

## Quantitative pupillometry as a tool to predict post-cardiac arrest neurological outcome in target temperature patients<sup>☆</sup>



### Pupíloetría óptica cuantitativa como herramienta para predecir el pronóstico neurológico posparada cardíaca en pacientes con control de la temperatura

Dear Editor:

An expert consensus document has been published recently on the management of temperature control in patients after cardiac arrest.<sup>1</sup> However, we believe that in the neuroprognosis and tools section—one of the newest and more practical methods to this end—quantitative pupillometry has been left out.

The lack of pupillary reactivity is one of the criteria with more specific weight to assess neurological prognosis although such an assessment using the standard method is largely subject to assessment and interpretation biases. Such non-minor errors associated with the assessment of pupillary reactivity have been explored in former studies, among them, the one conducted by Riker et al.<sup>2</sup> They studied a sample of 55 patients with temperature monitoring during the post-cardiac arrest period and went on to perform a neurological assessment through pupillometry. Among the study results, patients with Neurological Pupil index (NPI) scores of 0 or <3 within the first 6 h were more prone to poor prognoses (86%) compared to those with NPI scores >3 (52%;  $P = .03$ ). Without a doubt the best study conducted so far and with more scientific repercussion is the one conducted by Oddo et al.<sup>3</sup> They analyzed over 450 patients with cardiac arrest in whom pupillary reactivity was assessed using the standard method vs quantitative pupillometry. Investigators found that, with pupillometry, all examinations with NPI scores  $\leq 2$  within the first 72 h after the cardiac arrest provided a 100% specificity to predict unfavorable neurological outcomes after 3 months according to the cerebral performance category (CPC) scale. As a matter of fact, when pupillometry was added to the bilateral lack of somatosensory evoked potentials (N=20) maximum sensitivity in all the tests run was achieved (58%) with similar specificity (100%).

In an even more complex scenario, Miroz et al.<sup>4</sup> conducted an observational cohort study among patients treated with ECMO-VA due to cardiogenic shock or refractory cardiac arrest. These authors found that pupillometry revealed that an abnormal NPI (<3, at any time within 24 to 72 h) was 100% specific to predict 90-day mortality. However, NPI values = 0 when ECMO-VA support was initiated (N=9) were 100% predictive of mortality.

The last clinical practice guidelines on the post-cardiac arrest syndrome<sup>5</sup> emphasize that this tool is suitable to predict—in a more precise and reproducible way—the lack of corneal reflex compared to standard assessment.

Infrared pupillometry provides intensivists with an easily reproducible, non-invasive, precise, and quantitative tool for pupillary examination. Based on the current evidence available and our own experience, we believe that pupillometry should be added to the neurological examination armamentarium available and performed on a routine basis in device-capable centers to assess the neurological prognosis of patients after cardiac arrest under temperature monitoring.

### Funding

This study had no funding whatsoever from government or private companies.

### Reference

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<sup>☆</sup> Please cite this article as: Blandino Ortiz A, Higuera Lucas J, Soriano C, de Pablo R. Pupíloetría óptica cuantitativa como herramienta para predecir el pronóstico neurológico posparada cardíaca en pacientes con control de la temperatura. *Med Intensiva*. 2022;46:415.