



## EDITORIAL COMMENT

## Pregnancy, the exception to the indexing of echocardiographic parameters?

### A gravidez, a exceção à indexação dos parâmetros ecocardiográficos?

Tatiana Guimarães

Serviço de Cardiologia, Centro Hospitalar de Lisboa Norte – Hospital Santa Maria, Lisboa, Portugal

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Cardiovascular disease is the leading cause of maternal mortality and its clinical diagnosis during pregnancy remains challenging.<sup>1</sup>

Pregnancy is a dynamic state that is associated with major hormonally mediated changes that result in numerous biological adaptations. These comprise significant physiological and hemodynamic changes within the cardiovascular system, including structural and functional adaptations of the myocardium.<sup>2</sup>

An understanding of the physiologic alterations is important for early recognition and monitoring of the consequences of cardiac disease in pregnancy. These changes include heart rate, blood volume, and cardiac output as well as decreased vascular resistance.

Echocardiography is the preferred diagnostic test for cardiac disease in pregnant women for its safety and general availability with no risk of radiation to the mother and the fetus; provides precise information about structural abnormalities and illuminates the pathophysiology of cardiac disease and its hemodynamic consequences.<sup>1</sup>

Echocardiographic changes during pregnancy are based on the physiologic alterations. Increased blood volume and cardiac output during pregnancy lead to dilatation of the heart; the left ventricular (LV) end-diastolic dimension increases slightly but remains within normal limits in normal pregnancy. Reversible “physiologic” LV hypertrophy also exists during pregnancy. LV mass increases, resulting from the increased LV diameter and increased LV posterior wall and intraventricular septal thickness. Like the LV, the right ventricle increases in size over the course of pregnancy because of increased preload. The left atrium size increases gradually in pregnancy, although the measurements remain within normal limits.<sup>1</sup> Other normal cardiac structural changes that can be shown by echocardiography include an increase in aortic root, mitral, and tricuspid annular size, and an increase in stroke volume leading to an increase in Doppler flow velocity across the aortic valve. Mild valvular regurgitation occurs normally in pregnancy and has been demonstrated in up to 28, 94, and 94% of mitral, tricuspid, and pulmonic valves, respectively.<sup>3</sup>

Echocardiographers and clinicians should be aware of the normal and abnormal cardiac structural and functional adaptations seen both during pregnancy and the postpartum period. Importantly, during a normal pregnancy, the extent of the dilatation is small with chamber sizes remaining within normal limits. Also, these changes are reversed

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E-mail address: [tatiana.oliveira.guimaraes@gmail.com](mailto:tatiana.oliveira.guimaraes@gmail.com)

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within three to six months of delivery.<sup>4</sup> Echocardiographers should therefore still use guidelines to assess whether a chamber is enlarged.<sup>5</sup>

Proper scaling of cardiac dimensions is of paramount importance in making correct decisions in clinical cardiology. The usual normalization of cardiac dimensions to overall body size assumes an isometric relationship. To allow comparison among individuals with different body sizes, chamber measurements should be reported indexed to body surface area (BSA).<sup>6</sup> However, pregnant women experience a continuous BSA variation during gestation and after delivery. International guidelines are not clear about the indications or whether to index echocardiographic parameters during pregnancy and which methodology should be used.

Ferreira et al., recently published a systematic review in the Portuguese Journal of Cardiology concerning the impact of echocardiographic indexation to evaluate cardiac reverse remodeling throughout pregnancy and postpartum. The main objective of the study was to identify and compare the most common indexing methodologies in the literature on the pregnant population: using absolute values, indexing to the BSA before pregnancy, using allometric indexes, or indexing to BSA measured on the same day of cardiac assessment. The authors conclude that indexation methods do not impact the clinical interpretation of longitudinal echocardiographic assessment but highlight the need to harmonize normalization procedures during pregnancy.<sup>7</sup>

This is the first study to evaluate the impact of indexation for the longitudinal analysis of cardiac adaptation, specifically left ventricular mass, during pregnancy and one to six months after delivery. In most published data in this field, authors do not provide any reason whether to index or not echocardiographic parameters and if so, the rationale for selecting the index methodology. However, the study has some limitations, such as a small sample size and few echocardiographic variables being analyzed, limiting the potential impact on other cardiac metrics.

The study emphasizes the need for the development and uniformization of echocardiographic methodologies in pregnancies, to guarantee a correct interpretation and approach to this special and unique population.

## Conflicts of interest

The author has no conflicts of interest to declare.

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