

AbstractID: 12692 Title: Extraction of Tube Current Values From DICOM CT Images For Patient Dose Calculations

Purpose: When CT examinations are conducted with automatic mA-modulation, the tube current (mA) may vary from one CT slice to next; i.e., mA is no longer a fixed constant. Patient dose calculation is no longer a straight forward process. The purpose of this presentation is to show how the mA information may be extracted from DICOM CT images without having to manually read off “mA-values” from the displayed images.

Method and Materials: A statistical programming language “R”, which is capable of reading DICOM files, is employed to extract the mA-values from a series of DICOM CT images. This task is carried out with a “script” designed to read the mA-values from the DICOM CT images and generate a “file” in “delimited ASCII” format. This “file” can be imported into Excel (a Microsoft spreadsheet program) for further processing, calculation and chart production. A CT examination of chest was selected to carry out this operation for demonstration purposes.

Results: The “script” generated a delimited ASCII “file” which is a two column data sheet with the slice location and its corresponding mA-values. After the “file” is imported into Excel for calculation, and with other pertinent scan parameters, the average mA can now be plugged into a CT dosimetry calculation program such as ImPACT for calculation of CTDI_w, CTDI_{vol}, Dose-Length-Product and critical organ dose. Furthermore, a graphical presentation of the “mA” vs. slice location can be produced with Excel. The chart generated by Excel is supplied as supporting material for review.

Conclusion: The script we have written is able to extract mA-values from DICOM CT images, generating a delimited ASCII file for further processing with Microsoft Excel spreadsheet program. This semi-automated process of extracting mA-values enabled us to perform dose calculation for patients undergoing CT examination scanned with automatic mA-modulation control.