

**Authors' reply** Thank you for publishing the comment of Rajendram et al<sup>1</sup> referring to the recently published scientific statement<sup>2</sup> regarding the diagnostic workup of patent foramen ovale (PFO) during the coronavirus disease 2019 (COVID-19) pandemic. The recommendation of possible deferral of elective diagnostic workup aimed at screening for PFO, which is a preventive procedure affecting long-term prognosis after cardiogenic embolism, was indeed accepted by the Polish experts, in line with the European guidelines.<sup>3</sup> Transesophageal echocardiography, as part of diagnostic workup for PFO in particular, is a complex, aerosol-generating procedure with a predictable impact on echocardiography laboratory services in the era of COVID-19..

We acknowledge the comment on a possible rare scenario of platypnea-orthodeoxia as a consequence of PFO. However, this condition is truly rare in non-COVID patients (a review by Collado et al<sup>4</sup> mentions a prevalence of 2.5% in the PFO population, and not 25%, which is in line with our own observations), although proper diagnosis is valuable in individual cases of chronic, uncontrolled hypoxia. This means that, for most patients with PFO, a clinical benefit will “classically” stem from abated paradoxical embolism. Interestingly, strokes are not abundant during the pandemic.<sup>5</sup> Even though a suspicion of PFO can be made using computed tomography or magnetic resonance imaging data, the critical diagnostic step involves transesophageal echocardiographic study with a positional maneuver, which can be a critical limiting factor in the sickest patients including those with COVID-19, especially when ventilated. Importantly, extracardiac shunting is an alternative explanation beyond the common diagnosis of PFO. Importantly, transthoracic echocardiography is routinely suggested in all COVID-19 patients with aggravating hypoxia.<sup>3</sup>

We deeply regret that the referenced publication by Rajendram et al remains to be published in *Intensive Care Medicine*, as we were unable to reach it when preparing this response. It is true that right ventricular overload or failure, which were identified as negative prognostic factors in

patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), may lead to interatrial shunt reversal and worsening of hypoxia merely by inversion of the pressure gradient between the atria. This mechanism is arguably more likely than position-related shunting typical for platypnea-orthodeoxia. At the same time, the right-to-left shunt unloads the right atrium and is likely to decrease right atrial pressure, potentially reducing systemic venous congestion. Experience in treating patients with pulmonary hypertension indicates that sealing interatrial communication does not improve their clinical outcomes and, inversely, septostomy or implantation of an atrial flow regulator<sup>6</sup> remains an option for the sickest patients without an intracardiac shunt. Therefore, PFO closure during the COVID-19 pandemic cannot be routinely recommended, and the clinical benefit proposed by Rajendram et al<sup>1</sup> remains hypothetical—even if hypoxia could be alleviated.

We acknowledge the pathophysiological insights included in the letter and, indeed, agree that restrictions in diagnostic procedures must be lifted as early as the COVID-19-related healthcare overload decreases—according to local resources and delivery of services. We have actually proposed the statement on identifying urgent indications for structural heart interventions, which might be represented not only by patients with PFO at high risk of recurrent stroke but also the subsets of candidates for transcatheter aortic valve implantation or MitraClip procedures. However, benefits and risks (including device-related thrombosis) must be carefully weighed considering that the procoagulant state appears to be a major pathophysiological component of COVID-19.<sup>6</sup> We also believe that continuation or suspension of specific lines of diagnostic workup has to be strongly linked with the local influence of the COVID-19 epidemic upon the healthcare system rather than the fact of a pandemic itself.<sup>2</sup> Considering the fact that high-quality medicine requires an individualized approach and high-level diagnostic inquisitiveness, we appreciate refreshing the still uncommonly diagnosed platypnea-orthodeoxia syndrome to the readers of *Kardiologia Polska* (*Kardiol Pol*, *Polish Heart Journal*).

## ARTICLE INFORMATION

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