A comparison of radiation doses of radiology procedures to Diagnostic Reference Levels (DRLs) in Dutch hospitals

Authors:
G. de Vries, H. Bijwaard; Haarlem/NL

Aims and objectives:
A study of the Dutch National Institute for Public Health and the Environment (RIVM) showed in 2013 that many Dutch hospitals were still struggling with the practical implementation of DRLs. To promote their use, to help hospitals with their implementation, and simultaneously monitor the compliance to the DRLs, radiography students of Inholland University of Applied Sciences performed dose measurements at Dutch hospitals.

Methods and materials:
Seven Dutch hospitals volunteered to participate in this study. Dose quantities (DAP, DLP, CTDI) and weights of 20 patients were measured by radiography students in these hospitals (and sometimes in multiple radiography rooms) for the following radiology examinations: PA chest radiography (N=13), AP pelvis radiography (N=8), CT-Abdomen (N=6), CTPA-chest (N=4) and CTCA (N=3). The doses and standard errors were estimated at patient weight 77 kg by linear interpolation (following the prescribed procedure). The doses were compared to the DRLs by a one-tailed t-test.

Results:
In all cases except two, the interpolated doses are significantly below the DRL (p < 0.05) and these are often also below the so-called target value (indicating good-practice). Interestingly, dose values vary considerably between hospitals and sometimes even between different radiography rooms within the same hospital.

Conclusion:
The compliance among the participating Dutch radiology departments to the DRLs is high. This sets an example for all other radiology departments that will be asked to participate in a follow-up study in 2015. The variation of results between hospitals and even between radiography rooms should be investigated further.