

LEFT VENTRICULAR EJECTION FRACTION DURING ONCOLOGIC TREATMENT: CORRELATION OF THREE IMAGING METHODS

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Purpose: Chemotherapy administration comes with risk of cardiac toxicity, assessed by changes in the left ventricular ejection fraction (LVEF). Cardiac Magnetic Resonance (CMR) is the gold standard for calculation of LVEF, however, it is an expensive method not promptly available in every medical center, especially in developing countries. Other methods such as Echocardiography (ECHO) and Radionuclide ventriculography (RV) are accurate enough to estimate LVEF and readily available in developing countries. The aim of this study is to determine correlation between these three imaging methods and, to suggest confident assessment of LVEF during oncologic treatment with a reliable imaging technique both for screening and follow up.

Methods: Population of 52 Mexican women with stage IV-B cervical cancer and no previous cardiovascular disease history, age range 40-65. RV, ECHO and CMR imaging were performed one week before and 6 months after chemotherapy (cisplatinum-vinorelbine) and (nimotuzumab) in some of the patients. Data analysis was made by t-paired and Pearson correlation tests to asses difference of means and correlation with a value of $p < 0.05$ to be considered as statistically significant.

Results: Baseline LVEF was $62.1 \pm 7.2\%$ for RV, $64 \pm 8.8\%$ for ECHO, and $61.5 \pm 6.4\%$ for CMR. After the follow up LVEF was $58.6 \pm 9.7\%$ for RV, $62 \pm 7.1\%$ for ECHO and $56.5 \pm 8.3\%$ for CMR. Correlation was statistically significant between the three methods when evaluating baseline LVEF ($p = 0.03$), with a stronger correlation between CMR and RV ($p = 0.01$). However the corretations of final LVEF were not significant due an overestimation using ECHO. CMR and RV showed a significant decrease of LVEF in the follow up, which wasn't observed using ECHO.

Conclusions: Significant correlation between the three methods shows that any of them can be used for initial assessment of LVEF before undergoing a chemotherapy treatment. However, during the follow up, CMR and RV showed significant diminishment of LVEF in an early stage. Because of this, these two methods may be the best option to detect chemotherapy associated cardiomyopathy. The uneven performance of the echo may be due to either intraobserver variability or a poor acoustic window. It is also noteworthy that in comparison to RV, CMR does not use ionizing radiation. Given that CMR was the most accurate method to detect even the slightest descent in LVEF at the earliest stages, we believe it to be the ideal test when suspecting or evaluating cardiotoxicity. The decision about which method is adequate should be individualized to each patient's needs.