A quality control tool for multi-energy X-ray computed tomography imaging

Unmet Need

X-ray computed tomography (CT) imaging devices are ubiquitous in any radiology department and CT examinations are among the most commonly ordered diagnostic procedure. Multi-energy computed tomography is an emerging imaging technology that is able to distinguish different materials better than conventional single-energy CT. Many new CT scanners have multi-energy capability, and this technology is becoming more prevalent. Rigorous quality control (QC) programs are essential to maintain high-performance levels of CT scanners. An integral component of any QC protocol is the imaging of a phantom (a specifically designed physical test object) to identify artifacts that come from the imaging device. While QC phantoms for single-energy CT are well developed, there is currently no standard phantom or analysis methodology for establishing a multi-energy CT QC program. Therefore, a multi-energy CT phantom providing the rigor needed to ensure optimal system performance is of critical need.

Technology

Duke researchers have developed an imaging phantom suitable for QC scans on a multi-energy capable CT scanner. The phantom is an add-on module to the standard American College of Radiology image quality phantom. It is primarily composed of a water-equivalent plastic and contains cylindrical inserts representing iodine, calcium, blood, adipose tissue and more. The phantom will be used to collect QC scans using the multi-energy mode of CT scanners to verify the quantitative accuracy of multi-energy scans and to ensure the efficacy of clinical protocols for multi-energy analysis. The design is simple, and it allows for the

automated analysis to streamline the QC process.

Meet the Inventors

Advantages

- Provides a standard phantom to establish rigorous quality control of multi-energy CT scanners
- Design is a simple add-on to existing single-energy CT phantoms
- Allows for the automated analysis to streamline the QC process