

AbstractID: 6860 Title: A Motion Phantom System For Image Quality Assessment of a 64-slice Volume CT scanner

PURPOSE:

As the utilization of cardiac CT grows, the development of the testing tools to assess the image quality parameters that are associated with cardiac CT protocols is lagging behind. This paper presents a motion system that was designed to provide the moving imaging targets by rotating the CT phantom in order to simulate the heart beat; thus evaluate the performance of a cardiac CT system.

METHODS AND MATERIALS:

To assess the image quality of a ultra-fast/thin slice VCT (GE LightSpeed), we designed a motion device that was capable of rotating CT phantoms at a controlled rotation speed ranging from 0 to 30 rpm. The apparatus consisted of radiation translucent support plates, gear motor, speed controller, rpm sensor, gears and shafts. This motion phantom system was designed to assess the additional image quality parameters associated with cardiac CT protocols such as the motion artifact occurrence, the loss of spatial resolution due to motion, temporal resolution and isotropic resolution during gated and non-gated protocols.

RESULTS:

The motion phantom system was designed and made in-house. The flexibility of the system allowed its usage with multiple existing CT phantoms including the ACR CT phantom, CATPHAN, CIRS Helical CT phantom and AAPM CT performance phantom. By scanning the phantom in stationary and in various rotation speeds, we were able to examine the performance parameters of the VCT scanner and optimize the clinical protocols with regards to slice thickness selections, detector row combinations, pitch and other technique settings.

CONCLUSIONS:

The motion phantom system is an essential tool to evaluate the image quality and verify the manufacturer specifications on temporal resolution and isotropic resolution which should reveal the true capability of a volume CT scanner. This motion system is also useful in optimizing the clinical protocols.