

Case Report

Advances in Hematology and Oncology Research

Clinical Demonstration of the Importance of MPI - FMTVDM - Quantification

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Abstract

Isotope redistribution has long been established as an important tool for determination of severity of coronary artery disease (CAD) using myocardial perfusion imaging (MPI). The addition of technologist or automated quantification of regional blood flow differences (RBF) and metabolic uptake and release of isotope measured during MPI increases the accuracy of CAD diagnosis as can be seen in this clinical example [1].

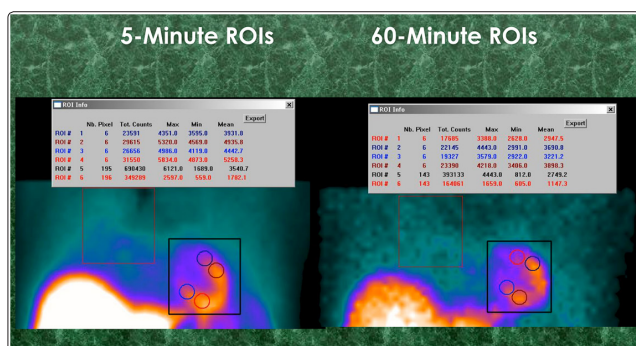
Keywords: FMTVDM, Nuclear Cardiology, Myocardial Perfusion Imaging, Quantification.

Case Presentation

A 44-year old African American male presented to the emergency room with retrosternal chest discomfort after working in his garage. He had no history of prior heart disease other than being treated for hypertension with a loop diuretic. His left arm blood pressure obtained in the sitting position was 142/90 mmHg and 146/88 mmHg in his right arm with a regular resting heart rate of 78 bpm. No other cardiovascular risk factors were identified. His cardiac exam was remarkable for an S4 consistent with his hypertension. His lungs were clear to auscultation and percussion with normal peripheral pulses of 2/2 in both upper and lower extremities.

Myocardial Perfusion Imaging (MPI) with nuclear technologist quantification.

The myocardial perfusion imaging (MPI) study included pharmacologic stress and sestamibi - followed by 5-minute and 60-minute region-of-interest (ROI) redistribution measurements made by the nuclear technologist. Figure 1 and Table 1 show the specific ROI measurements made for both the 5-minute and 60-minute MPI results.



Legend: ROI measurements of isotope quantification

Figure 1: Myocardial perfusion imaging quantification by nuclear technologist of isotope redistribution using FMTVDM [1].

Table 1: Quantified measurements* of isotope redistribution obtained from the 5- and 60-minute image results

Region-of-Interest	5-Minute Quantification	60-Minute Quantification	Percent Redistribution**
Basal Anterior	4351	3388	22.0%
Mid Anterior	5320	4443	16.5%
Posterior	4986	3579	28.2%
Inferior	5834	4218	27.7%
Total Heart	6121	4443	27.4%

** The expected redistribution for Tc-99m isotopes for this time interval is 10%.

Each of the ROIs revealed a greater than expected 10% redistribution – washout – of the isotope, consistent with CAD in these vascular territories. This was not only true for the individual ROIs but for the entire heart itself consistent with triple vessel CAD.

Conclusion

Quantification of isotope distribution-redistribution demonstrated triple vessel CAD in this patient. Triple vessel CAD represents just one of the common concerns among nuclear medicine physicians and cardiologists when qualitatively and semi-quantitatively looking for CAD. While this and other imaging problems occur all too often resulting in sensitivity and specificity issues, the use of quantification imaging to determine where a patient lays on the Health-Spectrum measures the true extent of the patient's problem and allows for follow up measurement of the success or failure of the patient's subsequent treatment [2].

Acknowledgment: FMTVDM patent for quantification of MPI, cancer and other is issued to first author. Figure reproduced with author's expressed consent.

References

1. The Fleming Method for Tissue and Vascular Differentiation and Metabolism (FMTVDM) using same state single or sequential

-
- quantification comparisons.
2. Fleming RM, Fleming MR, Dooley WC, Chaudhuri TK (2020)
The Importance of Differentiating Between Qualitative, Semi-

Quantitative and Quantitative Imaging – Close Only Counts in
Horseshoes. Eur J Nucl Med Mol Imaging.

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