Trends in radiation protection in CT: present and future status.

Abstract:
With the introduction of modern multislice scanner generations, computed tomography (CT) has emerged as a useful tool for evaluation of the coronary arteries. A common application of coronary CT angiography (CCTA) is the examination of patients with intermediate pretest probability for obstructive coronary artery disease. Despite the widespread use of cardiac CT examinations in clinical practice, concern remains about the exposure to ionizing radiation and its potential hazards. Therefore, radiation dose and strategies for dose reduction have become an important focus of interest. Several smaller analyses have shown an effective radiation dose between 6.4 and 27.8 mSv for spiral CCTA image acquisition. The international Prospective Multicenter Study On RadiaTion Dose Estimates Of Cardiac CT AngIOgraphy I (PROTECTION I) study, the largest observational study on radiation dose estimates of cardiac CT so far, determined radiation dose estimates of CCTA, as well as the effect of different strategies to reduce dose in clinical practice. The median dose-length-product of 1965 CCTA examinations was 885 mGy x cm, which corresponds to a median estimated effective radiation dose of 12 mSv. However, a large variation in dose between study sites was observed, indicating a large potential to reduce dose for individual sites. Several dose-saving scanning techniques and algorithms have been developed. This article discusses
these strategies as well as their effect on radiation dose and image quality. Because the contrast-enhanced CT angiography is the largest part of the total study dose, the following described strategies focus on radiation dose reduction for CCTA image acquisition.