Gated Blood Pool Processing – MUGA Screen

OVERVIEW

A MUGA study, also called a Gated Blood Pool Study (GBPS) quantifies the left ventricular ejection fraction (LVEF) and allows for the visual assessment of LV wall motion using nuclear medicine imaging techniques. A scintillation camera is used in conjunction with radiopharmaceutical products, to acquire either planar gated images or SPECT images of the heart. While planar acquisitions are widely used for MUGA studies, the addition of a SPECT acquisition allows for a more in-depth evaluation of wall motion. These images are then processed in 4DM to obtain an accurate non-invasive estimation of the LVEF.

DATASETS NEEDED FOR PLANAR MUGA

For the GBPS workflow to populate for a Planar MUGA study, a Left Anterior Oblique (LAO) dataset will need to be present as well as a radiopharmaceutical labeled as Tc-99m RBC. Other views such as Left Lateral (LLAT) or Anterior (ANT) can also be populated in 4DM and viewed on the NM Viewer screen within the GBPS workflow.

HOW -TO GUIDE

PLANAR MUGA PROCESSING

With the correct datasets for a Planar MUGA study the GBPS workflow (*figure 1*) will automatically be selected, and you will see two active screens - NM Viewer and MUGA.

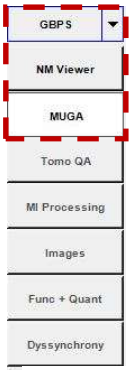


Fig. 1

Each acquisition will appear on the NM Viewer screen for review, and the Ejection Fraction (EF) Calculation will be processed on the MUGA screen (*Fig 2*).

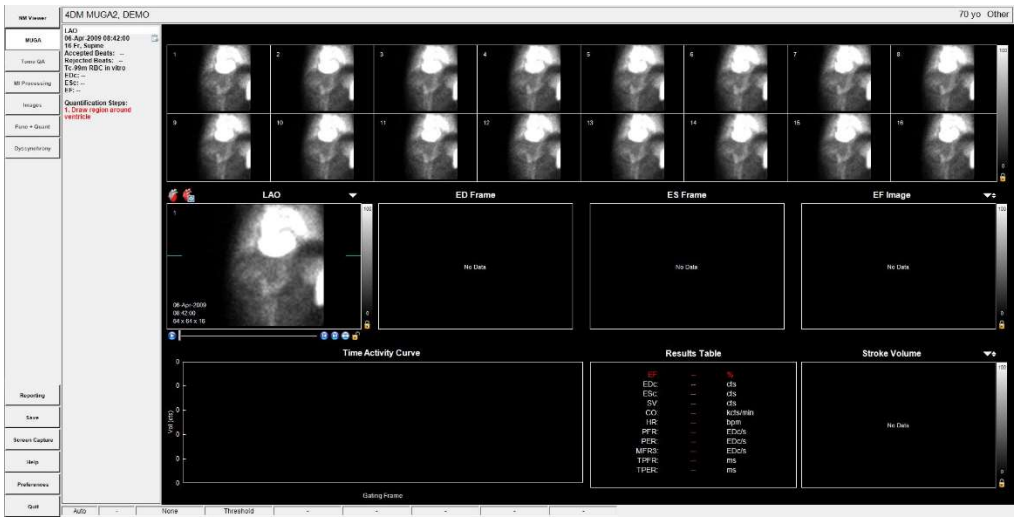


Fig. 2, MUGA screen prior to EF calculation

DEFAULT QUANTIFICATION THRESHOLD PROCESSING

EF quantification should be done on the left anterior oblique (LAO) acquisition. If there is another view present, such as the anterior view, use the dropdown arrow (1 *Fig. 3*) and select your LAO view. Follow the quantification steps displayed in RED (*fig. 4*) in the dataset information panel to perform automatic EF calculation.

