

Seeking the “coronal view” for new-onset unmet needs in chronic thromboembolic pulmonary hypertension during the COVID-19 pandemic

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I have read the recently published article in your Journal entitled “How to deal with chronic thromboembolic pulmonary hypertension (CTEPH) during the COVID-19 pandemic: Too many gray zones to be considered” authored by Akay et al.^[1] with a great interest. Briefly, this article seems to seek satisfactory answers for critical questions in gray zones regarding the modifications and prioritizations in diagnostic work-up, risk stratification, and tailored management algorithms of CTEPH during COVID-19 outbreak.^[1-4]

In this paper, the main issues highlighted were as follows: (i) the risks for clinical deterioration in patients with CTEPH complicated by COVID-19 who had already mismatched ventilation to perfusion relationship, limited endothelial vasodilatory reserve and right heart failure even prior to addition of the infection, microvascular *in situ* clot formation and thromboembolic events due to hypercoagulable state triggered by viral infection, anesthesia, surgery and/or extracorporeal membrane oxygenation (ECMO); (ii) the risks for aerosolization of virus into the environment and exposure of the healthcare staff in touch during respiratory support, physical and echocardiographic assessments, lung ventilation/perfusion scanning and computed tomographic pulmonary angiography and right heart catheterization; (iii) contamination of the devices; (iv) precautions for avoidance from early intubation

and utilization of less invasive respiratory supports; (v) risk-based multidisciplinary team decision for best treatment option with a priority of pulmonary endarterectomy (PEA) or medical treatment according to the currently available guidelines for PH; and (vi) postoperative management during hospital stay and post-discharge follow-up including riociguat treatment, optimal anticoagulation, self-monitoring of the international normalized ratio, and tele-medicine. Proposals for modification and prioritization of procedures addressed in this article seem to be in accordance with recently published position papers focusing to defer all right heart catheterizations, and interventional and surgical procedures until a later date in stable patients.

Potential drug interactions between anticoagulants and antiviral agents has remained as another concern in systemic inflammatory response syndrome characterized by macrophage activation syndrome, cytokine storm, and hypercoagulability which were addressed in this article.

The first reports about pulmonary arterial hypertension (PAH) complicated by COVID-19 suggest a paradoxically better outcome with few catastrophic events.^[4] It is hypothesized that a kind of pulmonary capillaritis related with cytokine storm develops in fatal COVID-19 without PAH, but severe pulmonary microvascular remodeling in

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PAH resulting in exhausted pulmonary endothelial vasodilatory reserve may be protective against the harms of vasculitis and cytokine storm. Strict self-isolation and beneficial effects of PAH-specific treatments have been also speculated as modifiers of this specific course.^[4]

However, as a limitation of this article, in distal (subsegmental) lesions which may not be amenable for PEA, current status of balloon pulmonary angioplasty as an emerging treatment option, solely or as a part of hybrid treatment with PEA and or/riociguat and other PAH-specific off-label CTEPH therapies, should have been emphasized.

Nevertheless, this manuscript should be considered as a first comprehensive national paper addressing the multiple new issues raised in CTEPH practice requiring modifications, prioritizations, and deferral patterns in the era of pandemic.

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