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EVOLUTION FOR CARDIAC: RELEVANCE OF RECONSTRUCTION VOI IN SEMI-QUANTITATIVE IMAGING

A. Odolini[2], L. Federici[3], D. Scalvini[3], F. Motta[2], C. Rodella[1], R. Giubbini[2], L. Camoni[1]
[1]Spedali Civili of Brescia, Brescia, Italy
[2]University of Brescia, Brescia, Italy
[3]University of Brescia, Brescia, Italy

BACKGROUND-AIM

SPECT Myocardial perfusion imaging is a well established diagnostic tool in ischemic heart. In SPECT reconstruction it is necessary to define a VOI (Volume Of Interest) on the left ventricle acquisiti on volume and only the volume contained in the VOI will be rebuilt by the iterative algorithm. Aim of this study was to assess how statistically relevant was the operator's choice of different types and sizes of VOI in Evolution for Cardiac Algorithm, with regard to the semi-quantitative values of perfusion and function parameters.

METHODS

60 patients were retrospectively evaluated: 35 of them with extra-myocardial activity and 25 without extra-myocardial activity, as control group. For each patient we performed a triple reconstruction with the iterative algorithm GE Evolution for Cardiac, applying three different types of VOI (wide VOI, close VOI and mask VOI) and the resulting images were evaluated with two different semi-quantitative analysis software: Corridor 4DM and QPS/QGS. The Summed Stress Score(SSS), Summed Rest Score(SRS), Ejection fraction(EF) values from each reconstruction were statistically analyzed to understand how it may be relevant the difference between the different VOI.

RESULTS

The statistical analysis of Friedman's variance, for the population with extra-myocardial activity, produced the following results for Corridor 4DM, were: 0.489(SSS 16.5±10.1), 0.346 (SRS 9.6±7.6), 0.946 (StressEF 52.6±14.3), 0.431 (RestEF 53.6±14.3); for QGS/QPS, the were: 0.688(SSS 15±10.5), 0.38(SRS 7.9±8.1), 0.383 (StressEF 44.1±14.3), 0.006 (RestEF 45.8±12.6). The control group results were for Corridor 4DM:0.503(SSS 17.5±11.1), 0.549(SRS 11.9±10.6), 0.117 (StressEF 54.2±13.7), 0.041 (RestEF 52.4±14.4); for QGS/QPS, the were:0.658 (SSS 16.9±11.8), 0.739 (SRS 11±11.9), 0.003 (StressEF 45.2±14.6), 0.009 (RestEF 45.2±15.1). Considering the semi-quantitative perfusion data evaluation, there weren't relevant differences in the use of the three types of VOI, with both Corridor 4DM and QPS, and in both patients groups, In the evaluation of LV function Corridor are 4DM showed differences between the VOI selection for RestEF in patients without extra-myocardial activity, while there were differences in the StressEF and RestEF by QGS for the population without extra-myocardial activity and in RestEF for the patients with extra-myocardial activity.

CONCLUSION

The MPI SSS, SRS, SDS are not sensitive to variations of VOI; the choice of a mask that excludes the extra-cardiac activity does not affects the results and it can improve data normalization and interpretation, as suggested by some sources in the literature[1,2]. The gated imaging results seem to be sensitive to VOI selection, mainly with QGS rather than with Corridor 4DM. Thus, technologists should be aware of these limitation to be considered in post processing and reporting. References:[1] Hesse B. e al., EANM/ESC procedural guidelines for myocardial perfusion imaging in nuclear cardiology, Eur J Nucl Med Mol Imaging, 21 maggio 2005, 32: 855-897. [2] IAEA, Nuclear cardiology: guidance and recommendations for implementation in developing countries, Vienna 2012, 4: 27-39.