

# radiation reduction in cardiovascular diagnostic medicine

Ionizing radiation has long been known to increase the risk of cancer. X-rays and  $\gamma$ -rays have recently been officially classified as carcinogens by the World Health Organization's International Agency for Research on Cancer<sup>1</sup>.

According to the updated risk estimates released in the Seventh Report of the authoritative Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation (BEIR VII report), the attributable risk of cancer is 1/750 for 15 mSv exposure, corresponding to the dose estimate of a coronary MSCT; 1/500 for 20 mSv exposure, corresponding to the dose estimate of a coronary stent; 1/400 for 25 mSv exposure, corresponding to the dose estimate of a Thallium scan<sup>2</sup>.

PET only imaging, utilizing  $^{82}\text{Rb}$ , has been shown to have a lower patient exposure level in comparison to a Cardiac SPECT Thallium scan, a Cardiac SPECT  $^{99}\text{Tc}$  Sestamibi scan and Computed Tomography Angiography (CTA)<sup>3</sup>. Additionally, doses absorbed during  $^{68}\text{Ge}$  rod transmission scans were negligible, when compared to CT-based transmission scanning. Therefore, the radiation doses represent a limitation to the generalized use of CT-based transmission measurements with current PET/CT scanning systems<sup>4</sup>.

In summary, Positron's dedicated PET scanner combined with  $^{82}\text{Rb}$  imaging, can be offered as a highly accurate test with a lower radiation burden to the patient compared to competing technologies.

Patient radiation exposure by the most frequent diagnostic nuclear imaging procedures<sup>3,5</sup>.

Study	Total Body Effective Dose (mSv)
$^{201}\text{Tl}$ stress and reinjection (110+37 MBq)	25.1
$^{99}\text{mTc}$ -Sestamibi 1 day (370+1,100 MBq)	10.7
$^{99}\text{mTc}$ -Sestamibi 2 day (1,100+1,100 MBq)	16.0
$^{201}\text{Tl}$ / $^{99}\text{mTc}$ Dual isotope (110+1,100 MBq)	27.3
$^{82}\text{Rb}$ Stress/Rest PET (1,100+1,100 MBq)	7.5
ECG pulsing, no aorta*	9
No ECG pulsing, yes aorta*	29

1. World Health Organization, International Agency for Research on Cancer: Overall evaluations of carcinogenicity to humans, list of all agents evaluated to date. [[http:// monographs.iarc.fr/ENG/ classification/Listagentsalphorder.pdf](http://monographs.iarc.fr/ENG/classification/Listagentsalphorder.pdf)]. Accessed February 4, 2007.
  2. Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation; Nuclear and Radiation Studies Board, Division on Earth and Life Studies, National Research Council of the National Academies: Health Risks From Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase (2) Washington, DC: The National Academies Press; 2006.
  3. Thompson RC, Cullom SJ. Issues regarding the radiation dosage of cardiac nuclear and radiography procedures. J Nucl Cardiol 2006;13:19-23.
  4. Tung-Hsin W, Yung-Hui H, et. al, Radiation exposure during transmission measurements: comparison between CT-and germanium-based techniques with a current PET scanner Eur J Nucl Med Mol Imaging (2004) 31:38-43.
  5. Einstein AJ, Henzlova MJ, Rajagopalan S: Estimating risk of Cancer associated with radiation exposure from 64-slice Computed Tomography Coronary Angiography. JAMA 2007, 298:317-323.
- \* 64-Slice Cardiac computed tomography



“Dedicated PET imaging with  $^{82}\text{Rb}$ , demonstrates a reduction in radiation exposure compared to SPECT, PET/CT and CTA.”

## contact

7715 loma court, suite a  
fishers, indiana 46038

**p** 317.576.0183

**f** 317.576.0358

[sales@positron.com](mailto:sales@positron.com)

[www.positron.com](http://www.positron.com)

256-00025  
rev 00

# Positron