Purpose:

CT can contribute over 50% of radiation dose in the whole body (WB) PET/CT scan. Tube current modulation (TCM) is a standard technique for reducing CT radiation dose to the patient by changing the tube current with the patient size, and is controlled by a very low-dose scout scan, which assumes the patient is positioned at the center of the CT gantry opening. However, most patients are not positioned at the center due to practicality or to avoid claustrophobic or to reduce time of radiation exposure from the patient to the technologist. We study the impact of the AP and PA scout scans to the patient radiation exposure from CT.

Methods:

In a retrospective study of 200 patients, each received two WB PET/CT scans: one with AP, and the other one with PA. The helical CT with TCM and PET acquisitions were identical in both scans. Separation of the two scans was about 10 months in average. The scans were performed on four GE PET/CT scanners: three 16- and one 64-slice with the same TCM settings. The 200 patients were selected for the same scan coverage and similar body weight (difference ≤ 3 kg). The tube current in each slice and average exposure to the patient were recorded and compared.

Results:

The AP scout caused lower radiation dose on 94% of the patients. Both the tube current, and radiation exposure were reduced by 46±30 mA and 1.6±1.0 mGy, respectively. The effective radiation dose is reduced by 1.7±1.2 mSv. These results were statistically significant (p<0.00001).

Conclusions:

The AP scout caused significantly less radiation dose than the PA scout in the CT scan of the whole-body PET/CT scan. Care should be taken to select the orientation of the scout scan to achieve appropriate radiation exposure to the patient when TCM is applied.