Comparison of two ultrasound contrast agents for left ventricular opacification

Becher HH.¹; Mannani N.¹; Choy M.¹; Paterson I.¹; Pituskin E.²; Choy J.¹

¹Mazankowski Alberta Heart Institute, University of Alberta, Edmonton, Canada
²Cross Cancer Institute, Edmonton, Canada

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Background: Several ultrasound contrast agents have been approved and used for measurement of LV volumes and ejection fraction (EF). However, there has been no direct comparison between these agents.

Purpose: To compare different imaging parameters between two widely used ultrasound contrast agents for LV opacification when imaged with a low power contrast specific imaging modality

Methods: A retrospective study was performed using recordings of the local echocardiography registry for patients undergoing chemotherapy for cancer treatment. Patients were included who underwent follow-up echocardiograms (3 months) with 2 different ultrasound contrast agents and had only minor changes in the LV ejection fraction (EF) between the studies (<5%). Qualitative and quantitative analysis of the contrast effect was performed in apical four- and two chamber views (4CV,2CV). For quantitative analysis of the LV opacification square regions of interest (ROI) were placed in the apical and basal regions of the ventricle in each echocardiographic recording and the arithmetic mean and standard deviation of pixel intensity within each ROI was recorded throughout the entire loop. Qualitative visual assessment was performed using a three step visual score in order to assess the endocardial border delineation, basal attenuation and apical swirling. Wilcoxon signed-rank test was used to compare the measurements obtained with different contrast agents.

Results: 41 patients fulfilled the inclusion criteria. In all patients suitable recordings for measurement of LV volumes and EF were obtained. The mean + standard deviation of the EF was 61 ± 9%. Both contrast agents provided intensive LV opacification in the basal and apical cavities. The video intensities (mean + standard deviation) in the apical and basal cavities were comparable across both contrast agents in the 2CV apical ROI (219.96 ± 21.42 vs 224.69 ± 20.23, p = 0.32), the 2CV basal ROI (114.55, 42.02 vs 112.79, 42.57, p = 0.81), the 4CV apical ROI (228.02, 17.80 vs 225.51, 20.37, p = 0.30), and the 4CV basal ROI (100.05, 41.11 vs 92.84, 42.54, p = 0.37). Visual assessment of endocardial delineation on end-diastolic and end-systolic frames revealed no statistical difference between the contrast agents.

Conclusion: In patients with normal LV function no clinically relevant differences were found between the two contrast agents regarding LV opacification and endocardial border delineation.