

Gamma Camera QC Program

Daily Quality Control

Quality Control needs to be performed on each day of clinical use. Either intrinsic or extrinsic techniques are acceptable. This is performed to verify that components are properly functioning and provide a uniform image in response to a uniform flux of radiation.

Weekly Quality Control

System (extrinsic) spatial resolution using a 4-quadrant bar phantom is to be performed weekly to quantitatively verify that a detector is satisfactory for clinical imaging. Visual analysis of the bar pattern linearity should also be performed.

Monthly Quality Control

A Center of Rotation (COR) acquisition is performed on a monthly basis in order to maintain and verify the camera's ability to properly perform SPECT studies. In addition to COR's, a high-count flood either intrinsic or extrinsic needs to be performed. This can be performed monthly or at a frequency recommended by a qualified medical physicist. The high-count flood is performed to correct for residual detector and collimator non-uniformity and minimize the production of artifacts in clinical studies.

Acceptable Criteria

Acceptable uniformity standards are usually established by the vendor. When vendor limits are not available, acceptable limits should be established by the qualified medical physicist. Bar phantoms are qualitatively assessed by observing the limit of spatial resolution. Acceptable COR values vary from system to system, so manufacturer guidelines can be used as a reference. Technologists should record all values pertinent to Quality Control as well as visually assess the images. Some artifacts are appreciated only visually.

Gamma Camera QC Protocol

The Gamma Camera Quality Control Protocol may be designed by the Manufacturer or Medical Physicist. In general, uniformity images should be acquired in a 256 x 256 matrix and 10 Million counts. Some systems (Siemens) may require uniformity images to be acquired in a 1024 x 1024 matrix. Bar pattern images should be acquired for 5 Million counts in the finest matrix available (i.e. 512 or 1024).

Gamma Camera QC Documentation

Gamma Camera Quality Control should be documented each day QC is performed. It is important to keep a log of the values produced from these acquisitions so as to easily track the performance of a system. These acquisitions guide service engineers in diagnosing problems with the camera system. Organized and consistent nomenclature and dating is preferred so as to easily view the past performance of the system.