Title: Variable left ventricular ejection fraction on multigated radionuclide imaging analyzed by different software packages in patients with cancer.

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Background:

Baseline and serial multigated acquisition (MUGA) scans are an established method for assessing left ventricular (LV) ejection fraction (EF) in oncology patients. The purpose of the study was to explore the interchangeability of 2 commercially available software on evaluation of LV EF.

Methods:

In all 602 studies were performed in 322 patients. Of the 602, only 573 studies in 315 patients could be reprocessed using Jetstream, Inc. (JS) and MIM Software, Inc. (MIMS) packages for estimating LV EF. LV EF was determined by localizing a region of interest around the LV in a left anterior oblique projection.

Results:

Median age was 53 ± 12.88 years and 226 patients (70.2 %) were female. Baseline data and cancer type are listed in the table. The most common co-morbidities were hypertension (45%) followed by diabetes mellitus (19.2%). In the 573 studies analyzed, the mean EF and standard deviation for MIMS and JS were 55.62% ± 10.12% and 65.51% ± 10%, respectively (p value < 0.00001, Student's

paired t-test and Z-test). Despite a correlation of 0.84 (see figure 1), JS tended to measure a higher EF. The mean difference in EF between the paired studies was 10.4%, and 312 (55%) of the studies had a difference in EF greater than 10%. Interobserver variability in EF for JS and
MIMS was measured as 1 and 0.994 respectively.

Conclusion:

Our study highlights that software packages are not interchangeable in measuring EF. Additionally, 55% (312 patients out of 573) demonstrates a difference in EF of > 10% depending on the software used. This variability may lead to inappropriate delaying or discontinuing chemotherapy or radiation. MUGA reports should note the software version used, and future serial imaging of patients should be processed on the same software.

Baseline Characteristics		
Total No. of Studies:	602	
Patients	322	
Studies reprocessed	573	
Number of Patients	315	
Female	226	70.19%
Male	96	29.81%
Mean age	53	

Insurance (of 322 patients)		
Managed Care (MC)	140	43.50%
Veterans Affairs (VA)	1	0.30%
Medicare	19	5.90%
Medicare + MC	15	4.70%
Medicare + VA	1	0.30%
Medicaid	35	10.90%
Charity Care	103	32.00%
Unknown	8	2.50%

Race (of 322 Patients)		
Black/African American	136	42.24%
White/Caucasian	27	8.39%
Asian	10	3.11%
Other Race	149	46.27%

Ethnicity (of 322 patients)		
Hispanic or Latino	128	39.75%
Not Hispanic or Latino	192	59.63%
Unknown/Unreported	2	0.62%

Table 1: Baseline Characteristics of Patients

Co-Morbidity	Patients	No	Yes	Unknown
Cancer	321	10 (3.1%)	311 (96.9%)	0 (0.0%)
Hypertension	318	174 (54.7%)	143 (45.0%)	1 (0.3%)
Diabetes mellitus	317	255 (80.4%)	61 (19.2%)	1 (0.3%)
Hyperlipidemia	318	259 (81.4%)	58 (18.2%)	1 (0.3%)
Coronary artery Disease	318	296 (93.1%)	21 (6.6%)	1 (0.3%)
Prior Myocardial infarction	318	297 (93.4%)	20 (6.3%)	1 (0.3%)
Prior PCI	318	308 (96.9%)	7 (2.2%)	3 (0.9%)
Prior CABG	318	313 (98.4%)	3 (0.9%)	2 (0.6%)
Prior A-Fib	318	307 (96.5%)	10 (3.1%)	1 (0.3%)
PVD	318	312 (98.1%)	5 (1.6%)	1 (0.3%)
CKD	318	306 (96.2%)	11 (3.5%)	1 (0.3%)
Stroke	318	313 (98.4%)	4 (1.3%)	1 (0.3%)

Table 2: Co-Morbidities in Patients

Cancer Type (of 310 Patients)		
Breast	144	46.50%
Lymphoma	82	26.50%
Gastric	16	5.20%
Bone	6	1.90%
Sarcoma	25	8.10%
Ovarian	9	2.90%
Multiple myeloma	6	1.90%
Head and Neck	1	0.30%
Lung	4	1.30%
Uterine	7	2.30%
Other	10	3.20%

Table 3: Cancer Types in Patients

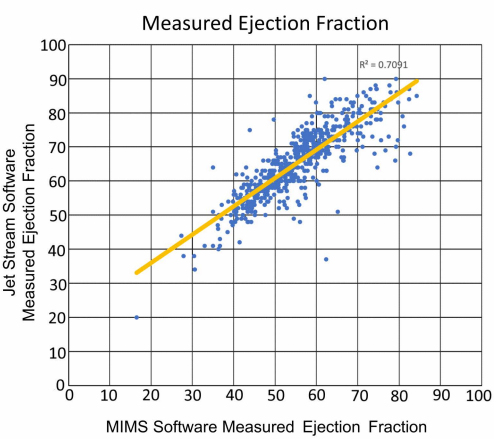

Figure 1: Correlation Plot

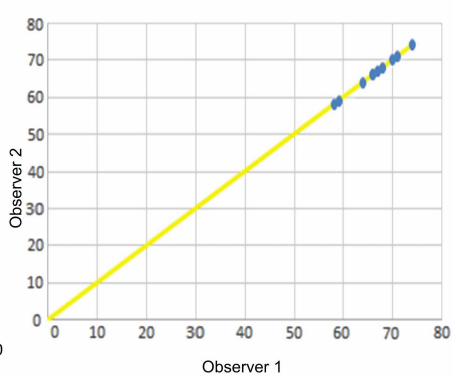

Figure 2: JS EF Correlation 1