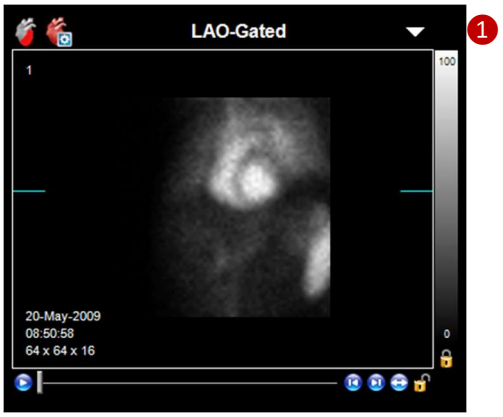


Fig. 3, showing LAO view to quantify EF

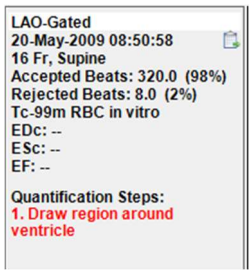
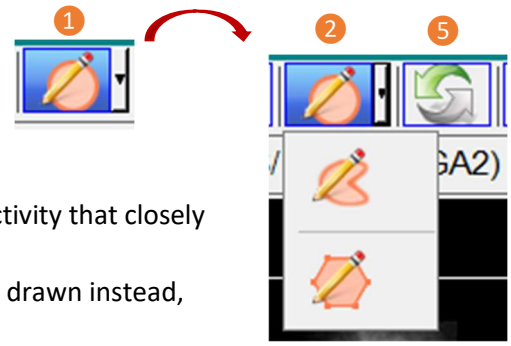
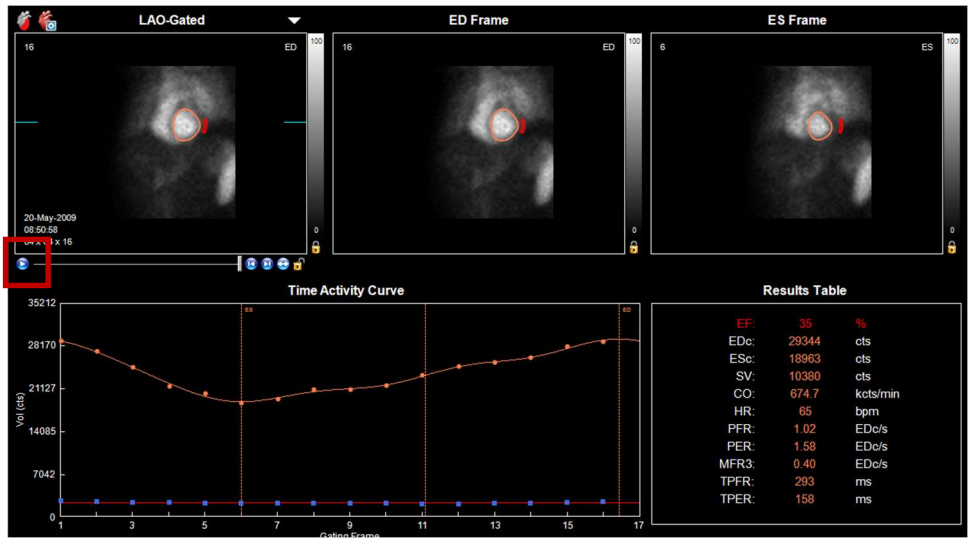


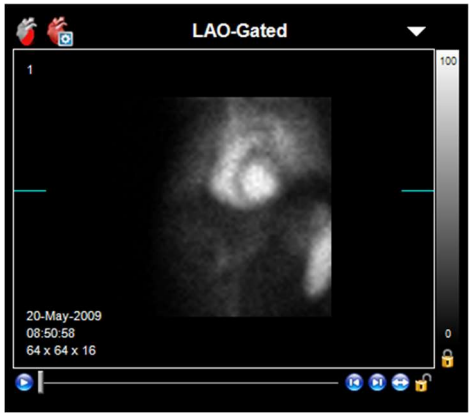
Fig 4



To draw a region of interest around the left ventricle:

- Select the ROI tool 1.
- In the gated viewport draw a circle around the LV blood pool activity that closely approximates the myocardium *(Fig. 5).*
  - If desired, a freehand or connect-the-dot ROI can be drawn instead, using the ROI dropdown arrow 2.
- 4DM will draw all remaining regions, including background, and display the results in the Time activity Curve and Results Table.
- Cine the data and ROIs using the video controls 3.





(Fig. 5)

(NOTE) If the automatic processing fails to properly track the LV blood pool activity, click the Reset tool 5, and proceed to the Interpolated processing below.

SEMI-MANUAL INTERPOLATED PROCESSING

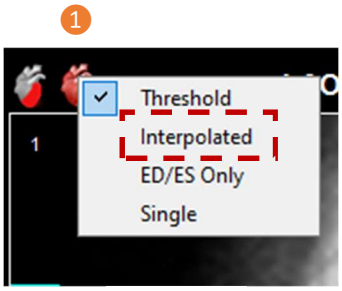


Fig. 6.1

This alternate method of processing will ask you to draw end-diastolic (ED) and end-systolic (ES) ROIs that closely track the LV blood pool. Select the Interpolated processing method using the Quantification Menu Tool  *(Fig 6.1).* This will generate a new set of instructions in red in the dataset information panel:

- Scroll through the gated dataset using the video controls to the visually estimated ED frame 3.
- On this frame draw an ROI that tightly borders the ED LV activity using either the freehand or connect-the-dot method.
- Scroll through to the visually estimated ES frame and repeat the previous step.
- 4DM will now draw all remaining ROIs including background and display the results.

(NOTE) 4DM may display a notification stating that better ED and ES frames were detected than the ones selected by the user. Click OK to use 4DM-detected frames *(Fig 6.2)*.

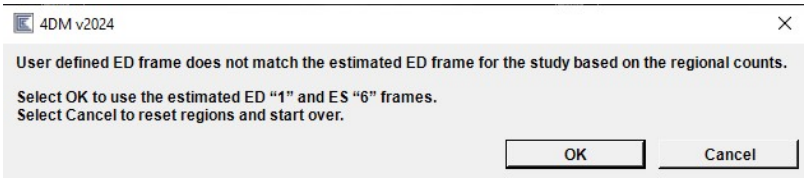


Fig. 6.2