

AbstractID: 9376 Title: Quantifying the increase in radiation exposure associated with SPECT/CT compared to SPECT alone for routine Nuclear Medicine examinations.

## **Purpose**

Hybrid imaging SPECT/CT systems are continuing to gain widespread acceptance in nuclear medicine and cardiology facilities. Although the technology clearly has its benefits, new developments in hybrid imaging, including combining SPECT with multi-slice CT systems, result in higher exposure levels for patients and the requirement for increased shielding in a Nuclear Medicine Department. In addition, in a Nuclear Medicine facility devoid of Radiologists / CT technologists there could potentially be limited knowledge of CT techniques, clinical applications and associated dose consequences.

## **Methods**

Patient examinations from a Millennium VG Hawkeye SPECT/CT (GE Medical Systems) in one center and a recently installed Symbia T6 True Point SPECT/CT (Siemens Medical Solutions) system in another center were reviewed to determine the Effective Dose (ED) for a selection of clinical procedures. SPECT ED was calculated using the injected activity of the radiopharmaceutical and dose tables published by the Society of Nuclear Medicine. CT ED was calculated using the Dose Length Product method.

## **Results**

The percentage increase in ED ranges from 4% (GE), 13% (Siemens) for a Ga<sup>67</sup> chest examination to 57% (GE), 100% (Siemens) for an I<sup>123</sup>-mIBG Abdomen/pelvis examination. For examinations that include a CT scan of the abdomen, the increase in ED is of the order of 10 months background radiation per CT scan performed for the GE system and 16 months for the multi-slice Siemens system.

## **Conclusion**

Even though the increases in ED may be considered clinically acceptable in view of the diagnostic benefits of the CT, in order to comply with the ALARA principle it is necessary to determine if dose reduction is achievable. This study will investigate what if any dose reduction can be achieved by various methods.