Purpose:

In tube current modulated CT scans, scanograms (localizer radiographs) are needed prior to the diagnostic scan to obtain the attenuation properties of each patient which is then used to plan the mA modulation of the diagnostic scan. The purpose of this study was to investigate whether lowering the dual-scanogram dose affects the mA modulation scheme. Although scanograms use relatively low dose, the goal of this study is to reduce radiation dose from scanograms even further in keeping with the ALARA principle.

Methods:

Abdomen-pelvis CT exams were performed on an anthropomorphic phantom (Pixy RS102 phantom, Radiology Support Devices) using a Toshiba Aquilion CT scanner with SUREExposure tube current modulation. Various combinations of kVp and mAs were used to acquire dual-scanograms (AP and lateral); parameters for the diagnostic scan following the scanograms were fixed. For each kVp, the mA was reduced in intervals from a baseline 100% mA level, including 80%, 60%, 40%, 20% of the baseline, and a minimum level of 10mA. For each exam the resulting CTDIvol and total mAs were compared.

Results:

When scanogram kVp was reduced from 120kVp (default) to 100kVp and 80kVp, both CTDIvol and total mAs of the diagnostic scan increased slightly (up to 4.3%). When scanogram mA was decreased in intervals representing 80%, 60%, 40%, and 20% of baseline, there was little to no effect (less than 3%) on CTDIvol and total mAs for the diagnostic scan. For the minimum mA scanograms, CTDIvol was affected by up to 5.5% and total mAs was affected by up to 6.1% (at 80kVp). It should be noted that for 120kVp, the decrease of both CTDIvol and total mAs was within 1% at all reduced scanogram dose levels.

Conclusions:

It was suggested to use the default 120kVp scanogram to minimize the dose from the diagnostic scan. However, the mA of dual-scanograms may be significantly reduced without affecting planned mA of the exam.