications treated at our hospital in March 2020. Although they had a higher

score according to the International Society on Thrombosis and Haemostasis (ISTH) diagnostic criteria for disseminated intravascular coagulation (DIC), only 3 strictly met the diagnostic criteria. As other authors have noted,<sup>5</sup> it is likely that patients with COVID-19 have a severe hypercoagulability, more so than a consumption coagulopathy, as is the case of classical DIC. Indeed, the pattern is different, as in patients with COVID-19, fibrinogen is characteristically elevated and thrombocytopenia is uncommon, and if it occurs, it is usually mild or moderate. We agree with the hypothesis of Valga et al. of multiple interactions between the immune system, coagulation (immunothrombosis), and associated endothelial dysfunction as a response to SARS-CoV-2 to explain the prothrombotic state of coronavirus disease.

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## Telematic cardiology consultation in the elderly. The 5 M framework can help



### Consulta telemática de cardiología para ancianos. La regla de las 5 M puede ser una ayuda

#### To the Editor,

We read with great interest the excellent consensus document of the Spanish Society of Cardiology on teleconsulta-

tions for clinical cardiologists in the era of COVID-19 by Barrios et al.<sup>1</sup> Telematic cardiology consultations are now a reality in Spain<sup>2</sup> and a document to help organize them will always be welcome. However, as active members of the Geriatric Cardiology Section, we were disappointed to see that there was no specific reference to elderly patients, who make up a very high percentage of the patients we see in our everyday practice. Elderly patients, who are particularly vulnerable to coronavirus infection,<sup>3</sup> need more help to understand that telemedicine can be an effective way to communicate with their cardiologists and to be able to use it effectively. With this in mind, the 5 M framework<sup>4,5</sup> (figure 1) can be a useful guide for teleconsultations:

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