

## KEY POINTS

**QUESTION:** Can a personalized CT approach in  $^{18}\text{F}$ -NaF PET/CT reduce the radiation dose to patients with breast cancer before neoadjuvant chemotherapy, without compromising clinical image evaluation?

**PERTINENT FINDINGS:**  $^{18}\text{F}$ -NaF AC PET images were retrospectively reviewed for the clinically required L/C CT range, and effective doses were estimated for standard practice and the proposed personalized CT method. The clinical impact of the personalized method was determined by evaluating whether lesions clinically requiring coverage had been missed from the L/C CT region. The personalized CT method reduced the CT dose by half, without impacting clinical image evaluation for the MO, although for the TO the clinical image evaluation may have been compromised in a small proportion of patients. Future work should evaluate whether this method can be implemented in clinical practice without compromising clinical image evaluation, after training of technologists in identifying the personalized CT scan range.

**IMPLICATIONS FOR PATIENT CARE:** Large CT dose reductions provided by the personalized CT approach can reduce the postulated risk of inducing cancer in later life in patients with breast cancer before neoadjuvant chemotherapy, making PET/CT imaging more justifiable in terms of risk–benefit analysis.

## REFERENCES

- Israel O, Pellet O, Biassoni L, et al. Two decades of SPECT/CT: the coming of age of a technology—an updated review of literature evidence. *Eur J Nucl Med Mol Imaging*. 2019;46:1990–2012.
- Bebbington NA, Haddock BT, Bertilsson H, et al. A Nordic survey of CT doses in hybrid PET/CT and SPECT/CT examinations. *EJNMMI Phys*. 2019;6:24.
- Willowson KP, Bailey EA, Bailey DL. A retrospective evaluation of radiation dose associated with low dose FDG protocols in whole-body PET/CT. *Australas Phys Eng Sci Med*. 2012;35:49–53.
- Bebbington NA, Zacho HD, Holdgaard PC. Lesion detection in  $^{18}\text{F}$ -sodium fluoride bone imaging: a comparison of attenuation-corrected versus nonattenuation-corrected PET reconstructions from modern PET-CT systems. *Nucl Med Commun*. 2022;43:78–85.
- Sanghera B, Sonoda LI, Hart J, Vivian G, Mills T, Wong WL. Age and dose-limited PET-CT scan regime in lymphoma: between the devil and the deep blue sea? *Radiat Prot Dosimetry*. 2012;150:381–384.
- Sonoda LI, Sanghera B, Wong WL. Investigation of dose minimisation protocol for  $^{18}\text{F}$ -FDG PET-CT in the management of lymphoma postchemotherapy followup. *ScientificWorldJournal*. 2012;2012:208135.
- Gelfand MJ, Sharp SE, Palumbo JS. Selective CT for PET/CT: dose reduction in Langerhans cell histiocytosis. *Pediatr Radiol*. 2015;45:81–85.
- Sharma P, Singh H, Kumar R, et al. Bone scintigraphy in breast cancer: added value of hybrid SPECT-CT and its impact on patient management. *Nucl Med Commun*. 2012;33:139–147.
- Utsunomiya D, Shiraishi S, Imuta M, et al. Added value of SPECT/CT fusion in assessing suspected bone metastasis: comparison with scintigraphy alone and non-fused scintigraphy and CT. *Radiology*. 2006;238:264–271.
- Jambor I, Kuisma A, Ramadan S, et al. Prospective evaluation of planar bone scintigraphy, SPECT, SPECT/CT,  $^{18}\text{F}$ -NaF PET/CT and whole body 1.5T MRI, including DWI, for the detection of bone metastases in high risk breast and prostate cancer patients: SKELETA clinical trial. *Acta Oncol*. 2016;55:59–67.
- Abikhzer G, Srouf S, Fried G, et al. Prospective comparison of whole-body bone SPECT and sodium  $^{18}\text{F}$ -fluoride PET in the detection of bone metastases from breast cancer. *Nucl Med Commun*. 2016;37:1160–1168.
- Notes for guidance on the clinical administration of radiopharmaceuticals and use of sealed radioactive sources. U.K government website. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/961343/ARSAC\\_NfG\\_Feb2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961343/ARSAC_NfG_Feb2021.pdf). Published March 2024. Accessed January 22, 2025.
- Segall G, Delbeke D, Stabin MG, et al.; SNM. SNM practice guideline for sodium  $^{18}\text{F}$ -fluoride PET/CT bone scans 1.0. *J Nucl Med*. 2010;51:1813–1820.
- Iball GR, Bebbington NA, Burniston M, et al. A national survey of computed tomography doses in hybrid PET-CT and SPECT-CT examinations in the UK. *Nucl Med Commun*. 2017;38:459–470.
- Lima TVM, Gnesin S, Ryckx N, et al.; Swiss Workgroup on Nuclear Medicine DRLs. Swiss survey on hybrid imaging CTs doses in nuclear medicine and proposed national dose reference levels. *Z Med Phys*. 2018;28:265–275.
- Costa R, Hansen NM, Gradishar WJ. Locally advanced breast cancer. In: *The Breast: Comprehensive Management of Benign and Malignant Diseases*. 5th ed. Elsevier Inc.; 2018:819–831.
- Lin EC. Radiation risk from medical imaging. *Mayo Clin Proc*. 2010;85:1142–1146.
- ImPACT's ct dosimetry tool. Impactscan.org website. <http://www.impactscan.org/ctdosimetry.htm>. Updated May 27, 2011. Accessed January 22, 2025.
- The 2007 recommendations of the International Commission on Radiological Protection. ICRP publication 103. *Ann ICRP*. 2007;37:1–332.
- Schmidt B, Raupach R, Flohr T. How to scan with CARE kV. Siemens website. [https://cdn0.scrvt.com/39b415fb07de4d9656c7b516d8e2d907/1800000000073220/c2ab5e6cbb6e/CT\\_How\\_to\\_reduce\\_dose\\_CARE\\_kV\\_final\\_1800000000073220.pdf](https://cdn0.scrvt.com/39b415fb07de4d9656c7b516d8e2d907/1800000000073220/c2ab5e6cbb6e/CT_How_to_reduce_dose_CARE_kV_final_1800000000073220.pdf). Published 2011. Accessed January 28, 2025.
- Zacho HD, Fonager RF, Nielsen JB, et al. Observer agreement and accuracy of  $^{18}\text{F}$ -sodium fluoride PET/CT in the diagnosis of bone metastases in prostate cancer. *J Nucl Med*. 2020;61:344–349.

## Errata

In the article “Amyloid Imaging Update: How the Amyloid Landscape Is Changing in Light of the Recent Food and Drug Administration Approval of Anti-amyloid Therapeutics,” by Grabher (*J Nucl Med Technol*. 2024;52:314–325), the author affiliation was updated to Grabher Consulting & Specialty Services [not Life Molecular Imaging]; the correspondence e-mail was updated to [barbara.grabher@gmail.com](mailto:barbara.grabher@gmail.com) [not [b.grabher@life-mi.com](mailto:b.grabher@life-mi.com)]; and the disclosure was updated to “Barbara Grabher is a full-time employee of Life Molecular Imaging as a Clinical Applications Specialist, supporting their amyloid imaging tracer, Neuraceq. Her affiliation does not endorse one specific tracer over another.” These have been corrected online. The author regrets the errors.

In the article “SNMMI-TS Nuclear Medicine Technology Universal AES/CI Handbook,” by Johnson et al. (*J Nucl Med Technol*. 2024;52:285–298), Jane Kamm of SNMMI should not have been listed as a coauthor. The error has been corrected in the online article. We regret the error.