Pilot study – breast – case ID 32

Invasive lobular carcinoma

1. Patient history

An 84-year-old woman was diagnosed with an invasive lobular carcinoma. Breast-conserving surgery including lumpectomy and sentinel lymph node resection was performed.

2. PET-CT specimen images

The patient was pre-operatively injected with ^{18}F-FDG (IV) at the nuclear medicine department. Figure 1A shows three orthogonal slices of the specimen PET-CT image. Increased ^{18}F-FDG uptake is visualized (colored hotspots) which indicate metabolically more active cells such as the invasive lobular carcinoma cells. There is an area of increased FDG uptake close to the top of the sagittal section (caudal margin). An enlargement of this suspicious area is provided in Figure 1B (PET-CT) and Figure 1C (CT only). The ^{18}F-FDG uptake is represented by a bright colorful region that reaches the specimen border (Figure 1B, dashed ellipse). The CT image confirms that dense tissue is also reaching the border (Figure 1C, dashed ellipse) [FIG 1.] [1]*.

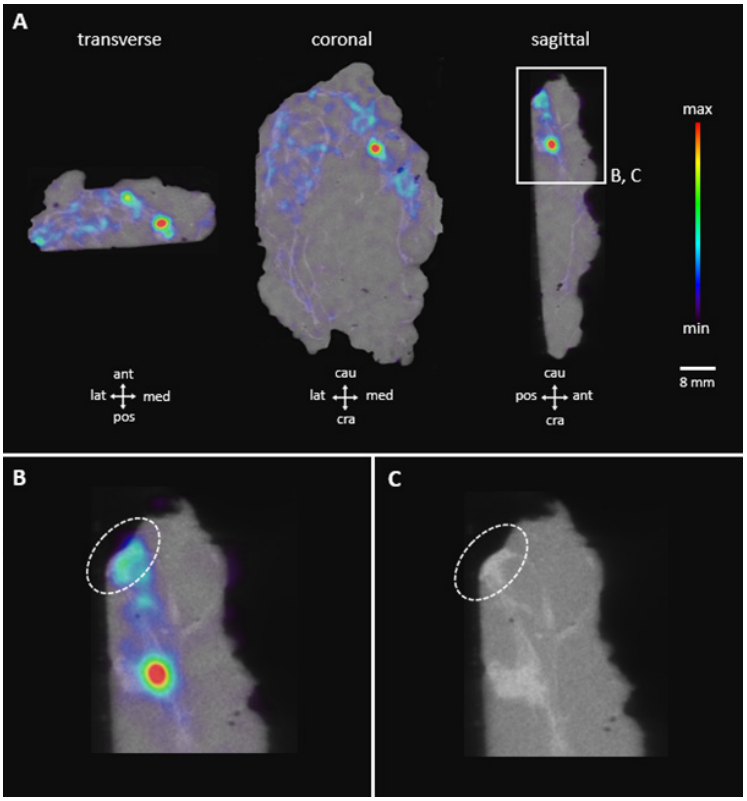


Figure 1. Three orthogonal views (A) of the PET-CT specimen images. The invasive lobular carcinoma is represented by the ^{18}F-FDG hotspots that are reaching the tissue borders deineated by CT image. Surgical orientation of the specimen is indcated at the bottom of each view. The color bar at the right shows the relative ^{18}F-FDG activity in the specimen. Figure 1B (PET CT) and Figure 1C (CT only) show an enlargement of the suspicious margin observed at the top of the sagittal section. The suspicious margin is indicated by the dashed ellipse. Abreviations: ant, anterior; pos, posterior; 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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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
Ki-67	30%
Receptor status	ER positive, PR positive, HER2 negative
Margin status	Positive margin with a length of 2 mm at the caudal margin

4. Discussion and conclusion

The histopathological analysis confirmed a positive margin (i.e. involvement of tumor cells at the tissue border) with a length of 2 mm at the caudal margin. This is also supported by the findings of radiotracer uptake reaching the caudal border of the specimen on the PET-CT image. After a multidisciplinary consultation, it was decided to schedule a mastectomy.

[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