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WARAGORN YAPAO: THE QUALITY CONTROL OF COMPUTED  
TOMOGRAPHY AND COMPUTED TOMOGRAPHY DOSE INDEX. THESIS  
ADVISORS: TRONGTUM TONGDEE M.D, JONGJIN PATARAMONTREE  
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The objectives of this quality control (QC) program were to study CT scanner performance and to do an analysis of measurement and interpretation. The quality control program for CT scanners included: first, the scanner performance test to compare to the nominal standard; second, to keep the performance records for comparative check. The three basic tenets of QC in CT were considered: (1) QC must be performed on regular basis; (2) the measurements must be interpreted promptly; (3) records of the tests should be kept.

The study included nine parameter tests for three-CT scanners to demonstrate their quality, their limits of tolerance and causes of testing error. Each is described with respect to phantom or equipment and frequency of testing. These tests are CT number uniformity, linearity of detector, high- and low- contrast resolution, modulation transfer function, size independence, density of hard copy, radiation dose and slice thickness.

Testing was conducted on Phillip Tomoscan CX/Q, GE Sytec 4000 and GE 9800 Q CT scanners. The test was performed using Phillip CT quality test phantom. The result shows that no parameters are out of the acceptable limits. The uniformity of all machines is in acceptable limit. The linearity shows that the relationship of CT number and attenuation coefficients is straight line,  $\mu_{sp}$  for the GE Sytec 4000 which gives the maximum slope. The high contrast resolution tests show resolving power of system. GE 9800 Q is able to resolve 1.7 mm and 2.5 mm for head scan and body scan respectively while both GE Sytec 4000 and Phillip Tomoscan CX/Q give higher resolution of 1.5 mm for both head scan and body scan. The low contrast resolution of GE Sytec 4000 and Phillip Tomoscan CX/Q are similar: 2 mm for head scan and 15 mm for body scan while GE 9800 Q gives lower low contrast resolution of 3 mm for head scan and is unable to detect 15 mm for body scan. The modulation transfer function at 0.7, GE Sytec 4000 and Phillip Tomoscan CX/Q give similar spatial resolution of 2.0 mm for head scan while GE 9800 Q gives spatial resolution of 2.5 mm. The size independence of all machines is in acceptable limit. The optimum density in hard copy is found in two automatic film processors, but film from Phillip Tomoscan CX/Q has high density variation in step by step of the gray scale. For radiation dose, each scanner gives a different radiation dose, depending on type of scanner and slice thickness. The slice thickness from measurement is the same as the nominal thickness.

From parameter measurements, each CT scanner yields high quality of lesion detection. The errors in measurement depend on exposure, window width, window level, region of interest, position, accuracy setting of the phantom, etc. To keep the result of measurement as a reference standard of quality control, great most precision of setting and testing is very important.