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Letter to the Editor

Use of neonatologist-performed echocardiography in the management of the infant with hypoxic-ischaemic encephalopathy during therapeutic treatment: The Spanish registry

Dear Editor,

Neonatal hypoxic-ischemic encephalopathy (HIE) is a major cause of death and disability worldwide. These newborns often have multiple organ failure as a result of the hypoxic-ischemic insult. Myocardial dysfunction is manifested mainly in the first days of life by low cardiac output with decreased myocardial contractility, systemic hypotension, and pulmonary hypertension.[1]

In addition, therapeutic hypothermia (TH) as the standard therapy for moderate or severe HIE may have effects on the cardiovascular system, as heart rate and biventricular output are markedly reduced during treatment, with an increased peripheral vascular resistance that affects the redistribution of cardiac output from systemic blood flow preferentially for cerebral perfusion.[1,2]

Recently, Montaldo et al. published, in *Resuscitation*, a relevant study in which they found that infants with HIE and adverse neurological outcome showed a preferential cerebral flood flow redistribution during TH.[2]

Therefore, meticulous haemodynamic assessment and management during TH seems relevant to improve outcomes. The methods most frequently used to evaluate haemodynamic status in this population include measuring cardiac enzymes and electrocardiography. However, the combination of clinical examination and bedside ultrasound has been shown to improve clinical diagnosis and patient management, and to potentially improve short- and long-term outcomes.[3]

The term 'neonatologist performed echocardiography' (NPE) was introduced to describe the use of echocardiography to provide physiological information in real time to support clinical decision-making. However, despite the increasing use of echocardiography in the neonatal clinical practice, there is no established structured training process specifically designed for the neonatologists.[4]

In order to learn the reality of the use of this tool in the total management of the cooled infant with HIE, a national cross-sectional study was carried out in Spain in 2015 using a questionnaire sent to all 57 level III units that offered TH (Table 1). Almost half of the hospitals reported not having professionals with experience in neonatal cardiac ultrasound, demonstrating that knowledge regarding NPE is clearly insufficient in 50% of the centers. Likewise, 77% of the centers do not perform NPE as part of the examination of factors that may contribute to

Table 1 – Questions regarding infants diagnosed with hypoxic-ischaemic encephalopathy treated with hypothermia treatment in your hospital.

	Very often or always	Often	Rarely or never
1 Are there professionals with specific training in neonatal cardiac ultrasound?	30 (57)	16 (30)	7 (13)
2 Do you perform NPE scans in the process of helping to establish neurological status?	13 (23)	16 (29)	27 (48)
3 In clinical practice, do you use the information from NPE to establish the prognosis of death or severe disability?	0	19 (34)	37 (66)
4 How do you rate knowledge at your hospital on performing and interpreting NPE?	Adequate 18 (32)	Clearly insufficient 28 (50)	Minimally sufficient 10 (18)
5 How do you see the need for more specific training in performing and interpreting NPE?	Interesting but expendable 27 (47)	Much needed 24 (42)	Not necessary 6 (11)

NPE: neonatologist-performed echocardiography.

influencing the evolution of the neurological lesion of the newborn, and none of the hospitals reported taking into account the information of NPE evaluation in the prognosis of death or severe long-term disability.

Series from other countries regarding the use of NPE as a routine evaluation in this pathology are lacking. However, our data suggest there is room for improvement in the evaluation of the cardiac state of the infant with HIE. Comprehensive understanding of the physiological changes that occur in the cooled infant with HIE, and real-time bedside assessment tools, such as near-infrared spectroscopy and NPE as part of drawing the clinical picture, are invaluable aids to decision-making, including the use of volume loads, doses of inotropes, or strategies to modify pulmonary vascular resistance.[5] Hospitals that wish to offer an integrated approach to the infant with HIE should be encouraged to train their own professionals to offer a round-the-clock NPE evaluation of this high-risk population.

Conflict of interest

All the authors of the letter do not have any conflict of interest to declare.

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Cristina Vega-Del-Val[a,b]

[a]*Neonatal Unit, Hospital Universitario of Burgos, Avda Islas Baleares s/n, 09006, Burgos, Spain*

[b]*Fundación NeNe, Spain*

Juan Arnaez[a,b,*]

[a]*Neonatal Unit, Hospital Universitario of Burgos, Avda Islas Baleares s/n, 09006, Burgos, Spain*

[b]*Fundación NeNe, Spain*

Alfredo Garcia-Alix[a,b,c,d]

[a]*Institut de Recerca Pediatrica Sant Joan de Dèu, Hospital Sant Joan de Dèu, Passeig Sant Joan de Déu, 2, 08950, Barcelona, Spain*

[b]*Universitat de Barcelona, Barcelona, Spain*

[c]*CIBER de Enfermedades Raras (CIBERER), U724, Fundación NeNe, Madrid, Spain*

[d]*Fundación NeNe, Spain*

* Corresponding author at: Unidad de Neonatología, Hospital Universitario Burgos, Spain.
E-mail address: juan.arnaez@neurologianeonatal.org (J. Arnaez).

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