

## The assessment of maternal haemodynamic profile via transthoracic bioreactance as a screening tool for the early prediction of preeclampsia (PE) and normotensive fetal growth restriction (FGR).

AUTHOR(S)

Cathy Monteith

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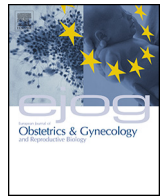
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## LETTERS TO THE EDITOR—Correspondence

**Reply to letter to the editor entitled “Non-Invasive cardiac output monitoring (NICOM®) can predict the evolution of uteroplacental disease—results of the prospective HANDLE study”**

Dear Editor,

We thank Dr. Perry et al. [1] for their recent interest in the HANDLE study and would like to respond to some of their comments relating to our recent publication on the role of bioactance obtained haemodynamic variables in the prediction of the uteroplacental diseases preeclampsia (PE) and fetal growth restriction (FGR) [2].

Our cohort did not exclude those with advanced maternal age (range 16–44 years) or obesity (body mass index range 16.26–39.89;  $n=54$  (14.8%) with a BMI  $>30$ ). This technology has previously been applied by my co-authors to a high risk population with a history of PE [3]. Therefore, our objective for this cohort was to better identify the at risk nulliparous parturient. As such multiparous women and those with a history of PE were excluded. In our methodology we detailed the power calculation from an anticipated 5% nulliparous PE rate in our local population and recruited 422 expecting to capture 20 PE cases. The anticipated 5% and subsequent 20 cases of nulliparous PE rate was previously achieved in another study carried out in our unit using transthoracic echocardiography in low risk nulliparous women [4].

Our group have also recently demonstrated very acceptable agreement between bioactance and echocardiography for the measurement of stroke volume (mean bias 6 mL, LOA –18–29 mL, ICC 0.8) and measurement of cardiac output (mean bias 0.2L, LOA –1.3–1.7L, ICC 0.8) this cohort with a mean percentage error of  $\pm 26\%$  and a precision of 3.4% [5].

We entirely agree that FGR is not diagnosed by an EFW of  $<10$ th centile. It is well established that the detection rate fetal growth restriction (FGR) via clinical examination is suboptimal [6]. The authors completely agree that those fetus at greatest risk are those for whom the estimated fetal weight is less than the third centile. However, even when a definition of a birthweight  $<10$ th centile is applied there is a significant difference in the haemodynamic status of the mother which therefore poses a potential for earlier recognition and better management of those pregnancies. As detailed in the manuscript only one third of infants with a birthweight  $<10$ th centile were suspected antenatally in this cohort. Although the data was not presented in the referred manuscript there were no differences in the haemodynamics of pregnancies where the birthweight was  $<3$ rd centile and those  $<10$ th centile. Whilst Perry et al. suggest a smaller mother would

have a lower cardiac output we did not observe this difference. There was no difference in maternal cardiac index (adjusted for body surface area) of FGR and unaffected pregnancies.

We thank Dr Perry et al. for their acknowledgement surrounding the strength of the postnatal element of this study. This has not been addressed in this manuscript and the postnatal persistence of a high resistance vasculature is the subject of a further manuscript which is currently under submission.

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Cathy Monteith\*

Fergal D. Malone

Department of Obstetrics & Gynaecology, Royal College of Surgeons, Ireland

Afif EL-Khuffash<sup>a,b</sup>

<sup>a</sup>Department of Neonatology, Rotunda Hospital, Dublin, Ireland

<sup>b</sup>School of Medicine, Royal College of Surgeons in Ireland, Dublin, Ireland

Etaoin Kent

Obstetrics & Gynaecology, Rotunda Hospital, Dublin, Ireland

\* Corresponding author at: RCSI, The Master’s House, Rotunda Hospital, Parnell Square, Dublin 1, Ireland.

E-mail address: [cathymonteith@rcsi.ie](mailto:cathymonteith@rcsi.ie) (C. Monteith).

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