AbstractID: 2350 Title: Comparison of CT scanner image noise, image width, dose and spatial resolution using standard test methods

To extract comparative information on image quality and dose from a CT scanner, the test approach must be methodical to eliminate the effects of variable scan parameters. ImPACT test CT scanners using standard imaging performance parameters. Image noise is measured using the standard deviation of pixel values in a uniform water phantom, with a fixed region of interest size. Spatial resolution in the scan plane is calculated from the modulation transfer function obtained from a high contrast edge. Spatial resolution in the z-axis direction (the measured imaged slice width) is obtained from angled test objects or discs parallel to the scan plane. Dose is quoted using a standard dosimetry parameter, the volume computed tomography dose index ($CTDI_{vol}$). These performance parameters are all interdependent, and can also be dependent on the clinical scan protocol. To overcome this, clinical protocols are used as a baseline, with scan parameters standardised where possible. Axial scanning provides a more straight forward comparison basis, but helical scanning can also be used. Noise values are normalised to a constant dose and measured image width by utilising the accepted relationship between these parameters. However the influence of the resolution algorithm on noise is less well defined. Noise and spatial resolution for a range of algorithms is demonstrated graphically. A general, similar, trend with algorithm is noticed for all manufacturers, however some specific algorithms do not easily fit into this trend. By interpolation of data points from different convolution kernels, noise can be compared at any spatial frequency. A single number can also be extracted empirically from the whole data to summarise the relationship. A single number can be useful for image quality characterisation but a graphical approach is more comprehensive and intuitive.