Pilot study – breast – case ID 3

Ductal carcinoma in situ

1. Patient history

A 63-year-old woman diagnosed with ductal carcinoma in situ underwent wire-guided breast-conserving surgery.

2. PET-CT specimen images

The patient was intravenously injected with ^{18}F-FDG prior to breast-conserving surgery at the nuclear medicine department. Figure 1A shows a 3-dimensional render of the PET-CT images of the resected ductal carcinoma in situ. The ^{18}F-FDG distribution is represented in color scale superimposed on the CT render in greyscale. A main hotspot of ^{18}F-FDG uptake is visible at the medial side (lower edge of the image) of the resected breast tissue. Figure 1B and Figure 1C show a cross section of the PET-CT images and the CT only images respectively. The dashed ellipse on Figure 1B indicates that ^{18}F-FDG is visible at the specimen border. The CT also confirms that there is dense tissue reaching the tissue border (Figure 1C, dashed ellipse) [FIG 1.] [1]*.

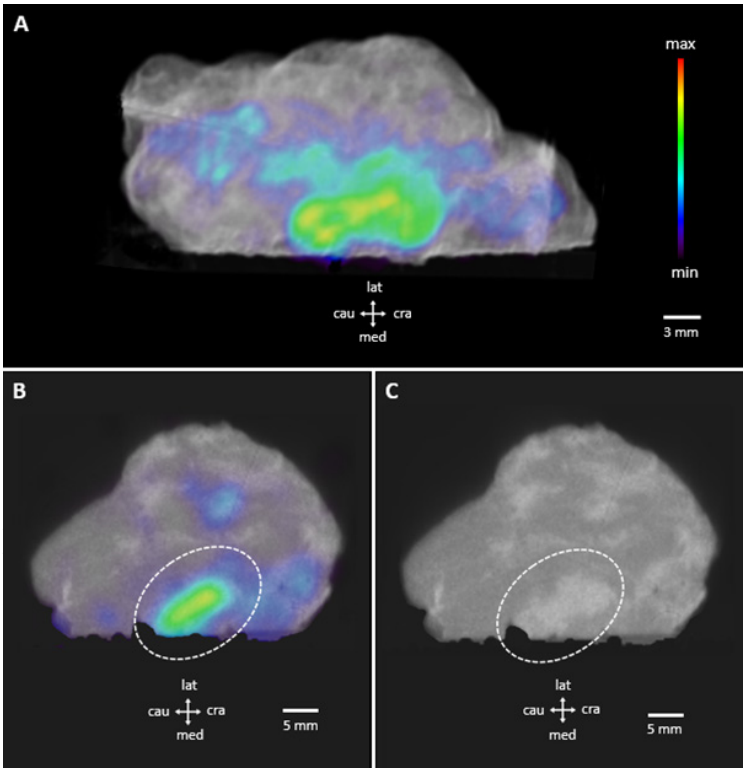


Figure 1. PET-CT specimen images of a resected ductal carcinoma in situ. A 3-dimensional PET-CT render (A), a PET-CT cross section (B) and a CT only cross section (C) are illustrated. The dashed ellips indicates a suspicious margin at the medial side of the resected breast tissue. Specimen orientation is as indicated. Abbreviations: med, medial; lat, lateral; cra, cranial; cau, caudal [1].

** The PET-CT images are intended to illustrate the possible applications of high-resolution specimen PET-CT imaging. The images shown were acquired with a preclinical high-resolution PET-CT system with comparable characteristics (e.g. spatial resolution) as the XEOS Aura 10 PET-CT.*

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Microcalcifications can be detected on the CT images. Figure 2 shows the sagittal section of the CT scan. The white arrows indicate the microcalcifications located inside the ductal carcinoma in situ. In addition to the information provided by the PET image, this may also allow confirming that all microcalcifications were resected.

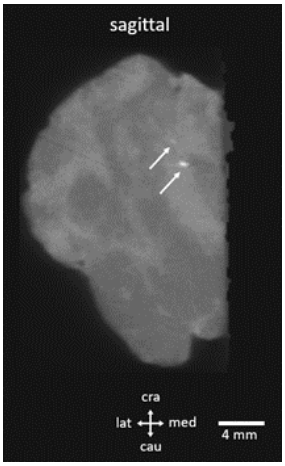


Figure 2. Sagittal view of the CT scan of the resected ductal carcinoma in situ. Microcalcifications can be clearly observed on the CT images (white arrows).

3. Findings and diagnosis

After specimen imaging, the resected tumor was taken to the pathology department for standard-of-care histopathological evaluation. The histopathological results are listed in Table 1.

[TABLE 1.] Tumor characteristics assessed by histopathological evaluation.

TUMOR CHARACTERISTICS	
Subtype	Invasive lobular carcinoma with in situ component.
TNM stage	pT2 N0(sn)
Specimen size	46 x 60 x 34 mm
Tumor size	20 mm
Grade	2
Receptor status	ER negative, PR negative
Margin status	Positive margin at the medial margin.

4. Discussion and conclusion

Histopathological evaluation concluded that there was a positive medial margin, with tumor cells reaching the medial border of the specimen. The specimen PET-CT images demonstrate radiotracer uptake that also reaches the medial border of the specimen.

[1] Van de Sande L, Menekse G. Peri-operative ^{18}F-FDG-PET-CT specimen imaging for margin assessment in breast malignancies: a proof-of-concept study. Eur J Surg Oncol 2022; 48:e87. https://doi.org/10.1016/j.ejso.2021.12.116