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## Remarks on the Position Paper on Cardio-Oncology Hematology and Remarks on the Review of Cardiac Imaging Modalities for the Detection of Cardiotoxicity



### Puntualizaciones al documento de consenso en cardio-onco-hematología y a la revisión sobre técnicas de imagen cardíaca en detección de cardiotoxicidad

#### To the Editor,

The Nuclear Cardiology Working Group of the Spanish Society of Nuclear Medicine and Molecular Imaging would like to make some comments on the recent articles by López-Fernández et al.<sup>1,2</sup>

In the first article, the authors state that “isotopic ventriculography should not currently be considered for monitoring onco-hematologic treatments due to the risk associated with ionizing radiation”, without providing any specific reference supporting this statement, whereas the second article does not even mention isotopic ventriculography.

Strong scientific evidence supports the effectiveness of nuclear cardiology techniques in assessing ventricular function, and isotopic ventriculography is the gold standard for evaluating chemotherapy-induced cardiotoxicity. Ventriculographic calculation of left ventricular ejection fraction using nongeometric methods does not suffer from the errors of other diagnostic techniques caused by changes in ventricular morphology or in regional wall motion.

Not only do classic studies of anthracycline-induced cardiotoxicity show that isotopic ventriculographic monitoring of left ventricular ejection fraction reduces the incidence of heart failure by up to 4 times, but, when it does occur, it is reversible and less severe.<sup>3</sup> Based on this scientific evidence, ventriculography has been widely used in clinical practice since the 1980s, as well as in innumerable clinical trials monitoring cardiotoxicity.<sup>4</sup>

Because of its high reproducibility, ventriculography is an ideal technique to monitor cardiac function. Compared with echocardiography, ventriculography shows much lower intraobserver and interobserver variability, an essential consideration when tracking small variations in left ventricular ejection fraction and detecting

early deterioration in the subclinical phase before heart failure development.<sup>4</sup>

The second article acknowledges the drawbacks of other diagnostic techniques that can be used to evaluate cardiotoxicity: low reproducibility (2D echocardiography), reduced availability, and few published data (3D echocardiography and global longitudinal strain), lack of availability (magnetic resonance), and lack of usefulness (computed tomography), but the article fails to include any information on isotopic ventriculography, which is superior to all of the previous techniques in terms of reproducibility, reliability, and use in clinical practice and also benefits from decades of scientific evidence.

The modality is unaffected by obesity, acoustic windows, claustrophobia, breast prostheses, and pacemakers and its cost is similar to that of the alternative modalities.<sup>5</sup>

Analysis of the scientific evidence on radiation and its associated risk is vital. There are no data on cancer induced by radiation exposure from nuclear cardiology studies. The radiation exposure from ventriculography is equivalent to that of 3 to 6 months exposure to background radiation. The natural incidence of cancer exceeds the theoretical rate of supposed radioinduced cancer and is lower than that caused by background radiation.<sup>6</sup> The radiation from computed tomography and radiotherapy, commonly used in oncology patients, is much higher than that of ventriculography.<sup>7</sup>

Nuclear physicians adhere to ALARA (As Low As Reasonably Achievable) criteria, using the lowest dose possible and attempting to reduce it even further by using new systems and improved techniques. Thus, nuclear cardiology is a critical strategic component in the multimodality approach to cardio-oncology.<sup>8</sup>

Accordingly, the articles by López-Fernández et al. should have noted the crucial role played by isotopic ventriculography in cardiotoxicity detection due to its reliability, reproducibility, and low radiation, with clearly superior benefits for patients; all these benefits are supported by extensive scientific evidence. Monitoring of patients receiving cardiotoxic treatments should be multidisciplinary, with coordination among oncologists, cardiologists, and cardiac imaging specialists to ensure that the method with the best results is applied and that patients are not denied the gold standard technique without scientifically sound reasons.

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## Remarks on the Position Paper on Cardio-Onco-Hematology and Remarks on the Review of Cardiac Imaging Modalities for the Detection of Cardiotoxicity. Response



### Puntualizaciones al documento de consenso en cardio-onco-hematología y a la revisión sobre técnicas de imagen cardíaca en detección de cardiotoxicidad. Respuesta

#### To the Editor,

Heart failure is one of the most concerning and best studied complications of antitumor treatments. Existing literature suggest that surveillance strategies are needed to promote early diagnosis at stages when cardiac dysfunction may be reversible with appropriate therapy.<sup>1–3</sup> Regardless of the technique used for cancer treatment monitoring, it is clear that left ventricular ejection fraction alone is not sufficient to detect early myocardial injury.<sup>4</sup> Current guidelines recommend echocardiography as the method of choice for the longitudinal follow-up of cancer patients.<sup>1–3</sup>

The main limitations of isotopic ventriculography are both the repeated use of radiation<sup>5</sup> and the limited information on heart function. In fact, the high reproducibility of left ventricular ejection fraction measurements reported in the past is not available with current gamma cameras.<sup>1,6</sup>

Echocardiography offers a complete evaluation of the heart (right ventricular function, atrial function, valvular and pericardial disease)<sup>7</sup> and new echo techniques, particularly myocardial deformation imaging, allow for an early diagnosis of subclinical changes in cardiac function.<sup>8</sup> Therefore, in daily practice, isotopic

ventriculography is suggested only when echocardiography or cardiac-magnetic resonance imaging are not available and it has a low impact as an imaging technique for the diagnosis and prevention of cardiotoxicity.<sup>1–3,6</sup>

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