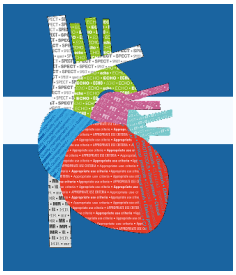

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Acquisition Parameters Affecting Image Contrast in Single Photon Emission Computed Tomography (SPECT)

Background: There are various physical factors that limit the quality of the Single Photon Emission Computed Tomography (SPECT) images. The study will examine different acquisition parameters for the gamma camera such as matrix size and motion type. Also, it will cover the processing parameters like filtered back projection and iterative reconstruction techniques. Objective: The aim of the present work is to evaluate physical acquisition parameters affecting the cardiac imaging to optimize the patient's examination time and image quality that are acquired with the gamma camera and workers radiation protection (through reducing time of radiation exposure) in cardiac SPECT facilities.

Methodology: The SPECT phantom filled with water mixed with (25 mCi) of 99m Tc, was positioned on a special holder attached to the imaging table. The cylinder axis of the phantom was parallel to the axis of rotation of gamma camera detector, within the rotational Useful field of view.

Results: A non-significant difference observed between contrast values in 128x128 and 64x64 matrix size. The count rate with 64x64 higher is greater than the count rate with 128x128 matrix size and that is because the pixel size in 64x64 is larger than pixel size in 128x128 matrix size, at which it is able to collect more counts. This is the same effect as in FBP, a non-significant difference observed in contrast values in 128x128 and 64x64 matrix size. Count rate with 64x64 is greater than 128x128. But generally, the contrast by using iterative method is higher than when using FBP in each matrix size. A statistically significant difference is observed in contrast values by changing motion type. But generally, the contrast by using iterative method is higher than it is by using FBP in each motion type.

Conclusion: Generally, we found that the image contrast by using iterative method is higher than when using FBP with most factors. The big advantage of the iterative approach is that accurate corrections can be made for all physical properties of the imaging system and the transport of γ -rays that can be mathematically modelled. In the present study, it was found that matrix size doesn't affect contrast values in SPECT studies, but contrast by using matrix 128x128 is small higher than 64x64. S&S also continues to give the best contrast value in motion types.
In Matrix Size, a non-significant difference was observed between contrast values in 128x128 and 64x64 matrix size. In Motion Type, a statistically significant difference was observed between contrast values by changing motion type. S&S continues, gives the best contrast value. Finally, contrast parameter in SPECT studies by using Iterative method is higher than when using FBP with most physical factors.

Country/Organization invited to participate

Egypt

Author: Prof. HELAL, Nadia (Nuclear& Radiological Regulatory Authority)

Presenter: Prof. HELAL, Nadia (Nuclear& Radiological Regulatory Authority)

Track Classification: Radiation protection for personnel and dose reduction for patients