PERFORMANCE EVALUATION OF DSA UNITS

A. Servomaa and Y. Björkman
Finnish Centre for Radiation and Nuclear Safety
P.O. Box SF-00101 Helsinki, Finland

ABSTRACT

The performance of the digital subtraction angiography(DSA) units in Finland has been measured by means of the DSA phantom and measuring method standardized by the American Association of Physicists in Medicine (AAPM).The performance evaluation method is non-invasive and involves the use of a patient simulating phantom with different test inserts.The 8 units, including both continuous and pulsed mode units,were evaluated applying a technique normally used in each x-ray department.Image quality including low and high contrast performance, the response of log-amplifier,image homogenity, artifacts and misregistration were measured.Besides the AAPM test inserts, a Burger-type hole pattern insert for contrast detail determination was also studied.

The preliminary results show reasonable differences in contrast and spatial resolution.The high contrast resolution varied between 0.8-1.4 lp/mm, iodine contrast spatial resolution between 0.35-0.7 lp/mm with 10 mg/cm2 iodine consentration and 0.175-0.5 lp/mm with 5 mg/cm2 consentration, when ⌀ 25 cm field size and 512x512 matrix size were used. Also ⌀ 2-4 mm iodine vessel were detected with 10 mg/cm2 and ⌀ 2-4 mm with 2.5 mg/cm2 consentration. The results agree well with the results presented in literature. The dose rate in front of the grid varied between 1.5-10 mR/s on continuous mode units and dose/frame between 0.1-1.0 mR on pulsed mode units. The hole pattern test insert proved to be a sensitive method for showing differences in contrast details. Some deficiencies in logaritmic amplification and image homegenity were also observed.