AbstractID: 13026 Title: CT radiation dose optimization in whole-body PET/CT examination

Purpose: To assess radiation dose from CT component in whole-body PET/CT examinations, and to evaluate the effect of protocol optimization on image quality. **Method and Materials:** We conducted a survey of 140 consecutive patients who underwent routine whole body PET/CT examination. All data was acquired on GE Discovery STE 16 scanner at 120 kV, 30-210 mA, 1.75 pitch, 0.8s rotation time, 16x0.625 mm x-ray beam collimation and a noise index of 25. Effective dose was estimated using DLP values recorded in each study, and conversion factors dependent on the region of the body being scanned. The protocol optimization included 1.35 pitch, 0.5s rotation time, 16x1.25 mm collimation and noise index of 26.12. Data of 100 patients was surveyed to evaluate the impact on radiation dose, and our radiologists assessed changes in image quality. For seven patients who had previous PET/CT studies within the last 6 months, SNR was measured placing ROIs at three different sections of the liver (dome, middle and inferior).
Results: The optimization of the whole-body CT acquisition used for attenuation correction and anatomic localization of the PET data resulted in 32% reduction of the mean CT radiation dose: effective dose was reduced from 8.05 mSv to 5.45 mSv, and $CTDI_{vol}$ decreased from 6.38 mGy to 4.37 mGy. The most effective dose reduction of 57-65% with 7-29% decrease in SNR has been achieved for average size patients. For small patients SNR change (47-48%) was higher than percent dose saving (27-36%), and for the obese patient (BMI=35) both changes were in the same range (31-37%).
Conclusion: This study demonstrated that optimization of CT acquisition can effectively reduce radiation dose in the whole body PET/CT without sacrificing image quality. Different scanning protocols must be established according to the patient weight to achieve an optimal dose savings without image quality degradation.